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Original Papers

COVID-19, "Lockdown" and Achilles Tendon Ruptures

Murphy et al have documented 14 achilles tendon cases in 2019 and 13 cases in 2020. There was a greater incidence of tendon rupture cases in 2019 compared with the equivalent lockdown period in 2020.

The Psychological Effect of COVID-19 on Pregnant Women

Atheer et al in an analysis of 35 studies of Covid-19 and pregnancy found that the most common stressors for pregnant women were fear of contracting the disease and uncertainty. Accurate information was a protective factor.

An Audit of Adherence to Nasogastric Tube Safety Standards in a Radiology Department

Lambe et al performed an audit to improve the quality of chest x-rays in the visualisation of N/G tube positioning. The proportion of tubes centred lower increased from 36% to 93%.

Mupirocin-Resistant Methicillin-Resistant Staphylococcus aureus (MRSA) and Vascular Surgery

Garvey et al describe 41 cases of MR-MRSA. Patients who had vascular surgery and those with greater dependency e.g. urinary catheters were at higher risk.

Occasional Piece

Incidental Radiological Findings in the Research Setting and the Argument from Human Dignity

Short Report

"What Matters To You" Putting Patient Centred Care First

Corner et al point out that WATY prevents health care workers making assumptions about what is important for patients. The average patient age was 82 years. 39% patients wanted to return to baseline mobility, and 35% wanted to go home.

Case Reports

Traumatic Cervical Chance Fracture

McDonnell describe a 64 year old male with fractures of C5-C7 spinous processes and a C6 chance fracture following an RTA.

Autoimmune Anti-HMGCR Myopathy a Rare but Disabling Complication of Statin Therapy

O'Dea et al report an 85 year old man with proximal limb weakness, dysphagia, raised CK, myopathic EMG, and a necrotising myopathy on muscle biopsy. He had a 10 year history of statin medication. HMGCR antibodies were positive.

Birt-Hogg-Dubé Syndrome: From a Skin Tissue to a Multi-Visceral Issue

Kholy et al describe a case of Birt-Hogg-Dube syndrome. A 39 year old woman presented with flesh-like bumps on her forehead. The skin biopsy a fibro-folliculoma. A chest CT scan showed bilateral multiple thin-walled cysts and a lesion in the right kidney. The folliculin FLCN sequence variant was identified.

Case Series

Edible Cannabis Toxicity in Young Children; An Emergent Serious Public Health Threat

Mattimoe et al report 6 children with cannabis poisoning. They presented with encephalopathy. Four required hospitalisation. The poisonings were due to the ingestion of cannabis edibles. The authors state that it is an evolving problem.

Book Review

'Music and Creativity in Healthcare Settings – Does Music Matter?' by Hilary Moss

Letters To Editor

Ask to Mask - Varying Compliance With COVID-19 Guidelines Within Hospitals

"LAP-MAP" - A New Blood Pressure Target During Laparoscopic Surgery

Pathfinder: Alternative Care Pathways for Older Adults who Dial 999/112

Motivational Interviewing: Teaching Doctors the Skills to Address Childhood Obesity

Management and Outcome of Patients with Candidaemia over One-Year

Exercise and the Prevention of Frailty – Evidence from a Community-Based Medical Exercise Intervention

E-Consultations: A Potential Response to Viral Challenges

The Pandemic Electronic- Handover Collaboration, Leadership and Teaching NCHDs' Perspective

Response Letters

Response to: 'Impact of a National Lockdown on Cycling Injuries' (Ir Med J; Vol 114; No. 7; P412)

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Issue: Ir Med J; Vol 114; No. 8; P428

Antenatal Administration of Pertussis and Influenza Vaccines: The Benefits for Young Infants

J.F.A. Murphy - Editor of the Irish Medical Journal

It is increasingly being accepted that maternal immunisations are an effective way to provide protection to young infants. They provide cover for that period between birth and before the primary infant immunisation programme commences. They were introduced[1] in the UK in 2012 and in Ireland in 2013.

While these antenatal immunisations are being actively encouraged, there is limited data on the efficacy and cover that they provide for infants.

Rowe et al[2] have just published an Australian population-wide cohort study compromising 186,962 mother-infant pairs over a 28-month period. 128,060 mothers (68.5%) received pertussis vaccine and 85,830 (45.9%) received influenza vaccine. The pertussis vaccine was administered after 28 weeks gestation, but this recommendation has now been reduced to 20 weeks gestation. The influenza vaccine was recommended at any stage during the pregnancy, but optimally before the influenza season. The vaccine effectiveness was calculated using the formula (1 – the risk ratio) x 100%.

The authors used record linkages to track infants with laboratory confirmed pertussis and influenza infection. The outcomes were stratified into two age groups, infants < 2 months and infants aged 2-6 months.

The results were encouraging particularly for pertussis immunisation. In the case of infants under 2 months the vaccine effectiveness for antenatal pertussis immunisation was 80.1%, and for infants aged 2-6 months it was 31.8%. In the case of antenatal influenza vaccination, the vaccine effectiveness was 56.1% for infants under 2 months and 35.7% for infants aged 2-6 months.

The findings indicate a high degree of effectiveness for antenatal pertussis vaccination, and a moderate effectiveness for influenza vaccination.

The cover was best for infants under 2 months which is encouraging. These are the infants at greatest risk when they contract pertussis. The lower effectiveness for infants aged 2-6 months is consistent with waning maternal antibody concentrations with age.

One of the drawbacks of the study was that the timing of the vaccination during the pregnancy was not documented and thus any time-varying effect could not be explored.

Pertussis is a toxin-mediated disease. The bacteria attach to the respiratory cilia and produce toxins which paralyse the cilia. This precipitates the distressing cough and the apnea that one encounters in young infants. Apnea is the most common factor that necessitates a hospital admission. The cough becomes paroxysmal in 90% of cases and can last for many weeks. Preterm infants are the most vulnerable age category[3].

The lymphocytosis due to the pertussis toxin is encountered in infants but rarely in adolescents and adults. One possible explanation is that the latter have sufficient pertussis toxin neutralising antibodies or that they are able to generate them rapidly. The pertussis toxin inhibits the transit of lymphocytes from the blood vessels into the lymphoid tissues.

Lymphocyte counts over 70x109/L are particularly associated with pulmonary hypertension, pneumonia, and death. A US study found that there was a ten-fold increase in the risk of death when the lymphocyte count exceeded 50x109/L. The lymphocytosis causes a hyperviscosity syndrome. The pulmonary hypertension is caused by lymphocyte thrombi in the pulmonary blood vessels.

In 1950, in the pre-vaccine era, there were 3,612 cases of pertussis in Ireland. In 2019, there were 165 cases of pertussis, mostly in young infants. The last major outbreak was in 2012 when there was 458 cases with three deaths in infants under 3 months old. Almost all pertussis-related deaths occur in infants under age 4 months old. Preterm infants have higher severity index scores and more likely to require intensive care. They often present with apnea, episodes of cyanosis with coughing, and poor feeding.

The circulation of the B. pertussis organism is not controlled by immunisation; therefore, vaccination remains imperative.

Maternal vaccination will help to lower these case numbers among infants further. The combination of antenatal vaccination with the normal subsequent infant vaccination programme guarantees a high level of protection.

The antenatal influenza vaccine, while effective, it was not as protective as the pertussis vaccine. However, it provides significant cover even up to age 6 months. The overall vaccine effectiveness was 56.1%.

Hallissey et al[3] in a 34-point questionnaire found that mothers consider their GPs advice on the matter of vaccination. The health care provider is the most important tool to improve vaccination uptake. A survey of UK GPs found support for the embedding of the vaccination programme within the routine antenatal care programme[4,5].

In summary, the study of Rowe et al confirms the value of maternal immunisation in the protection of young infants.

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The Use of Caffeine for Apnoea Associated with Trisomy 13 and Trisomy 18

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Apnoea is a major complication and a leading cause of death for infants with trisomy 13 (Patau syndrome) and trisomy 18 (Edwards syndrome) In recent years, the question of safety and potential merits of caffeine use to mitigate apnoea associated with these conditions has been prompted by parents.

The phenotype of Patau syndrome includes features of cleft lip and palate, anophthalmia/microphthalmia, postaxial polydactyly, scalp defects, ear abnormalities, cardiac anomalies, omphalocele, central apnoea, holoprosencephaly, seizures and neurodevelopmental delay. Edwards syndrome is associated with characteristic craniofacial features, cleft palate, overriding fingers, clenched fists, rocker bottom feet, syndactyly, hypotonia, central apnoea, neurodevelopmental delay, seizures, cardiac anomalies, omphalocele and kidney anomalies. The prevalence of live born infants with trisomy 18 and trisomy 13 is estimated as 1/6,000-1/8,000 and 1/10,000-1/20,000 respectively[1, 2]. A 2019 study across 18 countries reported the median mortality for trisomy 13 and trisomy 18 in the first week of life was 48% and 42% respectively, half of which occurred on the first day after delivery[3]. Mortality in the first year of life was 87% for infants with trisomy 13 and 88% for infants with trisomy 18, therefore approximately 10% of infants may survive to 1 year of age[3]. A 2015 study of 36 infants born with trisomy 18 reported the most common cause of death in both preterm and term infants before 30 days of age was respiratory failure or apnoea, whereas babies who survived longer than 30 days of age died primarily from heart failure[4].

Apnoea associated with these syndromes can be central, obstructive, or epileptic in origin. Central apnoea is due to temporary failure of the pontomedullary pacemaker to stimulate the normal breathing rhythm. It may be caused by a variety of neurological, neuromuscular, brainstem or craniofacial abnormalities. There is considerable overlap in the clinical presentation of central and obstructive apnoea. Obstructive apnoea is secondary to obstruction of the airways and ongoing central stimulation of the respiratory system is present.

These infants are at increased risk of development of obstructive apnoea due to associated craniofacial features, hypotonia, laryngomalacia and tracheomalacia and adenoid and lingual tonsil hypertrophy. Apnoea secondary to epileptic seizures is increasingly recognised in infants with trisomy 18[5]. A 2015 study of 16 such infants identified three with electroencephalogram (EEG) confirmed seizures, two of whom suffered apnoea corresponding with ictal discharges[6]. Antiepileptic medication was successful in treating the epileptic apnoea identified in these three infants[6]. Kumada *et al* also reported a case of an infant with Edwards syndrome who developed epileptic apnoea at 10 months of age whose epilepsy was successfully managed with zonisamide[5]. Both reports stress the critical differentiation of epileptic apnoea from central apnoea since medications, such as theophylline and caffeine, which may be considered to ameliorate central apnoea, can be harmful to individuals with epileptic apnoea[5, 6].

Management of apnoea for infants with trisomy 13 and trisomy 18 will depend on whether the apnoea is central, obstructive or epileptic in nature, associated medical issues, and parental wishes. Potential therapeutic strategies include medication, non-invasive ventilation, surgery, conservative management or acceptance. Medications including acetazolamide, theophylline and progesterone have been theorized as potentially beneficial in the management of apnoea and sleep disordered breathing in the general population[7]. However, trials evaluating their safety and efficacy are lacking and there are no reports at present of their use in trisomy 13 or trisomy 18 patients.

The therapeutic evidence base for caffeine has been most thoroughly established within the premature population. Caffeine reduces the severity of apnoea of prematurity through stimulation of the respiratory centre in the medulla, increased minute ventilation, increased sensitivity to carbon dioxide, improved contraction of the diaphragm, enhanced skeletal muscle tone and modulation of neurotransmitters, and peripheral chemoreceptor activity[8-10]. Numerous studies have demonstrated that caffeine use in the premature population reduces the frequency of apnoea, promotes independence from mechanical ventilation, decreases intermittent hypoxemia and reduces the likelihood of developing bronchopulmonary dysplasia[8]. Therapeutic use of caffeine outside of the premature population is not commonplace in clinical practice nor documented in the available literature. No literature currently exists documenting the use of therapeutic caffeine for amelioration of apnoea associated with trisomy 13 or trisomy 18.

While caffeine has a proven safety profile and known benefits in the premature population it would be remiss to assume that such characteristics could be directly applicable to the Patau and Edwards syndrome populations. There is no evidence base for its use in this context. Babies with trisomy 13 and trisomy 18 may suffer a myriad of anomalies which may affect the pharmacokinetic and pharmacodynamic profiles of the drug. There is no commonly adopted standardised protocol for the optimal timing and dosing of caffeine therapy outside of respiratory management of premature infants, and there are potential serious consequences of caffeine overdose[8]. The use of caffeine for infants and children with trisomy 13 and trisomy 18 poses other practical questions including how to best measure its therapeutic effect, how to dose adjust appropriately, how to monitor for toxicity and when to stop administering the medication.

As apnoea is a leading cause of death in the first days and weeks of age for infants with trisomy 13 and trisomy 18 ethical concerns of administering a medication which may interrupt a natural death must be duly considered.

Clinicians must consider the origin of apnoea, suitable investigations and management holistically. Physicians must be prepared for balanced conversations with families, aware of the current evidence base for therapeutic interventions and have fully considered the ethical implications posed by the individual case. Whilst interest in the use of caffeine in this situation for management of apnoea is understandable, the authors of this article contend that there is not currently sufficient evidence to justify or recommend widespread unselected use. As described, in some circumstances it may indeed be harmful and cause unnecessary distress. Performing a sufficiently powered and controlled study is unlikely to be possible and clinicians should continue to act in a clinically informed case by case basis.

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A Time of Crisis, a Time to Re-evaluate

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The Covid-19 pandemic demonstrated the strong culture of professionalism in healthcare that exists nationally and internationally. In excess of 40,000 responses to the HSE's "be on call for Ireland" campaign were received. Healthcare workers came out of retirement and home from abroad to work frontline with student nurses and doctors.

Despite individual displays of patient advocacy, altruism and compassion during this crisis, this is a critical time for professionalism. When people are under pressure, there are more communication breakdowns, more interpersonal disputes, increased risk of adverse incidents causing patient harm, which in turn increases anxiety, leading to more incidents.

During times of stress, underlying structural organisational problems previously present, resurface and need to be addressed including bullying, harassment, burnout, unprofessional behaviour, inadequate care for the caregivers, suboptimal staff self-care and preventable patient harm.

Disappointingly more than 10 years after *To Err is Human* identified significant numbers of preventable patient deaths, the Joint Commission identified that communication breakdown was still the root cause in > 60% of cases of sentinel events. Medical error has recently been identified as the third leading cause of death in the USA [1]. National data from the INAES study similarly identified that the majority of adverse events are preventable [2].

Bullying is a patient safety issue because bullied doctors are more likely to be involved in adverse incidents [3]. Recently a large study in Australia identified that between 54-57% of junior doctors reported being bullied [4]. Training accreditation was withdrawn from an intensive care unit in Sydney because of alleged bullying by senior staff [5]. The financial cost of bullying and harassment to the NHS is estimated at £2 billion per annum [6]. A recent Medical Council survey identified that bullying and harassment of trainee doctors in Ireland is increasing and 40.9% of respondents experienced some form in their role [3]. Not only is bullying a patient safety issue, it is a recruitment and retention issue and a healthcare organisation reputational issue.

Physician burnout is a leading indicator of health system performance. Burnout is associated with increased adverse incidents. A recent national study of hospital doctors in Ireland identified that 30.7% met the criterion for burnout [7], not too dissimilar to figures from the USA. The financial cost of burnout in the USA is approximately US $4.6 billion/year [8]. Burnout is the factor most strongly related to doctors plans to withdraw from the clinical workforce [9]. Burnout is a patient safety issue, a recruitment and retention issue and an institutional reputational issue.

Physician self-care is another area of concern in particular depression, suicide risk, substance abuse and error impact. The overall pooled prevalence of depression or depressive symptoms was 28.8% in trainee doctors in a large systematic review. Depression is associated with poor quality care and increased medical errors. A systematic review estimated that doctor relative suicide risk is 1.1-1.34 higher for male doctors and 2.5 -5.7 higher for female doctors, compared to the general population.

Approximately 10-12 % of doctors will develop a substance abuse disorder during their career, a rate similar to or exceeding that of the general population but in doctors it is typically more advanced before identification and intervention. A large North American study identified that the impact of error on lives led to increased anxiety about future errors, increased sleeplessness, reduced job satisfaction and confidence.

The financial cost of clinical claims, some of which are due to unprofessional behaviour is significant in Ireland and internationally. In Ireland in 2019, the cost of resolving and managing active clinical claims was €325.1 million euro, an increase from €268.5 million, the previous year.

Drivers for change and improvement include patient safety and patient experience, staff wellbeing, burnout, recruitment and retention, risk of litigation, healthcare organisation reputation and the rising cost of litigation.

At undergraduate level unprofessional behaviour is associated with disciplinary action as a practicing doctor [10]. At post graduate level unprofessional disruptive behaviour is associated with compromises in patient safety and quality of care.

Professionalism should be taught and embedded across the continuum of undergraduate and post graduate education and continuous professional development.

A multifaceted professionalism programme for all staff (clinical and non-clinical) incorporating evidence-based interventions is an important tool to address organisational, structural issues, promote staff self-care and improve patient centred care, all culminating in a stronger culture of professionalism. The triad of leadership, education and accountability strengthens a culture.

Healthcare staff is the Irish health system's most valuable asset: staff must be supported and "care provided for the care-giver".

Pillars of professionalism programmes at international centres of excellence may include staff support and training, communication and events, policy and pathway development, data analysis for lessons learned and research.

Peer Support programmes where trained peer supporters are available to meet with healthcare staff on a one-to-one basis and provide free confidential support are valuable. It has been shown that talking with a peer soon after an adverse event increases resilience. Staff engagement and communication is crucial with Professionalism in the Workplace Surveys where results are shared, and interventions co-designed with staff to address issues identified. This data provides a baseline against which the impact of an intervention can be measured. Staff training is required in requested areas such as complex communication, successful leadership, building teamwork and ethical decision making.

Expected behaviour may be addressed through development and writing of professionalism pledges by staff from a broad range of professions, (approved by senior leadership) and to which staff hold themselves accountable. Pathways to address unprofessional behaviour can be co-designed. Recognition of colleagues who go "above and beyond" through peer nominated professionalism team awards and events such as a Professionalism week to celebrate great work is important. A Professionalism conference open to all staff with national and international experts (clinical and non-clinical) sharing their work helps consolidate the academic component of the programme. Inclusivity of all healthcare staff is key.

This time of Covid crisis, is a time to re-evaluate and act.

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NSAIDs and Renal Impairment: Deprescribing Chronic NSAID use in General Practice

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Abstract

Aim

NSAIDs are high-risk medicines that can commonly cause adverse renal effects. Recent evidence suggests a rise in the number of patients with acute and chronic renal disease. The aim of this audit is to determine our de-prescribing rate of chronic NSAID use in an Irish general practice.

Methods

We reviewed NSAID-containing drug prescriptions that were issued over a three month period in 2018. A description analysis was performed to ascertain for the frequency and type of NSAIDs prescribed. An educational session was delivered to clinicians to encourage de-prescribing of NSAIDs if deemed clinically appropriate.

Results

Fifty-one NSAID-containing prescriptions were identified. Thirty-six (71%) patients, who were prescribed a regular NSAID, were aged between 71-85 years. Meloxicam was used the most (31%), whilst the preferred NSAIDs (naproxen and ibuprofen) were used least (18%). A 37% improvement in de-prescribing of chronic NSAIDs was achieved upon re-auditing.

Conclusion

NSAIDs are commonly implicated in inappropriate prescribing. Clinicians are encouraged to practice de-prescribing at every opportunity. Recent evidence suggests that pharmacy-led educational interventions can further assist de-prescribing of inappropriate medicines. Thus, a close collaboration between physicians and pharmacists is encouraged to further maximise quality of prescribing and patient care.

Introduction

Inappropriate prescribing of high-risk medications remains prevalent in primary care. This represented 51% cases in 2015 compared with 45% in 2012[1]. Non-steroidal anti-inflammatory drugs (NSAIDs) are amongst the most frequent medications involved in high-risk prescribing[2] and their associated adverse drug reactions account for 30% of hospital admissions in the UK[3].

Adverse renal effects are well-recognised complications of these medications and are often a reason for prescription error negligence claims[4]. Drug monitoring data from New Zealand[5] identified a large proportion (70%) of 119 reports of renal adverse reactions associated with NSAID use were considered serious adverse reactions, twelve of which were life-threatening and four cases were fatal, with the majority of these reports (74%) occurring in patients aged 50 years and over.

In Ireland[6], chronic kidney disease (CKD) affects approximately 15% of adults in the Irish health system and, the numbers of patients developing renal failure have been increasing from 2,848 cases in 2005 to 4,440 in 2017, representing a growth of 56% in the number of patients requiring treatment. Recent research[7] has found a substantial rise in the cases of acute kidney injury (AKI), which may be responsible for the increase in cases of CKD. From 2005 to 2014, the overall rate of AKI was found to have increased by 126% (from 5.5% to 12.5%). Incidences increased across all healthcare settings and across all age groups, in particular in elderly patients. AKI stages 1, 2 and 3 occurred in 81.3%, 11.6% and 7.1% cases, respectively. Throughout the study period, stage 1 AKI was found to increase by 130% (from 4.4% to 10.1%) and stage 3 AKI by 76% (from 0.46% to 0.81%).

Exposure to NSAID use increases the risk of AKI by approximately 1.5-fold[8]. Furthermore, short-term use of these drugs appears to increase the risk of further developing end-stage renal disease (ESRD) requiring chronic dialysis treatment[9]. Patients with CKD and ESRD are at increased morbidity, in particular from cardiovascular disease and increased health care utilisation than in patients without renal failure[10]. Mortality rates are proportional with progressing stages of CKD. Adjusted all-cause mortality rates for Medicare patients aged 66 years and older by CKD stage in the United States revealed 79, 101, 182 deaths per 1,000 patient years for stages 1-2, stage 3 and stages 4-5, respectively in 2014[11].
This prompts the need to review and to attempt minimise chronic NSAID prescribing in clinical practice, in particular in the elderly with evidence of renal impairment.

Currently, NICE guidance on non-steroid anti-inflammatory drugs recommends routinely reviewing the appropriateness of NSAID prescribing, especially in patients at high risk, and if necessary, ibuprofen or naproxen are the preferred NSAIDs to be used at the lowest dose and for the shortest duration of treatment necessary to control symptoms.

Methods

We aim therefore to assess the frequency of chronic NSAID use, to determine the number of patients with CKD and on an NSAID and to perform de-prescribing of chronic use by reviewing our current repeat drug prescribing practices in patients 65 years and over.

Using Healthone medical software system, our first audit cycle aimed to obtain baseline data of patients aged 65 years and over from the 1st September 2018 to the 30th November 2018. The ATC M01 classification system code was used to identify these patients on non-steroidal anti-inflammatory drugs.

A descriptive data analysis was undertaken of the most up to date regular drug prescription during the study period to ascertain frequency and type of NSAIDs prescribed in Swan Park Surgery, a rural general practice in Monaghan with four doctors serving a population 9,395 patients, of whom 4,073 (43%) are public patients. Estimated GFR levels were obtained by reviewing the patients' latest laboratory results.

Results were subsequently disseminated to all prescribing clinicians at a practice meeting, aimed at increasing awareness of the adverse effects of long-term NSAID use. It was thus agreed upon to review the ongoing appropriateness of chronic NSAID use and to attempt de-prescribe if clinically deemed appropriate.

A re-audit of these patients' drug prescription was performed on the 19th April 2019, to identify the number of patients whose NSAID was subsequently discontinued or alternatively changed to a preferred NSAID.

Results

Among patients aged 65 years and older, a total of 51 prescriptions containing an NSAID~~,~~ were identified in this audit. Thirty two (63%) patients receiving an NSAID were female and 19 (37%) were male patients. The majority (71%) of patients, who were prescribed an NASID, were aged between 71-85years (table 1). Meloxicam (31%) and etoricoxib (20%) were prescribed the most (table 2). Naproxen was used in nine (18%) patients, whilst ibuprofen was not prescribed to any patients (table 2).

The majority (61%) of patients had mild stage 2 CKD (eGFR 60-89ml/min). Nine (18%) had moderate stage 3 CKD (eGFR 30-44ml/min), of whom three (33%) were in stage 3b CKD (eGFR 30-44ml/min). No NSAIDs were prescribed in stage 4 (eGFR 15-29ml/min) or 5 CKD (eGFR <15ml/min) (table 3).

Forty-eight of the 51 patients were re-issued their repeat prescription at the time of our re-audit, approximately three month later. Sixteen (33%) of these patients were no longer on a regular NSAID. Two patients had theirs changed to a preferred NSAID – naproxen. Of the 35 patients who had their NSAIDs continued, one (3%) had their NSAID subsequently deleted from their regular prescription list. This represents a 37% de-prescribing rate of NSAID use.

Of the nine patients with stage 3 CKD, five (56%) had their NSAIDs discontinued; two (33%) of the six patients with stage 3a CKD and two of the three (67%) patients with stage 3b CKD.

Table 1: Number of patients using NSAIDs by age group.

Age group	Number of patients
65-70 years	11 (22%)
71-85 years	36 (71%)
86-90 years	4 (8%)

Table 2: Frequency of NSAID use by NSAID drug type.

NSAID	Number of patients
Ibuprofen	0 (0%)
Ketoprofen	1 (2%)
Dexketoprofen	1 (2%)
Naproxen	9 (18%)
Meloxicam	16 (31%)
Diclofenac	6 (12%)
Aceclofenac	2 (4%)
Celecoxib	6 (12%)
Etoricoxib	10 (20%)

Table 3: Number of patients using NSAIDs by CKD stage.

CKD stage (GFR stage, ml/min)	Number of patients
1: >90	10 (20%)
2: 60-89	31 (61%)33%)
3a: 45-59	6 (12%)
3b: 30-44	3 (6%)
4: 15-29	0 (0%)
5: <15	0 (0%)

Discussion

NSAIDs are high-risk medicines, which are continued to be prescribed in elderly patients. Our audit shows that, of the 51 NSAID-containing prescriptions of patients aged ≥65 years, the majority of these were issued to those aged between 71 and 85 years (71%). Meloxicam was used the most (31%), whilst the preferred NSAIDs, naproxen and ibuprofen, were less frequently prescribed (18% and 0%, respectively). Upon completion of our audit, we achieved an improvement of 37% in de-prescribing of chronic NSAID use following a brief clinician-based educational intervention.

NSAIDs are one of the most frequently used medicines for pain and inflammation. Diclofenac, ibuprofen and etoricoxib are amongst the top 100 most frequently prescribed medicines in Ireland and public expenditure for these drugs has exceeded over 5 million euros in 2017[12].

Current evidence shows trends towards decreased prescribing of these high-risk medications[13-14], whose side effect profiles have been well established. These include an increased risk of renal impairment but also of adverse cardiovascular, gastric and bleeding risks[15]. These risks are further aggravated by co-prescriptions with other potentially interacting medications. Concomitant use of antiplatelets, anticoagulants, SSRIs, corticosteroids and aldosterone antagonists increase the risk of gastrointestinal[16] and intracranial bleeding[17]. Co-prescriptions with ACE inhibitors, ARBs, diuretics increase the risk of renal impairment[18].

At-risk populations such as the elderly are particularly vulnerable to these adverse effects[19]. This is further compounded by the increasing prevalence of polypharmacy in these patients. Recent studies show an increase from 17.8% in 1997 to 60.4% in 2012 among Irish patients aged ≥65years[20], and from 12% in 1991 to 49% in 2011 among UK elderly patients[21].

Potentially inappropriate prescribing (PIP) in older people is currently well recognised[22]. A TILDA study published in 2014 found an overall prevalence of up to 14.6% among Irish adults aged ≥65years. NSAIDs were identified as one of the most common examples of PIP, accounting for 5.8% of all PIP identified[23].

Optimising drug therapy in older patients continues to be challenging, both in primary and secondary care. This can be demonstrated in a recent Irish study in 2018, which found that, among patients who had at least one hospital admission in a year, the risk of having any potentially inappropriate prescription was increased by 72% after their admission[1].

Despite these challenges, clinician should endeavour to practice de-prescribing at every patient contact. Drug utilisation review tools[22] such as the STOPP (Screening Tool of Older Person's Prescriptions) and BEER's criteria are amongst some of the strategies to help optimise de-prescribing for clinicians.

This audit achieved a de-prescribing rate of 37% of chronic NSAID use, following a physician-based educational intervention. However, recent evidence from a randomised controlled trial in Canada in 2018, involving community pharmacists, found that pharmacy-led educational interventions to both patients and physicians had significantly increased discontinuation rates of inappropriate medications; by 43% over a six month period, compared to 12% of patients receiving usual care. NSAID use in this study was reduced by 57.6% after intervention compared to 21.7% in their control group[24].

Community pharmacists can thus additionally play a vital role in helping optimise potentially inappropriate drug prescribing. This may be achieved through a close collaboration of both physicians and pharmacists to help improve quality of prescribing and patient care.

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No conflicts of interest declared.

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A Study of Consultant Attitudes to NCHD Less-Than-Full-Time (LTFT) Training

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Abstract

Aims

Less-than-full-time (LTFT) training is increasing in availability and flexibility. Negative perceptions by consultants is a concern. This study aims to ascertain the attitudes of consultants to LTFT training and determine potential barriers to LTFT training.

Methods

A prospective cohort questionnaire-based study was designed with mixed qualitative and quantitative methodology. It was distributed to consultants in a tertiary paediatric hospital. The main outcome measures were likelihood of negative perceptions of LTFT NCHDs, and perceived advantages and disadvantages of LTFT training.

Results

35.4% had worked LTFT, and 40.5% (*n*=17) of those who hadn't had considered or were currently considering it. Most respondents did not have a negative perception of LTFT NCHDs (84.6%). Work-life balance, reduction of burnout, and being fully committed were perceived advantages of LTFT training to NCHDs. Advantages to the team were energy, staffing, and productivity. Disadvantages to the NCHD were training duration, involvement in clinical activities, and negative perceptions. Disadvantages to the team were continuity, roster planning, and workload distribution.

Conclusion

Consultant perceptions of LTFT trainees are positive. There are common themes in the perceived impact of LTFT training that must be explored to maximise the success of this training pathway.

Introduction

Less-than-full-time (LTFT) training is defined as "any arrangement with reduced working hours for doctors, as arranged with an employer".[1] LTFT training in medicine is increasing in popularity, although this varies with geographic location and medical specialty; a study of trainees and consultants in the UK showed that 42% of women and only 7% of men worked LTFT.[2,3]

Potential advantages to LTFT training include work-life balance and reduced burnout, and the annual National Trainee Survey shows that self-reported training quality is higher in LTFT trainees.[4,5] However negative perceptions by senior colleagues are a barrier.[6] LTFT champions have been proposed to combat negative perceptions and stigma, and may have a positive impact on trainee experience.[5] Impact of LTFT training on career progression is unclear, with studies showing lower academic scores for LTFT trainees, but others showing higher rates of consultant appointment.[4,7]

Research on attitudes to LTFT training in Ireland is sparse. The aim of this study is to ascertain the attitudes of consultants from a range of different specialties in a tertiary paediatric centre to LTFT training, and to determine the potential barriers to LTFT training based on these attitudes.

Methods

This study was a prospective cohort questionnaire-based study. A mixed method qualitative and quantitative approach was used. The study population was all consultants (*n*=128) working in Children's Health Ireland at Temple Street, a tertiary paediatric hospital in Dublin, Ireland. The specialty groups included are shown in figure 1.

A novel 11-item questionnaire survey was developed based on the previously published literature and a recent unpublished survey about attitudes to LTFT training among paediatric trainees.[8-10] A combination of multiple choice questions (*n*=6), Likert 5-point scales (*n*=2), and free text items (*n*=3) were included. The anonymous survey was developed through the Survey Monkey application and distributed by email to all consultants between September and October 2020.

Results

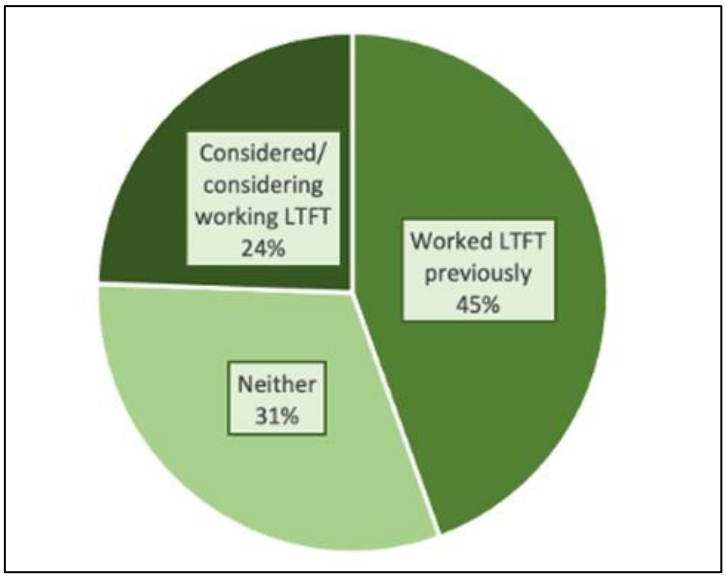
Demographics

65 responses were received, giving a response rate of 50.8%. Most respondents (71%, *n*=46) were female from a population of 56% (*n*=72) female consultants; 3.1% (*n*=2) chose not to specify their gender and 26.2% (*n*=17) were male. The 2 respondents who did not identify their gender were included in all analyses except subgroup analysis by gender. Response rates varied by specialty: General paediatrics (85.7%), paediatric intensive care medicine (83.3%), radiology (75%), laboratory-based specialties (66.7%), paediatric medical subspecialties (57.5%), paediatric emergency medicine (50%), psychiatry (50%), anaesthesiology (38.5%), surgical specialties (19.2%), ophthalmology (0%). Specialties with more female consultants had higher response rates.

Experience with LTFT training

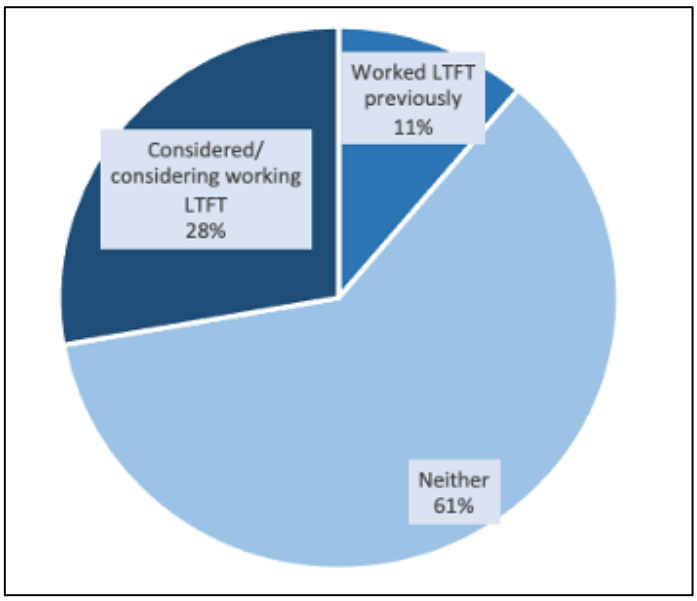
Over half of respondents (52.3%, *n*=34) had worked with a colleague who was working LTFT at some point in their career. 35.4% (*n*=23) had worked LTFT themselves, either as a consultant (30.8%, *n*=20) or as an NCHD (10.8%, *n*=7). A large proportion (40.5%, *n*=17) of those who had never worked LTFT had considered or were currently considering it.

Figure 1: Female consultant experience with working LTFT.



When subgroups were analysed by gender, more female consultants than male consultants had worked LTFT, but a similar percentage of each gender were or are considering it, as shown in figures 1 and 2.

Figure 2: Male consultant experience with working LTFT.



Knowledge about LTFT training in Ireland

Most respondents (72.3%, *n*=47) were aware of job sharing as a LTFT option for trainees in Ireland, and 72.3% were aware of the supernumerary flexible training scheme. 1 respondent was not aware of any options.

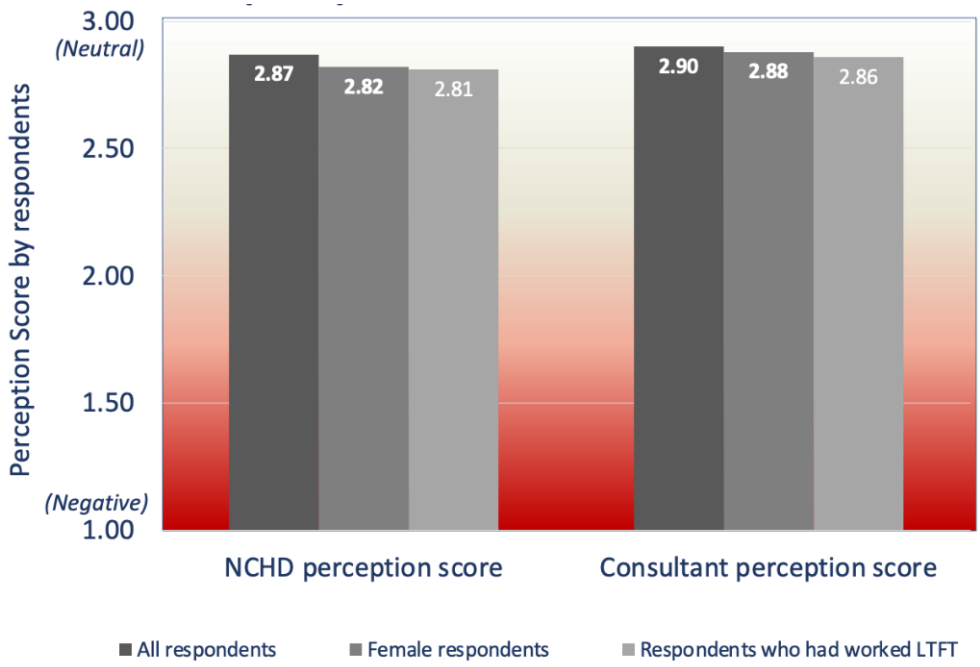
Acceptability of LTFT training to consultants

All respondents felt that being a mother was an acceptable reason for an NCHD to choose LTFT training, and 95.4% (*n*=62) felt that fatherhood was an acceptable reason. Most (98.5%, *n*=64) felt that a physical health issue was an acceptable reason, and 95.4% (*n*=62) for a mental health issue. Most (92.3%, *n*=60) felt working LTFT to accommodate other educational commitments was acceptable. Overall, 81.5% (*n*=53) felt that no justification was required.

Negative perceptions to LTFT trainees

Most respondents stated that an NCHD's or consultant's choice to work LTFT would not negatively influence their perception of that doctor (84.6% and 89.2% respectively). The mean score on attitudes to an NCHD working LTFT was 2.87, with 1 being negative, 2 being neutral, and 3 being positive. The mean score on attitude to a consultant working LTFT was 2.9. Some respondents felt that they may negatively perceive an NCHD or consultant that was working LTFT (9.2% and 7.7% respectively). It was noted that attitude scores from female respondents and respondents who had worked LTFT were lower (i.e. more negative) than for the total cohort, shown in figure 3.

Figure 3: Impact of LTFT training on respondents' perception of NCHDs and Consultants.



Perceived advantages and disadvantages of LTFT training

Thematic analysis of the perceived advantages and disadvantages of LTFT training for the NCHD and for the clinical team revealed a number of key themes. These are demonstrated in figure 4.

Figure 4: Thematic analysis of perceived advantages and disadvantages of LTFT training on NCHDs and the clinical team.

Advantages of LTFT training to the NCHD	
Maintaining work-life balance (38/65 respondents)	"They can pace their career with the rest of their life" "More flexible working patterns to suit their home life needs"
Being rested, with less risk of burnout (26/65 resoindents)	"It gives you mental headspace" "NCHDs would be less stressed and more refreshed"
More well-rounded (10/65 respondents)	"They have the maturity to get out of rat race"
Development of a specific career advantage (10/65 respondents)	"Potential for prolonged placement can allow trainee gain a greater understanding of a specialty" "They have more time to focus on research and papers"
Being fully committed when at work (9/65 respondents)	"They can be more engaged when at work" "They can fully participate in all activities on their work days"

Advantages of LTFT training to the clinical team	
Less fatigue and more enthusiasm (21/65 respondents)	"They would be a safer doctor because they would be less fatigued" "Everyone benefits from a happy enthusiastic trainee"
Extra staff (13/65 respondents)	"They are often supernumerary and have a special interest in the area"
Increased productivity (10/65 resondents)	"LTFT trainees can be more creative and generally more productive" "Part-time workers are more efficient"

Disadvantages of LTFT training to the NCHD	
Prolonged duration of training (31/65 respondents)	"It lengthens an already long road in training"
Less involved in clinical/non-clincial activities (17/65 respondents)	"You miss out on meetings and decision making" "Less time with the team"
Negative impact on clinical accumen (10/65 respondents)	"It can negatively affect skills and confidence in early training years" "Their clinical skills suffer as they do not see the cases through"
Reduced career opportunities (9/65 respondents)	"LTFT may affect their ability to be given the post they want"
Negative perceptions from consultants (7/65 respondents)	"There is still a culture of part-time not being understood or accepted". "Shame and weakness may be perceived by others"

Disadvantages of LTFT training to the clinical team	
Reduced continuity of care (31/65 respondents)	"Continuity of care can be difficult to achieve" "More time needs to be spent on handover"
Difficulties with roster planning (11/65 respondents)	"The service must be adequately staffed in their absence, but this is not the case in Ireland" "Timetabling needs to fit in with how the team works"
Disruption to team dynamic (7/65 respondents)	"The team do not get to know the person as well" "Resentment from full time colleagues can become an issue"
Uneven workload distribution (6/65 respondents)	"Sometimes there is less ownership of administrative work"

Discussion

The results of this study show that there is demand among consultants across all specialties in paediatrics to consider working LTFT.

While all respondents felt that motherhood was an appropriate reason for an NCHD to work LTFT, there is ongoing evidence of gender-based stereotypes in with regard to the acceptability of fathers working LTFT, as well as those with mental health issues. Research and media publications on promoting mental healthcare equity and addressing mental health issues among medical professionals show there is public interest in this area.[11,12] A focus on addressing mental health inequity in medical schools is welcome and should be adopted across Ireland.[13] A Recent epidemiological study by Lien et al shows an improvement in the understanding and acceptability of mental health issues over time, but that more work is required.[14] This finding may be interpreted as an example of societal discrimination against people with mental health issues, a lack of understanding about mental health issues; indirect discrimination against groups of trainees more likely to choose LTFT training cannot be overlooked, as has been raised in previous research.[15]

Perceived advantages to NCHDs of LTFT training from this study are in keeping with previous research with the exception of career advantages which are not previously described. The themes of work-life balance and reduced burnout in particular have an indirect impact on medical workforce retention. LTFT training has been proposed as a viable method to increase workforce retention by multiple authors based on surveys and NCHD feedback.[16] In the UK's Gold Guide, LTFT training features prominently, with the aim of retaining doctors, promoting work-life balance, and maintaining a balance between training requirements and service provision.[17] To date, Irish medical workforce planning literature has not placed such importance on LTFT training; in the '*Review of Emergency Medicine Medical Workforce in Ireland 2017*', the percentages of doctors in emergency medicine working LTFT was noted (1% of trainee specialists and 8% of general division doctors), but LTFT expansion does not feature prominently in the report.[18]

Potential disadvantages included concerns about leaving the job early/not doing their share of the work, but this may not be supported by the literature. The manner in which clinical competencies and clinical experience are gained and the impact of LTFT training on this can be looked at for answers; Clinical competencies and clinical experience are gained through time, training, simulation, and clinical exposure over time. The role of the trainers and training sites as well as the training bodies in providing for and ensuring acquisition of these competencies must not be understated, and training bodies must address this by developing guidance for trainers regarding the expectations of the training bodies about LTFT trainees. Thus, with an appropriately scheduled roster for LTFT trainees, and with a dedicated trainer overseeing the trainee's learning, there is no objective reason why LTFT trainees cannot gain clinincal competencies on a pro rata basis. For some sites and specialties, the day-to-day clincal exposure may vary, and key learning experiences may be scheduled for certain days of the week only.

One measure to address this potential barrier to gaining clinical competencies and exposure would be to invert the trainee's timetable half way through the rotation, or to make other site-specific changes to ensure that the trainee gains the pro rata amount of clinical competencies and experience as their full time colleagues. The key is that scheduling of LTFT trainee working hours must be approached in a collaborative way with the needs of the trainee and the team both taken into account. Creative approaches to roster planning are required.

De Jong et al found that part time specialists do more hours and more out-of-hour shifts per FTE than their full-time counterparts, with the difference being greatest among surgeons.[19] This also raises issues with the practicality of the role, as the reasons why the specialists were working more hours is unclear. Regarding negative perceptions from senior colleagues, the reasons for this negative perception from a small number of consultants requires further study. Interestingly, consultants who had first-hand experience of working LTFT had a more negative view of LTFT NCHDs and consultants. Reasons for this are unclear, and it is in contrast to other studies.[20] The perception of discrimination in LTFT employment in medicine has previously been found to be weighted against women; Lack of access to part time careers has been described as a form of gender discrimination by Lugtenberg et al. due to the known substantially higher demand for it among female doctors.[21]

The generational pattern of attitudes to LTFT training noted by previous authors was not replicated in this study, although the number of respondents at either end of the spectrum is a limiting factor.[22] Attitude scores for consultants qualified as doctors for <10 years (*n*=1) were 1 for both, for those qualified 11-20 years were 2.97 and 2.93, 21-30 years were 2.8 and 2.92, and for those qualified >31 years (*n*=6) were 3 for both.

The impact of LTFT training on the team are noteworthy, as there is a paucity of evidence about this topic. Continuity of care, roster planning, workload distribution and team dynamic were discussed, but consultants also reported perceived benefits including increased productivity, reduced fatigue and increased enthusiasm, and extra staffing. Previous research has found that part time employment was superior to taking leave of absence in relation to long term career prospects and long term salary growth, and is therefore a key factor to consider in the planning of medical recruitment and retention.[23] Regarding continuity of care, the issue is multifaceted, as it relates both to the workings of the team and to the quality of care provided to the patient. It is unclear which factor is of the most concern to participants in this study, and further research is required to explore this concern and to develop strategies to address this. Clinical handover has the potential to mitigate most team-based continuity of care issues. The issue of the quality of care provided to patients, the learning experience of working with a patient on consecutive days, and the overall impact on education and training is worth considering in the context of LTFT training. More frequent change of trainees on a daily basis has the potential to negatively affect patient and team perceptions of the service provided. However, the longer duration of time that LTFT trainees spend at each training site has the potenital to have a positive impact on patient and staff relationships both in the core medical team and with all involved health and social care professionals.

Regarding the management of LTFT trainees, it must be recognised that training bodies, HR departments, trainers, and hospital management each play a role in the management of LTFT trainees. Clear guidance is needed to inform and educate key stakeholders about the expectations that training bodies place upon them when working with a LTFT trainee. Online logbook requirements should be modified for LTFT trainees to reflect the pro rata requirements expected of them. Incorporation of the LTFT training pathway into the Train-the-Trainer courses run by training bodies may be beneficial and educational. On an individual support level, the model of site-specific 'LTFT champions' may play a role in providing practical support and advocacy for LTFT trainees as individuals and as a group; this model has been used with success in the UK.

Subgroup analysis by specialty was not performed in this study due to small numbers. Previous research has demonstrated significant inter-speciality rates of LTFT training.[2,6,15] Selection bias is likely to be a limiting factor in this study, as is the trend with previous surveys on the topic of LTFT training; in the research by Hoesli et al, female respondents and LTFT respondents were disproportionately more likely to answer the survey.[7] Eysenbach's analysis of the quality of web-based survey data defines the 'volunteer effect', whereby self-selection of participants can lead to sample bias, which can be noted from the disproportionate number of female and medical specialty respondents, and the lack of surgical consultant and older/younger consultant responses. Response rate was comparable to other studies.[7,15,19,20,24,25] Questionnaire-specific bias was limited in this survey-based research through careful preparation of questions, formatting of the questionnaire, and careful interpretation of data.[8]

Overall, it is clear that in this Irish tertiary paediatric hospital, consultants have a moderate amount of experience with LTFT training and have some concerns about the disadvantages of this style of training. Female trainees in paediatrics are increasing, and with this the need to address the gap in LTFT training availability and efficacy must be addressed. Key recommendations of this study are that further research is required to explore the reasons for negative perceptions of NCHDs and consultants working LTFT; Roster guidance should be developed with a creative and easily-modifiable template for roster-makers, HR departments, and LTFT trainees alike; A focus on clinical handover, with specific instruction to LTFT trainees, should be developed; More NCHDs should be encouraged to work LTFT, and more places provided and funded to allow this; A steering group is required to guide this process and to make continuous changes as the process evolves, including further research into the naming of this style of training; and training bodies should produce a guide for trainees and trainers to clarify the rights and responsibilities of both parties during LTFT training.

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Changes in Multidisciplinary Tracheostomy Team Practice Over Time

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Abstract

Aim

Increasing numbers of tracheostomy patients are discharged from the Intensive Care Unit (ICU) to general hospital wards. There is evidence that a Multidisciplinary Tracheostomy Team (MTT) can have a positive impact on the care of tracheostomy patients discharged from the ICU. We compared tracheostomy management and patient outcome in two time periods, at the start of our MTT practice in 2009-2011 and again in 2017.

Methods

In a retrospective audit, we compared tracheostomy management and patient outcome in 117 patients who had a tracheostomy in 2009-2011 with 81 patients who had a tracheostomy in 2017.

Results

The duration of tracheostomy cannulation was significantly shorter (21 vs 31 days, p=0.0005) in 2017 compared to 2009-2011. A Mini-Trach was used after tracheostomy decannulation in 56 of the 81 (69%) tracheostomy patients in 2017.

Conclusions

The continued development of our MTT service over 8 years was associated with a significantly shorter duration of tracheostomy cannulation and the introduction of Mini-Trach use after tracheostomy decannulation. These results support the importance of maintaining an active MTT service to manage tracheostomy patients after discharge from the ICU.

Introduction

The number of critically ill patients who require a tracheostomy to assist in weaning from mechanical ventilation has increased.[1,2] There are numerous reports comparing outcomes in tracheostomy patients discharged from the ICU before and after the establishment of a MTT.[3-8] The MTT provides a key role in weaning from mechanical ventilation, cuff management and down-sizing of the tracheostomy tube, restoration of speech and safe swallowing and eventual tracheostomy decannulation. In addition, the MTT provides tracheostomy related education for ward-based staff, the patient and their family.[9] The aim of this study was to compare changes in tracheostomy management and patient outcome since the establishment of our MTT in 2009-2011 and again in 2017.

Methods

This study was conducted in the Mater Misericordiae University Hospital in Dublin, Ireland. Medical and surgical patients who had a tracheostomy performed during their ICU course in 2009-2011 and 2017 were included in the study. Medical patients included Respiratory Medicine, Cardiology, Nephrology, Neurology, Gastroenterology, Infectious Disease, Endocrinology and Haematology patients. Surgical patients included Cardiothoracic, General, Vascular, Orthopaedic and Plastic Surgery patients. Patients with a cervical spinal cord injury who required a tracheostomy and patients having a permanent tracheostomy were not included in this study.[10] Ethical approval for the study was obtained from the Mater Hospital Institutional Review Board.

Demographic data and details of tracheostomy management were retrieved from the Critical Care electronic patient record (ICIP, Philips Healthcare). Tracheostomy placement was by percutaneous dilatational technique or by open surgical technique. Details of tracheostomy management were recorded by the MTT since its formation in March 2009 for all patients discharged from the ICU with a tracheostomy or Mini-Trach (Portex, Smiths Medical) in place. The team is composed of a Critical Care Consultant, a Critical Care Advanced Nurse Practitioner and a Speech and Language Therapist. All patients with a tracheostomy or Mini-Trach in place who were discharged from the ICU to a hospital ward were followed weekly or more frequently by the MTT. Tracheostomy patients requiring minimal ventilatory assistance but with an effective cough were identified as a cohort who might be safely managed with a Mini-Trach after tracheostomy decannulation. The tracheostomy was removed over a guidewire and a Mini-Trach advanced over the guidewire through the tracheostomy stoma. The Mini-Trach was retained securely in place by a tracheostomy tie and a non-adhesive foam dressing was inserted between the stoma and the Mini-Trach.

Data was collected for 24 months for the first time period (2009-2011) and for 12 months for the later time period (2017). Mini-Trach tubes were not used during the earlier study period but were placed during the later time period as part of the progression towards complete decannulation.[11] Patients who had a Mini-Trach alone without prior tracheostomy placement were not included in this study.

Normally distributed data (patient's age) were compared with Student's t-test. Categorical data (proportion of ICU patients with tracheostomy, mode of tracheostomy, gender, in-hospital death) were compared using Fisher's exact test. APACHE score, duration of tracheostomy, ICU and hospital length of stay were not normally distributed and were compared using the Mann-Whitney U test. A p value of < 0.05 for each test was defined as statistically significant. Data were analysed in Prism 8.4 (GraphPad LLC).

Results

One hundred and seventeen of the 2,129 patients admitted to the ICU between March 2009 and February 2011 had a tracheostomy performed and were included in the study. Between January and December 2017, 81 of the 1,081 patients admitted to the ICU had a tracheostomy performed and were included in the study. The demographic data in both study periods are shown in Table 1. Although there was an increase (6% vs 8%, p=0.03) in tracheostomy use in 2017, the patient's age, gender and APACHE score on ICU admission were similar in both time periods (Table 1).

Table 1. Demographic data.

	2009-2011	**2017**	
Patients admitted to ICU	**n = 2,129**	**n = 1,081**	**p value**
Patients with T - no. (%)	117 (6)	81 (8)	0.03
Mean Age (± SD) yr	60 ± 17	58 ± 16	0.53
Male gender - no. (%)	67 (57)	57 (70)	0.07
Median APACHE score (range)	21 (14-27)	19 (14-23)	0.16

ICU: Intensive Care Unit; T: tracheostomy; SD: standard deviation;
APACHE: Acute Physiology and Chronic Health Evaluation

The median duration of tracheostomy cannulation was shorter (21 vs 31 days, p=0.0005) in 2017 compared to 2009-2011 (Table 2). The proportion of patients who had a percutaneous dilatational tracheostomy (PDT) compared to open surgical tracheostomy was higher (96% vs 83%, p=0.003) in 2017 than in 2009-2011. There was no difference in the median time from ICU admission to tracheostomy insertion or the number of patients discharged from the ICU within 7 days of tracheostomy insertion between the two study periods. There was no significant difference in the hospital length of stay (LOS) for tracheostomy patients during both time periods (Table 2).

Table 2. Tracheostomy Management and Patient Outcome data.

Tracheostomy Patients	2009-2011 n = 117	2017 n = 81	p value
PDT - no. (%)	97 (83)	78 (96)	0.003
Median days ICU admit to T (range)	9 (6-15)	8 (5-12)	0.14
ICU D/C within 7days of T - no. (%)	49 (42)	29 (36)	0.46
Median Duration of T (range) days	31 (20-59)	21 (13-35)	0.0005
Median ICU LOS (range) days	16 (11-29)	21 (14-31)	0.03
Median Hospital LOS (range) days	74 (44-120)	67 (38-105)	0.14
Deaths - no. (%)	43 (37)	24 (30)	0.36

PDT: percutaneous dilatational tracheostomy; ICU: Intensive Care Unit;
T: tracheostomy; D/C: discharge; LOS: length of stay

Fifty-five of the 81 patients in 2017 were discharged from the ICU with a tracheostomy in place. A Mini-Trach was used after tracheostomy decannulation in 56 patients, 12 of whom were still in the ICU when their tracheostomy was replaced by a Mini-Trach. Forty-six Mini-Trach patients (82%) were successfully decannulated (Table 3). Twenty-four patients died in 2017, 16 with a tracheostomy in situ (13 in ICU, 3 in hospital ward), 6 with a Mini-Trach in situ (1 in ICU, 5 in hospital ward) and 2 patients who had been decannulated (Table 2, 3).

Table 3. Mini-Trach after Tracheostomy data (2017).

Patients with T – no.	81
Patients died prior to decannulation – no.	16
Patients with MT after T (total) – no. (%)	56/81 (69)
Patients with MT after T (exclude deaths)* – no. (%)	56/65 (86)
Discharge from ICU with MT – no. (%)	12 (21)
Median Duration of T prior to MT (range) days	21 (13-36)
Median Duration of MT after T (range) days	8 (5-19)
Median Duration of MT plus T (range) days	33 (19-48)
MT patients decannulated – no. (%)	46 (82)
Deaths in MT patient – no. (%)	6 (11)

T: tracheostomy; MT: Mini-Trach; ICU: Intensive Care Unit;
*excluding tracheostomy patients who died prior to decannulation

In 2017, 12 of the 81 tracheostomy patients required re-admission to ICU during their hospital course. Six of these patients had their tracheostomy still in place at the time of ICU re-admission. Of these, 3 patients died, 1 patient was transferred to another hospital and 2 patients survived to be discharged home. Four of the 6 Mini-Trach patients who required re-admission to ICU had their tracheostomy re-fashioned. The outcome in these 4 patients included one death and 3 patients surviving to be discharged home. Of the two remaining MT patients re-admitted to ICU, one died, and one patient was transferred to another hospital.

Discussion

We compared tracheostomy management and patient outcome in two time periods (2009-2011 and 2017) in a university-affiliated adult hospital. The MTT was established in our hospital in March 2009 to help manage the growing number of tracheostomy patients being discharged from the ICU to general hospital wards. There have been several reports of fewer tracheostomy-related complications and shorter duration of tracheostomy cannulation or hospital LOS when outcomes before and after the establishment of tracheostomy review teams have been compared.[3-8] After the first 8 years of our MTT practice, we report a reduced duration of tracheostomy cannulation and the introduction of Mini-Trach use after tracheostomy decannulation.

The proportion of PDT's compared to open surgical tracheostomy increased significantly (83% vs 96%, p=0.003) between the two study periods and similar trends have been noted by others.[12] We found that there was a highly significant (31 vs 21 days, p=0.0005) reduction in the duration of tracheostomy cannulation between the two time periods. The regular weekly patient follow-up by the MTT and the use of a Mini-Trach after tracheostomy removal are likely to be associated with the shorter duration of tracheostomy cannulation in 2017. A median duration of tracheostomy cannulation of 16 days was reported in 3,443 adult patients from the Global Tracheostomy Collaborative quality improvement database.[13] Although the duration of tracheostomy cannulation is influenced by multiple factors, these recent Global Tracheostomy Collaborative data suggest we may be able to target some further reduction in tracheostomy time for our patients, leaving aside the question of whether a short-duration tracheostomy could have been avoided altogether.

The MTT made regular assessments of tracheostomy patients who were weaning from mechanical ventilation to identify patients who might benefit from a Mini-Trach after tracheostomy decannulation. Although a Mini-Trach can only accommodate a 10Fr suction catheter, the use of a Mini-Trach to assist in the management of sputum retention in thoracic surgery patients has been reported.[14] Potential advantages of Mini-Trach use after tracheostomy decannulation include improved voice and patient satisfaction, restoration of normal humidification of inspired air and the maintenance of relatively non-invasive access to the airway for tracheal suctioning. The Mini-Trach cannula extends further into the trachea than a tracheostomy, decreasing the risk of inadvertent decannulation. The consequences of a Mini-Trach decannulation are likely to be less threatening for the patient than an un-planned tracheostomy decannulation, particularly out-of-hours.

In 2017, a Mini-Trach was used after tracheostomy decannulation for a median of 8 days in 56 of 81 (69%) patients or 56 of 65 (86%) patients if we exclude patients who died prior to tracheostomy decannulation (Table 3). This is a higher incidence of Mini-Trach use after tracheostomy decannulation than reported previously.[11] The low number of Mini-Trach patients (4 out of 56 patients) who required re-admission to ICU and re-fashioning of their tracheostomy in our study was reassuring. Our normal MTT practice is to retain the Mini-Trach in place until the patient successfully clears their tracheal secretions and has made progress with their physical rehabilitation.

We report a prolonged hospital LOS (67-74 days) for tracheostomy patients during both study periods. In similar studies, the median hospital LOS in tracheostomy patients ranges from 20 to 40 days and is influenced by many factors including the range of step-down facilities available for tracheostomy patients.[3,4,8,13] The hospital LOS reported in the present study and others emphasises the importance of having a high-quality and durable MTT service to provide consistent follow-up in these patients and assist with planning and expediting their complete decannulation.

We found that 36-42% of patients were discharged from the ICU within 7 days after tracheostomy insertion during both study periods. Similarly, 30% of PDT patients in the NCEPOD study were discharged from the ICU within 7 days of tracheostomy insertion.[1] The key role of the multidisciplinary team in coordinating the care of tracheostomy patients after discharge from the ICU was also highlighted by this report.[1]

The ICU LOS in our study (16-21 days) was longer than the 11 days reported in a mixed medical and surgical tracheostomy patient cohort with similar age, gender and APACHE score to our patients.[3] However, Tobin et al., reported that 40% of their annual 1,100 – 1,200 admission were cardiac surgery patients and the median LOS in their ICU was only 1 day.[3] One possible beneficial effect of the longer ICU LOS in our study was that more patients had their tracheostomy replaced by a Mini-Trach prior to discharge from the ICU. In 2017, 12 patients were discharged from the ICU after their tracheostomy had been changed to a Mini-Trach. This may be potentially safer than our earlier practice of sending all our patients to ward level care with a tracheostomy still in place and warrants further study.

We found no difference in hospital mortality (30-37%) for tracheostomy patients during both study periods (Table 2). The 30-day mortality after early or late tracheostomy placement was 31-32% in the TracMan trial.[15] Although the incidence of tracheostomy related complications has increased with the greater number of tracheostomies being performed, the patients' age, severity of the underlying illness and number of comorbidities contribute to the increased mortality.[16] A five-fold increase in mortality in tracheostomy patients with 4 or more comorbidities and a 55% one-year mortality for tracheostomy patients over 65 years of age have been recently reported.[13,17] Our results and the results of similar studies confirm that the requirement for a tracheostomy in critically ill patients is associated with a prolonged ICU and hospital LOS and with a high in-hospital mortality rate.

The limitations of our single centre retrospective study include the broad range of indications for tracheostomy and the standard recognised difficulties of safely accommodating tracheostomy patients outside the ICU setting. We have used broad metrics, such as ICU and hospital LOS and duration of tracheostomy cannulation to monitor tracheostomy management as these have been used by previous authors and facilitate comparison of our results with published data.

In conclusion, in a study comparing tracheostomy management and patient outcome since the establishment of our MTT service in 2009 and again in 2017, we found a significantly increased use of tracheostomy and the percutaneous dilatational tracheostomy technique. We report a highly significant reduction in the duration of tracheostomy cannulation between the two study periods. The use of a Mini-Trach following tracheostomy decannulation has been introduced into our more recent practice. The potential role of a Mini-Trach after tracheostomy decannulation appears promising and requires further study.

Declaration of Conflicts of Interest:
The author's report no conflicts of interest.

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Closing the Osteoporotic-Fracture Care Gap for Frail Older Persons

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Abstract

Aim

To implement standardised fracture risk assessment in the frail older person.

Methods

Frail older patients underwent opportunistic screening for fracture risk. Roadblocks to standardised assessment were identified. An Integrated Care Team for older persons (ICT) trained in fracture risk assessment using FRAX. Clinical assessment was via a locally agreed algorithm. Data was entered onto Excel. The SQUIRE guidelines for quality improvement programmes were used to report the results.

Results

Of 96 patients opportunistically screened, the average age was 84 years. FRAX was completed for 19% (n=18). 89% (n=16) met the pharmacotherapy threshold. Nine were recommended pharmacotherapy. Of sixteen patients recommended for DXA, just 31% (n=5) were booked. Following implementation of a quality improvement project, 100 patients were assessed, and average age was 80 years. FRAX was completed for 62% (n=63) and 95% (n=60) required pharmacotherapy. 24% (n=14) had untreated prior fracture. All had pharmacotherapy prescribed. 59% (n=59) required DXA scanning. 70% (n=41) had DXA ordered.

Conclusion

ICT ownership increased FRAX assessment 3-fold and point of contact prescribing to 100%.

Introduction

Ireland has the 6th highest hip fracture rate in the world. [1] The establishment of a national fracture prevention strategy aimed at reducing the total number of hip fractures is important. Fracture admissions to Irish public hospitals have been shown to have increased by 30% between 2010 and 2014. [2] Fracture liaison services (FLS) increase fracture prevention rates in high risk patients. A comprehensive FLS can reduce the total number of future incident fractures. Significant numbers of patients with a first fragility fracture do not undergo fracture risk assessment and management. An Irish study has shown that up to 64.5% of medical inpatients over the age of 65 years exceed the National Osteoporosis Federation threshold for fracture prevention treatment.[3] This can be seen worldwide where in the Canadian population fewer than 20% of patients receive pharmacotherapy to prevent future fragility fractures in contrast with 75% of patients who receive β-blockers beta blockers to prevent a subsequent myocardial infarction.[4]

No quality indicators are yet in place in the Irish healthcare system for FLS. There is a plan to establish a National service strategy with targets for the 16 trauma hospitals currently submitting data to the Irish National Hip Fracture Database.[5] Non-regional centres have yet to be included in national strategies. Non-regional centres comprise over half of the hospitals in Ireland. Integrated care teams provide a potential solution to providing FLS in non-regional centres.

This Quality Improvement Project (QIP) is in a Model 3 non-regional centre, serving a population catchment area of 110,000 and has been reported using the SQUIRE guidelines.[6] An FLS is operational for 10 years providing targeted assessments for persons over the age of 50 years attending an orthopaedic fracture clinic.[7] The cost benefit of fracture prevention has been shown in community based studies. A systematic, community-based screening programme of fracture risk in older women in the UK showed that the incremental cost of screening per Quality Adjusted Life Year gained was £2,772. The intervention arm prevented fractures at a cost of £4,478 and £7,694 per fracture for osteoporosis-related and hip fractures respectively.[8]

Cost-effectiveness of treatments applied on a population basis is a key part of effective healthcare planning. Drugs used to treat osteoporosis have been found to be cost-effective in postmenopausal women over the age of 60, particularly if they had other risk factors.[9] This further strengthens the case for a catchment wide approach to case finding of patients at high risk of fracture.

The integrated care team (ICT) for older persons provides care to the frail older person across both catchment-based acute and community settings. It became apparent to the ICT for older persons that the rate of fracture risk assessment in the frail older inpatient and those attending outpatients was unknown. The FLS linked with the ICT for older persons in 2019. The QIP was developed to provide quality FLS to those at highest risk of primary and secondary fracture, prescribe appropriate pharmacotherapy and ensure that Dual energy Xray Absorptiometry (DXA) where deemed appropriate, is requested and followed up.

Methods

Initially, patients routinely referred to the Senior Pharmacist, as part of Comprehensive Geriatric assessment (CGA),[10] completed the Fracture Risk Assessment Tool (FRAX)[11] if identified at high risk for fracture. Patients were identified as high risk if they had a previous fracture, rheumatoid arthritis, premature menopause, chronic obstructive pulmonary disease or were prescribed long term steroids or proton pump inhibitors but not already on osteoporosis treatment. FRAX was also completed on patients as part of a pharmacy falls review if requested. Pharmacy assessments were paper based. Recommendations were made in the patient's medical notes and verbally communicated to the in-patient medical team and/or to the ICT for older persons. During this case-finding phase it was self-evident that the cohort of patients being reviewed were at high risk of fracture, that there were larger numbers than could be assessed, that competing interests meant that a standardised approach to all patients could not be achieved and that there was a cohort that could not be monitored as they were physically unable to have a DXA scan performed. Data collection was not standardised. Follow up and outcomes were not routinely measured. The numbers of patients assessed for fracture risk, FRAX, proportion of DXA scans booked and prescribing of bone health medication were retrospectively recorded onto an Excel spreadsheet from paper records and analysed. This led to a quality improvement project which follows the SQUIRE guidelines for a QIP.

The QIP involved extending the service to the ICT for older persons. Patients aged 70 and above, attending selected medical out-patient clinics or admitted through the Emergency Department, are routinely triaged to the ICT for older persons with the VIP tool. The VIP (Variable Indicative of Placement risk) is a validated screening instrument which identifies hospitalised patients aged 70 years and older who are most likely to benefit from specialist geriatric assessment.[12]

FRAX became part of the CGA carried out by the ICT for older persons. Following CGA, each patient was discussed at a Consultant-led multi-disciplinary meeting (MDM). Secondary osteoporosis screening blood tests and DXA scans were booked and pharmacotherapy prescribed. During this phase, FRAX scores were documented in a standardised fashion onto a paper template. The MDM allowed for standardised supervised assessment of fracture risk, DXA booking and bone health medication prescribing. A prescribing algorithm was developed in order to allow different practitioners to prescribe uniformly. The cut-offs for prescribing are greater than 20%, 10-year probability of major osteoporotic fracture or greater than 3.5% 10-year probability of hip fracture. Data routinely collected included age, gender, previous history of fragility fracture, FRAX score, DXA scan booking and prescription of pharmacotherapy. Patients' functional ability as measured by Barthel index[13], mobility status, visual impairment, falls history and clinical frailty score were also recorded. Clinical frailty score (CFS) was used, as a part of CGA, to assess the level of frailty of patients. The CFS is a validated scale, providing a summary tool for clinicians to assess frailty and fitness. [14] Patients were divided into mild, moderate and severely frail.

Data was entered onto an Excel spreadsheet by a trained administrator. Descriptive statistics were used to analyse the data.

Consent was not required as the assessment and intervention provided is part of routine clinical practice.[15,16] There were no ethical issues foreseen, identified or raised for this QI project.

Results

Data for 96 patients was collected during the initial case finding stage. The average age was 84 years with a 1:1 male to female ratio. FRAX was available for 19% (n=18), of those 89% (n=16) met the pharmacotherapy threshold. 37.5% (n=6) had a clinically significant FRAX but no prior history of fracture. 19% (n=3) had a history of previously untreated fragility fractures. For 44% (n=7) history of previous fractures was not documented. DXA was booked for 31% (n=5) out of the 16 patients where DXA was recommended. For 56% (n=9) out of 16 patients, recommendations regarding starting pharmacotherapy were made but there was no record of whether prescriptions were issued.

During the QI phase data for 100 consecutive patients, referred to ICT for older persons through both inpatient and outpatient pathways, was collected prospectively. The average age was 80 years with a 1:1.5 male to female ratio. In addition to FRAX the CGA furnished the team with data relevant to the older person and fracture risk. With regard to the Barthel index, most patients 42% (n=42) had low functional dependence, followed by 22% (n=22) with medium dependence, 8% (n=8) with high dependence while 1% (n=1) maximally dependent for activities of daily living (ADLs). With regard to mobility, 25% (n=25) of patients were functionally independent. 38% (n=38) were able to mobilise unaided. 24% (n=24) used a rollator Zimmer frame, 37% (n=37) used a walking stick, while only 1% (n=1) was a wheelchair bound patient. A large number of patients 61% (n=61) reported a history of at least one or multiple falls while 39% (n=39) had no previous history of falls. Visual impairment was noted in a majority of patients 55% (n=55). 34% (n=34) were found to be moderately frail, 28% (n=28) were mildly frail. 14% (n=14) of the patients included in the cohort were severely frail.

FRAX was available for 62% (n=62) patients, of those with 95% (n=59) meeting the pharmacotherapy threshold. FRAX was not calculated for 38% (n=38) patients. 24% (n=14) patients had a previous history of untreated osteoporotic fracture. 70% (n=41) had DXA scans booked where deemed appropriate. All patients qualifying for pharmacotherapy had it prescribed at the point of first contact.

Discussion

A case finding strategy identified that many patients at risk of fracture were not receiving appropriate pharmacotherapy and DXA scan. Training of an ICT for older persons increased the number of patients screened for fracture, who received pharmacotherapy review and point of contact prescribing. The QI project enabled patient cohort profiling. The majority of patients while being determined as moderately frail, have low dependency and a history of at least one fall. This is a high-risk fracture group.

Not all patients were FRAX scored. The reason for this is likely to be multifactorial – already on bone health medications, unable to get both height and weight at the time of assessment and competing clinical interests. Future data collection will need to take note of the reasons for FRAX not being completed so that we can understand the barriers to standardised care.

A team already engaged in integrated care for the older person extended their training to include FRAX scoring, which was a whole-time equivalent cost-neutral initiative. Greater numbers of patients at high fracture risk receive appropriate fracture prevention as a result of this QIP.

Controversy around the accuracy of fracture prediction using FRAX based cut-offs exist. Despite no particular supporting evidence, numerous guidelines have developed which use a FRAX score cut off to determine whether pharmacotherapy should be commenced. [17] The use of clinical risk factors in conjunction with BMD and age improves sensitivity of fracture prediction without adverse effects on specificity. Even if the performance of FRAX is enhanced by the use of BMD tests, it should be recognised that FRAX without BMD has a predictive value for fractures that is comparable to the use of BMD alone. FRAX remains a well validated tool to evaluate fracture risk. In patients where treatment will be commenced and DXA is possible, treatment follow-up requires that bone density measurement is used in addition to FRAX in order to monitor response to drug therapy.

There are some limitations to this work. The availability of a Geriatrician and pharmacist with an interest in osteoporosis were key. Therefore, it is not generalisable to every healthcare setting. The retrospective nature of data collection in the first study phase is likely to have resulted in less accuracy in data recording.

This QI project helped to pinpoint gaps in the identification of fracture risk and enabled an ICT for older persons to implement a pathway for identification and management. Ad-hoc opportunistic screening informed the development of a standardised fracture risk assessment process and point of contact prescribing. This was achieved through an integrated care team for the older person.

Declaration of Conflicts of Interest:
No conflict of interests to be declared.

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Retrosternal Thyroid Goitre Aetiology, Presentation and Management

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Abstract

Aims

The aim of this study was to review the presentation, indications for surgery and surgical approaches to retrosternal thyroid goitres in our tertiary head and neck centre.

Methods

A retrospective 5-year review of patients who underwent surgery for retrosternal goitres (RSG) was performed from 2015 to 2020. Patients were identified through review of the HIPE database and theatre logbooks. Data was then recorded from electronic records and radiological investigations. A literature review was carried out in pubmed using the following search terms 'retrosternal goitre', 'substernal goitre', 'thyroid goitre' and 'mediastinal goitre'.

Results

32 patients were identified who received total thyroidectomy operations for RSG within this 5-year period. 27 patients (84%) had their goitres excised entirely via a transcervical approach. 1 patient (3%) required a full sternotomy and 4 patients (12.5%) required surgical intervention at the manubrium.

Discussion

The majority of RSGs can be successfully excised through a transcervical approach. A small proportion, however, may require thoracic intervention to enable removal. These intrathoracic approaches range from medial resection of clavicle, partial sternotomy to full median sternotomy. Predictive factors for thoracic intervention include posterior mediastinum involvement and extension beyond the arch of aorta. To ensure successful surgery, one needs a full armamentarium of surgical techniques.

Introduction

A goitre is defined as an enlargement of the thyroid gland to twice its normal size[1-2]. It has been estimated to affect 10% of the UK population and 1.5 billion people globally[3]. RSGs are most frequently benign with only 3-15% identified as malignant[1]. Of the benign causes iodine deficiency gives rise to the majority, however, other associated risk factors for developing the disease include increase in serum thyroid-stimulating hormone (TSH) level, natural goitrogens, smoking, and selenium and iron deficiencies[4].

With iodine deficiency being the largest causative agent of multinodular goitres, particular attention is payed to levels of dietary iodine intake globally. In 1990 the Joint UNICEF/WHO committee urged all countries to adopt and implement universal salt iodisation (USI). The introduction of USI, represented a simple intervention of an iodinated substance to table salt which did not require a change in dietary habits[5]. Most countries have taken a voluntary approach to this which has culminated in a wide variation in the production and use of iodised salt. Ireland and the UK have some of the worst figures, with iodised salt comprising only 3.3% of salt sold in Ireland and similar figures in the UK[5]. This is of clinical significance as studies have demonstrated that dietary iodine intake in Irish women remains well below WHO recommendations and Ireland is an area of borderline dietary iodine deficiency[5]. In recent years, there has been limited published data regarding the incidence of goitres within the Irish population, however with iodine deficiency still a national problem one can surmise goitres remain an endemic disease in Ireland.

Dietary goitrogens can also cause thyroid goitres, these are naturally occurring chemicals found in many plant-based foods. High consumption of these foods on a regular basis may affect your thyroid hormone production in several ways. Firstly, they can inhibit the process by which iodine is incorporated into the thyroid hormones thyroxine (T4) and triiodothyronine (T3) and secondly inhibit the release of thyroid hormones from the gland. The two main food groups that are classified as dietary goitrogens include cyogenic and flavonoid containing plant foods. These include cruciferous vegetables, starchy plants and certain fruits e.g. broccoli, kale, cauliflower, strawberries, sweet potatoes and tofu[6].

Selenium, iron and smoking have also been noted to affect the thyroid gland. Selenium deficiency decreases the synthesis of thyroid hormones which in turn increases TSH level[7]. This imbalance in thyroid hormones can result in fibrosis of the gland and goitre formation. Similarly, iron deficiency can contribute to the development of hypothyroidism and cigarette smoke contains goitrogens including thiocyanates which may lead to goitre formation[7].

Retrosternal, substernal and intrathoracic goitres are terms used to describe a subgroup of goitres that extend into the thoracic cavity[3]. Although there are several descriptions of RSG in the literature, the two most common definitions are a “thyroid gland that descends below the plane of the thoracic inlet” or a “thyroid gland with greater than 50% below the thoracic inlet”[1,2,8-10].

Retrosternal goitre (RSG) can be classified as Primary when the intrathoracic thyroid mass arises from aberrant thyroid tissue in mediastinum and is entirely separate from the neck and Secondary RSG which result from the downward growth of a normally situated thyroid gland in the neck[1].

Goitres may present to surgeons for diagnostic and therapeutic purposes. Of all multinodular goitre patients undergoing total thyroidectomy, the incidence of RSGs has been reported to be between 1-20%. The wide variation in reported incidence has been partially surmised to be due to the lack of consensus regarding the definition of RSG[11]. The diagnosis is usually made in the 5th-6th decades of life with a female preponderance 4:1[11]. The majority of RSGs (85-90%) are located within the anterior mediastinum, with the remainder (10-15%) located in the posterior mediastinum[11].

They can cause a variety of symptoms including respiratory distress, dysphagia and thoracic inlet obstruction. These symptoms are induced by extrinsic compression of the trachea, oesophagus and great vessels as the goitre grows in size[1]. The gold standard treatment for symptomatic retrosternal goitres is thyroidectomy. There is no substantial supporting evidence in the literature for the use of medical suppression therapy in the form of levothyroxine or radioactive iodine[1].

We aimed to review the presentation, indications for surgical intervention and surgical techniques in retrosternal thyroid surgery within our own institution.

Methods

A literature review was carried out in pubmed using the following search terms 'retrosternal goitre', 'substernal goitre', 'thyroid goitre' and 'mediastinal goitre'. Following this, a retrospective 5-year review of patients who underwent surgery for retrosternal goitres was performed in our tertiary hospital. After discussion with our institution's ethics committee, ethical approval was deemed not to be required as this review was primarily an audit. All patients who received total thyroidectomy operations were identified with the assistance of the Hospital In-Patient Enquiry (HIPE) Department and by reviewing theatre logbooks from 1st of January 2015 to 1st of January 2020. A small proportion of thyroidectomy surgery was still undertaken by General Surgeons previously, however, in recent years this operation has been solely undertaken by ENT in our institution. The hospital's electronic patient care record was then reviewed for each patient looking at relevant outpatient clinic letters. Patients with symptomatic RSGs were investigated with CT neck/thorax imaging to assess the size, location and compressive effects of the goitre. For the purposes of this study a retrosternal goitre was defined as a thyroid goitre confirmed radiologically to be extending beyond the thoracic inlet.

Preoperative CT imaging identified maximal retrosternal area of each goitre and its relationship to the trachea, oesophagus and major vessels. In patients with asymptomatic or mildly symptomatic retrosternal goitres we routinely elect for a period of observation with a repeat CT neck/thorax on presentation or progression of symptoms.

The presence of positive symptoms and/or time to progression of symptoms were documented for each case. Following this, operative notes were examined to identify surgical approach and technique for each patient's procedure.

Results

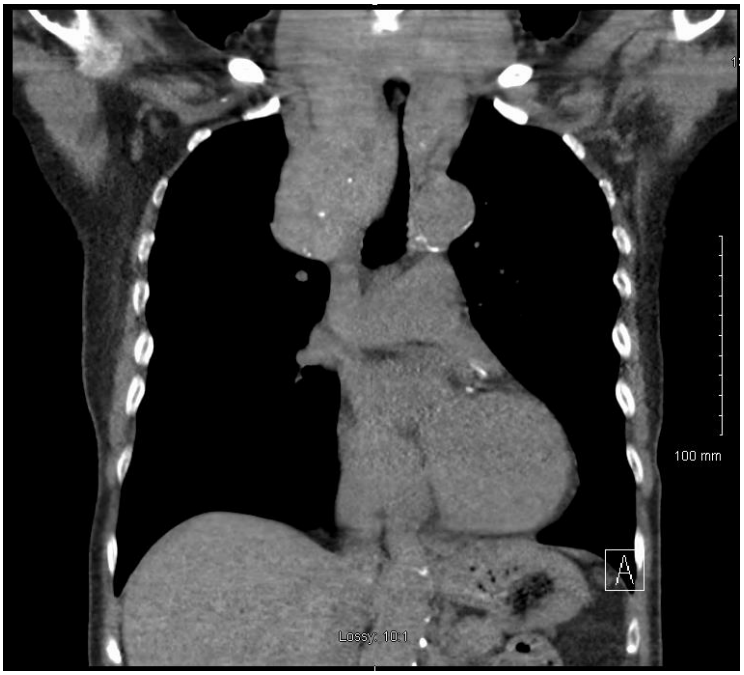
A total of 32 patients were identified who received total thyroidectomy operations for retrosternal goitres within this 5-year period under ENT in our institution, which consisted of four separate consultants. The indication for surgery was compressive symptoms secondary to the goitre in all 32 patients. There was a female preponderance of 3.5:1, with 25 of the 32 patients being female. The age of patients undergoing surgery ranged from 30 to 85 with a median age of 65. The most common symptoms reported were orthopnoea, dyspnoea, choking/pressure sensation and dysphagia respectively (see figure 1). Seventy eight percent of patients reported varying degrees of orthopnoea, whilst only 9% had stridor and 6% were documented to be Pemberton's positive on clinical examination.

Figure 1: Table showing occurrence rates of clinical symptoms/signs.

CLINICAL SYMPTOMS/SIGNS	PERCENTAGE (Number)
Orthopnoea	78% (25)
Dyspnoea	50% (16)
Choking/pressure	47% (15)
Dysphagia	47% (15)
Stridor	9% (3)
Hoarseness	6% (2)
Pemberton's positive	6% (2)
Cough	3% (1)

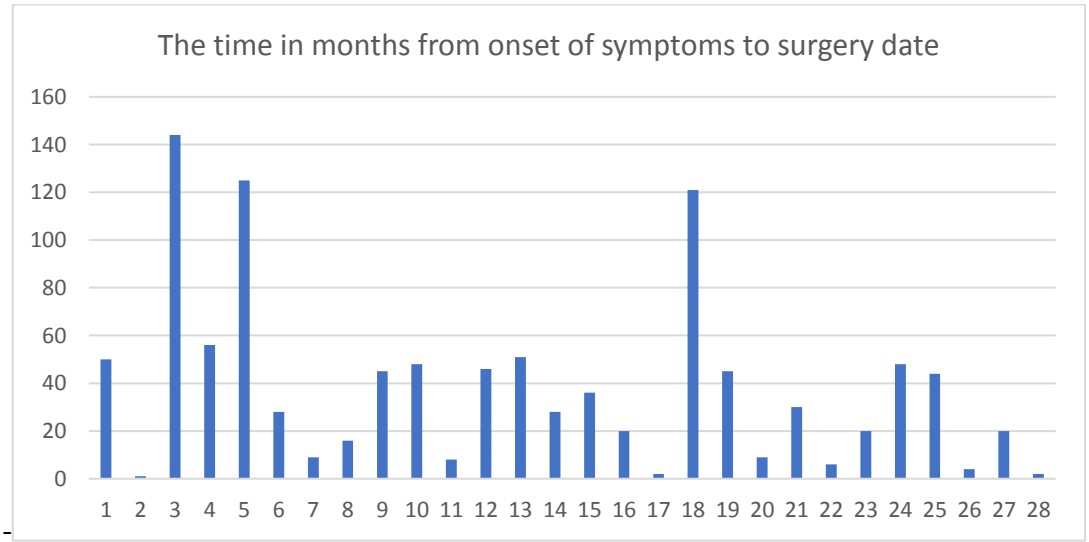
The radiological retrosternal extent of goitre was recorded in 23 patients. With a retrosternal extension range beyond the manubrium of 2cm – 14 cm with an average of 7.5cm. All of these patients had radiological evidence of airway compromise with tracheal deviation and/or compression. The degree of tracheal compression was reported in 18 patients. The range of reduction of tracheal lumen was 3mm – 15mm with an average reported compression of trachea to 7.8mm (see figure 2).

Figure 2: CT thorax in coronal plane depicting a retrosternal goitre causing significant tracheal compression.



Length of time from onset of symptoms to initial review and surgery date was ascertained. Twenty eight out of the thirty two patients had retrievable figures on this data point. Of these 28 patients, length of time from onset of symptoms to surgery ranged from 0-144 months, with an average of 34 months (see figure 3). Length of time from initial ENT review to surgery ranged from 0-132 months with an average observation time of 11.7 months. One patient had immediate surgery during acute presentation to the emergency department with stridor.

Figure 3: Graph showing length of time in months from onset of symptoms to surgery date (x axis shows case number and y axis is time in months).



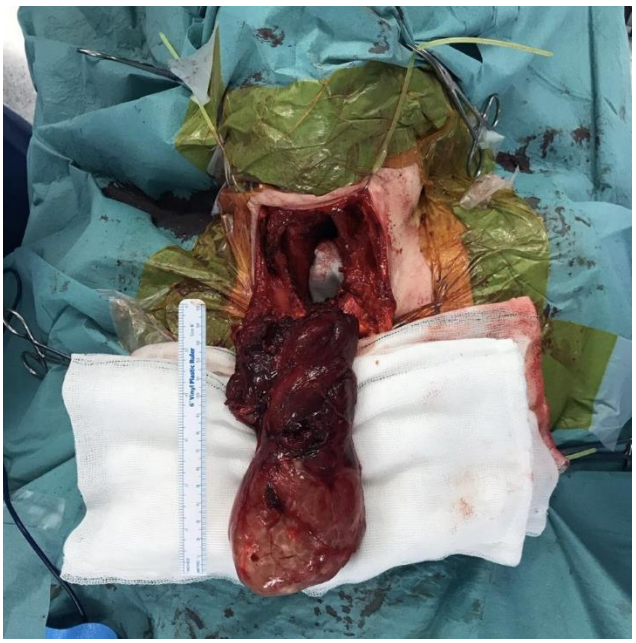
Once decision has been made to proceed with thyroidectomy, a Cardiothoracic Surgery consult is requested for those patients deemed high risk of requiring a sternotomy. This is decided on an individual patient by patient basis by reviewing each patient's clinical condition and pre-operative cross-sectional imaging and noting the presence of any positive predictive factors for requiring sternotomy. For those patients deemed high risk of requiring sternotomy, Cardiothoracics team remain on standby for the surgery.

For the 32 patients identified, 27 patients (84%) had their goitres excised entirely via a transcervical approach. 1 patient (3%) required a full sternotomy and the remaining 4 patients (12.5%) required surgical intervention or manoeuvres at the thoracic inlet.

Surgical Technique

A skin crease incision is made 2-4 cm above the sternal notch. Subplatysmal flaps are then raised and the sternothyroid muscle is routinely divided. The cervical thyroid mobilised and thyroid vessels are ligated. Once the cervical thyroid is mobilised, we assess the mobility of retrosternal component and decide on need for additional access at the thoracic inlet. Thoracic inlet techniques described in these five cases included soft tissue split down to the sternal notch with vertical midline incision and (see figure 4), division of the sternohyoid muscle, manubriumectomy to increase diameter of thoracic inlet, partial upper sternotomy or total sternotomy. For the patients who required partial upper and total sternotomies, it was performed by Cardiothoracics Surgery team.

Figure 4: Intraoperative image of a retrosternal goitre after being delivered through a transcervical approach with an extended midline incision and soft tissue split down to the sternal notch.



Post operatively all patients were extubated and with no symptoms of tracheomalacia and none required a tracheostomy. Two patients (6%) had prolonged complications of hypocalaemia, however, none of the 32 patients (0%) suffered from permanent recurrent laryngeal nerve injury.

Discussion

Goitres can cause significant compressive symptoms including respiratory distress, dysphagia and vascular compromise of the major vessels[11]. The literature reports that retrosternal goitres are more likely to result in varying degrees of pressures effects, compared with purely cervical goitres, which may culminate in acute respiratory compromise and sudden death[12]. Tracheomalacia has been reported in 1% and superior vena cava syndrome in 3.2% of patients with RSGs according to one systematic review[8]. As there is no reliable medical management, surgery remains the treatment of choice for retrosternal goitres with or without clinical symptoms due to the apparent life-threatening risks of an enlarging goitre[1,2].

The slow growing nature of thyroid goitres is an important consideration in patient selection for surgery. The risk-benefit profile for elderly patients with co-morbidities i.e. life expectancy measures in years rather than decades, often does not favour surgical intervention but rather observation to ensure no emergent intervention is required for compressive symptoms. The average time from presentation to surgery of 11.7 months reflects the authors considered approach to intervention, with a period of observation of symptoms and serial imaging to assess need for surgical intervention.

The vast majority of RSGs can be successfully excised via a cervical approach with thoracic intervention required in only a small subgroup reported between 0-11%[11], with one paper stating that all RSGs could be removed via the neck[13]. A small proportion of these patients, however, may require additional intervention, which is not standard practice for thyroidectomy operations, to enable removal. These techniques range from less extensive procedures such as medial resection of the clavicle and manubriumectomy; to more invasive approaches including full median sternotomy and lateral thoracotomy. The literature has reported a significant association between the extent of RSG and reported complications, with the incidence of tracheomalacia, superior vena cava syndrome and the need for thoracic approach increasing 10-fold in patients with RSGs extending to the aortic arch[8]. The predictive factors reported for extra-cervical approaches include involvement of the posterior mediastinum, extension beyond the aortic arch, previous goitre surgery, superior vena cava obstruction, malignancy and emergent airway obstruction[8,11,14-16].

The greatest operative risk when resecting an intrathoracic goitre is the potential for catastrophic thoracic haemorrhage which the surgeon would not be able to control due to lack of access to thoracic vessels. The potential for sternotomy or manubrium manoeuvres can and should be anticipated depending on the features of the goitre as previously described. In order to optimize patient safety and avoid the scenario of an uncontrolled haemorrhage it is paramount that these high-risk goitres be operated in a surgical centre with the ability to undertake a sternotomy.

Patients may also require a tracheostomy post operatively due to bilateral vocal cord palsy or significant tracheomalacia. To ensure successful retrosternal thyroid surgery, one needs a full armamentarium of surgical techniques, equipment and specialists.

Declaration of Conflict of Interest:
The authors have no conflicts of interest to disclose.

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The Benefits Experience by Families Participating in the Watersports Inclusion Games

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Abstract

Aims

The Watersports Inclusion Games (Inclusion Games) is a free event for children and families with disability to participate in water-based activities[1]. Family participation in physical activity can improve mental health and confidence in children with disability[2]. This study aims to gain an insight into the benefits and barriers of participation, perceived by parents and carers.

Methods

After an initial literature review, an online pre-event and post-event survey was constructed via SurveyMonkey. Both surveys were circulated 3 times to attendees. Statistical and thematic analysis was carried out to compare changes in responses both before and after the event.

Results

49% of participants were primarily hoping to experience a new sport in a controlled environment and meet others with similar challenges. The surveys also highlighted an increase in reported family bonding [P=0.14] due to the event. A thematic analysis revealed event organisation and planning is vital for effective participation of children with disability.

Conclusion

Creating an equal opportunity for young people with disabilities and their families to partake in watersports led to increased confidence and a higher likelihood of future participation. Effective organisation and extra help were key enabling factors facilitating these benefits.

Introduction

In Ireland approximately 6.7% of people under 20 years are disabled[1] and families are the main providers of support for these young people[2]. For a young person with a disability or impairment, participating in any physical activity at a level similar to that of a person without disability takes meticulous planning and effort. Aside from societal barriers to accessibility, individual challenges such as physical ability, sensory acuity and social anxiety are all factors which must be considered prior to engaging in physical activities[3]. However, equal opportunity to partake in physical recreation is a right of every person with disability and is vital for growth and development[4]. We wish to draw clinician awareness to these events and make referrers aware of the ongoing offerings from watersports organisations wishing to support inclusion. We outline positive physical and mental health benefits for such approaches.

The Watersports Inclusion Games is an inclusive community event for children and adolescents with range of sensory, physical, intellectual and learning disabilities, supported by several partner organisations. "*The event showcases the latest on adaptations and innovations for optimised watersports delivery and promotes the benefits to health and wellbeing of accessible inclusive watersports participation"*[5]. The weekend event has occurred annually since 2017 in different counties throughout Ireland and allows children and families to partake in sailing, rowing, canoeing, supping and surfing. Despite the abundant benefits of participating in watersports, it is not a daily reality for families with disabled children often due to barriers in accessibility. Given the limited publications in this area, both in Ireland and internationally, we sought to explore the views of participants regarding barriers and benefits when partaking in watersports and the Inclusion Games in 2019.

2018 HSC guidelines in Northern Ireland highlight that being active for children with disability results in better pain management and greater ability to cope with difficult situations[6]. A 2004 study reported that when families of young people with disabilities participated in outdoor or sports activities together, the young person was better at coping with stress and harboured a better perception of themselves[7].

Carers are essential for providing opportunities for physical recreation and leisure activities. A study by Kim and Lehto explored the barriers when traveling for young people and families with disability. They reported the most motivating factor for whole family participation in physical leisure activities was the physical competence of the child or young person with disability. Families most often reported that they resorted to sedentary activities, requiring minimal adaptation for their child[8]. When participating in activities such as watersports, the lack of accessibility for disabled children frustrated parents and motivation seemingly lost[8, 9].

Water and water-based activities have distinct effects on disabled participants which other environments cannot provide. For instance, balancing on uneven surfaces such as sand is congruent with physical therapeutic goals to provide stability for individuals with disability.

Furthermore, the tightness of wetsuits and the movement of the waves are sensory stimuli which cannot be experienced in other settings[10]. Alongside physical benefits, water-based activities also provide mental, emotional and social impetus which children can apply to other aspects of their lives.

Methods

A literature review was carried out and was used to develop a draft questionnaire for carers based on key themes we identified in the literature.

The pre-event survey wanted an insight into what parents and children were hoping to gain from this event as well as the barriers they are currently experiencing when participating in watersports. In collaboration with the community organisers, the key research questions regarding benefits and barriers were utilised to form anonymous pre-event and post-event surveys. This was piloted by the involved team, including the community partner, medical students and non-medical students.

The surveys included both closed and open free text questions, to gauge what participants and families valued about this event and conducted a thematic analysis based on this. The post-event survey sought to ascertain if these needs were met and the views of the participants following the event.

SurveyMonkey, an online survey tool with industry standard encryption technology, was used to gather the information before and after the event from the adult carers of the participants in the Inclusion Games. Both surveys were circulated three times to attendees

The quantitative data was then statistically analysed on Excel and SPSS, where chi-square tests were used to determine differences between pre-event and post-event survey responses. A thematic analysis following the Braun and Clarke model was carried out on some qualitative post-event data, by assigning codes to themes and subthemes. This way the answers were categorized and qualitatively explored[12].

Results

There was a reasonably high response rate of participant surveys relative to report rates in similar literature:

Pre-event response rate: 41 responses from 85 links sent out (48%).
Post-event response rate: 65 responses from 85 links sent out (71%).

Carer's reports of disability needs to organisers highlighted a range of mental and physical disabilities experienced by participants. Specific diagnoses include autism spectrum disorder, Down syndrome, cerebral palsy, paraplegia and hydrocephalus.

Table 1: *What are you hoping for from this event? [Pre-event] - Responses (n = 41)*

New Experience	49%
Confidence	10%
Social interaction	19%
Other	22%

In the post-event survey, the equivalent to the question posed in table 1 asked if participants had achieved what they had hoped for from this event. 100% (all 60 respondents) stated yes.

Table 2: *How much of a benefit do you think watersports will have for the participant in relation to the following aspects [pre-event] - Responses (n = 41)*

	Boosting confidence	Improving motor skills	Meeting peers / other parents	Enjoying family life at a whole family event	Gaining a new experience / skill
Very beneficial	82.9%	75.6%	68.29%	63.4%	82.9%
Moderately beneficial	14.7%	7.3%	21.95%	17.1%	14.6%
Somewhat beneficial	2.4%	17.1%	9.76%	17.1%	2.5%
Not beneficial	0.0%	0.00%	0.00%	2.4%	0.0%

Table 3*: Having participated in this event, how much of a benefit do you think watersports had for the participant in relation to the following aspects [post-event] - Responses (n = 60)*

	Boosting confidence	Improving motor skills	Meeting peers / other parents	Enjoying family life at a whole family event	Gaining a new experience / skill
Very beneficial	82.8%	46.3%	64.3%	73.2%	86.0%
Moderately beneficial	13.5%	26.8%	16.7%	12.2%	12.0%
Somewhat beneficial	2.7%	12.3%	16.7%	12.2%	2.0%
Not beneficial	0.0%	14.6%	2.3%	2.4%	0.0%

A thematic analysis was carried out for the post-event survey question – "list some things you enjoyed about the event". The objective of this question was to appraise what families valued about partaking in the event based on recurring themes. (Table 4)

The 3 themes analysed from the responses included *event, personal* and *volunteers.* Event was mentioned 60 times in participant responses, under the subthemes of weather, location, atmosphere, organisation and specific activities. An example of a response referring to this theme includes, "*Very well organised, very easy to register, plenty of volunteers to help you find where you were to go. We got to sail 2 x lovely yachts ... one with our son and another while our son was on a hansa. Lovely relaxing experience."*

The theme referring to personal aspects of the event was mentioned 33 times. It was categorised by the subthemes of family bonding, personal achievements and the social impact of the event. An example includes, *"Well organised, the fresh air, just being out and about together as a family, trying out new activities, meeting new people, fabulous volunteers".*

The final theme of volunteers was mentioned 29 times, regarding the helpfulness, friendliness and general appreciation for the volunteers as subthemes. An example includes, *"To be able to get onto any boat without having to worry about how to. "The level of help and the amount of volunteers made this possible. Never once had to worry, just to let them know how they could best help me*."

Table 4: Thematic analysis - Responses (n=60)

Theme	**Sub-theme**	**Number of mentions**
Volunteers (1) 29 mentions	Support / helpfulness (1.1) Friendliness (1.2) General appreciation (1.3)	(9/29) (8/29) (12/29)
Event (2) 63 mentions	Venue / location (2.1) Weather (2.2) Atmosphere (2.3) Organisation (2.4) Specific activities (2.5)	(8/63) (7/63) (13/63) (17/63) (18/63)
Personal and family (3) 33 mentions	Family bonding (3.1) Personal achievements or feelings (3.2) Social aspect (3.3)	(11/33) (16/33) (6/33)

Discussion

This is the first Irish study on the benefits and barriers for younger people with disabilities and their carers engaging in watersports. This pilot study utilised survey methodology to explore the views of the participants in the 2019 Inclusion Games, through pre-event and post-event surveys. We explored the obstacles young people with disability can face when participating in watersports and where the main limitations to participation exists. Given the spartan nature of the literature, this study establishes insight into where difficulties arise for families and the impact the Inclusion Games, even as a brief initiative, can have.

Carers reported that 49% of participants were hoping for a *new experience*. Previous authors highlight that many children with disability and their families may be limited when attempting watersports due to high costs, lack of transportation, difficulty accessing equipment and unavailability of trained personnel[13]. The Inclusion Games were specifically aimed at eliminating these barriers by creating a free event with access to equipment tailored for young people with disabilities, to enable whole family participation. This is an important social, personal and community value.

The other hopes participants had prior to the games included *gaining confidence* and *social interaction.* A 2016 study revealed that a social hurdle for children with disabilities when participating in physical activity was a lack of confidence or sense of frustration. This stemmed from comparison with young people of typical development, especially as the skill gap widened with age[13].

When considering the benefits of watersports in terms of physical wellbeing, we are aware a brief intervention such as this, has limited long term physical impact. Several studies involving simulated sailing courses and surf therapy accommodated for children with disability, shows that continuous participation in water-based activities have a strong impact on enhancing physical capability and in turn quality of life[8, 13-16]. This is potentially due to the buoyancy water provides, which can enable children with impaired mobility on land to move with less assistance and more ease. Independent movement in the water such as swimming, surfing or walking, can provide postural stability and in turn strengthen muscles[14].

Potentially a longer term and consistent water-based intervention will show a beneficial change in motor skills. Longer term initiatives such as Sailability[17] are available to families and anecdotal evidence suggests gaining confidence and exposure to events such as this have led to ongoing collaborative supports from partner organisations working with carers. Events such as the Watersports Inclusion Games may foster such developments.

The comparison between table 2 and table 3 also shows there was a statistically significant increase [*P*=.014] in enjoyment of family life at a whole family event. One parent commented saying: "*….My other son who is 11 and does not have special needs attended too and it worked really well for us as a family."* Surf therapy studies for children with disability have found that participation of non-disabled siblings as well allows for healthy competition and decreased jealousy between siblings, promoting more bonding[10].

Where families of children with disability are involved, planning and extra help are key enabling factors when taking part in new activities. Without planning, carers report resorting to "easier" activities[9, 18]. Following the event, carers commented they were able to worry less and leave the event with the information and confidence for future participation[18]. Furthermore, providing the opportunity for a new experience can stimulate the child's interest in different activities, increasing the likelihood of future participation[19]. As one parent said: "…*that he would get an overall idea of what he could do, rather than just being at home and an experience that he would hopefully take up."*

Creating an equal opportunity for young people with disability and their carers or families to participate led to many reported positives. Exposure to these events lends confidence to participants and this in turn may lead to longer term participation in other sports or an ongoing basis with partner organisations supporting young people with disabilities. The value brought by the Inclusion Games can be amplified by offering frequent, smaller events throughout the year as consistent participation is associated with increased benefits. To facilitate this enablement, we must robustly support funding, expertise and awareness for inclusive watersports in Ireland. There are undoubted physical and mental health benefits for young people and families.

Declaration of Conflicts of Interest:
The authors declare that there are no conflicts of interest regarding this article.

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COVID-19, "Lockdown" and Achilles Tendon Ruptures

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Abstract

Introduction

The COVID-19 pandemic has affected the types of trauma being operated on by Orthopaedic surgeons. Lifting of restrictions around sports saw a sudden return to play for people after a period of inactivity. Achilles tendon ruptures are associated with these episodic athletes. We hypothesised that easing of "Lockdown" restrictions led to increased presentations of Achilles tendon ruptures vs. the same period in 2019. We conducted a case-control study to investigate.

Methods

Data from electronic theatre logbooks of all operations performed from 27th March 2020 (Lockdown begins) to 31st July 2020 and 27th March 2019 to 31st July 2019 was collected. All operatively managed Achilles tendon ruptures were included. All other operations were excluded.

Results

772 total cases were performed in 2019. There were 17 Achilles tendon ruptures in that period (2.2%). 14 occurred after easing of restrictions. 580 total cases were performed in 2020. There were 13 Achilles tendon ruptures in that period (2.2%). 11 occurred after easing of restrictions and the return of sport. There was a greater incidence of Achilles tendon ruptures in 2019 vs. the equivalent "Lockdown" period in 2020.

Conclusion

COVID-19 pandemic restrictions and return to play after inactivity does not increase the incidence or rate of Achilles tendon rupture.

Introduction

The COVID-19 pandemic has changed the way we live. As Trauma & Orthopaedic surgeons, it has also affected our clinical activities. Elective procedures are being postponed and only now resuming normal order at time of writing, albeit with appropriate COVID-19 precautions in place. We are seeing a shift in the characteristics of our trauma patients. In the Republic of Ireland, we have seen a large upward trend in trauma-related "DIY" as people are confined to their homes. Bicycle-related trauma has increased too as people aim to stay active with the closure of gyms, swimming pools and other areas of recreational activity.

On 20th February 2020, COVID-19 was added to the list of notifiable diseases in Ireland. The 27th of February 2020 saw the first case on the island of Ireland[1]. The first case in the Republic of Ireland was announced two days later on the 29th February[2]. On the 27th of March 2020, the Republic of Ireland was deemed to be in full "lockdown" to help prevent the spread of COVID-19[3]. The measures taken coincided with an escalating death toll and as a response to increased reliance on intensive care units (ICUs).

A phased easing of restrictions began on the 18th May 2020. On June 29th, 2020, a further easing of restrictions was announced. As part of this, an allowance was made for outdoor team sports training and fixtures to return[4]. During a particular week in the month of July 2020, our unit operated on 8 ruptured Achilles tendons. This seemed to the authors at the time to be quite a large number. We would normally operate on 1-2 ruptured Achilles tendons per week. The authors hypothesised that the COVID-19 pandemic was having an impact on the presentations of such injuries to our department.

The Achilles tendon is the strongest tendon in the body, but it is also the most commonly injured. The overall incidence of Achilles tendon ruptures is increasing because of an increase in the prevalence of obesity, an aging population and an increased participation in sport[5,6]. It has an incidence worldwide of 18:100,000 and is more common in men between the ages of 30-40. Risk factors for Achilles tendon rupture include fluoroquinolone antibiotics, anabolic steroid use/misuse and episodic athletes or so-called "weekend warriors"[7]. The latter group is who we wanted to focus on for the purpose of our study. The sporting injury normally occurs due to sudden forced plantar flexion or violent dorsiflexion in a plantar flexed foot.

Our aim was to compare rates and incidence of Achilles tendon rupture in our department during the COVID-19 pandemic versus a similar time period in 2019. Our hypothesis was that the re-introduction of team sports as part of our national COVID-19 strategy increased rates & incidence of Achilles tendon rupture due to this episodic athlete or "weekend warrior" phenomenon. Large numbers of people went from a period of inactivity into sports that place a huge amount of eccentric stress on a tendon that has not been primed sufficiently. It was hypothesised that the rate and incidence would be higher than a similar period in 2019 pre-COVID-19 and government lockdowns.

We undertook a case-control study to see what effect COVID-19, "lockdown" and subsequent return-to-play had on the rates & incidence of Achilles tendon ruptures as our primary outcome measure. The secondary outcome measure was what effect COVID-19 had on the overall caseload in a busy trauma theatre. This is the first study of operatively managed Achilles tendon ruptures during the COVID-19 pandemic at the time of writing.

Methods

This was a retrospective case-control study of all Achilles tendon ruptures managed operatively in our department between specified dates in 2019 and 2020. The study start date was 27th March 2020 as this coincided with full "lockdown" in the Republic of Ireland. The study end date was the 29th July 2020. This date came 4 weeks after the easing of restrictions where team sports could return. As decided by the authors, this allowed sufficient time for the injuries to present to our unit and encompassed the previously mentioned week of 8 tendon ruptures that prompted the authors to conduct the study.

Rate and incidence of Achilles tendon ruptures managed surgically in our unit between 27th March 2019 and 29th July 2019 were also recorded. This was our control group. In this way, we hoped to see what effect, if any, the COVID-19 pandemic had on the numbers of presentations of Achilles tendon ruptures to our unit by comparing figures from 2019 vs. 2020. Our primary outcome measure was thus rate & incidence of Achilles tendon ruptures presenting during the COVID-19 pandemic.

The total number of operations performed for all causes in the study period was also recorded. A secondary outcome measure for this study was what effect, if any, the COVID-19 pandemic had on overall caseload in a busy trauma theatre.

Anonymous patient data was collected using our operating theatre's MetaVision system. In this way we could see the date of surgery, the procedure performed and the name of the performing consultant orthopaedic surgeon.

Inclusion criteria for the study were all Achilles tendon ruptures managed operatively during the study period in 2019 and 2020. Exclusion criteria were all operations performed during those same time periods for indications other than Achilles tendon rupture.

Results

In 2020, there were 580 operations performed in the trauma theatre(s) in our institution. In the control group (2019), a total of 772 operations were performed. This was a reduction of 28.1%.

The incidence of operatively managed Achilles tendon ruptures in the 2020 period was n=13. This gave a rate of 2.2% (13/580). (Fig. 1)

The incidence of operatively managed Achilles tendon ruptures in the control group was n=17. This gave a rate of 2.2% (17/772). (Fig. 1)

In 2020, 11 Achilles tendon ruptures occurred after the easing of government restrictions and team sports could return i.e., the period between 29th June 2020 & 29th July 2020.

In 2019, 14 Achilles tendon ruptures occurred in the same timeframe i.e., 29th June 2019 – 29th July 2019.

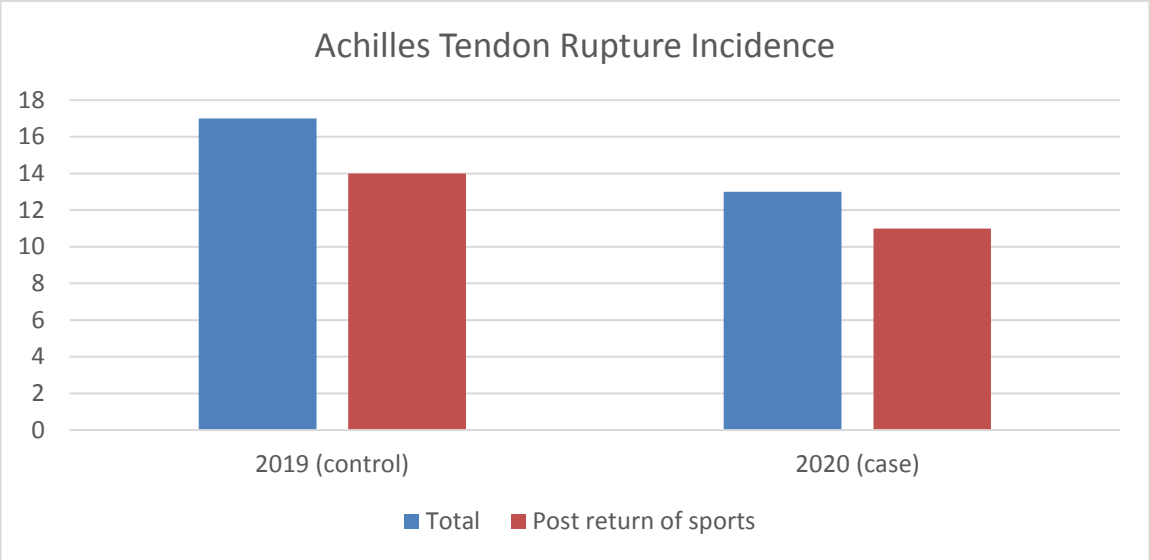

Fig. 1: Achilles tendon rupture incidence in 2019 versus 2020.

Of the 13 Achilles tendon ruptures in 2020, 12 of those were attributed to team sports. The patients felt the characteristic sudden "pop" in their heel while running or sprinting. The other patient was a direct trauma where a wheelbarrow struck him directly in his Achilles tendon.(Fig. 2)

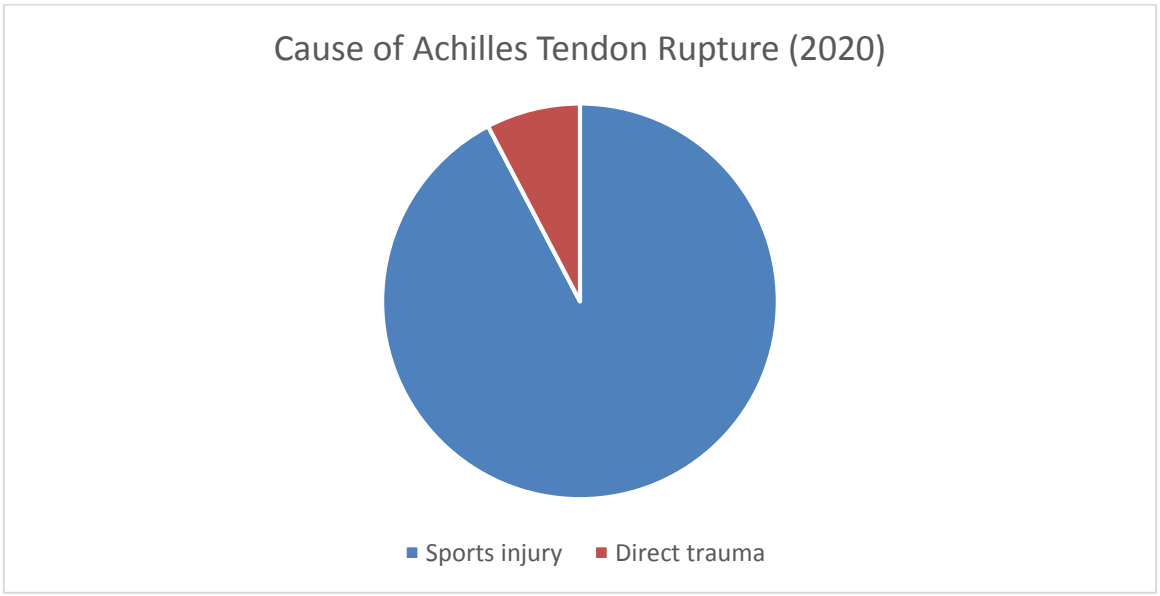

Fig. 2: Etiology of Achilles tendon ruptures during COVID-19 study period.

8 of the 13 Achilles tendon ruptures in 2020 occurred in a single, typical 5 day working week. These all occurred after the easing of restrictions on 29th June and re-introduction of team sports.

All patients from 2020 had a negative COVID-19 PCR swab within 48 hours of surgery.

Discussion

The COVID-19 pandemic caused a fundamental shift in the organisation and running of our healthcare systems. The patient is always at the forefront of the mind of the surgeon. However, a pandemic forces a change in strategy and the need to re-examine the service being delivered. Well over one calendar year into the pandemic, there is much to discover. Part of the reason for this study was to examine changing trends in the cases presenting to our emergency department and eventually finding their way into our trauma theatres. As surgeons, it is our duty to stay well-informed and as up to date as possible. We expected to see a new trend in the presentation of Achilles tendon ruptures given what we already know about their aetiology. With this in mind, we hoped to inform our future practice during this COVID-19 era and anticipate future service needs.

Our hypothesis that the sudden return-to-play after a government lockdown would influence presentations of Achilles tendon ruptures to our unit turned out to be false. Our department in fact saw a greater number of these cases in our control group from 2019. The rate of Achilles tendon rupture in 2020 and 2019 was the same (2.2%).

The period between the easing of restrictions and July 29th, 2020 was where we thought we would see the highest numbers of cases if our hypothesis was true. This was not the case as, again, the incidence of injury was still higher in the same time-matched period in 2019 vs. 2020.

An important secondary finding in this study was the level of surgical activity that persisted in our trauma theatre despite numerous COVID-19 logistical issues. We saw a reduction of 28.1% in our overall number of operative cases, but our department remained the busiest surgical specialty in the hospital and accounted for approximately 25% of all operations in our institution in 2020. This was achieved despite issues with pre-operative COVID-19 swabs. They could end up on a general run and take up to 4 hours to be resulted, be misplaced altogether if the patient had been sent from another institution or even come back indeterminate if the patient previously had COVID-19. Pre-operative COVID-19 questionnaires presented another challenge to getting patients to theatre as the answers given by patients could overrule a negative swab result and thus cause further delays by necessitating theatre cleaning and donning and doffing of PPE as we would have to then treat these patients as “positive”.

Fortunately, we were able to offer all patients surgery for their injury. Unlike other healthcare systems around the world, we were not forced to make difficult ethical decisions regarding whether to operate on these patients[8]. Of course, all necessary precautions were taken to ensure the safety of the patient, theatre staff and ward staff. COVID-19 swabs were readily available and so this made the decision to operate much easier for our institution[8].

Although operative and non-operative management of Achilles tendon ruptures has been shown to have similar outcomes[9], there are significant risks associated with the conservative route. There are studies to suggest that non-operative management of Achilles tendon ruptures may lead to a decrease in tendon strength[10]. The actual clinical significance of this weakness has however been called into question[9,11]. Tendon re-rupture risk has been quoted in the literature as high as 10-12%[12]. Others would disagree and maintain that the risk of re-rupture is the same for operative and non-operative management when a functional rehabilitation programme is used[9]. Studies also suggest that a person's ability to return to work and sports is faster with operative treatment versus non-operative treatment[9, 13]. During the COVID-19 pandemic, this is not as much of a factor when a lot of people are working from home and sport was the inciting cause of 92% of these injuries.

There were some limitations with our study. This is a single-centre study and so our results may not reflect what is happening in other institutions even within our own country. The 4-week period after the easing of restrictions where sports could return was perhaps too short. If we had extended that data collection period by another 4 weeks, then we may have seen a larger number of tendon ruptures given the large number (n=8) we saw in a single week in July. Many people may have still had reservations about returning to sport immediately after restrictions were eased and so we may have missed these potential Achilles tendon ruptures. The COVID-19 pandemic is a relatively new phenomenon and so a study like ours is difficult to assess given lack of previous studies on the topic.

This novel study of surgically managed Achilles tendon ruptures during the COVID-19 pandemic showed that there was no clear association between the pandemic and Achilles tendon ruptures. Our hypothesis that a period of imposed inactivity in the form of "lockdown" and then a sudden return-to-play would increase presentations of these injuries turned out to be false. On the contrary, there were a greater number of these injuries between the same dates in 2019. As a secondary outcome, we found that COVID-19 had a clear impact in terms of decreasing trauma cases for theatre. As we continue to examine the effects of COVID-19 on surgical activity, we would call on other Orthopaedic departments internationally to share their experiences with COVID restrictions and if they are seeing any trends in their operative caseload.

Declaration of Conflicts of Interest:
None to declare.

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The Psychological Effect of COVID-19 on Pregnant Women

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Abstract

Aims

We aimed to conduct a narrative review on the direct and indirect psychological implications of COVID-19, amongst the pregnant population.

Methods

Two medical databases (PUBMED and EMBASE) were analysed and papers describing the psychological impact of COVID-19 on pregnant women were included.

Results

We identified a total of 35 papers in our study, 14% (5/35) focused on first time mothers, 71% (25 /35) on depression among pregnant persons, 83% (29/35) examined anxiety, 40% (14 /35) described the impact of stress and 43% (15/35) included a discussion on fear. The most common stressors were fear of contracting COVID-19 and uncertainty surrounding the situation Protective factors include having accurate information regarding COVID-19, a higher level of education and a secure income

Conclusion

COVID-19 has had significant psychological effects amongst the pregnant population including increased levels of anxiety, depression, fear and stress. Many individuals experience suicidal ideation. Social isolation and increasing rates of emotional and physical abuse may be significant factors. Consideration needs to be given to enhance social support and self-care routines. Exercise has shown to alleviate some stress, anxiety and other subjective symptoms. Professional assistance and knowledge have also shown to decrease the severity of these effects.

Introduction

The COVID-19 pandemic has had catastrophic effects not only on the physical health but also the mental health of individuals all over the world. Pregnant and nursing women are a vulnerable group that often bare a disproportionate brunt of social adversity[1]. Pregnant women face many challenges during the gestational period, and these have been exacerbated by COVID-19. Women experience many changes during pregnancy and these changes can mask or alter the presentation of mental illness, often causing it to be overlooked[2].

This paper explores how the pandemic has impacted the mental wellbeing of pregnant women through a narrative review of the currently available literature. The study aimed to examine the psychological impact the current pandemic has had on pregnant women and attempted to identify any potential interventions that may minimize the negative psychological effects or help individuals protect their mental health.

Methods

A systematic search was conducted in MEDLINE/PubMed and Excerpta Medica dataBASE (EMBASE) on December 2020. Three searches were conducted and then combined using the Boolean operation AND. First terms relating to COVID-19 were searched, using the boolean operation OR, these including coronavirus, covid 2019, SARS2, SARS-CoV-2 and severe acute respiratory pneumonia outbreak. Second terms relating to mental distress or illness were searched also using the Boolean operation OR. These included, *inter alia*, depression, mental health, PTSD, anxiety, self-harm. Finally, terms relating to pregnancy were searched, again using the Boolean operation OR, for example pregnant, pregnancy, and antenatal. The full search description is included in figures 1&2 below.

Figure 1: *Search description.*

((("coronavirus"[MeSH] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[All Fields] OR "covid 2019"[All Fields] OR "SARS2"[All Fields] OR "SARS-CoV-2"[All Fields] OR "SARS-CoV-19"[All Fields] OR "severe acute respiratory syndrome coronavirus 2" [supplementary concept] OR "coronavirus infection"[All Fields] OR "severe acute respiratory pneumonia outbreak"[All Fields] OR "novel cov"[All Fields] OR "2019ncov"[All Fields] OR "sars cov2"[All Fields] OR "cov22"[All Fields] OR "ncov"[All Fields] OR "covid-19"[All Fields] OR "covid19"[All Fields] OR "coronaviridae"[All Fields] OR "corona virus"[All Fields]) AND ((((((((((((((((((anxiety) OR (depression)) OR (ptsd)) OR (post traumatic stress disorder)) OR (mental health)) OR (psychology)) OR (psycho)) OR (mania)) OR (bipolar)) OR (self-harm)) OR (self harm)) OR (suicide)) OR (suicidal)) OR (psychological impact)) OR (Stress Disorders[MeSH Terms])) OR (Traumatic[MeSH Terms])) OR (Post-Traumatic[MeSH Terms])) OR (psychology[MeSH Terms]))) AND (((((((((antenatal) OR (pregnant women)) OR (pregnant)) OR (pregnancy)) OR (expectant mothers)) OR (maternal health)) OR (Pregnant Women)) OR (Pregnant Women[MeSH Terms])) OR (Pregnant[MeSH Terms]))

Figure 2: *Papers Included.*

1. COVID-19 pandemic - C. R. Ahlers-Schmidt, A. M. Hervey, T. Neil, S. Kuhlmann and Z. Kuhlmann
2. Associations Between Fear of COVID-19, Mental Health, and Preventive Behaviours Across Pregnant Women and Husbands: An Actor-Partner Interdependence Modelling - D. K. Ahorsu, V. Imani, C. Y. Lin, T. Timpka, A. Broström, J. A. Updegraff, K. Årestedt, M. D. Griffiths and A. H. Pakpour
3. Pregnancy and birth planning during COVID-19: The effects of tele-education offered to pregnant women on prenatal distress and pregnancy-related anxiety -
4. Coronavirus disease 2019: Knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria
5. Anxiety and depression symptoms in the same pregnant women before and during the COVID-19 pandemic - R. Ayaz, M. Hocaoğlu, T. Günay, O. D. Yardımcı, A. Turgut and A. Karateke
6. Uptrend in distress and psychiatric symptomatology in pregnant women during the coronavirus disease 2019 pandemic - Nicolas Berthelot, Roxanne Lemieux, Julia Garon-Bissonnette, Christine Drouin-Maziade, Élodie Martel, Michel Maziade
7. Analysis of the Impact of the Confinement Resulting from COVID-19 on the Lifestyle and Psychological Wellbeing of Spanish Pregnant Women: An Internet-Based Cross-Sectional Survey - Gemma Biviá-Roig, Valentina Lucia La Rosa, María Gómez-Tébar, Lola Serrano-Raya, Juan José Amer-Cuenca, Salvatore Caruso, Elena Commodari, Antonio Barrasa-Shaw, Juan Francisco Lisón
8. The prevalence of psychiatric symptoms ofpregnant and non-pregnant women duringthe COVID-19 epidemic - Yongjie Zhou1,HuiShi2,ZhengkuiLiu3, Songxu Peng4,RuoxiWang5,LingQi6,ZezhiLi7,JiezhiYang8,YaliRen9,Xiuli Song10,LingyunZeng1,WeiQian3and Xiangyang Zhang
9. Mental Health Outcomes in Perinatal Women During the Remission Phase of COVID-19 in China - Xiaoqin Zeng, Wengao Li, Hengwen Sun, Xian Luo, Samradhvi Garg, Ting Liu, Jingying Zhang and Yongfu Zhang
10. Association between social support and anxiety among pregnant women in the third trimester during the coronavirus disease 2019 (COVID-19) epidemic in Qingdao, China: The mediating effect of risk perception - Chongyu Yue, Cuiping Liu, Jing Wang, Meng Zhang, Hongjing Wu, Chunrong Li and Xiuling Yang
11. Anxiety levels and obsessive compulsion symptoms of pregnant women during the COVID-19 pandemic - Murat Yassa, Ahmet Yassa, Cihangir Yirmibeş, Pınar Birol, Umur Göktuğ Ünlü, Arzu Bilge Tekin, Kemal Sandal, Memiş Ali Mutlu, Gül Çavuşoğlu, Niyazi Tug
12. Near-term pregnant women's attitude toward, concern about and knowledge of the COVID-19 pandemic - M. Yassa, P. Birol, C. Yirmibes, C. Usta, A. Haydar, A. Yassa, K. Sandal, A. B. Tekin and N. Tug
13. Whether and how lockdown and mandatory quarantine regarding COVID-19 may affect mental health among pregnant women in China: Potential social, cognitive, and eHealth-related mechanisms - Xue Yang1; Bo Song; Anise Wu; Phoenix K. H. Mo; Jiang Li Di; Qian Wang; Joseph T. F. Lau; Lin Hong Wang
14. Perinatal depressive and anxiety symptoms of pregnant women during the coronavirus disease 2019 outbreak in China - Yanting Wu, PhD1; Chen Zhang, MSc1; Han Liu, MSc1; Chenchi Duan, MSc1; Cheng Li, PhD; Jianxia Fan, PhD; Hong Li, MSc;Lei Chen, MSc; Hualin Xu, MSc; Xiangjuan Li, PhD; Yi Guo, MSc; Yeping Wang, MSc; Xiufeng Li, BA; Jing Li, BA;Ting Zhang, MD; Yiping You, BA; Hongmei Li, PhD; Shuangqi Yang, BA; Xiaoling Tao, BA; Yajuan Xu, BA; Haihong Lao, BA;Ming Wen, BA; Yan Zhou, BA; Junying Wang, BA; Yuhua Chen, BA; Diyun Meng, MSc; Jingli Zhai, MSc; Youchun Ye, MD;Qinwen Zhong, BA; Xiuping Yang, BA; Dan Zhang, PhD; Jing Zhang, BA; Xifeng Wu, PhD; Wei Chen, BA;Cindy-Lee Dennis, PhD; He-feng Huang, MD
15. COVID-19-related financial stress associated with higher likelihood of depression among pregnant women living in the United States - Zaneta M. Thayer, Theresa E. Gildner

16. COVID-19 positive mothers are not more anxious or depressed than non COVID pregnant women during the pandemic: A pilot case-control comparison - P. Kotabagi, M. Nauta, L. Fortune and W. Yoong
17. Impact of COVID 19 on psychosocial functioning of peripartum women: A qualitative study comprising focus group discussions and in-depth interviews - A. Kumari, P. Ranjan, K. A. Sharma, A. Sahu, J. Bharti, R. Zangmo and N. Bhatla
18. Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic - Catherine Lebel, Anna MacKinnon, Mercedes Bagshawe, Lianne Tomfohr-Madsen, Gerald Giesbrecht
19. Attitudes and precaution practices towards COVID-19 among pregnant women in Singapore: a cross-sectional survey - Ryan Wai Kheong Lee, See Ling Loy, Liying Yang, Jerry Kok Yen Chan and Lay Kok Tan
20. PMH4 The Psychological and Behavioral Responses to Covid-19 Epidemic in Pregnant Women in China: A Nationwide Survey - He Z, Chiu WT, Wu H, Ming WK
21. The mental health status and approaches of accessing antenatal care information among pregnant women during COVID-19 epidemic : a cross-sectional study in China - Hong Jiang, MD, PhD ; Longmei Jin, MD ; Xu Qian, MD, PhD ; Xu Xiong, DrPH ; Xuena La, MD ; Weiyi Chen, MD ; Xiaoguang Yang, PhD ; Fengyun Yang, MD ; Xinwen Zhang, MD ; Nazhakaiti Abudukelimu ; Xingying Li ; Zhenyu Xie, MD ; Xiaoling Zhu, MD ; Xiaohua Zhang, MD ; Lifeng Zhang, MD ; Li Wang, MD, PhD ; Lingling Li, MPH ; Mu Li, MD, PhD
22. Anxiety, depression, and related factors in pregnant women during the COVID-19 pandemic in Turkey: A web-based cross-sectional study - Hatic Kahyaoglu Sut PhD, Burcu Kucukkaya Msc
23. Impact of COVID-19 on psychosocial functioning of peripartum women: A qualitative study comprising focus group discussions and in-depth interviews - Archana Kumari, Piyush Ranjan, K. Aparna Sharma, Anamika Sahu, Juhi Bharti, Rinchen Znagmo, Neerja Bhatla
24. Mental health status of pregnant and breastfeeding women during the COVID-19 pandemic: A call for action - M. Ceulemans, T. Hompes and V. Foulon
25. Jewish and Arab pregnant women's psychological distress during the COVID-19 pandemic: the contribution of personal resources - M. Chasson, O. Taubman-Ben-Ari and S. Abu-Sharkia
26. Health anxiety and behavioural changes of pregnant women during the COVID-19 pandemic - G. A. Corbett, S. J. Milne, M. P. Hehir, S. W. Lindow and P. O'Connell M
27. Impact of the COVID-19 lockdown on antenatal mental health in Greece - T. Dagklis, I. Tsakiridis, A. Mamopoulos, A. Athanasiadis, R. Pearson and G. Papazisis
28. Investigation on the mental health status of pregnant women in China during the Pandemic of COVID-19 - H. Dong, R. Hu, C. Lu, D. Huang, D. Cui, G. Huang and M. Zhang
29. Effects of the COVID-19 pandemic on anxiety and depressive symptoms in pregnant women: a preliminary study - F. Durankuş and E. Aksu
30. Depression, stress, anxiety and their predictors in Iranian pregnant women during the outbreak of COVID-19 - F. Effati-Daryani, S. Zarei, A. Mohammadi, E. Hemmati, S. Ghasemi Yngyknd and M. Mirghafourvand
31. The impact of the COVID-19 pandemic on the perinatal mental health of women - T. Farrell, S. Reagu, S. Mohan, R. Elmidany, F. Qaddoura, E. E. Ahmed, G. Corbett, S. Lindow, S. M. Abuyaqoub and M. A. Alabdulla
32. Exercise routine change is associated with prenatal depression scores during the COVID-19 pandemic among pregnant women across the United States - T. E. Gildner, E. J. Laugier and Z. M. Thayer
33. Birth plan alterations among American women in response to COVID-19 - T. E. Gildner and Z. M. Thayer
34. How to prevent in-hospital COVID-19 infection and reassure women about the safety of pregnancy: Experience from an obstetric center in China - X. X. Gu, K. Chen, H. Yu, G. Y. Liang, H. Chen and Y. Shen
35. The Disproportionate Burden of the COVID-19 Pandemic Among Pregnant Black Women - R. E. Gur, L. K. White, R. Waller, R. Barzilay, T. M. Moore, S. Kornfield, W. F. M. Njoroge, A. F. Duncan, B. H. Chaiyachati, J. Parish-Morris, L. Maayan, M. M. Himes, N. Laney, K. Simonette, V. Riis and M. A. Elovitz

Original articles that described the psychological impact that COVID-19 had on antenatal women were included. Studies were excluded if; they did not contain original research, they were not written in English, they did not include antenatal women, or if psychological factors were not assessed.

All papers were retrieved, and two researchers independently identified papers meeting the inclusion criteria from the titles and abstracts. All identified papers were read in full, additional papers that did not meet the inclusion criteria were excluded at this point.

Results

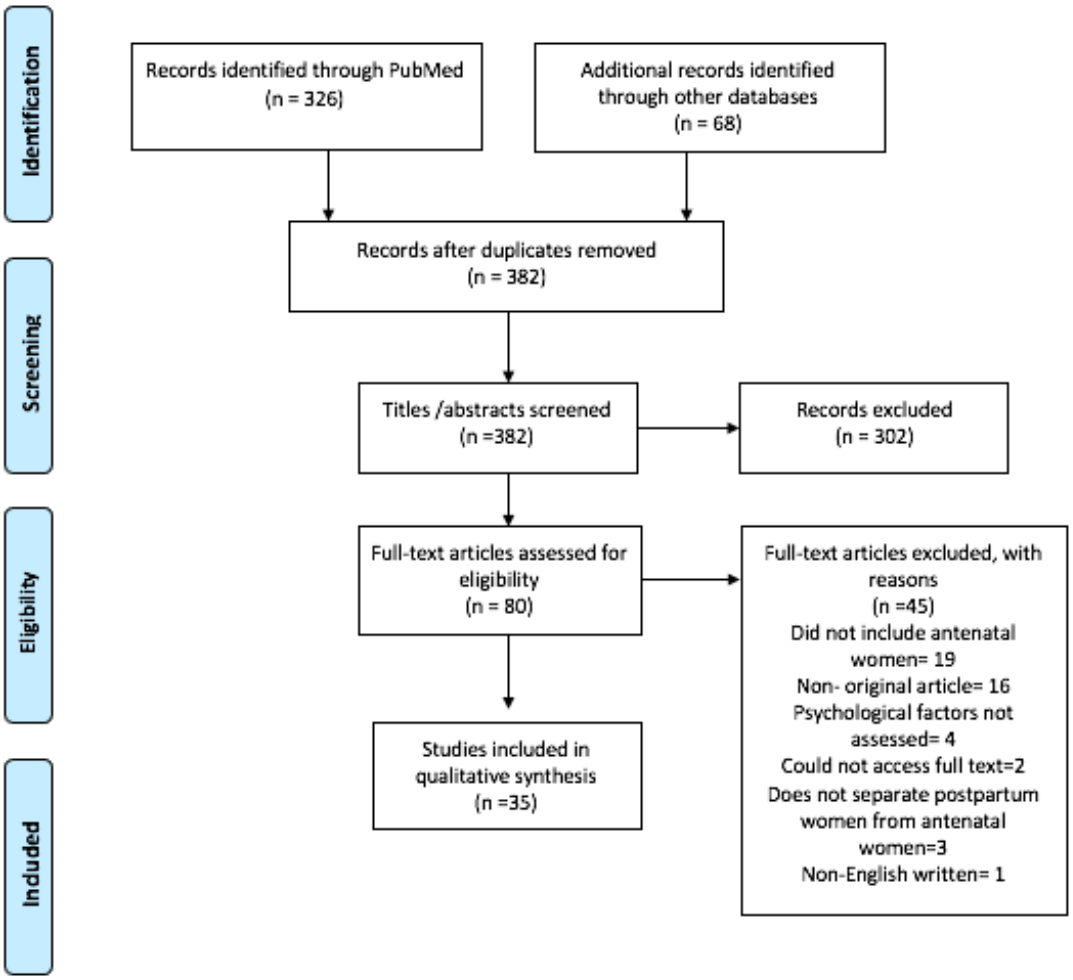

Figure 3: *PRISMA flow chart showing the included and excluded studies.*

Study Characteristics

We included a total of 35 papers in our study. These included a wide range of mental health diagnoses including depression (28/35), anxiety (27/35), stress (2/35), fear (15/35), worry (11/35), PTSD (2/35) and suicidal ideation (2/35).

The populations included in the studies were all aged between 15 to 47 years with the majority being non COVID-19 infected.

We reviewed studies from 14 different countries.

The sample sizes of the studies ranged between a minimum of 14 participants and a maximum of 19515 participants. Of these papers the majority were cross sectional studies (19/35). The papers included both quantitative and qualitative studies. Twelve percent (4/35) of the articles focused on first time mothers.

Screening Tools

Thirty-three different scales were used across the papers we reviewed. The Edinburgh Postnatal Depression Scale (EPDS), Generalized Anxiety Disorder scale (GAD-7) and Patient Health Questionnaire (PHQ-9) were used multiple times.

Prevalence of Psychological Impact

Anxiety

After the onset of COVID-19 a markedly increased level of anxiety has been seen amongst pregnant women[3] . One paper recorded that 10.9% of pregnant women during the pandemic experienced anxiety and depression, a contrast to only 6% experiencing this pre COVID [4] .
Overall anxiety has been shown to be higher for women who had a lower level of education, were unemployed, already had a chronic illness, did not engage in physical exercise, were smokers, and had no/poor knowledge of COVID-19[5].
Pregnant women were also anxious about the wellbeing of their unborn baby and the safety of their relatives[6.] Adding to this, some women also worried about inadequate prenatal care[7].

Depression

Multiple papers recorded high levels of depression among their participants. Levels varied around 50%, Yang et al found a rate of 44.6% in a Chinese population[8] , Jiang et al found a rate of 45.9%[9] and Kahyaoglu Sut et al 56.3% [5]. A study of the pregnant population in Ethiopia found that the rate of depression spiked from 25.8% pre-COVID to 66.4% post-Coronavirus[10]. It was also discovered that the rate of depression was positively related to the deaths due to COVID-19 per day, as well as confirmed cases[11].

Stress

It is evident that women during the COVID-19 pandemic are suffering more prenatal distress than their peers pre-COVID-19[4]. One study found that 89.1% of participants were experiencing stress during this time [12].

Sleep Disorders

The fears and concerns of pregnant w omen as a result of COVID-19 can to lead to numerous adverse consequences one of which is increased sleep disorders[4] .Women documented that their sleep cycle had been disturbed, they found themselves going to sleep later, waking up later, taking daytime naps and overall sleeping more than normal[13].

Identified stressors

There are multiple factors that were identified as contributing to the psychological distress experienced by pregnant women during this COVID-19 pandemic. Among these were lack of social support[14] , fear and concern in partners [3], managing high levels of uncertainty [3], being confined to their own homes[6] , fear of contracting Covid-19 [15], lack of a sense of security [16] and financial stress caused by the pandemic [17].

Risk factors and protective factors

Certain attributes correlated with the development of negative psychological symptoms in antenatal women. These included being younger, multiparous [9], having a lower level of educational attainment [12], having a lower total household income, living rurally [9,] having prior psychiatric issues [4] and having previous unpleasant pregnancy experiences[18]. Conversely, women who had higher levels of education, had jobs, were free from pregnancy complications and had better knowledge and understanding regarding the COVID-19 pandemic were less likely to experience these negative consequences [9].

Direct implications

Negative

Direct impacts on antenatal care were also identified.

In one study, 89% of the cohort reported experiencing changes to their care, most notably appointments being cancelled (one study reported 36%) [7] experiencing cancellations with another reporting that figure to be 52.2% [19]and not being allowed to bring a family member for support (90%). As a result of this most participants felt they received a lower quality of care[7]. Some women around (22.5%) also cancelled their own appointments due to fear of contracting COVID-19[19].

It was noted that 87.7% of one cohort found themselves engaging in less exercise than before the confinement with the main reason being not having sufficient space[19].

Positive

Conversely, pregnant women also reported some positive effects of the current pandemic. Although we noted that many women found that their level of physical activity decreased, a small group found the opposite and that they had the time to engage in more exercise than before the pandemic[14]. Although elevated fears and concerns had a negative effect on their mental health, it resulted in increased participation in COVID-19 preventative measures[3.]

Proposed Interventions

Four studies explored interventions to improve the psychological wellbeing of pregnant women during this time. Self-care strategies such as physical activity, meditation, limiting exposure to social media or news which promote fear and staying in touch with family and friends via the phone were all proved to have a positive impact on the mental wellbeing of patients [14].
A Turkish study examined a tele education system which proved to be very effective in reducing perinatal stress and anxiety in pregnant women [20]. It has been shown that the more knowledge pregnant women have on COVID-19 the more confident they are that they can overcome the virus and the challenges it presents to them in this time [6]. It was also shown that women who made use of antenatal care information were at a significantly lower risk of suffering from anxiety, stress and depression [9].

Discussion

Although many of the pregnant women in these studies showed high levels of depression, anxiety and stress[21, 14, 15], there was a study carried out in China which found that women who were pregnant during the pandemic showed fewer depression, anxiety, PTSD and insomnia symptoms than non-pregnant women[22] . The reason for this may be that pregnant women have more access to healthcare professionals to reassure them than non-pregnant women. This is supported by another study which showed that pregnant women had lower anxiety levels compared to non-pregnant women [23]. It was also suggested that pregnant women were less disappointed in the disruption the pandemic caused to social and recreational activities as they were less likely to be attending these anyway. In addition some pregnant participants enjoyed the opportunity that lockdown gave them to spend more time with their family [13].

Screening measures and treatment plans need to be put into place in order to identify those who are suffering from psychological distress and measures to mitigate these effects need to be implemented [15].Tying in with this identifying women with a history of psychiatric disorders or a lack of support at home at their first antenatal visit is important, as they are at a higher risk of developing subsequent mental health problems [4]. Identifying these women early on would allow more regular reviews and more targeted help to be offered to them in an effort to preemptively put the necessary supports in place.

The main strength of our study is that a review has not been conducted on this topic to date. This study pulls data from different parts of the world, including fourteen different countries, the heterogeneity of our study data is a strength as well as a weakness. However, the fact that knowledge about the virus is rapidly evolving and that we can only review data from less than one-year period is a recognized limitation.

While COVID-19 has impacted millions of people all over the world, it is vital that vulnerable groups receive specific consideration. The psychological well-being of pregnant women has been disproportionately affected by the virus and the social changes that have occurred secondary to it. The illness has implications for mental health conditions like anxiety and depression, it has resulted in significant social stressors with increasing rates of social isolation. Clinicals and policy makers must be cognisant of these concerns and identify that it is not just the illness itself that is harmful to pregnant women's mental health, but the fear, uncertainty and public health measures that have been put in place. Studies have identified social supports and lifestyle modification that can help address some of these concerns, including exercise and the provisions of reliable information. Professional clinical input has also been shown to decrease the severity of these effects. It is vital that Specialist perinatal mental health teams, community mental health teams and GPs continue to function and where these teams have not been fully staffed that priority is given to fill the remaining vacancies, this is of particular relevance in the North West of Ireland.

Declaration of Conflicts of Interest:
The authors declare no conflict of interest.

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An Audit of Adherence to Nasogastric Tube Safety Standards in a Radiology Department

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Abstract

Aim

To audit our department's adherence to the requirements of the 2011 Patient Safety Alert from the National Patient Safety Agency (NPSA) in the UK.

Methods

A retrospective study was carried out looking at chest radiographs performed in our institution to confirm nasogastric tube position over a period of 11 weeks. The referral information, image quality and report were analysed for each study and compared with the gold standards.

Didactic presentations and posters were delivered to a target audience including the referring practitioners, radiographers and radiologists. The audit was repeated after 12 months to close the loop.

Results

Marked improvement was observed in the quality of radiographs in the follow up audit in terms of the percentage of studies which were centred lower than normal (36% to 93%), in which the NG tube was clearly seen (86% to 100%), in which the bottom of both hemidiaphragms was visible in the midline (95% to 100%) and in which the tip of the NG tube was visible (72% to 88%). There was however no improvement in the quality of referrals or reports.

Discussion

Targeted interventions have achieved a marked improvement in the quality of radiographs. Alternative approaches will be needed to reach referrers and reporters. Future approaches may include earlier interventions, a combination of verbal and visual presentations, the introduction of dedicated dictation templates and the inclusion of both hospital boards and frontline staff.

Keywords: Audit, Nasogastric, Safety, Chest radiograph

Introduction

The aim of this study was to audit our department's adherence to the requirements of the 2011 Patient Safety Alert from the National Patient Safety Agency in the UK[1].

Nasogastric (NG) tubes are commonly used for nutritional support in patients with inadequate or unsafe oral intake and a functional, accessible gastrointestinal tract.

The use of misplaced NG tubes was first recognised as a patient safety issue by the NPSA in 2005[2]. Further patient safety alerts were issued by the NPSA and National Health Service (NHS) in 2011, 2012, 2013 and 2016[1, 3, 4, 5].

Administration of fluid or medications through a misplaced NG tube is considered a 'never event' in the United Kingdom (UK). Such an error is thus considered in the same category as wrong site surgery, maternal death from post-partum haemorrhage and patient escape from high security mental health services. Never events are considered 'wholly preventable where guidance or safety recommendations that provide strong systemic protective barriers are available at a national level and have been implemented by healthcare providers'[6].

Despite this, between September 2005 and March 2010, there were 21 deaths and 79 cases of harm attributed to the incorrect placement of NG tubes according to the National Reporting and Learning System[1].

There were 95 reported incidents between September 2011 and March 2016 where fluid or medications were inappropriately administered through a misplaced tube into the lungs or pleural space. While these figures must be analysed in the context of over 3 million nasogastric and orogastric (OG) tubes inserted in the NHS in the same period[5], it is clear that there is a real but avoidable risk to the patient safety.

Chest radiograph (CXR) misinterpretation by doctors who did not appear to have received the competency-based training required by the 2011 alert was identified by NHS clinical reviewers as the most common error responsible for harm. PH testing of the gastric aspirates, unapproved tube placement checking methods and communication errors resulting in unchecked tubes were amongst other causes identified.

The radiology department has an important and multifaceted role in the patient safety pathway. Three key radiology requirements were identified in the 2011 alert. Firstly, imaging must be justified. Secondly, the radiographer should ensure that the NG tube is clearly visible on the radiograph, the radiograph is centred lower than normal and that the bottom of both hemidiaphragms is seen in the midline. Thirdly, the radiology report should state both the position of the tube and comment on whether it is safe to proceed with the administration of liquid through the tube.

These formed the basis for the three standards against which our department was audited; the imaging request must be justified by the clinical information provided, the radiograph should be appropriately exposed and centred and the radiology report should state both tube position and comment on safety for use. A target of 100% compliance was selected in our study.

Methods

The study was performed in a tertiary referral university teaching hospital. A retrospective search was carried out of our department's Radiology Information System (RIS) to identify chest radiographs performed to confirm NG tube placement from 2/12/18 to 19/02/19 using specific search criteria (Figure 1).

58 radiographs were retrieved in the study period. The referral, image and report were analysed in each case.

For each study, seven questions were applied (table 1):

Question
Was the request justified by the clinical information provided?
Was the NG tube clearly seen on the radiograph?
Was the radiograph centred lower than normal?
Was the bottom of both hemidiaphragms visible in the midline?
Was the tip of the NG tube visible?
Did the report include a comment on the position of the tube?
Did the report include a comment on safety for use?

Table 1: The seven questions applied in each case.

Specific interventions were set out to target each of our three audit standards.

Justification of the imaging request based on the clinical information provided

As the majority of CXR referrals in our department were made by interns, a decision was made to provide education on appropriate referrals to incoming interns during their induction week in July 2019. A short didactic presentation was given at which attendees were reminded that CXR is a second line test for confirming NG tube placement. The first line test is pH testing of gastric aspirate. A pH between 1 and 5.5 confirms a satisfactory position. CXR should be reserved for cases in which there is no gastric aspirate, the pH is outside the range 1-5.5 or the patient is at high risk of a malpositioned tube, for example, a patient with a reduced level of consciousness. Attendees were also reminded that all imaging must be justified by the clinical information provided. For example, 'NG tube inserted. No gastric aspirate. Position of NG tube?'

Acquisition of the chest radiograph with attention to appropriate exposure and centring

A didactic presentation was delivered to our department radiographers at our annual internal audit meeting in November 2019. A short summary of the 2011 Patient Safety Alert was presented to improve local awareness of the NPSA guidelines. The results of our first audit were presented. By displaying representative examples of adequate versus inadequate radiographs and well-positioned versus malpositioned NG tubes, we were able to stimulate discussion and debate.

Adequacy of radiology report by clearly stating the tube position and commenting on safety for use.

A poster was designed presenting NPSA guidelines, highlighting the obligation by the radiologist to document both the position of the NG tube and whether the position is safe for the administration of liquid through the tube (Figure 2). Examples were exhibited of a well-positioned tube and a malpositioned tube with suggested templates for how each could be reported. The poster was printed in A2 size and copies were erected in both the registrar and consultant reporting rooms.

A re-audit was performed in February 2020. An identical sample size of 58 CXRs performed between 23/11/19 and 23/01/20 was retrieved via the RIS using the same criteria as before.

Results

Fifty-eight CXRs were included in both the first and the second audits. Our seven questions were applied to each of the radiographs in both audits.

The percentage of radiographs in which the NG tube was clearly seen on the image improved from 86% to 100%. The percentage of radiographs which were centred lower than normal improved from 36% to 93%. The percentage of radiographs in which the bottom of both hemidiaphragms was visible in the midline improved from 95% to 100%. The percentage of radiographs in which the tip of the NG tube was visible improved from 72% to 88%.

However, the percentage of radiographs which were justified by the clinical information provided disimproved from 7% to 2%. The percentage of reports which made a comment on the position of the tube disimproved from 67% to 59%. The percentage of reports which made a comment on safety for use disimproved from 59% to 57%. The results are summarised in Table 2.

The results of the first audit showed our department fell significantly short of reaching the target value of 100% compliance in terms of justifiability of referrals, quality of radiographs and adequacy of reports.

The targeted intervention with radiographers saw marked improvement in the quality of radiographs in the second audit with a greater proportion of studies being appropriately exposed and centred.

Unfortunately, there was no improvement in the quality of referrals, with only one referral in the second audit being justified by the clinical information provided.

Similarly, there was no positive change in the quality of the radiology reports, with a large proportion of reports both in the first and the second audit failing to comment on the position of the tube or its safety for use.

Patient type	Inpatient
Modality	XR
Exam description	CXR
Reason for exam	NG

Figure 1: The search criteria used in the Radiology Information System.

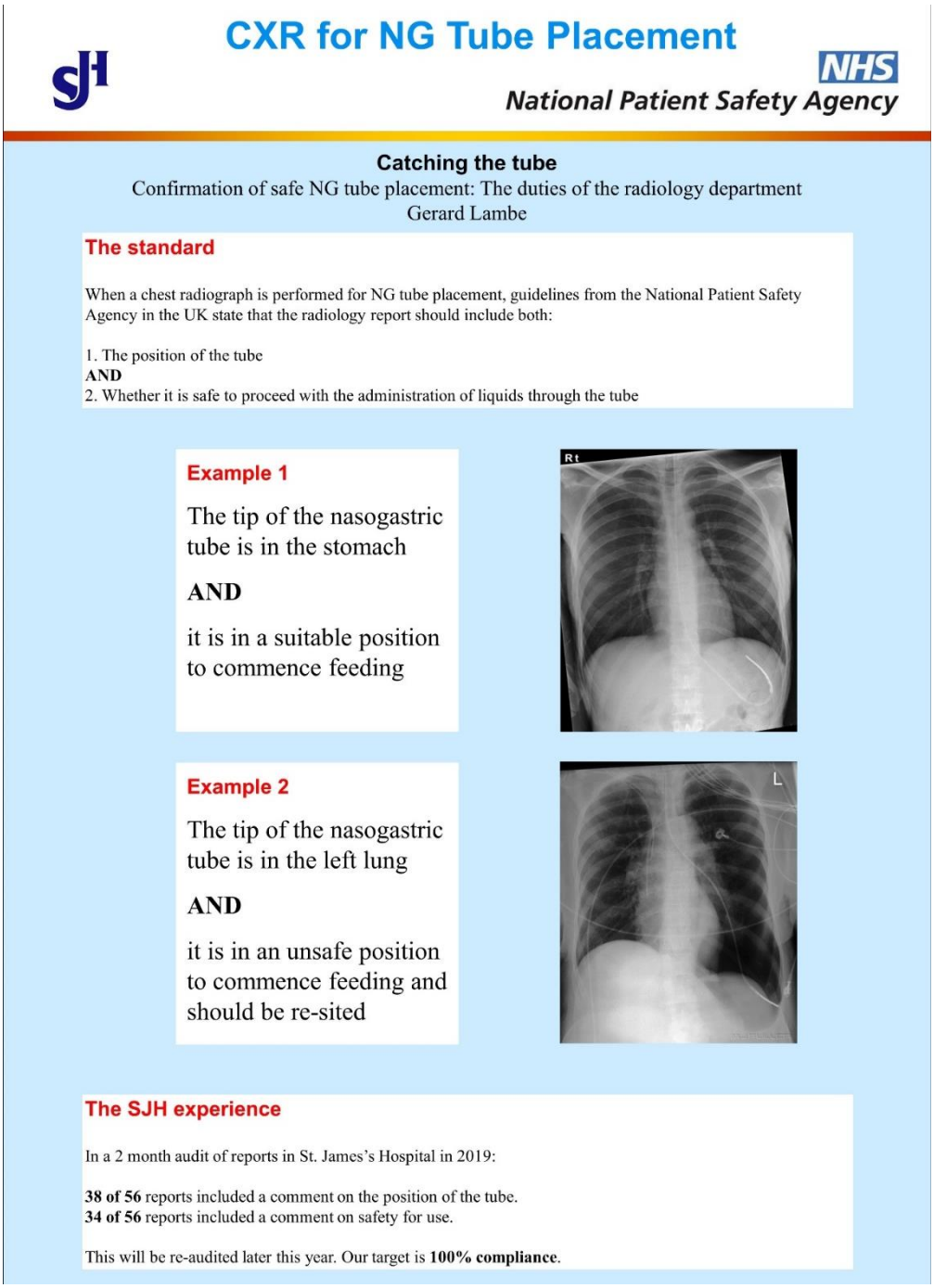

Figure 2: The poster erected in the registrar and consultant reporting rooms.

Question	Audit 1 (n=58)	Audit 2 (n=58)
Request justified by the clinical information provided	4 (7%)	1 (2%)
NG tube clearly seen on the radiograph	50 (86%)	58 (100%)
Radiograph centred lower than normal	21 (36%)	54 (93%)
Bottom of both hemidiaphragms visible in the midline	55 (95%)	58 (100%)
Tip of the NG tube visible	42 (72%)	51 (88%)
Report makes comment on the position of the tube	39 (67%)	34 (59%)
Report makes comment on safety for use	34 (59%)	33 (57%)

Table 2: Results of the first and second audits.

Discussion

Our success in improving the proportion of chest radiographs with appropriate exposure and centring between the first and second audits may reflect several aspects of our targeted intervention with the radiographers. Firstly, the combination of verbal and visual communication was likely more effective than the visual approach alone which was used with reporters. The presentation that was made to radiographers was short but direct and employed representative examples of radiographs from our own institution to engage their interest. All imaging was anonymised, and message was framed as a patient safety issue rather than a slight on anyone's individual practice. The information delivered was relevant, concise and practical.

By contrast, while the same combination of verbal and visual communication was used to reach incoming interns, it was not immediately relevant to either their past or present experiences. In addition, the message was delivered during a busy induction week and the take-home points may have been diluted by the volume of other information being imparted.

To improve the justification of imaging, future approaches should consider supplementing the didactic presentation at intern induction week with a formal training course and self-assessment as part of their online induction module. The online approach is likely to assume even greater importance in the future as we continue to learn to live and work with the current COVID-19 pandemic.

Medical students rotate through the radiology department for two weeks in the course of their medical training. There is an opportunity at this time to add a short section on justification of CXRs for NG tube placement to the CXR lecture they receive from the radiology registrars in the course of their rotations. Such an approach may mean that the message delivered at intern induction week would serve to remind and reinforce old learnings rather than overburden with new information.

To improve the proportion of radiology reports which state the tube position and make a comment on safety for use, a lesson can be learned from our success with the radiographers. The posters in the reporting rooms could be reinforced by a visual presentation at the 3 monthly departmental discrepancy meeting which is attended by radiologists and registrars. In addition, a dedicated Powerscribe dictation template for 'NG tube CXRs' could be made available to everyone which would facilitate fast and reproducible reporting across the department.

Interestingly, the 2016 Patient Safety Alert in the UK is explicitly stated to be directed at trust boards and those involved in clinical governance rather than at frontline staff. A number of implementation issues were identified which included matters such as inadequate systems designed to ensure that staff had received the relevant competency-based training, concerns regarding bedside documentation containing all safety-critical steps and issues maintaining a stock of relevant equipment such as radio-opaque tubes and pH test strips. Any future interventions which involve the hospital board may help to build on the modest improvements seen after our targeted interventions with frontline staff.

Declaration of Conflicts of Interest:
The authors declare that they have no conflicts of interest.

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Mupirocin-Resistant Methicillin-Resistant Staphylococcus aureus (MRSA) and Vascular Surgery

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Abstract

Aim

An outbreak of mupirocin and methicillin resistant *Staphylococcus aureus* (MR-MRSA) occurred in a tertiary hospital, causing considerable disruption in a vascular unit. We investigated factors that might explain this large outbreak and areas for intervention to prevent a recurrence.

Methods

Cases of MRSA strain, spa type t127 or t922, were identified through databases, and healthcare records to describe affected patients in time, place and person. The adjusted matched odds ratio (amOR) for selected exposures in a matched case control study among hospital in-patients was calculated, using multivariable conditional logistic regression.

Results

Forty-one cases occurred over 18 months. Males predominated (78%), with a median age of 73 years. The specialty with the largest number of patients was vascular surgery with 18 cases (44%). Male sex (amOR=21; 95%CI 0.99-454), vascular surgery consultation (amOR=5.1; 95%CI 0.89-29), urinary catheterisation (amOR=12; 95%CI 0.98-154), occupational therapy (amOR=9.9; 95%CI 1.6-61) and length-of-stay (amOR=1.1; 95%CI 1.0-1.1 per additional overnight stay) were independently associated with an outbreak case. Control measures included; enhanced contact precautions, patient isolation/cohorting, ward closure, enhanced environmental decontamination and staff screening.

Conclusion

Vascular patients and those with underlying high dependency, i.e. urinary catheterisation and a requirement for occupational therapy had a higher risk of colonisation with MR-MRSA. Recording patient dependency prospectively, avoiding excessive bed occupancy, and a formal hospital policy on staff MRSA screening, are recommended to prevent/control future outbreaks in vascular units and elsewhere in hospitals.

Introduction

Recognised risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA) include prolonged hospitalisation, long-term illness and multiple antimicrobial courses.[1] Furthermore, MRSA colonisation increases the risks for MRSA infection in patients undergoing invasive procedures.[2]

Colonisation may arise directly via the hands of staff or visitors, and indirectly through inadequately cleaned equipment and the healthcare environment.[3] Overcrowding and high antimicrobial use increase the risk of acquisition and spread.[4,5] Carriers can remain colonised with MRSA for up to four years.[6]

Infection with MRSA amongst vascular surgery patients has significant consequences. In a review of 408 patients in a Canadian vascular unit, there were 110 infections, of which MRSA accounted for 22.[7] The presence of MRSA predicted in-hospital death as well as length of stay, the need for admission to the intensive care unit and repeat surgery.[7] Plotkin and colleagues reviewed 27 mycotic aortic infections, of which 20 had bloodstream infection, with 10 of these due to MRSA, the most common pathogen.[8] Overall mortality was 59%, and 100% in those with MRSA.[8] Hence, all reasonable efforts are required to prevent vascular patients acquiring infection with MRSA.

Recognised control measures include the use of personal protective equipment (PPE), contact screening, isolation/cohorting and decolonisation using mupirocin nasal ointment (2%).[1] Nasal decolonisation can prevent colonisation progressing to infection and reduces onward transmission.[1]

Mupirocin resistant MRSA strains (MR-MRSA) have increased in Ireland, with high-level mupirocin resistance doubling between 1999-2005 and 2006-2007.[9] Earls *et al* studied 89 spa type t127 MRSA isolates, fifty of which were MR-MRSA.[10]

We describe the epidemiological characteristics of a hospital outbreak of MR-MRSA, centered on a vascular unit, identify potential factors which contributed to spread, discuss the challenges involved in outbreak management, and outline measures that could be undertaken to control further outbreaks.

Methods

The setting is an 820-bed adult tertiary referral hospital with a regional vascular surgery unit. The primary ward affected contained 35 beds, distributed among four six-bedded bays, a four-bedded bay, a two-bedded room and five single rooms. Bed occupancy levels in the hospital regularly exceeded 100% for much of the time period described. All new cases of MRSA are systematically reviewed and discussed by the infection prevention and control team (IPCT) to ensure prompt identification of cross-transmission events.

Cases associated with the outbreak were initially identified during routine testing of clinical specimens, and during the screening of in-patients with risk factors for MRSA in accordance with national guidelines.[1]

Patients were screened periodically (i.e. once weekly) during the initial two-month period of the outbreak. The identification of additional cases led to implementation of active case finding by screening patients (nose and groin) for MRSA on admission, and weekly. The National MRSA Reference Laboratory (NMRSARL) confirmed the outbreak strain by DNA microarray profiling and *spa* typing.[10] The outbreak MR-MRSA case definition is outlined below:

Case definition for a confirmed outbreak case

A confirmed case was defined as a patient or staff member with MRSA colonisation and/or infection with the specific antibiogram of tetracycline resistance (TetR); ciprofloxacin susceptibility (CipS), high-level mupirocin resistance (MupR), neomycin resistance (NeoR), urease positivity, and *spa* type t127 or t922, identified for the first time.

We reviewed the temporal distribution of outbreak cases using the date of the first specimen positive for the outbreak strain. We mapped ward transfer**s** during in-patient admissions and other hospital attendances over the course of the outbreak.

We undertook a matched case control study to investigate potential risk factors such as; exposure to selected procedures, contact with healthcare workers (HCW) and hospital locations. Exposures identified in more than 50% of cases during a hypothesis generating exercise were selected for assessment. Using https://www.openepi.com/Menu/OE_Menu.htm (accessed 9-9-2021), we calculated that with 25 cases, six controls per case would be required for the detection of an odds ratio (OR) of 5.0 at 5% alpha error, with 80% of power, and an expected prevalence for being a vascular surgery patient among controls of 15%. The analytical study was confined to outbreak cases who were hospital in-patients and who had a confirmed outbreak isolate for the first time. Controls were selected randomly from wards with outbreak cases that had screening swabs from which MRSA was not detected within 10 days of identification of their matched case, were also in-patients for at least one week before their negative screen, and had never previously been known to be MRSA positive. We used hospital databases and patient healthcare records to collect information on risk factors. We compared cases and controls using multivariable conditional logistic regression and calculated matched ORs (mOR). The model initially included all variables with a positive association with the outcome of interest and $p<0.150$ in univariate analyses. A likelihood ratio test p-value of >0.07 was used to determine whether an exposure be omitted from the multivariable model. All statistical analyses were performed using Stata version 15.1 http://www.stata.com (accessed 8-9-2021)

Results

Descriptive analyses

Forty-one cases met the outbreak case definition (Figure 1), with 39 (95%) being *spa* type t127 and two being the closely related *spa* type t922. The median age was 73 years (range 47-96); 32 (78%) were male. Patients were admitted under the following specialties: vascular surgery (n=18; 44%), general medicine (n=14; 34%) and other surgical specialties (n=8; 20%) (Figure 1).

Thirty-one cases were colonised, eight were infected and the status of two was unavailable. Seven patients died of which five were colonised and two infected with MR-MRSA.

Figure 1.

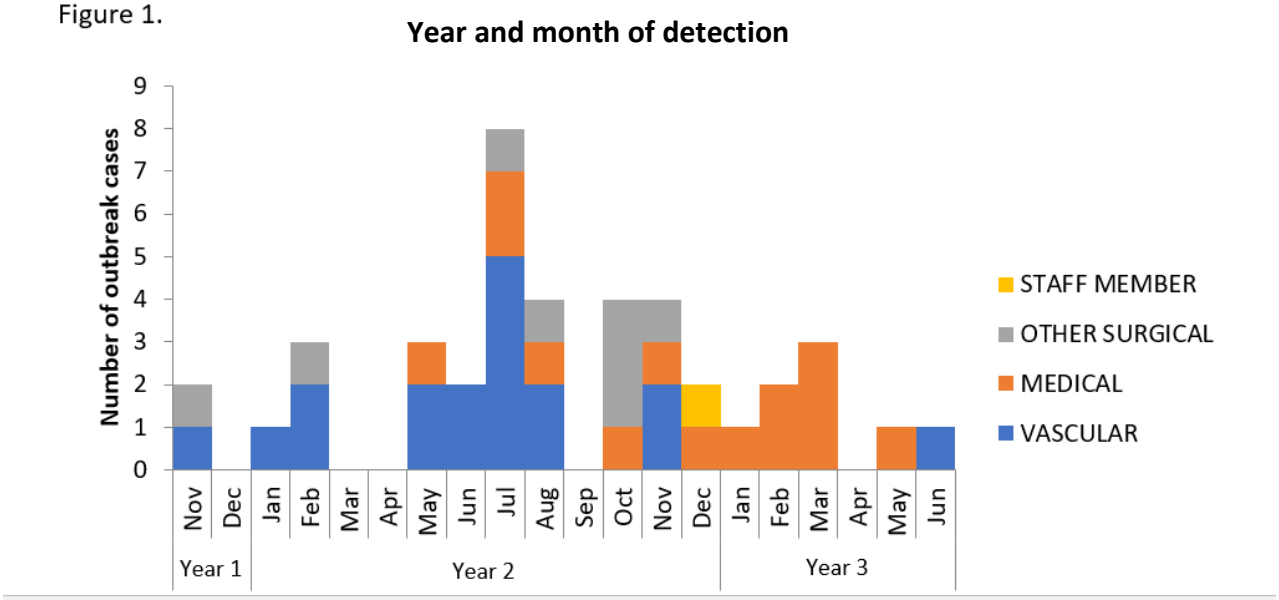

Figure 1. Distribution of outbreak cases by speciality during a MR-MRSA hospital outbreak.

Bed mapping and patient timelines

Initially there was one main cluster (18 cases) on a predominantly vascular surgery ward (designated Ward W). A second cluster on Ward W involving three cases probably arose from exposure to a case, not previously admitted to the hospital, which was positive on admission to Ward W. However, no single point source was identified.

The outbreak cohort was transferred to another ward (Ward Q) after three months to continue vascular services and for enhanced decontamination of Ward W. Three new cases were detected between January and April in year 2 indicating continuing transmission there. No obvious spatial-temporal links with existing recognised cases were identified for 11 cases.

Aspects of Ward W

The large increase in cases on Ward W was preceded by a four-week period when bed occupancy (103%) was above the normal complement of 245 weekly bed days (Figure 2). The bed occupancy dropped to 60-80% for seven consecutive weeks, in response to outbreak control measures. This temporary closure of beds and the reduction in vascular patient numbers was followed by a fall in new cases (Figure 2).

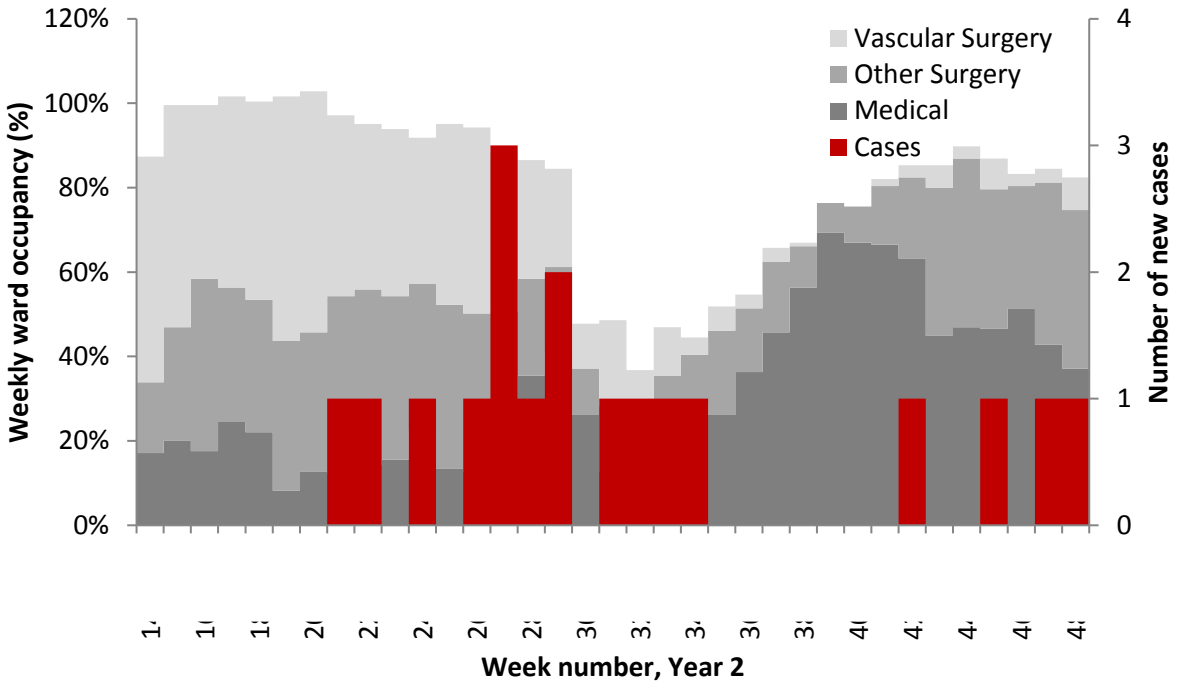

Figure 2. Distribution of patients with MR-MRSA on Ward W and weekly bed occupancy rates (%) by specialty.

Case control study

Twenty-two cases were enrolled in the case control study and on average, 5.2 controls were recruited per case. Eight variables were significantly positively associated with being a case and one was negatively associated on univariate analyses (Table 1). In the final multivariable conditional logistic regression model, being male, having a urinary catheter, having occupational therapy, and prolonged hospitalisation were significantly and independently associated with being a case. Having an in-patient vascular consultation was found to be borderline associated. None of the significant variables accounted for all cases, but male sex was the most predictive at 91%.

Table 1. Risk factors for the acquisition of mupirocin-resistant MRSA (MR-MRSA) spa type t127 or t922 colonisation/infection in a matched case control study during a MR-MRSA hospital outbreak.

Exposure	Cases			Controls			Univariate analyses			Multivariable analyses		
	Total	No.	%	Total	No.	%	Crude mOR	95% CI	P value	amOR	95% CI	P value
Male sex	22	20	91	114	71	62	**5.9**	**(1.3-27)**	**0.019**	**21**	**(0.99- 454)**	**0.050**
Ward W	22	18	82	114	51	45	**5.1**	**(1.6-16)**	**0.005**			
Emergency room consultation	21	10	48	112	78	70	**0.37**	**(0.14-0 .96)**	**0.040**	-		-
In-patient geriatric consultation	21	7	33	112	14	13	**3.3**	**(1.1-9.9)**	**0.038**			
In-patient vascular consultation	21	10	48	113	26	23	**3.2**	**(1.1-9.1)**	**0.027**	**5.2**	**(0.89-29)**	**0.066**
Peripheral vascular catheter	20	19	95	102	96	94	1.2	(0.14-10)	0.869	**-**		**-**
Urinary catheter	18	15	83	107	74	69	2.9	(0.79-11)	0.109	**12**	**(0.98-154)**	**0.051**
Wound for dressing	17	12	71	94	55	59	1.9	(0.61-6.2)	0.266	-		-
Antimicrobials	20	16	80	110	83	75	1.2	(0.38-3.9)	0.734	-		-
Surgical procedure	18	11	61	106	54	51	1.6	(0.53-5.0)	0.398	-		-
Physiotherapy	22	19	86	110	70	64	**4.0**	**(1.1-14)**	**0.037**			
Occupational therapy	22	16	73	109	30	28	**8.1**	**(2.6-25)**	**0.000**	**9.9**	**(1.6-61)**	**0.014**
Care from a social worker	22	13	59	109	32	29	**3.4**	**(1.3-9.0)**	**0.012**			
X-ray other than portable	22	21	95	114	93	82	4.3	(0.56-34)	0.159	-		-
Per in-patient day within two months of detection							**1.0**	**(1.0- 1.1)**	**0.002**	**1.1**	**(1.0-1.1)**	**0.013**

mOR=matched odds ratio; amOR =adjusted matched odds ratio; Bold indicates those factors analysed in multivariable conditional logistical regression analysis

Environmental investigations

Forty-five random samples of the environment, patient equipment and air were undertaken on and near ward W. One air sample taken in a nearby corridor/open area was positive for the outbreak strain.

Control measures

Each newly identified case was isolated or cohorted. Enhanced contact precautions, including the use of long-sleeved gowns for staff PPE, were instituted. An enhanced environmental and equipment cleaning regimen was implemented.

Ward W was closed to new admissions and enhanced decontamination efforts with hydrogen peroxide vaporisation (HPV) were undertaken.

Over a period of time to facilitate uptake, all healthcare workers (HCW) caring for Ward W patients were invited for screening for MRSA on a once-off voluntary basis. Of 55 tested, none was positive for the outbreak strain, but there was one staff member positive for the outbreak strain but this was unrelated to Ward W and occurred some time afterwards.

Nasal decolonisation using octenidine dihydrochloride (Octenisan® nasal gel) was attempted in three patients but none was successfully decolonised of MR-MRSA.

Discussion

This outbreak was the largest MRSA outbreak nationally reported in Ireland since outbreaks became notifiable in 2004.[11] Overall, 41 cases were identified over a 20-month period. It presented substantial challenges for elderly vascular surgery patients with the presence of mupirocin resistance making decolonisation difficult. For a period, all elective vascular surgery was suspended, and beds were unavailable due to ward closure.

Uptake of MRSA screening among staff was suboptimal but did not indicate any source among those who volunteered to be screened for MRSA carriage. Based on spatio-temporal analyses of cases, it seems likely that direct or indirect spread from existing known or unknown cases contributed to transmission, with overcrowding exacerbating spread. Apart from male gender, the other risk factors were indicators of underlying high dependency. Recent exposure to antimicrobials was not identified as a common feature among outbreak cases.

Male gender is a recognised risk factor for MRSA infection.[12] It has been proposed that poorer hand hygiene behaviour and/or gender differences in immune responses to infection may predispose males to higher MRSA colonisation and infection rates. The association found between cases here and occupational therapy consultation may be a proxy for dependence of patients or may reflect an increased risk associated with this professional activity, e.g. contaminated occupational therapy equipment. However, we did not target sampling of occupational therapy equipment as part of environmental screening. It is possible that MRSA-contaminated occupational therapy equipment might have played a role, and therefore consideration might be given to sampling this in the future. The association with vascular surgery, probably reflects poorer skin condition, ulcers, or co-morbidities in these patients. Studies have previously highlighted the risk of skin and soft tissue infections due to MRSA in patients with diabetes mellitus and peripheral vascular disease.[13]

A recent systematic review and meta-analysis of publications up to 2018 found that the prevalence of MR-MRSA was 13.8%, with 8.1% for high level mupirocin-resistance, and resistance was more common in Asia than Europe.[14] Widespread use of mupirocin ointment has previously been linked with the development of mupirocin resistance. [15-18] Just one patient had undergone attempted decolonisation with mupirocin within two months of subsequently being detected; thus, previous exposure to mupirocin does not appear to have been a contributory factor during our outbreak.

Older age was previously associated with MR-MRSA colonisation compared to colonisation with mupirocin susceptible MRSA.[19] Cases had a median age of 72 years, but as controls were frequency matched for age in the case control study, increasing age could not be assessed further as a risk factor.

Several studies suggest that overcrowding contributes to the transmission of healthcare associated infections. For MRSA, decreased healthcare worker hand-hygiene compliance, increased movement of staff and patients between wards, decreased opportunities for cohorting and isolation, and/or reduced efficiency of patient screening are recognised factors.[20,21] As the peak on Ward W was preceded by a period in which bed occupancy rates were above 100%, overcrowding may have played a role. As vascular surgery patients made up approximately one-third of all patients on Ward W, this may have facilitated additional spread, and the closure of Ward W to new admissions was followed by a reduction in new cases. Building guidelines for acute hospitals in Ireland published recently recommend that newly-built acute hospitals should compromise 100% single-room accommodation, multiple-bedded rooms should not contain more than four beds and that there should be a minimum floor space of 19m^2 around each bed.[22] The facilities in our hospital, albeit built well before when these were published, did not fulfil these criteria with excess bed occupancy and many beds too close together, thus likely contributing to the spread of MRSA.

Options for topical nasal decolonisation were extremely limited due to mupirocin and neomycin resistence. Octenidine is bactericidal, most isolates are susceptible[23] and the agent has potential,[24] but there is little local experience in its use. Cases probably remained colonised for longer than is typical, creating pressure for single rooms and cohort areas for longer, and serving as a potential reservoir for ongoing transmission. However, a recent mathematical model calculated the proportion of ICU patients with MRSA that are usually decolonised with mupirocin and chlorhexidine but found that there was significant room for improvement in current practice.[25]

Limitations to the epidemiological study include: (i) the date a person was first recognised as positive is more a reflection of screening activities than the actual time of acquisition, as colonisation *per se* goes undetected in the absence of screening, (ii) we chose two months as the window used for exposure assessment; a shorter or longer interval might have impacted on the findings, (iii) there were relatively large confidence intervals in the multivariable analyses (iv) heavily-dependent patients appear to have been at greatest risk, but there is no system in the hospital to prospectively capture the dependency level of patients and its variation during outbreak and non-outbreak periods, and (v) voluntary staff screening resulted in relatively few being screened.

Patients with underlying high dependency had a higher risk of colonisation with an unusual t127 strain of MR-MRSA. Spatio-temporal analyses suggested that direct or indirect spread from existing cases contributed to transmission, with overcrowding exacerbating spread. Recording the dependency of patients prospectively to inform patient needs, avoiding excessive bed occupancy levels, early closure of affected wards where possible, enhanced decontamination, the recording of individual HCW to individual patients, and a formal hospital policy on staff screening, are all recommended to prevent and support the management and investigation of any future outbreak.

Keywords:
Methicillin-Resistant *Staphylococcus aureus*; Mupirocin Resistance; Hospital Outbreak; Vascular Surgery; Prevention & Control; Bed Occupancy.

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Ethical Approval:
The data was anonymised and was collected as part of routine surveillance as mandated by national and other standards, and as part of outbreak investigations.

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Declaration of Conflicts of Interest:
H.H. has recently received research funds from Pfizer and Astellas and has in the recent past received a consultancy fee from Pfizer. All other authors report no conflicts of interest relevant to this article.

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Incidental Radiological Findings in the Research Setting and the Argument from Human Dignity

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Abstract

In research studies some collected data include Incidental Findings (IFs), i.e. findings "that potentially affect the health of a living being – if the diagnostic means were not intended to produce such findings".[1] They are found in up to 8% of brain MRI scans and as high as 41% in some CT scans; this wide difference in reported IFs is thought to be due in part to the wider field of view of CT scans which leads to better visualisation of additional organs.[2-4]

Given these facts, the ethical question arises: should the researcher tell the participant (or their healthcare provider) about an IF? After a brief evaluation of popular arguments put forward in the debate on how to handle IFs we'll recall what we owe human dignity and develop an argument from human dignity proving that disclosure of relevant IFs is without alternative.

Definitions

IFs differ in their severity; Hegenscheid et al. use a sliding scale where Category I IFs were normal or common in asymptomatic subjects (e.g. anatomical variants), Category II IFs were abnormalities needing further medical evaluation, and Category III IFs required immediate referral (e.g. acute brain infarction).[3-5] Similarly Lumbreras et al. classify IFs as minor, moderate and major but add correctly that depending on each individual an IF could be considered as major or minor and give the example of osteoarthritis as an age-related abnormality.[2] Katzman et al. reported that clinically serious IFs have a much lower prevalence of 1.1%; Illes et al. report that between 2 and 8% of findings have immediate clinical consequences. [6-11]

To Disclose or Not? A moral dilemma

Previously, it was uncontested in research ethics that, out of respect for their autonomy, there is a prima facie duty to inform a participant about any relevant IFs. According to this view, the decision not to disclose the finding can only be morally permitted for reasons that ostensibly outweigh the duty to disclose. Two reasons often put forward for not disclosing a finding are protection of the subject, and respect for personal autonomy. Non-disclosure could be required in order to protect the participant, e.g. from unnecessary psychological distress, [10] and respect for autonomy can be a reason for non-disclosure in the rare case that the right not to know was explicitly claimed by the participant with an acknowledgement of the consequences, and if there are no moral reasons to deny that right.

A duty to disclose IFs – limited only by conditions (a) and (b) – has, however, been questioned by several authors in recent years, mostly in relation to genetic research. [7-10] If there are convincing reasons for denying the duty to disclose IFs, one would also have to investigate whether they apply to IFs in radiological examinations carried out in non-interventional studies such as the UK Biobank or the Multi-Ethnic Study of Atherosclerosis (MESA) studies. [6] One argument for denying such a duty is that in a research context, no duty to inform exists because such a duty only rises from the patient-doctor relationship. [1] Another argument is that, in the case of genetic research, the relevant information mostly concerns risks of diseases and not manifest or actual diseases. Radiological IFs, though, often indicate manifest pathologies and not merely risks.

However, there is a serious moral case for non-disclosure. The moral duty not to harm research participants is contradicted by the moral duty not to produce false or useless research results by compromising a study's methodological integrity, as disclosing IFs compromises the integrity of the study, providing study subjects with information about their health that is not available to the general population which they are supposed to represent. [14] So the researcher is facing a moral dilemma: they must decide between two ethical demands that cannot both be met. What shall they do?

What Do We Owe Human Dignity?

It is thought that the duty of care is the most important moral principle protecting volunteers in medical research. [11-13] But does this go far enough in non-interventional research? [15] The researcher-participant contract – which can also be formally entered in the informed consent process – could state that the participant abstains from being informed about potential IFs. Given such a disclaimer, not informing the participant about IFs might be seen as legitimate. But is it? In order to examine this claim, we simply rely on three rather weak assumptions about the normative content of the concept of human dignity that can be supposed to be widely uncontroversial:

(I) “Human dignity” is a normative concept that, in the moral system of democratic constitutional states, designates a set of properties that human beings possess qua being human. It also legitimizes the expectation of a human being to be treated by others in a certain way.
(II) Someone’s human dignity has to be respected independently of potentially beneficial consequences for her. Insofar human dignity has stronger normative implications than the duty of care.
(III) If human dignity is attributed to someone, this person can expect not to be treated by others in a degrading way or as anything other than the potential source of ends and actions and not as a mere means to someone else’s end.

In order to assess the consequences of these assumptions for the handling of IFs, it is helpful to see what not informing a participant about an IF might look like in practice.

Non-disclosure in Practice

Let us assume that a participant – who has agreed not to be informed about potential IFs in a prior consultation with the researcher – asks after the examination whether “something was found”. How should the researcher react to this question? One thing is for clear: it is not morally permissible for them to avoid answering it, or to avoid meeting the participant after the examination. Such a form of not informing by refusing to talk to the participant might be justifiable by a paternalist account of the duty of care. But it is clearly disrespecting the human dignity of the participants. For in this case, the participant would be treated only as a means to the end of conducting a study, without being respected to the minimal degree that arises in direct interaction.

If refusing to communicate is not possible as a way of avoiding informing the participant, the researcher has two alternatives: contrary to the truth, they could (a) deny that “something was found”, or (b) refuse to inform the participant by referring to the fact that they agreed to forfeit their right to be informed in the informed consent process. The duty of care may allow for both options under certain circumstances. But in fact, both are problematic. Lying (a) is not a suitable form of non-disclosure, because it is a deliberate deception. Refusing to inform (b) can also hardly be considered as morally permissible. In this case, the participant who seeks to be informed could claim that they did not understand the whole extent of what they had agreed to in the consent process. Or they could say that they changed their mind about giving up their right to be informed. If an IF was discovered that is obviously clinically relevant, such as a life-threatening tumour that can be operated on, there is no doubt that it cannot be morally permissible for the researcher to insist on the principle “pacta sunt servanda” (according to which one is bound by entering into a contract forever) and to withhold the information about the IF from the participant, even though it would otherwise enable them to begin a potentially life-prolonging therapy. [11] Insisting on the contract would run counter to the common intuition that morality demands to release someone from a contractual obligation if this means that a life-threatening situation for that person can probably be solved or alleviated, and cancelling the contract is tolerable for the other party involved.

If we weigh up the choices, it is clear that the latter condition is also fulfilled in a case like this. Not disclosing the IF would prevent the participant from beginning potentially life-prolonging therapy as soon as possible. No comparable harm at all will come to the researcher by informing the participant.

The potential harm that might be done to third persons and future patients in particular, by disclosing the IF, is irrelevant. There are two reasons for this: first, in the informed consent process, the participant has – if we regard the researcher-participant relationship as a contract – only entered a contract with the researcher, and not also with third persons who might benefit from the research.

Second, participating in a study cannot establish a special moral duty of the participant – neither towards humanity, a certain community, or other individuals – that would exceed the moral duties that persons have independently of participating in the study. Hence burdening participants with special moral duties and thereby harming their physical integrity is incompatible with respecting their dignity. Therefore, no morally legitimate form of non-disclosure is available to the researcher. The only exception would be if the participant insisted on their right not to know.

Furthermore, human dignity also demands that we help someone in an emergency situation if helping is possible and reasonable for a third party. Therefore, even if there is no treatment contract between researcher and participant, the researcher has the duty to help the participant. This is the case even more so if the IF is sufficiently serious to call the situation of the participant an emergency and if the researcher is also a physician – which they usually are. [12] The latter means that they are capable of recognizing the emergency situation and of providing or arranging help.

Conclusion

Referring to human dignity enables us to see that in many cases disclosing IFs is morally required. That does not mean that a researcher is morally required to disclose all IFs as even a physician in a patient-doctor relationship is not required to do so, after all. Category I or minor IFs that have, according to current medical knowledge, no clinical significance might for example unnecessarily scare the participant. [2-5] It is these IFs and only them that might not be disclosed, but in order to take this paternalistic stance which censors the disclosure "in order to protect" the subject from stress, the research protocol would need very clear guidelines on which IFs would be disclosed. [13] However, respect for the human dignity of the participant requires taking seriously the fact that their life is self-determined. Relevant decisions that affect their life or the conduct of their life should not be subject to the researcher's discretion. Hence, Category II and III IFs could affect a subject's health status and therefore should be disclosed. Although management of IFs will vary between research canters there are guidelines in Europe which indicate that research participants should be informed of "relevant" IFs. [13-15] If "relevant" is understood to include all IFs that do not belong to Category I this is what is required in order to respect the participants' human dignity.

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"What Matters to You" Putting Patient Centred Care First

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Abstract

Aim

Evaluate the use and feasibility of implementation of the "What Matters to You?" (WMTY) in orthogeriatric patients.

Methods

An orthogeriatric assessment proforma was completed in patients with a hip or fragility fracture. Data including clinical frailty score (CFS), 4-AT delirium screen, length of stay, discharge disposition and WMTY responses were collected.

Results

Forty-nine patients were included. Median CFS was 5 (IQR 3), median 4AT was 1 (IQR 3). Forty-three (88%) were admitted from home and six (12%) from nursing homes. Nineteen (39%) were transferred to another hospital, fourteen (29%) home, fourteen (29%) to long term care, two (4%) died. Nineteen (39%) reported what mattered was a return to baseline mobility, seventeen (35%) to get home, two (4%) 'pain-free', three (6%) family, four (8%) miscellaneous and four (8%) no reply recorded.

Conclusion

WMTY promotes patient-centred practice. This study supports the feasibility of the tool in orthogeriatrics patients including those with mild to moderate cognitive impairment.

Keywords: What Matters to You, Patient-centred care, Quality Improvement

Introduction

"What Matters To You?"(WMTY) is a quality improvement initiative, incorporated in the 'National Clinical Programme for Older People' to encourage meaningful conversation between healthcare workers (HCW) and patients.[1] Asking WMTY prevents HCW making assumptions about what is important for patients and refocuses the goals of care.

Aligning 'What Matters' is one of the 4M's, an evidence-based element of high-quality care for older adults[2] correlating with the principles of Slainte Care 'Right care in the right place at the right time'.[3] This concept drives customised care plans, finding what is truly important to patients regarding their care.[4]

WMTY promotes active patient engagement, empowering and including them in the decision-making process, rather than being a passive participant[1]. It encourages patients to achieve better clinical outcomes through focusing on what matters most to them.[5]

We sought to evaluate the feasibility of implementation of WMTY in the orthogeriatric proforma document in a tertiary hospital in Ireland.

Methods

Orthogeriatric assessment proformas were completed for patients with hip or fragility fractures aged over 65 and 70 years respectively. The proforma assessed clinical frailty score [6], 4-AT delirium screen and asks WMTY. 49 patients were recruited by convenience sampling between January – March 2020. Anonymised data including age, gender, 4AT score, CFS, length of stay, place of residence on admission and discharge, and response to WMTY was collected. Answers were subdivided into five domains: Pain, Return to Baseline Mobility/Function, Discharge Location, Family and Miscellaneous. WMTY was open-ended and the five domains applied retrospectively. Data was collected and analysed using Excel.

Results

Forty-nine patients were included, thirty-one (63%) female and eighteen (37%) male with an average age of 82.49 years. The median CFS was 5 (IQR 3). Twenty-two (45%) scored between 1-4, sixteen (33%) between 5-6, ten (20%) between 7-9. One (2%) had no CFS recorded. Median 4AT score was 1 (IQR 3) with twenty-three (47%) patients with 4AT score of 0, twenty-one (43%) scoring between 1-3 and four (8%) with a 4AT $\geq$4. One (2%) had no 4AT recorded.

Forty-three (88%) patients were admitted from home and six (12%) from nursing homes. Fifteen (31%) were subsequently discharged to a rehabilitation hospital, fourteen (29%) directly home, fourteen (29%) to long-term care (LTC), four (8%) were transferred to another hospital and two (4%) of patients died.

Of the forty-nine patients, nineteen (39%) reported what mattered was a return to baseline mobility/function, seventeen (35%) expressed a desire to get home, two (4%) wanted to be pain-free, three (6%) stated family, four (8%) of responses were miscellaneous and a further four (8%) had no reply recorded. Twenty-two of Twenty-six patients with 4AT score of >0 responded to WMTY.

Of those who desired to return home, six were discharged directly home, one to LTC, nine to further hospital rehabilitation and one patient died.

Discussion

The study has shown the individual and varied aspirations of orthogeriatric patients regarding the outcome of their care.

Previous research[7] has demonstrated that responding to WMTY may be challenging for older patients. Multiple factors have been associated with difficulties in communication in elderly patients including cognitive decline, delirium and frailty.[8] In this study, a high proportion of patients with a 4AT score of >0, indicating some degree of cognitive impairment, responded to the WMTY question. This suggests that use of WMTY remains feasible in this population group. Previous studies[9] found that people with mild/moderate cognitive impairment can consistently express their preferences further supporting the use of WMTY in this cohort.

Important areas for future studies of the WMTY framework include evaluation of patient satisfaction, repeated application to highlight new or changing goals [10] and identification of barriers to widespread implementation. A particularly important area for further research is of the use of WMTY in a frail or cognitively impaired population group as there are currently few studies. Repeating this study using consecutive sampling would further validate the feasibility of WMTY.

Ethical Approval:
This study has received full ethical approval from the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

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Declaration of Conflicts of Interest:
We declare that we have no competing interests.

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Traumatic Cervical Chance Fracture

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Abstract

Presentation

A 64-year old male presented three days after a road-traffic-accident with associated loss of consciousness. Neurological assessment indicated a complete absence of sensory and motor innervation in the upper and lower extremities, with absent anal sensation.

Diagnosis

Imaging showed fractures of the C5-C7 spinous processes, with a C6 chance fracture. Additionally, there was widening of the disc space and facet joints, ligamentous disruption, and mild canal stenosis.

Treatment

Surgically managed (ACDF) and recovered well in the postoperative period without complication.

Conclusion

In consideration with other reports in the literature, it would appear cervical chance fractures can be managed effectively with either ACDF or PCDF when surgical intervention is required.

Keywords: Chance fractures, traumatic cervical spine injury, spine surgery

Introduction

Chance fractures are a rare phenomenon defined as a horizontal fracture through all three spinal columns secondary to a flexion-distraction injury[1]. They occur almost exclusively in the thoracolumbar spine and/or in patients with ankylosing spondylitis[2]. Traumatic chance (flexion-distraction) fractures of the cervical spine are even rarer due to the inherent mobility of the cervical spine[3], with literary evidence limited to a handful of reports[2,4,5]. As a result, the definitive treatment strategy remains unknown. The aim of this study is to identify patients at our institution that presented with a traumatic cervical chance fracture (and no history of ankylosing spondylitis), disclose the presentation and management, and review existing literature.

Case Report

Case X is a 64-year-old male referred three days after being involved in a road-traffic-accident (RTA) with associated loss of consciousness. Imaging showed fractures of the C5-C7 spinous processes, with a C6 chance fracture (Figure 1). Additionally, there was widening of the disc space and facet joints, ligamentous disruption, and mild canal stenosis (Figure 1). There were additional fractures of the L1-L4 transverse processes. CT showed a sub-arachnoid haemorrhage, and neurosurgical consult warranted no emergent surgical intervention. Neurological assessment indicated a complete absence of sensory and motor innervation in the upper and lower extremities, with absent anal sensation.

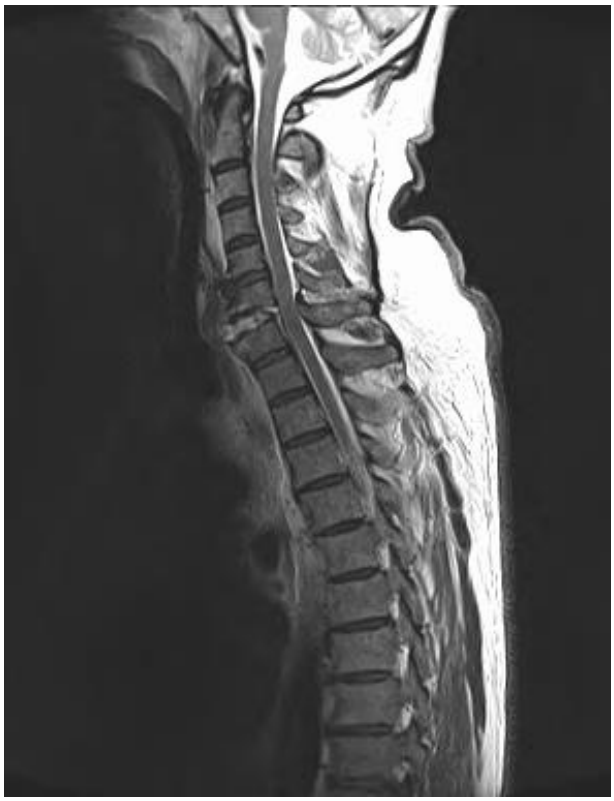

Figure 1: *Sagittal T2-weighted MRI depicting a widening of the intervertebral disc space, with evident disruption of anterior and posterior longitudinal ligaments and associated oedema.*

The patient underwent a C6-C7 anterior cervical discectomy and fusion (ACDF) (Figure 2) with no intraoperative complications. Postoperatively, the patient had a reduced level of consciousness requiring nasogastric feeding. The patient was discharged home 7 days later in a Miami J collar for follow-up in three weeks. On follow-up, neurological assessment was unable to be fully elicited due to confusion, although he appeared to have sensation in all extremities, with notable residual power deficit in the right arm (2/5). Imaging was satisfactory with normal alignment. The patient no longer required nasogastric feed and had returned to fluids and soft diet.

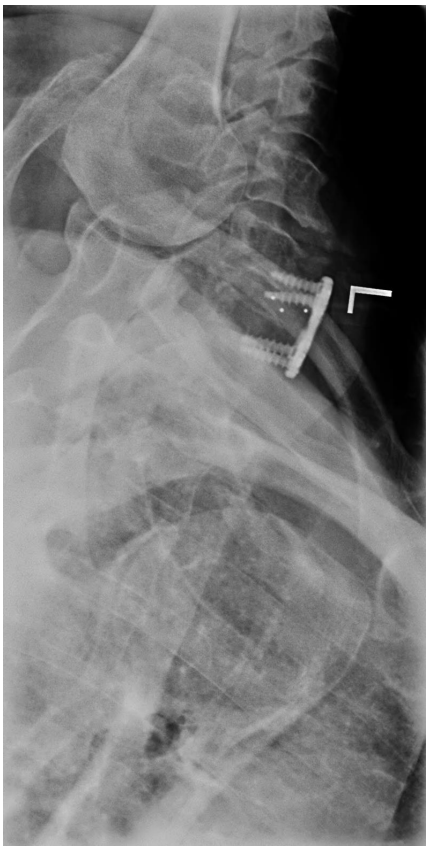

Figure 2: *Postoperative oblique view radiograph highlighting C6-C7 ACDF.*

Discussion

To date, there are only three studies regarding the management of traumatic cervical chance (flexion-distraction) fractures. Rowell et al.[4] report the case of a 40-year old female involved in a motor vehicle collision. Radiographs depicted a chance fracture through C6, with disc protrusion and extrinsic compression of the anterior cervical cord. The patient underwent posterior cervical discectomy and fusion (PCDF), with resolution of paraesthesia and pain, and no associated postoperative complications. Eghbal et al.[2] describe the case of 33-year old male pedestrian struck by a car, complaining of severe neck pain and paraesthesia in the 4th and 5th fingers of both upper extremities. MRI revealed a C7 chance fracture, with associated ligamentous disruption. Similarly, the patient underwent PCDF, with resolution of all symptoms at 6-month follow-up. Korres et al.[5] report two cases of chance fractures of the axis, both managed conservatively.

Both patients were treated with skull traction for the initial 6 weeks, followed by another 6 weeks of personalized cervical immobilization. Both patients recovered full cervical motion and had no complaints of residual pain. These two patients represented just 1% (2/184) of all axis fractures that presented to Korres' institution over a 32-year period, highlighting their rarity.

Chance fractures in the thoracolumbar region are managed based on the presence of neurological deficit[6]. It is currently unknown whether similar strategies are applicable to traumatic cervical chance fractures as the spinal regions are biomechanically and anatomically distinct[6,7]. In consideration with existing literature, a conservative approach may be implemented for traumatic cervical chance fractures with no associated neurological deficit or retropulsion of vertebral elements. Although ACDF was employed as the surgical approach in our case, it would appear an anterior or posterior approach can achieve desirable postoperative outcomes.

Declaration of Conflicts of Interest:
The authors have no conflicts of interest to declare.

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Autoimmune Anti-HMGCR Myopathy: A Rare but Disabling Complication of Statin Therapy

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Abstract

Presentation

An 85-year-old farmer developed disabling progressive proximal limb weakness and dysphagia after 10 years of statin therapy.

Diagnosis

Creatine kinase was elevated, and electromyography demonstrated myopathic abnormalities. A muscle biopsy confirmed a necrotising myopathy. Serum 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGCR) antibodies were positive. These investigations confirmed a diagnosis of autoimmune anti-HMGCR myopathy.

Treatment

The statin was stopped and treatment with steroids, intravenous immunoglobulins and rituximab yielded minimal clinical improvement over 1 year.

Conclusion

Autoimmune anti-HMGCR myopathy is a rare complication of statin therapy. In severe cases earlier treatment with multiple immunotherapies may be necessary.

Introduction

Statins are commonly prescribed medications worldwide, with Lipitor sales exceeding €100 billion between 1996 and 2011.[1] Statin-prescribing will increase significantly as over one billion people meet criteria for statin therapy based on their cardiovascular risk factors.[1] Approximately one third of Irish people aged 50 years or older were taking statins in a nationally representative sample.[2]

Statin-associated muscle symptoms (SAMS) occur in 7-29% of people taking statins and result in an approximate 75% discontinuation rate.[3,4] SAMS manifest as symmetrical pain, stiffness or cramps but are rarely associated with weakness or raised creatine kinase (CK) .[5]

Myopathy associated with 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGCR) antibodies should be considered in patients on statins who develop weakness and hyperCKemia.[6] Prompt recognition is crucial, as early statin discontinuation and treatment with immunomodulating agents results in better outcomes.[6]

We describe an 85-year-old man with anti-HMGCR myopathy that responded poorly to late immunotherapy, to raise awareness of this disabling complication.

Case Report

An 85-year-old farmer presented with progressive weakness of his limbs. Initially, he had difficulty lifting his legs when climbing into his tractor. Relevant medical history included ischaemic heart disease, hypercholesterolemia, atrial fibrillation and an intracranial aneurysm treated neurosurgcially. His medications included aspirin, telmisartan, bendroflumethiazide, metoprolol and 10 years of atorvastatin 80mg daily.

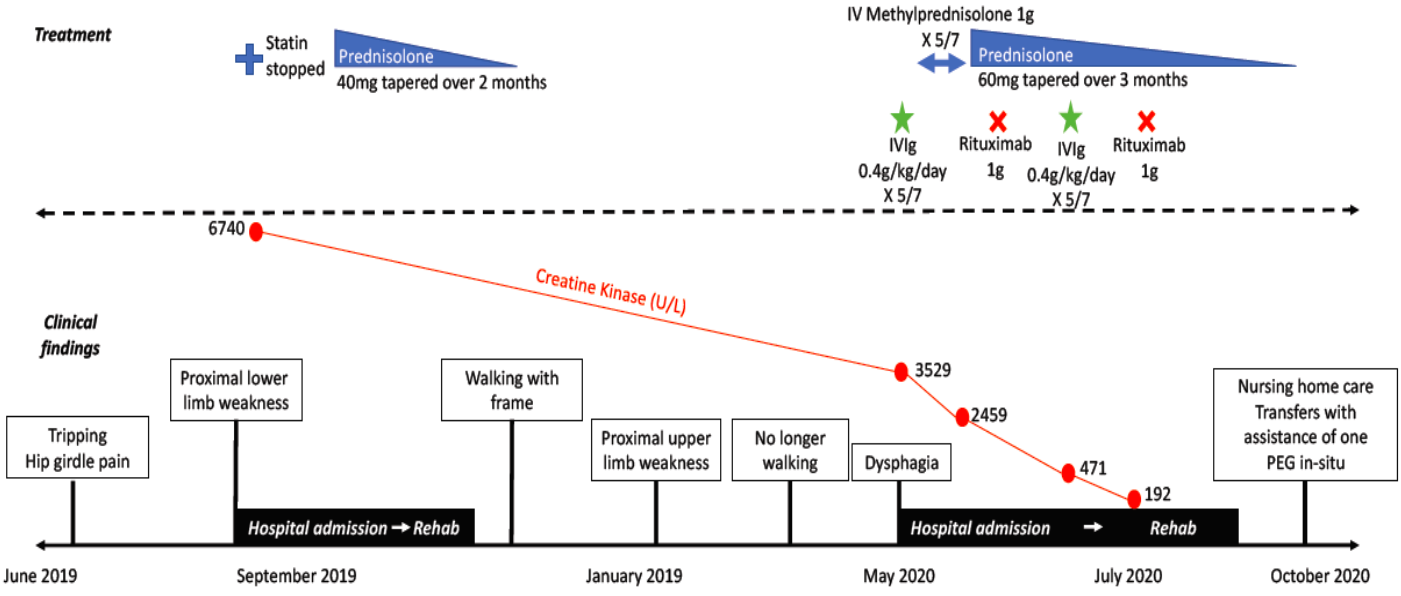
He was admitted to his local hospital following a fall. Proximal lower limb weakness was noted and CK was elevated at 6740 U/L (39-308). An inflammatory myositis was presumed but a muscle biopsy was not performed Atorvastatin was discontinued, prednisolone 40mg daily was started and tapered over two months (Figure 1).

His condition worsened and he required a frame to walk short distances. After six months, he was unable to lift his arms above his head. After nine months, he was bedbound and dysphagic (Figure 1). He was transferred to our hospital for further investigations and management.

He had symmetrical, predominantly proximal upper and lower limb weakness. Neck extension was moderately weak, with relative sparing of neck flexion. Reflexes were globally diminished. Sensory exam was normal except for reduced vibratory sensation to the ankles. Cranial nerves were unremarkable except for a soft voice and slow tongue movements.

CK was elevated at 3529 U/L. C-reactive protein and erythrocyte sedimentation rate were within normal limits. Electromyography showed myopathic motor units and fibrillation potentials. A muscle biopsy showed a necrotising myopathy (Figure 2). A myositis antibody panel was sent. A CT scan of thorax, abdomen and pelvis revealed no occult malignancy.

He was treated with intravenous steroid followed by an oral taper. He then received two courses of intravenous immunoglobulins (IVIg). Later, HMGCR antibodies returned positive (titre >200), confirming the diagnosis of anti-HMGCR myopathy and rituximab was commenced (see Figure 1 for doses). A percutaneous endoscopic gastrostomy was inserted. He partially improved (transferring from bed to chair with assistance) and resides in a nursing home.



(IV = intravenous; PEG = percutaneous endoscopic gastrostomy; IVIg = intravenous immunoglobulins; g = gram; kg = kilogram).

Figure 1: Patient's clinical timeline demonstrating progression of symptoms, creatine kinase trajectory and treatments.

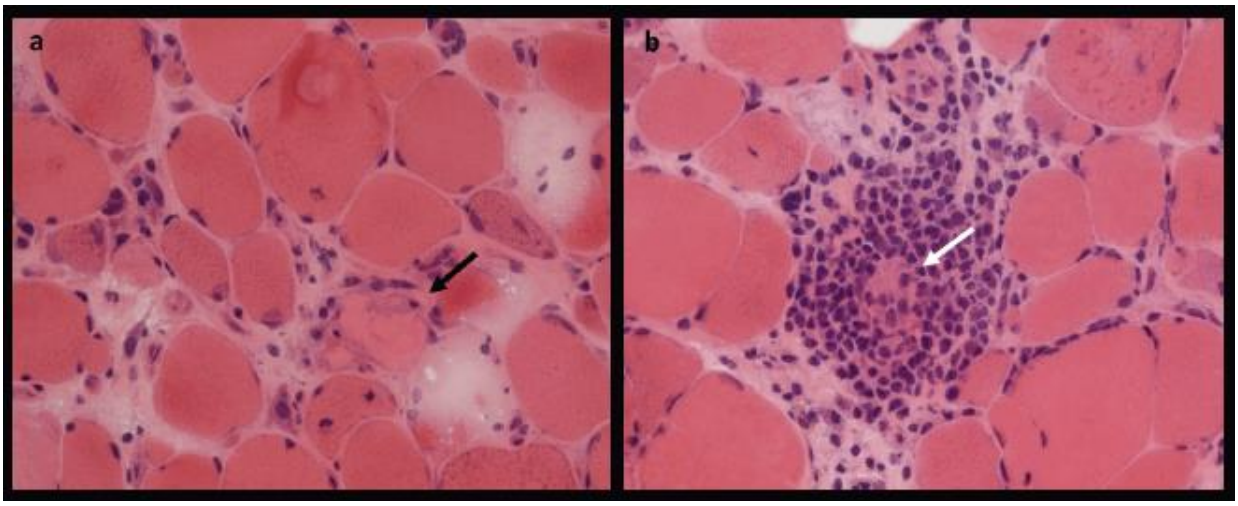


Figure 2: Muscle biopsy (vastus lateralis), necrotising myopathy.

(a) Severe variation in fibre size and increased endomysial connective tissue on a haematoxylin and eosin (H&E) stained frozen section (20X). The black arrow denotes a necrotic myofibre and myophagocytosis. **(b)** Endomysial lymphocytic inflammation (proven to be CD3 positive T cells) centred on a necrotic myofibre (white arrow) in a H&E stained section (H&E 20X). Additional immunohistological findings included variable MHC-1 upregulation in non-inflamed fibres.

Discussion

Anti-HMGCR myopathy is a rare complication of statins, with an estimated incidence of 2-3 per 100,000 on statins annually.[5] However, as statins are commonly prescribed[1], the overall incidence of anti-HMGCR myopathy is probably greater than expected. Statins upregulate muscle HMGCR and overexpression may lead to autoimmunity against HMGCR in susceptible people. The class II HLA allele DRB1*11:01 is strongly associated with developing HMGCR antibodies.[5]

Patients present with progressive proximal weakness and sometimes dysphagia.[6] Muscle-cell necrosis is seen on biopsy.[6] CK often exceeds 2000 U/L.[6] Screening for malignancy is recommended, as cancer occurs in over 15% of patients.[7] Remarkably, approximately one third of patients with HMGCR antibodies are statin-naïve.[6,8] HMGCR antibodies are rarely detected in patients with SAMs only.[9]

Immunotherapies are indicated if there is significant weakness or when minimal improvement occurs after statin discontinuation.[5] Steroids are recommended initially, followed by IVIg and/or an oral immunosuppressant such as methotrexate or azathioprine.[5] Rituximab is recommended in severe cases.[10]

Triple therapy with steroids, IVIg and an oral immunosuppressant or rituximab was used in almost half the cases reported[5] and was associated with better outcomes.[6] Over 75% of cases improve on immunotherapies, with extended treatment recommended as 55% relapse over time.[6]

Our patient's older age, along with the delayed diagnosis and treatment probably contributed to irreversible muscle injury. Clinicians are accustomed to managing SAMs but may be less familiar with the potentially devastating consequences of anti-HMGCR myopathy, and this may have contributed to the delayed diagnosis. Patients should be counselled on initiation of statin to report any muscle cramps, tenderness or weakness during treatment. They should be informed that up to one-third of patients on statins experience SAMs and that more sinister myopathic presentations are exceedingly rare. Patients on statins who develop significant weakness or hyperCKemia (CK elevated >5 times upper limit of normal) should be referred for specialist assessment by neurology or rheumatology, especially if these features persist following statin discontinuation.

This case highlights the significant side effect profile of statin therapy and in particular, the immune-mediated mechanism responsible for rare cases of statin-associated myotoxicity, that typically persists after the statin is removed. As statins are so frequently prescribed, it is important for clinicians to recognise this syndrome, to understand its immunopathogenesis and to treat early and aggressively with immunosuppressive therapies.

Declaration of Conflicts of Interest:
The authors report no potential conflicts of interest.

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Birt-Hogg-Dubé Syndrome: From a Skin Tissue to a Multi-Visceral Issue

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Abstract

Presentation

A 39-year-old woman noticed subtle skin changes on her face.

Diagnosis

Skin biopsy revealed fibrofolliculomas, a hallmark of Birt-Hogg Dubé syndrome (BHDs). Molecular genetic testing for the folliculin gene identified a pathogenic in-frame deletion mutation and imaging yielded multiple bilateral thin-walled lung cysts and an indeterminate renal lesion questionable for neoplasm.

Treatment

The patient was educated about possible complications and referred for genetic counselling as well as respiratory, renal, and dermatological services for appropriate specialist surveillance.

Conclusion

Birt-Hogg-Dubé syndrome is a rare genetic disease characterized by benign skin lesions, thin-walled pulmonary cysts, spontaneous pneumothorax, and renal tumours. Clinical features are easily under-recognized. A multidisciplinary specialist approach along with vigilant screening and genetic counselling are integral to management.

Introduction

Birt-Hogg-Dubé syndrome, a rare autosomal dominant disease affecting approximately 200 families worldwide, is linked to a mutation in the folliculin gene which encodes the protein folliculin (*FLCN*). [1,2,4]

Folliculin's function is largely unknown yet studies have shown it is naturally expressed in multiple tissues, alteration of which leads to formation of cystic structures in certain tissues and tumour suppression in others.

To elaborate more on this, the *BHD* gene also known as tumour suppressor gene *Folliculin* (*FLCN)* which is expressed in multiple tissues including the skin, lungs, and kidneys codes for the protein folliculin. Folliculin has been shown to have a role in tumor suppression exercising an inhibitory effect on the growth-promoting mammalian target of rapamycin (mTOR) pathway. [7,8]

Mutations and therefore modifications observed within the *FLCN* gene in BHDs lead to the expression of indolent or ineffective folliculin, subsequently activating the mTOR pathway. This in turn promotes cell growth and proliferation eventually resulting in tumour pathogenesis. The clinical expression of which typically includes cutaneous fibrofolliculomas and renal tumours of various histological types. [7,8]

A wide range of phenotype heterogeneity exists in families with Birt-Hogg-Dubé Syndrome despite sharing the same folliculin mutation.[3]

Diseases characteristics include multiple benign skin lesions (fibrofolliculomas and trichodisomas), thin-walled pulmonary cysts, spontaneous pneumothorax (89%), and sevenfold increased risk for renal tumours. [1,5]

Identification and treatment of complications, genetic counselling and appropriate surveillance are the cornerstones of management.

Case Report

A 39-year-old woman with a history of treated superficial spreading malignant melanoma attended for routine skin surveillance where she drew attention to new flesh-like bumps on her face (Figure 1)

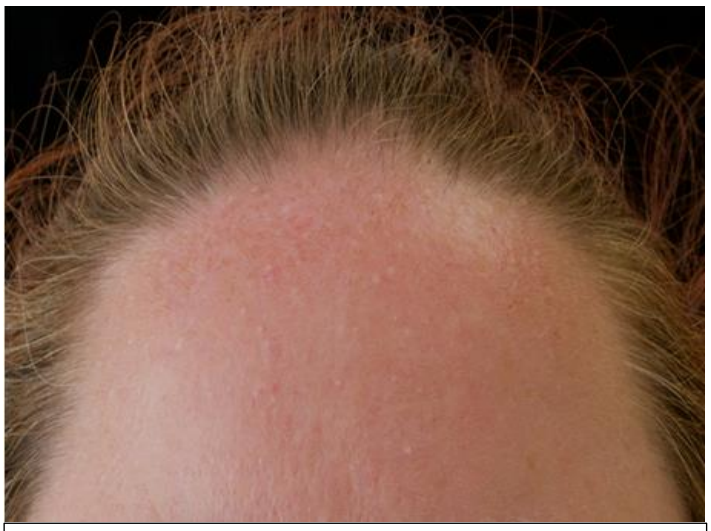

Figure 1: Forehead image showing small discrete subtle white to flesh coloured smooth dome shaped papules. These discrete papules appear clinically indistinguishable.

The 1-3mm flesh-coloured dome-shaped papules were spread across her forehead and cheeks and slowly multiplying in previous months to years. Skin biopsy was sought and a histopathological diagnosis of 'fibrofolliculoma' was made, a hallmark of Birt-Hogg-Dubé Syndrome.

Molecular genetic testing for folliculin gene was undertaken. Sequence analysis of the *FLCN* gene identified the pathogenic heterozygous variant c.1522_1524delAAG, p.(Lys508del). Full blood count, renal, liver, bone, and autoimmune profiles were normal.

High resolution CT Thorax revealed multiple bilateral thin-walled lung cysts with no pneumothorax (Figure 2). Contrast MRI kidney identified an isolated 13 mm T2 hypointense endophytic lesion in the interpolar region of the right kidney which could represent renal malignancy.

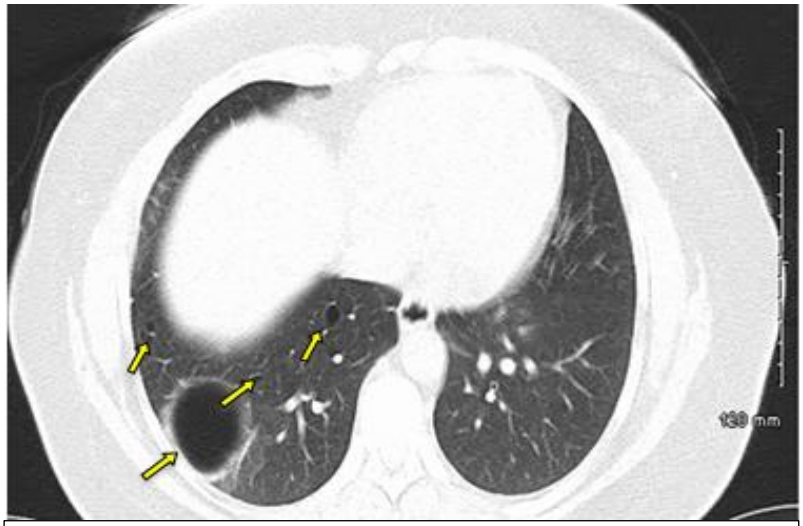

Figure 2: Chest CT showing multiple bilateral thin-walled lung cysts (arrows) consistent with the diagnosis of Birt-Hogg-Dubé syndrome the largest of these is in the posterior basal right lower lobe and measures 5.8 cm in diameter.

The combination of fibrofolliculomas, lung cysts, suspicious MRI kidney findings along with the positive pathogenic variant on genetic testing consolidated a diagnosis of Birt-Hogg-Dubé Syndrome.

Fibrofolliculomas are benign. Conventional cosmetic treatments were offered which our patient did not pursue.

There is currently no specific therapy/follow-up strategy of lung cysts associated with Birt-Hogg-Dubé Syndrome. Treatment strategies are based on education and management of complications.[7] Given the 50-fold increased risk of pneumothorax, counselling was given on avoidance of precipitants such as smoking and diving.[9] Respiratory specialist involvement ensured close outpatient surveillance.

The role of close respiratory outpatient follow up centres around preventing and treating pneumothoraces. It is recommended to repeatedly remind patients about the risk and symptoms of pneumothorax, and to recommend medical assessment in case of new respiratory symptoms such as dyspnoea or chest pain because of the high recurrence rate of pneumothorax in BHD. Furthermore, it is recommended to consider pleurodesis after the first episode of spontaneous pneumothorax. Moreover, periodic pulmonary function testing should be provided to patients with impaired lung function at baseline and those with extensive cystic lung disease.[7,9]

Annual MRI surveillance of the renal lesion was recommended with follow-up approach dictated by size and nature of tumour progression. Renal specialist involvement was organized. Expert recommendations suggest 36 monthly abdominal imaging in patients without evidence of renal lesions on baseline imaging.[6]

Given the 50% inheritance risk, this woman opted for genetic counselling and her family were subsequently screened. She had a family history of paternal colon cancer in his fifth decade; however, she did not know of any previous family members to suffer pneumothoraces or renal tumours.

Discussion

Birt-Hogg-Dubé Syndrome highlights how subtle and inconspicuous skin changes which could be easily overlooked can be the key to a life-changing diagnosis of a potentially very serious genetic condition.

There is not yet enough evidence to prove an association between Melanoma and Birt-Hogg-Dubé Syndrome, but this case raises an interesting consideration given the pathogenesis overlap in some signalling pathways such as mTOR. [10]

We wish to emphasise the importance of thorough skin examination, especially in those with newly identified lung cysts or pneumothoraces.

Due to the Birt-Hogg-Dubé Syndrome's rarity, carcinogenicity, heterogeneity of clinical manifestations, and propensity to mimic other clinical entities, a unifying diagnosis can be very challenging and early recognition, timely diagnosis, and appropriate interventions are key factors influencing survival and prognosis of patients and affected family members.

Patient Consent:
Received.

Declaration of Conflicts of Interest:
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Edible Cannabis Toxicity in Young Children; An Emergent Serious Public Health Threat

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Abstract

Introduction

Acute encephalopathy and sometimes, respiratory depression are increasingly reported due to accidental ingestion of cannabis edibles. Six young children presented to a paediatric ED with acute encephalopathy. All had tetrahydrocannabinol positive urine tests. This is the first series of paediatric cannabis poisoning reported in Ireland.

Cases

Case 1: 5 yr. GCS 10, pupils 8mm. Significant hypotension. GCS normal 12 hours after ingestion.

Case 2: 4 yr. GCS 8. Pupils 5mm. Decorticate posturing and tachycardia. GCS 8 for 8 hours more and PICU for poor respiratory effort. Full recovery after 36 hours.

Case 3: 3 yr. GCS 7. Pupils 6mm. Tachycardia, hypoventilation and decorticate posturing. Three generalised seizures, at least 8 hours after ingestion. GCS normalised within 30 hours.

Outcome

Two cases were discharged from ED after 12 hours. 4 cases were admitted to the ward with one requiring PICU. Autonomic instability occurred in 3 cases and resolved early. All cases were referred to TUSLA.

Conclusion

Accidental cannabis poisoning in young children from edibles causes significant morbidity. This is a serious evolving paediatric public health threat with child protection issues. Recognition and notification of all cases presenting to our Emergency Departments is imperative.

Introduction

According to WHO, 147 million people worldwide use cannabis, making it the world's most widely cultivated, trafficked, and abused illicit substance.[1] It is the most abused controlled drug in Ireland.[2] Cannabis intoxication in the paediatric population has been described worldwide as decriminalisation and underenforcement becomes the norm.

Accidental ingestion of cannabis edibles in young children is increasingly reported in ED and PICU settings as acute encephalopathy. Respiratory depression may result depending on the age and dose ingested. A large French multicentre study described PED tertiary admissions between 2004 and 2014 in a paediatric cohort under 6 years. Visits increased 133% and cannabis exposure related calls to toxicology call centres increased 312%. Other toxic exposures increased only 45%.[3] In the USA, severe paediatric intoxications were noted in States where cannabis had been decriminalised.[4,5] From 2014, 50% of calls to poison centres in USA involving e-cigarettes are for accidental swallowing of cannabis liquid in pods, in children less than 5 years.[6] Hashish oil of uncontrolled concentration can be used to make brownies, cookies, gummies, and jellies. Exposure risk is increased for children because of attractive packaging and labelling of edibles to resemble trusted brands. The potency of edible cannabis products varies as false labelling of content from unregulated origins is increasingly a covert method of drug trafficking unlike edibles consumed in licenced “coffee shops” in the Netherlands where small quantities of cannabis are sampled by those over 18 years in a safe environment and government regulated factories in North America. While an average adult inhaled cannabis dose is 5 to 20 mgs of THC, 10 to 50 times this dose can be ingested in edibles with at least a thirty minute time delay for initial effect.[7,8] Adults who order cannabis edibles online for personal consumption are frequently unaware of the danger for young children who often consume several sweets initially.[9]

Our tertiary Paediatric Emergency Department had 6 children under 10 years of age (5 were under 6 years) who presented within an 8-week period from March 17th, 2021 with acute encephalopathy. Each child had a urine sample that tested positive for Tetrahydrocannabinol (THC) on ELISA testing (Eurofins). We describe four serious cases.

Case 1

A 5-year-old presented to the ED after a known ingestion around 8pm. The child was increasingly drowsy over the evening. At 10:30 pm in ED, he was noted to have a GCS of 14/15. He was able to mobilize independently with an ataxic gait. Three hours after ingestion, the GCS dropped to 10/15. Pupils also dilated from 4mm to 8mm and he became hypotensive with a BP of 88/55mmHg. Routine bloods and a urine sample, by catheter, were obtained and a 20ml/kg bolus of normal saline was given. ECG was normal. He needed a second fluid bolus with good effect. After 5 hours, his GCS had improved to 13/15. By 8:00am, he was back to normal and discharged with social work follow up.

Case 2 and Case 3

3-year-old and 4-year-old siblings were disinhibited at 11:00pm following an earlier witnessed ingestion of cannabis jellies (Chuckles Peach Rings) around 8:00pm. The jellies were in a schoolbag in a communal space. Each jelly reportedly had 50mgs of THC and both children became increasingly drowsy and by 5:00am, an ambulance was called.

Case 2

The 4-year-old was brought to ED resuscitation area at 6 am with a GCS of 9/15. The pupils were 5mm and sluggish. Heart rate (HR) was 170, BP 98/50 mmHg and respiratory rate (RR) was 15/min and shallow. Oxygen was commenced at 6 L/min with adequate saturations. Decorticate posturing was observed on and off over the next 3 hours. Urine was obtained by suprapubic aspiration at 9.30am. By then, pupils were 8mm, BP 85/44. By 10.15 am, right pupil was 6mm and left pupil was 4mm and GCS 8/15. A brain CT was normal. The child was transferred to the ward. By 1.00 pm, the BP was 77/38, HR 94, GCS 7/15 and RR 12/min and shallow. A bolus of 20mls/kg of normal saline was given. Oxygen saturation decreased to 89% on 15L of oxygen. Humidified high flow nasal oxygen (Airvo) was started. The child was transferred to PICU. Respiratory drive improved overnight, and oxygen stopped. By noon, 36 hours after arrival, GCS was 13/15 and was normal by 3:00pm. The child remained in hospital for another 2 days as TUSLA and the Gardai were involved.

Case 3

The 3-year-old sibling of Case 2 arrived at the ED resuscitation area at 6am with pallor and a temperature of 34.1 ^{o} C. The airway was patent, oxygen saturation was 89% in room air and oxygen was started. The vitals were; HR 163, BP 127/78, CRT 2 and a GCS 8/15. Pupils were 6mm and sluggish. Decorticate posturing was observed with stiffening and breath holding with brief mild cyanosis, self-resolving. An intravenous line was sited, and a venous gas showed the following: pH 7.2, PCO2 8.2, lactate 1.4. ECG was normal and urine was obtained by catheter at 10:00am which was positive for THC. The child was transferred to the ward and in the ward, there were 3 episodes of cyanosis associated with tonic-clonic movements of all four limbs. Buccal midazolam was given, and a Code Blue was called. A brain CT was done at 4:00pm which was normal. The GCS improved slowly overnight and was normal by noon the next day. The child remained in hospital for the weekend as TUSLA and Gardai were involved.

Case 4

A 10-year-old ingested his 26-year-old sibling's cannabis sweets (Cannabust) around 17.30pm. By 17.45pm he felt dizzy and ataxic. On arrival to the ED at 6:30pm, he was noted to be very pale, GCS 13/15, RR 18, saturations 100% on room air, BP 110/65. Activated charcoal was attempted orally but then given by nasogastric due a large emesis. He received a saline bolus. GCS normalized within 4 hours. He was observed overnight in ED to be seen by social services.

Discussion

Cannabis, the genus, comes from 2 main species of cannabis plant, *C. indica* and *C. sativa*. The cannabis plant is complex and contains at least 120 compounds called 'Cannabinoids' so far. The *C. sativa* plant yields marijuana (dried crushed flower heads and leaves), hashish (resin) and hash oil (concentrated resin extract) which can be smoked, inhaled or ingested.

Tetrahydrocannabinol (THC) is the main psychoactive cannabinoid in the cannabis plant. The female *C. sativa* plant has the highest concentration of THC, with hybrid plants now producing more concentrated THC than ever before. Recreational marijuana had a THC concentration of 4% in the 1980s but had increased to 12% by 2012.[3,5] The psychotropic effects or potency of any preparation depends on the route and quantity of exposure and the THC content of the preparation.[12,13,14,15]

THC acts by binding to CB1 receptors in the cerebellum, basal ganglia, hippocampus and cerebral cortex. Therefore, toxicity is associated with cognitive and motor impairment. THC receptor binding inhibits neurotransmitters in the autonomic nervous system, acetylcholine, noradrenaline, dopamine, serotonin and GABA. Observed clinical effects are both dose and time dependent and therefore are related to the route of delivery, inhaled or oral. After inhaling cannabis, its effects peak within 30 minutes and last for about 4 hours. Ingested cannabis has lower bioavailability (5 to 20%) compared to the inhaled route due to gastric acid degradation and first pass hepatic metabolism. Onset of psychotropic effects are 30 minutes to 3 hours after oral ingestion and may last up to 12 hours. Although peak concentration usually occurs within 1-2 hours, it can be delayed for a few hours. Elimination half-life ranges from 25 to 36 hours.[6] It is metabolised by hepatic cytochrome oxidase and end products excreted in faeces (65%) and urine (20%). The delayed effects from oral ingestion compared to rapid effects from smoking or vaping is what pose the greatest risk to children and naïve users who consume several edibles initially then overdose.[6,8,10]

Immaturity of brain synapses may be important in toxicity in young children as well as the dose ingested per kilogram body weight. Effects can be stimulant, hallucinogenic or sedative. Unlike older children, those under 6 years present with altered sensorium from encephalopathy with dilated sluggish pupils, injected conjunctiva, euphoria, stupor or coma. Autonomic instability, either high or low blood pressure, often with tachycardia is described.[3,7] Respiratory depression and/or gastrointestinal symptoms (nausea, vomiting, hyperphagia, dry mouth and thirst) may also occur in some children.[6]

In a small cohort of 38 children presenting to an ED for acute cannabis intoxication after ingestion, degree of symptoms corresponded to an estimated dose. A dose of 3.2 mg/kg of THC led to observation and minimal medical intervention while 7.2 mg/kg of THC led to admission and moderate medical intervention. Doses of 13 mg/kg of THC led to admission to PICU and major medical interventions. [8]

Our younger cases exhibited dilated pupils and altered sensorium with a GCS that varied from 5 to 10. Two cases had significant autonomic instability which required fluid boluses and additionally hypertonia with clonus. The ten years old had milder symptoms but charcoal had been given within an hour of ingestion.

This is consistent with published literature that shows that younger children tend to present with CNS depression. A systematic review by John Richards et al (2019) found that lethargy was the common presenting feature of cannabis toxicity in children with mean length of stay being 27.1 hours, while 18% needed ICU care.[4]

A study in Colorado by Heizer et al (2018) found a dose relationship in the severity of symptoms in young children with accidental exposure. They also reported that children presented mostly with lethargy or somnolence (84%). [8]

We noted that one of our cases had generalised seizures. Seizures are rare and maybe due to adulterants, although a French study reported seizures in 4 out of 29 children admitted to ED with cannabis toxicity over a 10-year period. Peak effect may depend on the time of last meal, dose and rate of consumption and other health confounders e.g. prematurity.[8,13,15,17] We noted urinary retention in most of the patients and urine was obtained invasively. Perhaps an imbalance in GABA inhibition alongside dopamine and serotonin receptor imbalance are responsible for observed autonomic instability with urinary retention. The time course for peak clinical deterioration was 2 to 3 hours and subsequent improvement was 6 to 8 hours in 4 cases, but two cases remained symptomatic until 36 hours. These outliers may have ingested a larger ingested dose per kilogram of body weight and psychotropic effects persisted due to the lipophilic binding in the brain especially of young children. Packet THC content must be interpreted as hypothetical as production is uncontrolled.

Our case series points to an emerging problem that has been described in other jurisdictions, where cannabis use has been decriminalised or under-enforced. In Ireland, the Adult Cautioning Scheme introduced from December 14th 2020 promotes decriminalisation and follows similar trends worldwide.[5,10,11] Increased access to higher potency cannabis in edibles and ingestion of cannabis in liquid form is a major emergent serious threat for young children [4, 6, 11, 13, 14] Such edible cannabis products are attractive in presentation and are not in childproof packaging. Although no deaths have yet been reported internationally, indirect fatality from trauma with blood levels of cannabis(49ng/ml) nine times the legal limit for driving(5ng/ml) in Colorado is described. Wang et al (2016) describe the death of an 11-month-old who presented with metabolic acidosis, tachycardia and a positive urine drug screen. Long term health effects on children are yet to be discovered. [15,16,17] However, PED and PICU admissions and calls to poison centres have increased. These products have uncontrolled concentrations of THC as they are largely made illegally and often supplied through the internet.[6]

Food Safety Authority of Ireland (FSAI) has issued a warning for the public on April 26th, 2021 with photographs of how these recent cannabis jellies are packaged with names resembling known safe products (Trrlli, Skittles, Stoney Patch, [see below]).[15]

Some examples of the cannabis sweets

Point of care urine toxicology should be done routinely when an afebrile, previously well young children present with altered sensorium without focal findings.[6] Treatment is mainly supportive and activated charcoal is useful, if used within 1 hour of ingestion, when GCS level permits. It is possible to avoid a brain CT if urine toxicology is positive. All the cases were referred to child protection services. Two cases involved the Gardai.

Cannabis is increasingly perceived as harmless and the use of edibles amongst adults is becoming socially acceptable. Young children are at risk through accidental ingestion. The new Adult Cautioning Scheme will accentuate evolving child protection issues of this emergent serious public health threat. Recognition and notification of all cases presenting to hospitals is imperative and education of our staff and parents.

Declaration of Conflicts of Interest:
The authors declare no current conflict of interest.

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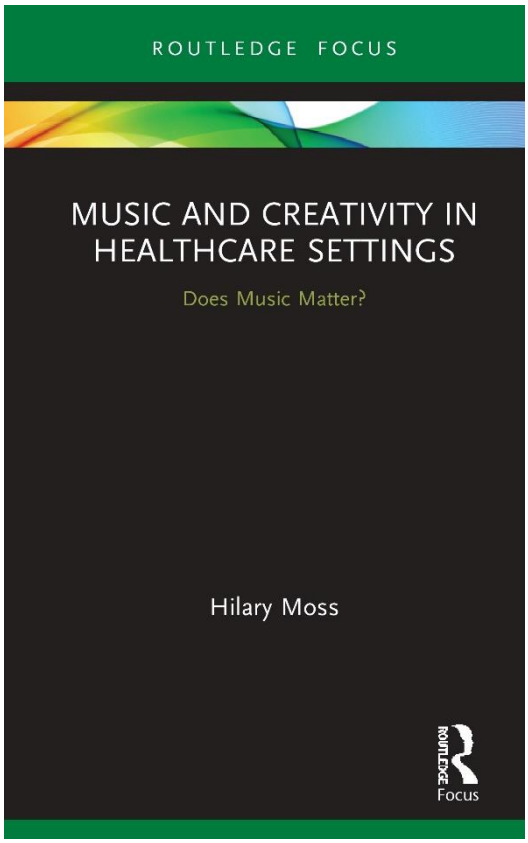
Book Review by M. Slevin

'Music and Creativity in Healthcare Settings – Does Music Matter?'

By Hilary Moss



The use of music in medical settings has become increasingly prevalent in recent years leading to the necessity to properly evaluate its role in healthcare settings – Hilary Moss does exactly this in her beautifully presented 'near pocket sized' book, which is immediately appealing to read. This can be a 'pick up and read' book or treated as an indepth study of the role of music as a therapeutic intervention incorporating the arts in bringing some human feeling into sterile healthcare settings. The book has 5 chapters each addressing a specific theme of good practice. Her listening chapter, a must for every clinician to read. As quoted from Ho and Srivastava 2019* "Sometimes and especially in cases when medicine cannot help, the art of listening is the only tool we have to offer".

This is Moss' own story. She taps into her 25 years of experience, detailing her own perspectives and evocative personal stories to highlight the value of music in situations of serious illness and extreme pain.

Each chapter is backed up with a detailed reference section for further reading. A list of online music and interview files is included to supplement each story / theme. This technique allows the reader to absorb Moss's personal experiences and really feel the powerful impact of music intervention and therapy in the cases presented. Recurring themes that are vital to all hospital based music and health programmes are explored, for example, the role of music as a means of communication when words are not available - the patients who could not talk speaking through their chosen music or songs they wrote, the musical conversation she had with a non-verbal young boy (as result of injury) delighted to be able to express himself through music, the role of music as a simple, but significant, distraction from the pain and distress of illness.

Moss demonstrates well the benefits of how listening to one's favourite music in the acute phase of a stroke makes a marked difference to a range of recovery variables. She notes that evidence is highest for people with dementia and stroke. The rehabilitative effects of 'music – based interventions' in several neurological diseases is now advanced.

Her illustration of the music narrative is powerful. Patients contending with challenging illnesses can begin to regain their identity and creativity to live more meaningfully despite their health difficulties through music. Music therapists have time to spend with patients listening and offering opportunities for self-expression, validation of identity and offering support in an otherwise busy healthcare environment. Moss shows how the power of music can effect change in communication (verbal and non-verbal), quality of life, perception of pain, anxiety and motivation. It can offer 'moments' of freedom for patients from their medicalized environment.

Moss makes a very valid point and balances her argument for music by also realizing through her research and experience that music is not always good for you! Music should not be used for "music's sake". Music does not necessarily make you a happy healthier person". The music chosen should be patient led.

It is critical that any music brought into a hospital setting is provided only to people who want to listen, that they are given a choice of what type of music they want to listen to and can stop listening when they want to. *She is not a fan of Christmas Carols sung badly!*

Moss presents practical 'to do' lists to inspire good practice for those who want to introduce music to improve the hospital atmosphere or doctor's waiting room. She emphasizes high quality music over poor performances and most important of all highlights the value of music therapy and music and health practice as something worth investing in. Her thought-provoking stories will definitely motivate many healthcare clinicians to welcome music therapists as part of their teams. She explores all aspects of music in the health care setting to include patient's families, healthcare staff / surgeons operating (however noise distraction can also be an issue, and this is where there is a fine balance). She emphasizes that there must be a team approach (hospital staff and qualified music therapists working and planning together). The engagement of clinicians is crucial in effecting this positive change.

There is much to reflect on in this book – as healthcare professionals this book alone is a perfect guide to improving overall patient care, while also appealing to musicians, music therapists, and in my view essential reading for anyone working in care and healing.

*Ho, V. and Srivastava, S. (2019) Violins, Medicine and the Art of Listening. *Med Teach,* 1-2, available: https:/ /doi.org/ 10.1080/0142159X.2019.1584277

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Ask to Mask: Varying Compliance With COVID-19 Guidelines Within Hospitals

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Face masks and social distancing were novel concepts at the onset of COVID-19 pandemic both for general public and for those Health care Workers (HCWs) who don't wear masks frequently. Adopting these measures along with other non-pharmacological interventions (NPI) in a limited time was thus difficult for HCWs.[1] This could be one of the contributors to the fact that till the availability of COVID-19 vaccinations, 22,484 HCWs had contracted COVID-19 in Ireland as of late January, 2021 and 12 (0.05%) had succumbed to this disease in the country at that time.[1]

Multiple audits were undertaken at our institute looking at the adherence of HCWs with the rapidly changing COVID-19 local and international prevention guidelines at the start of pandemic and subsequently at two further time intervals.[2] The first audit was carried out between April-May 2020 observing 175 HCWs, second between July-August 2020 with 200 HCWs observed and the third audit was completed during December 2020-January 2021, with a cohort of 131 HCWs observed respectively.

In the first audit 31.4% HCWs (n=55) were compliant with the physical distancing guidelines and 14% (n=12) were compliant with face mask guidelines. Results of the first audit were shared with all hospital staff via internal email system and as a virtual presentation. Multiple interventions were undertaken such as signage placement in the form of "Stay Safe" posters, "All Visiting Suspended" posters and floor signage (2-meter distancing, stand here, please wait in line, Arrows for directional flow). Seat banners were installed emphasising appropriate distancing. Canteen seating restrictions were (2/3 per table for max period messaging placed on tables) communicated and upheld each day. Screens were installed at 23 locations in hospital with high patient footfall reception areas. Seating in HCWs common rooms were modified with seat banners put in place, soft furnishings removed and replaced with clean down chairs and social distancing posters were placed accordingly.

A second audit was carried out after these interventions, which demonstrated that the compliance with physical distancing recommendation improved from 31.4% (n=55) to 55% (n=110) and compliance with face masks improved from 14% (n=12) to 52% (n=29) amongst the HCWs observed. The third audit showed that compliance with physical distancing dropped again from 55% (n=110) to 34% (n=44) while the compliance with face mask guidelines improved since the second audit from 52% (n=29) to 74% (n=45).

HCWs with COVID-19 have the potential to transmit infection not only to other HCWs but to the patients as well.[3] Availability of COVID-19 vaccination is certainly helping to prevent the transmission but the evolution of COVID-19 variants having higher infectivity and potential to cause breakthrough infections amongst vaccinated individuals is concerning.[4]

The results of these audits indicate that ongoing education and reminders to follow the NPIs in addition to face masks will be needed to prevent future outbreaks amongst HCWs as the pandemic continues and variants with higher infectivity continue to emerge.

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"LAP-MAP": A New Blood Pressure Target During Laparoscopic Surgery

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Dear Editor –

Prolonged laparoscopic surgery with steep Trendelenberg position is frequently requested in high risk surgical patients. The combination of prolonged laparoscopy with steep Trendelenberg positioning may alter cerebral haemodynamic parameters[1]. Possible decreases in cerebral perfusion pressure (CPP) and cerebral blood flow across anterior and posterior cerebral circulations, where high central venous pressure (CVP) creates a 'back-pressure', may expose 'watershed' areas to hypo-perfusion despite autoregulation [1]. An increase in intracranial pressure may also occur during prolonged steep Trendelenberg leading to temporary cerebral oedema. An increase in intra-ocular pressure has also been described [2]. Nevertheless, it is difficult to predict how a patient's unique physiologic and haemodynamic changes and reflexes during laparoscopy will affect cerebral perfusion.

The relationship between intra-operative mean arterial pressure (MAP) and clinical outcomes in non-cardiac surgery is well known [3]. While neither hypotension nor hypertension is desirable, a target net MAP has not been proposed for patients in steep Trendelenburg position during laparoscopic surgery.

Close attention to MAP is necessary to ensure adequate CPP. Our practise to target a higher MAP, also known as 'driving pressure', in these circumstances. A clinical estimate is derived from the formula CPP= MAP – CVP. We call this estimate LAP-MAP.

We increase MAP with a titrated vasopressor infusion, e.g. phenylephrine infusion, guided by invasive arterial blood pressure monitoring (the transducer should be zeroed at level of the external auditory meatus [4] so that LAP-MAP is greater than 65 mmHg when the patient is in steep Trendelenburg position.

The use of cardiac output (CO) monitoring to guide intravenous fluid therapy and vasopressor support is now recommended in recent guidelines [4]. Dynamic indices of fluid responsiveness, such as pulse pressure variation (PPV) or stroke volume variation (SVV), or changes in CO have excellent predictive capacities for fluid responsiveness.

We realise that CVP can be an unreliable measurement of intravascular volume status. However certain high-risk patients undergoing prolonged steep Trendelenburg positioning may also benefit from CVP monitoring in order to ensure adequate CPP and allow the calculation of LAP-MAP.

We propose 'LAP-MAP' as a clinically identifiable target which is easy to implement and titratable to patient needs. We suggest a 'LAP-MAP' target greater than 65 mmHg, during prolonged laparoscopy with steep Trendelenberg, that counteracts possible adverse effects on cerebrovascular perfusion. We suggest that LAP-MAP is added to anaesthesia practice for prolonged laparoscopic surgery, in high risk patients, requiring steep Trendelenberg positioning.

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Pathfinder: Alternative Care Pathways for Older Adults who Dial 999/112

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Dear Editor,

Traditionally, in the Republic of Ireland (RoI), all patients who dial 999/112 are brought to the Emergency Department (ED), unless they decline to travel. Older people are particularly vulnerable to adverse events in the ED such as delirium[1], falls[2], infections[2], medication errors[2] and functional decline[3]. Alternative care pathway models can reduce ED crowding and improve patient outcomes, especially for those with non-urgent needs that could be treated elsewhere.

Pathfinder is a collaboration between the National Ambulance Service (NAS) and the Occupational Therapy (OT) and Physiotherapy Departments in Beaumont Hospital, and received funding from the Slaintecare Integration Fund for a 12 month pilot in 2020 (Grant Agreement No. 392). The service aims to minimise unnecessary ED attendances for people ≥ 65 years by utilising alternative care pathways following a 999/112 call.

Pathfinder is dispatched by the National Emergency Operations Centre and responds to low acuity 999/112 calls for people aged ≥65 years within the Beaumont Hospital catchment. The team accepts calls within an agreed low-acuity code set (falls, non-traumatic back pain, generally unwell, blocked/dislodged urinary catheter) or "on scene" referrals from any NAS or Dublin Fire Brigade crew, irrespective of initial dispatch code. Pathfinder does not respond to calls where a GP has reviewed and recommended ED presentation or where a specialist medical team have requested a patient be transported. The team operates a 'Rapid Response Team' (Advanced Paramedic and Physiotherapist or OT) (8:00-20:00, Monday-Friday) and a 'Follow-Up Team' (Physiotherapy and OT) (8:00-16:00, Monday-Friday).

Once activated, the 'Rapid Response Team' conduct a comprehensive assessment in the person's home and establish whether a suitable alternative to the ED is available. Where deemed safe and appropriate, the person remains at home, most commonly through the activation of one or more alternative care pathways (e.g. GP, Integrated Care Team, Primary Care Team, Geriatric Day hospital, OPD clinics).

Input from the Pathfinder 'Follow-Up Team' may also be instigated. This team can respond immediately to provide a short period of intensive intervention at home. This can include rehabilitation, case management and, if required, referring onwards to established community and voluntary agencies for longer-term intervention.

The Pathfinder 'Rapid Response Team' reviewed 485 patients in the first year of operation. Three hundred and thirty patients (68%) remained at home after initial review, with 89% of those requiring Pathfinder 'Follow-Up Team' input. Four hundred and eighty-two (99%) of non-transported patients remained at home after 24 hours and 91% at 7 days. The average age of patients reviewed was 80 years with an average Rockwood Clinical Frailty Scale score of 6 (moderately frail).

Pathfinder is the first model of this kind to be implemented in the RoI. It has demonstrated that it is a safe alternative to ED conveyance for older people following low-acuity 999/112 calls. A network of alternative care pathways and immediate access to follow-up are two key enablers[4]. The overwhelmingly positive feedback confirms that this is a service model that older people and their carers want. It is a model which could be spread, with local adaptation, nationally.

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Motivational Interviewing: Teaching Doctors the Skills to Address Childhood Obesity

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One in four children in Ireland are classified as overweight/obese[1]. Doctors have a responsibility to address childhood obesity but may find this challenging in practice[2]. Motivational interviewing (MI) is a person-centred communication method demonstrated to be beneficial in childhood obesity treatment[3]. MI uses counselling methods including empathy, and exploration of intrinsic reasons for change to empower individuals to adopt healthier behaviours[4]. This study explores obstacles to addressing childhood overweight/obesity and evaluates whether a workshop teaching doctors MI skills could help doctors overcome these barriers.

The intervention was a 75-minute face-to-face workshop (prior to the COVID-19 pandemic) delivered by a clinical psychologist (RG) and health development specialist (ES). All paediatric doctors working in Northern Ireland were invited. Participants were taught MI techniques to counsel a family to adopt positive behaviours to support their child achieve a healthier weight. Participants practiced MI skills including asking permission, trying to understand concerns and reflective listening through roleplay. Attendees received pre- and post- intervention questionnaires immediately before and after the workshop. Questionnaires included free text questions, closed-ended questions and 5-point Likert style questions. Questionnaires were designed by AM and TB, checked for validity by RG, ES and AT and piloted for acceptability. Answers were evaluated to identify themes. Likert scale data were compared using a Paired Sign test.

Forty doctors attended. 39 (98%) participated in the study: 17 consultants, 11 registrars, 11 speciality doctors. 39 doctors (100%) "agreed"/ "strongly agreed" that "Doctors have a duty to address childhood obesity with families." 39 doctors (98%) answered "Yes" to: "Do doctors face barriers raising the issue of weight with families of children with obesity?" Examples of barriers offered by participants included lack of time, lack of experience and fear of parental reaction. Pre-intervention 14 doctors (36%) indicated they were "confident" or "very confident" to address obesity with the family of an overweight/obese child.

Post-intervention this increased to 36 doctors (92%) p<0.001. Pre-intervention 26 doctors (67%) indicated that they were “likely” or “very likely” to “address a child’s overweight/obesity if seeing them with another problem”. Post- intervention this increased to 36 doctors (92%) p<0.001. 38 doctors (97%) indicated that their intention to change their clinical practice to incorporate MI techniques.

Paediatric doctors believe they have a duty to advocate for child health and address obesity despite the barriers that exist. This study is a preliminary first step as it measured doctors’ intention to use MI skills to address childhood obesity. Doctors who attended were from a range of different training grades but perhaps represented those more interested in learning about MI skills and/or child obesity. The next step will be surveying participants to understand how often they utilised MI skills in clinical practice, in what settings (face-to-face vs. virtual) and whether they employed MI skills for conditions other than paediatric obesity. Future research should examine the effectiveness of teaching doctors MI skills to address childhood obesity in the longer term and include the views of children and parents as well as quantitative measures such as change in BMI.

Acknowledgments:

The authors would like to acknowledge the participation of the 39 paediatric doctors who volunteered to partake in the study.

Ethical Approval:

Ethical approval for this study was granted by the research ethics committee, School of Medicine, Dentistry and Biomedical Science, Queens University Belfast.

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Management and Outcome of Patients with Candidaemia over One-Year

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Dear Sir,

Candidaemia is the most common manifestation of invasive candidiasis associated with significant morbidity and mortality[1]. A retrospective review of management of patients diagnosed with candidaemia over twelve months at our institute was undertaken. The aim of this study was to assess compliance with local and international candidaemia management guidelines and to ascertain the clinical outcomes for these patients[2].

Health care records for all patients diagnosed with candidaemia from September 2019 to September 2020 were reviewed. All data was recorded and analysed confidentially in line with the GDPR after approval from our hospital clinical audit committee.

A total of 17 patients were diagnosed with candidaemia over the study period, eight males (53.3%) and seven females (46.7%). Median age of patients was 67 [IQR 50-77]. Fifteen patients were included in the analysis as two patients passed away before Candida was isolated from their blood cultures. Infection was primarily hospital-acquired (80%, n=12). The source of infection varied from intra-abdominal (46.7%, n=7), to intravenous (IV) line associated (40%, n=6) and genitourinary (13.3%, n=2).

Early IV treatment with an echinocandin or an acceptable alternative anti-fungal was initiated for all patients in accordance with guidelines[2]. All patients received appropriate definitive antifungal treatment. For patients with IV-line-associated candidiasis, the line was removed in all cases as recommended; and for those with an intra-abdominal source, 57.1% (n=4) had appropriate interventions to achieve source control. Follow-up blood cultures were repeated in 93.3% of patients (n=14) appropriately.

An echocardiogram to rule out endocarditis and an ophthalmological exam to rule out intraocular involvement were performed for 86.6% of patients (n=13)[2]. Antifungal treatment was continued for a minimum of two weeks after negative cultures in 80% of cases (n=12) in line with best practice. Two patients died during their course of treatment due to consequences of their underlying disease process, while all active management was withdrawn in another patient. All-cause mortality at one month after diagnosis of candidaemia was 26.7% (n=4) and at one year was 46.7% (n=7).

Overall, we found that compliance with local and international standards in the management of candidaemia at our institute was optimal, with most patients receiving appropriate treatment and undergoing therapeutic interventions[2]. Overall mortality associated with the diagnosis of candidemia on longitudinal follow up was high in spite of appropriate management underscoring seriousness of isolation of Candida in the blood stream necessitating early and targeted therapy.

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Exercise and the Prevention of Frailty – Evidence from a Community-Based Medical Exercise Intervention

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Dear Editor,

We were interested to read the paper by 'Moloney et al on Frailty, COVID-19 Disease Severity and Outcome Among Hospitalised Older Adults', in which frail patients were more likely to be admitted despite having mild Covid. We wish to describe some of our work in this area.

Frailty is a common syndrome of the elderly and is a predictor of mortality, falls, worsening disability and hospitalisation.[1] To date, there is no available pharmacotherapy that can be used to treat or prevent it. One treatment which has consistently proven to be effective in treating frailty is exercise.[2] We have developed a community-based medical exercise intervention that has positive effects on the physical fitness of older adults living with Non-Communicable Disease (NCD) and prevents the progression of frailty symptoms.

A pre-post quasi experimental pilot study carried out in the University of Limerick examined the effects of a community-based medical exercise intervention called 'ULMedX' on the physical health of individuals with established cardiovascular disease over 12 weeks. 'ULMedX' offered twice weekly supervised exercise classes to the participants and encouraged them to exercise outside of this with the aim of achieving the national physical activity guidelines. The exercise classes were multi-component in nature, each lasting 60 minutes, and consisted of a warmup, strength, and aerobic exercises and a cool down. The participants were 28 (18 male, 10 female) community-dwelling elderly adults with a mean age of 72 (65-82 range). Baseline and 3-month assessments of the 6-minute walk test (6MWT; meters), Sit to stand test (STS; number), Single leg balance test (SLBT; seconds) and Handgrip dynamometer test (HGDT) were conducted.

The participants between the ages of 65-75 years walked 73.4 meters (p=0.002) more in the 6MWT at the 12 week follow up, compared to baseline. Furthermore, participants over the age of 75 years improved on average 34.6 meters (p=0.038) over the same time period. Single leg balance improved by 3.7 seconds (p=0.018) on the right leg for participants over the age of 75 years. All other measures remained stable over the 12 weeks.

The findings of this study suggest that exercise interventions like 'ULMedX' can improve 6MWT test scores, which is an indicator of aerobic capacity, in older adults living with NCDs. This finding alone is important as higher 6MWT scores have a strong negative correlation with frailty scores and may indicate a reduced risk of mortality.[3] The improvements in the over 75-year olds' 6MWT scores are particularly important as frailty is an age progressive syndrome characterised by declines in physiological reserve and function.[2] The lack of an observed reduction in scores on any of the outcome measures over the 12 weeks is therefore a positive finding.

This study demonstrates initial evidence of the preventability of the onset of frailty with the use of a community-based medical exercise intervention. This adds to the growing support for the use of Exercise as Medicine to treat and prevent chronic illnesses including frailty, thus improving this population's response to acute illness.

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E-Consultations: A Potential Response to Viral Challenges

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Dear Editor,

The COVID-19 pandemic has posed huge challenges for our health service and Infectious Diseases Specialists have been at the forefront of tackling these unprecedented challenges. Ireland has amongst the lowest appointments of Infectious Diseases specialists per head of population in the European Union[1] and yet it has been demonstrated in multiple infection domains that input from infectious diseases specialists improves outcomes for patients[2].

In settings where on-site access to specialty input is limited, electronic consultations (e-consults) have been proposed as a method of delivering specialist input. An e-consult is an 'asynchronous consultative communication between clinicians occurring within a shared electronic health record or secure web based platform'[3]. E- consults can potentially improve access to specialty care and reduce appointment waiting times for those who require in person review. In the current era they can also reduce the face to face healthcare exposure of a single patient and thus also potentially reduce COVID-19 risk. Within the realm of infectious diseases, two recent studies have evaluated this intervention.

In their retrospective cohort study, Monkowski et al[4] assessed the impact of an inpatient infectious diseases telemedicine consultation on hospital and patient outcomes. They found a reduction in length of stay and reduction in the number of days of antibiotics used in patients who received e-consult. Tande et al[5] looked at the introduction of an asynchronous e-consults service between their tertiary referral centre and two other sites within their hospital group. They found a reduction in 30-day mortality associated with utilisation of infectious diseases e-consults in their propensity matched case control study. These findings suggest that e-consults can provide an innovative way to improve patient outcomes and ensure specialty care is available throughout all sites within a healthcare system.

Could we utilise this approach as one way of increasing specialty delivered care within the HSE? Unfortunately, COVID-19 has not been the only challenge posed to our healthcare system this year. The ransomware attack has plunged HSE information technology (IT) systems into disarray. However, it has also highlighted some key issues with our IT infrastructure. We do not have a universal electronic patient record across our hospitals. Thus 'consultative communication'[3] between clinicians/patients across different sites is far more challenging. Many HSE hospitals have different radiology and clinical laboratory interfaces, yet another barrier to safe sharing of patient information to allow collaborative care across different clinical sites.

These challenges present an opportunity for innovation. Whilst the need for an increased number of infection specialists in Ireland is clear; I believe a universal electronic health record within our hospitals would allow us to better utilise these specialty resources and ultimately improve outcomes for our patients.

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The Pandemic Electronic Handover: Collaboration, Leadership and Teaching: NCHDs' Perspective

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Dear Editor,

Since the start of COVID-19 pandemic, we have been faced by multiple unprecedented challenges in medicine. With the goal of reducing the spread of the virus, only limited numbers of doctors were allowed in clinical areas. This hindered interaction and clinical case discussions among different teams. It was imperative to design an electronically facilitated handover system to allow daily discussion of acute clinical cases.

The general surgery on-call team included a consultant, registrar and two senior house officers (SHOs). The on-call duties lasted for 24 hours (7:00-7:00 AM). An electronic capture tool was used. It was secured by login emails and information editing was monitored. Full audit of the data was maintained with data entry being performed by the day SHO and the night SHO who remained in house throughout the night. The two SHOs compiled the details of patients admitted during a full 24- hour call period into a standardised template. The template included patient's name and demographics, type of presentation (emergency vs elective), reason for admission, history of presenting complaint, background information, investigations, and management plan. A handover sheet was then emailed to all surgical consultants before the commencement of the next day. A virtual verbal handover was then performed by the on-call registrar by a video conference at 7:30 AM based on the handover sheet. This was led by the Professor of Surgery joined by other consultants from different sub-specialities including Upper Gastrointestinal, Hepatobiliary, Colorectal and Breast surgery. The conference was also attended by other Non-consultant Healthcare Hospital Doctors (NCHDs) and ran over 30 minutes depending on the number of patients.

While the electronic handover was not a new practice[1], it proved to be an essential adaptable strategy for the pandemic. It helped consultants and team members to be aware if one of their patients was admitted overnight and allowed prompt patient takeover and management. The system was a tool for exchanging expert opinion and discussing difficult cases admitted under the care of the surgical teams. It was also a visual teaching tool with immediate advice on patient management in the critical settings based on many years of general and subspecialised clinical expertise.

On the other hand, this system created a platform for the NCHDs to demonstrate their creditability and accountability while reflecting consultant's leadership and commitment to their patients and colleagues. It also allowed some interaction during a time of significant social isolation.

Being cheap, user-friendly, and consistent made it an excellent way for transforming patient's information between doctors efficiently, reducing errors associated with illegible handwritten notes, wrong patients' location or patients being omitted from the list. Moreover, the handover template was consistent with the Royal College of Surgeon of England guidelines to minimise working times by maintaining a minimum high-quality information in the handover that allows safe and efficient transfer of patient responsibilities between teams and reduces workload.[2]

This combination of an electronic capture and video conferencing tools can improve patient care, surgical education and teamwork for a surgical department, even during a pandemic.

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Reader Response to IMJ Article: 'Impact of a National Lockdown on Cycling Injuries' by Foley et al (Ir Med J; Vol 114; No. 7; P412)

H. O'Callaghan

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Sir,

Doctors Foley et al are to be commended for their data collection concerning cycling injuries during the 2020 lockdown. It is sobering to consider that one of the lesser highlighted but more alarming figures to be derived from their data were the 273 cycling-related attendances to the Emergency Department in St. Vincent's from January 1st to June 7th, 2020. This exposes the glaring inaccuracy of official Road Safety Authority figures regarding the yearly incidence of cycling injuries. In the most recent year (2018) for which the RSA provides figures, the RSA maintain that there were 1,056 cyclists injured in collisions nationwide[1]. RSA figures are derived from data provided by An Garda Síochána. The true burden of cycling injuries in this state is far higher than deeply flawed official figures suggest and would be more accurately estimated by measuring emergency department attendances. Unfortunately, flawed figures are currently being used to inform transport policy.

I also noted with interest that while lockdown did not result in increased cycling attendances to the ED, surprisingly there was a trend towards an increase in cyclist admissions ($p=0.05$) and significantly more operative procedures performed on cyclists during this time. The current boom in popularity of electric bicycles may plausibly account for this[2,3]. Electric bicycles – or eBikes – can be powered by battery as well as propelled by pedals. They are being widely adopted as an effective and affordable alternative to driving, especially when commuting on short or moderate length journeys. However, data suggests that the increased speed of eBikes is leading to more severe injuries[4]. A small increase in a cyclist's speed significantly increases the kinetic energy and risk for injury upon impact.

When considering future research in this area, identification of whether the bicycle involved was electrically assisted may help to give a fuller picture of the causation of cycling injuries.

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