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COMMENTARY

EDITORIALS

ORIGINAL PAPERS

Sheridan et al reviewed 1593 hip fracture procedures. Poorer outcomes were encountered with short intramedullary IM nail operations greater than 60 mins, and long IM nails operations greater than 105mins. Increased operation time led to increased transfusion rates.

Butler at al describe the role of pharmacy at the point of discharge. They found that it reduced errors in patients from 50% to 7%.

Mulholland et al assessed the cost awareness of trainee radiologists through a questionnaire. The cost of devices was under-estimated 48% of the time and over-estimated 32% of the time. A health economics module in postgraduate radiology training is recommended.

Scully et al identified 21 children who met the criteria for cholesterol screening while 30 met the criteria as per NHLBI guidelines. Ninety-eight per cent of respondents had no objection to cholesterol testing.

ORIGINAL PAPERS (Continued)

ASSOCIATION BETWEEN CLINICAL FRAILTY SCALE SCORE AND LENGTH OF STAY IN A COMPLEX DISCHARGE UNIT

McDermott et al applied a clinical fragility scale to a group of hospitalised elderly patients. A high score correlated with a longer stay in hospital.

THE BOOMERANG STUDY: INCREASED HOSPITAL RE-ADMISSION VIA THE EMERGENCY DEPARTMENT

Liston et al found a decrease in the length of hospital stay 7.34 to 6.69 days was associated with a significant increase in ED re-attendance 8.88% to 10.98%. However, the overall proportion readmission to hospital within 30 days of discharge from hospital was unchanged.

CHILD AND ADOLESCENT MENTAL HEALTH SERVICE: EXTENSION FOR COMMUNITY HEALTH CARE OPTIONS [CAMHS ECHO]

Rooney et al explore the feasibility and identify the perceived barriers and enablers of developing an ECHO programme for CAMHs in Ireland.

OCCASIONAL PIECES

THE TRUE COST TO THE STATE OF MATERNITY SERVICES IN IRELAND

Whelan et al has estimated the cost of a delivery. The authors make an estimation of 3,670.43 Euro per delivery. There is a discussion of the costs of obstetric malpractice claims.

CASE REPORTS

METASTATIC LOBULAR BREAST CARCINOMA OF THE URINARY BLADDER AFTER EIGHT YEARS IN REMISSION

McNicholas et al describe a 69-year-old woman who developed a urinary bladder metastasis 8 years after presentation with lobular breast cancer.

46, XX MALE DISORDER OF SEXUAL DEVELOPMENT

Flannery and Agha report a 47-year-old male with primary hypogonadism. Investigations found 46, XX karyotype. The SRY gene was present. He responded to transdermal testosterone with shaving and normal libido.

RARE VARIANT OF LATERAL MEDULLARY SYNDROME; OPALSKI SYNDROME WITH CEREBELLAR INFARCTION

Mannion et al describe a 36-year-old woman with neck pain, vertigo, facial numbness and gait disturbance. The diagnosis was Opalski syndrome. The CT scan showed a right vertebral artery dissection extending caudally from the posterior cerebellar artery.

CASE REPORTS (Continued)

DIGITALIS POISONING AFTER ACCIDENTAL FOXGLOVE INGESTION

Popoola et al describe a 22-year-old male who presented with a sinus bradycardia and heart block in keeping digitalis poisoning. The history revealed that he had made and drank a herbal juice with a mixture including foxgloves, a known source of digitalis.

MANAGEMENT OF AN UNSTABLE PRETERM COVID-19 PREGNANT WOMAN WITH EMERGENCY CAESAREAN DELIVERY

Quigley et al describe the multi-disciplinary management of a 33 weeks gestation mother requiring an emergency caesarean section because of increasing Covid-19 related respiratory symptoms. The value of low-spinal anaesthesia is emphasised.

CASE SERIES

ISCHAEMIC STROKE POST-VARICELLA INFECTION: A VACCINE PREVENTABLE DISEASE

O'Reilly et al describe 3 children who developed neurological complication following varicella infection. Two of the children have residual deficits. The authors urge the introduction of a varicella vaccination programme.

LETTERS TO THE EDITOR

LITHIUM TOXICITY; IMPORTANT CONSIDERATIONS WHEN TREATING A MEDICALLY UNWELL OLDER ADULT PRESCRIBED LITHIUM

INFANTILE HYPERTROPHIC PYLORIC STENOSIS IN A PRETERM INFANT FOLLOWING NASOJEJUNAL TUBE FEEDING

PITFALLS OF THE PIGMENTED LESION CLINIC

A KNOWLEDGE GAP IN NEONATAL TISSUE DONATION IN IRISH MATERNITY UNITS

PUFF ADDER BITE IN IRELAND

A SURVEY OF PARENTAL EXPERIENCE WITHIN THE NEONATAL UNIT DURING THE CORONAVIRUS PANDEMIC

COVID-19 AND TEACHING CHALLENGES

THE IMPLICATIONS OF THE COVID-19 PANDEMIC FOR BEREAVEMENT PRACTICE AND SUPPORT IN PICU

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The Mother and Baby Homes
Commission of Investigation Final Report

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

The Mother and Baby Homes Commission of Investigation Final Report[1] was launched on January 12th, 2021. The authors of the Report were Judge Yvonne Murphy, Dr. William Duncan – international legal expert on child protection and adoption, and Professor Mary E. Daly – historian.

The Taoiseach, Micheál Martin, made a formal apology in the Dáil to the survivors on behalf of the State. He said that they were blameless and had done nothing wrong. They should not have been there. He added that 'you were in an institution because of the wrongs of others, each of you deserved so much better. It was a completely warped attitude to sexuality and intimacy'.

The Report is 2,865 pages in length. It covers a 76-year period from 1922 to 1998. It included 14 Mother and Baby homes, and a representative sample of State operated County Homes. It describes a very dark aspect of the State's history which continued throughout most of the 20th century. It is probable that the proportion of Irish unmarried mothers who were in Mother and Baby Homes was the highest in the world.

The Commission had been established on foot of the 2012 Catherine Corless discovery that a large number of children had died in the Tuam Mother and Baby Home between 1925 and 1961. The Irish Mail published the findings in 2014. The then Taoiseach Enda Kenny stated that the babies of single mothers had been treated like some kind of sub-species. The Commission found that 9,000 children died in the 18 institutions that were investigated. This represents as many as 15% of the children who were resident these Homes. At Tuam, a child died every 2 weeks between 1925 and 1961.

The national infant mortality (number of infant deaths aged under 1 year per 1,000 live births) in Ireland decade-on-decade was: 1930 – 70/1000, 1940 – 65/1000, 1950 – 44/1000, 1960 – 30/1000, 1970 – 20/1000, 1980 – 12/1000, 1990 – 7/1000, 2000 – 6/1000, 2010 – 3.5/1000, 2020 – 2.8/1000.

The corresponding infant mortality rates at Bessborough were 1930 – 300/1000, 1940 – 750/1000, 1950 – 100/1000, 1960 – 100/1000, 1970 – 20/1000, 1980 – 20/1000, 1990 – 20/1000. From 1930 to 1970 the mortality rates were markedly higher in the institution compared with the national rates. After 1970 the gap narrowed but remained higher than expected. Similar patterns are encountered in the other Homes. In Roscrea, 1090 out of 6079 infants died.

The infant mortality rate is a critical measurement for any country, region or institution. It is a robust benchmark of the standard of care being provided to young infants. High rates are indicative of unmet human healthcare needs in sanitation, nutrition, education, and medical care.

The common causes of death described in the Report were malabsorption, respiratory infections, and gastroenteritis. This indicates that infection played a central part in many cases. Gastroenteritis was a major factor. Repeated episodes are known to cause intestinal villous atrophy and malabsorption. Growth failure in infants in institutions is not only due to insufficient food. It is often due to too few staff to feed the children correctly. In addition, poor appetite in these infants is common due to depression and the adverse neuroendocrine changes due to the lack of tactile stimulation and consoling. Continuity of a relationship to a parent figure is critically important for infants and children. This does not happen in an institution because of the number of attendants, none with a special responsibility for the child.

There are many scientific reports that confirm that infants placed in orphanages universally have progressive developmental deterioration. They are significantly delayed by the second year of life. 'Bottle propping' and unsupervised feeding in toddlers increases the risk of aspiration and poor milk and food intake. In addition, allowing a recumbent infant to drink alone increases the risk of otitis media. Aspiration pneumonia has been frequently found at post-mortem in infants dying in orphanages.

The 'orphanage literature' confirms that infants' health and well-being is uniquely vulnerable to the adverse effects of institutional care[2]. Infants are not designed to be in such places. They are physically, immunologically and psychologically programmed to be cared for in the tight circle of their parents, siblings and grandparents.

There is a notable observation in the Report that the infant mortality rate was higher among infants of mothers who entered the home in a private capacity. These mothers tended to discharge themselves shortly after the birth, leaving the infant behind to be cared for in the institution.

The Report describes the discovery of an undocumented grave of over 800 infants in Tuam. It is a harrowing description of significant quantities of human remains of children ranging in age from preterm infants to 3-year-old toddlers. They had been interred in an underground structure divided into chambers.

Taoiseach Enda Kenny described it as 'the chamber of horrors'. The original purpose of the building is unknown but there is speculation that it may have been part of a sewage or water system. The finding represents a deep lack of respect and dignity for all these infants and young children.

Unmarried mothers commonly had no choice but to go into a Mother and Baby Home. They were frequently shunned by the baby's father and their own family. Financial support for pregnant women was very limited or non-existent. The Children's Allowance was first introduced in 1944 but only if the mother had three or more children. Most of women who entered the homes were first-time mothers and not eligible for allowance. Society, for the most part, seemed to have averted its gaze when it came to caring for these young women.

The quashing of the proposed Mother and Child Scheme 1951 was a missed opportunity to improve the care of mothers and children at a critical moment[3]. It was introduced by Dr. Noel Browne, Minister for Health. He proposed free medical care for pregnant women and children up to 16 years of age. It would have brought about important improvements in their obstetric care, their medical care, professional support, and their health education. The blocking of the Scheme was spearheaded by Archbishop McQuaid because it would permit the discussion about family planning which he maintained was the remit of the Church. Secondly, he stated that it would increase the role of the State in the life of the individual and would lead to totalitarianism. There was also opposition among members of the medical profession because of remuneration concerns[4]. Throughout the narrative and debate there is no mention of the plight of infants and their high mortality rate.

The recommendations in the Commission's Report include the right to personal information, the right to information about burials and death registrations, redress, memorialisation, and archives. The Taoiseach has promised to act on all these recommendations. We need to reflect on how best to move forwards from the terrible events documented by the Commission. It should strengthen our resolve to enable every child to have a safe, healthy, happy and productive childhood irrespective of their background.

While mortality among children is now thankfully very low, there are still substantial numbers who suffer from deprivation and poverty. The RCPI report found that 230,000 children are living in poverty, with 110,000 children being severely deprived. In July 2020, there were 2,650 homeless children[5].

TUSLA, the child and family agency, is the key organisation responsible for improving wellbeing and outcomes for children. It has over 4,000 staff and its services include child protection and welfare, family support, educational support, services for those in care and adoption.

The DEIS (delivering equality of opportunity in schools) schools is a programme aimed at improving the educational needs and nutrition of children from disadvantaged communities. There are 890 schools and 180,000 children in the DEIS programme.

There are 2,000 children in direct provision centres. This was a temporary measure put in place for asylum seekers 20 years ago. It needs to be reviewed as a matter of urgency.

We are now clear about the interventions and supports that mothers and their infants require. Antenatal psychosocial assessments allow the early identification of needs and risks. Home visiting is important particularly for mothers with any level of vulnerability. Other important measures are the promotion of parenting skills, identification and support for mothers, health education around infant nutrition, injury prevention, oral health, and early literacy, and immunisation.

Finally, we must constantly remind ourselves, that despite modern technology advances, the basic needs of infants and children remain unchanged.

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Meningococcal B Conjugate Vaccine (4CMenB) Meets Expectations but Does Not Exceed Them

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In December 2016, meningococcal B conjugate vaccine (4CMenB) was included in childhood immunisation in Ireland and offered to all infants in a three-dose schedule (primer at 2 and 4 months and booster at 12 months). While its introduction represented a major advance in the decades long effort to protect from invasive meningococcal disease (IMD), novel aspects of its development and licensure raised questions about its clinical efficacy to protect the individual directly and the population indirectly by inducing herd immunity. Articles by Ladhani et al. and Marshall et al. in the January 23rd, 2020 issue of the *New England Journal of Medicine* provide answers to these questions. [1, 2]

Neisseria meningitidis is a Gram-negative diplococcus adapted to colonise the human nasopharynx and a leading cause of bacterial meningitis and invasive disease worldwide. Case-fatality rates range from 10%-20%. Incidence rates of IMD are highest in infants and young children under one-year of age. Six serogroups A, B, C, W-135, X and Y, based on antigenically distinct polysaccharide capsular antigens, are responsible for all IMD. Polysaccharide antigens are poorly immunogenic in infants and young children under two-years of age, but conjugation (covalent linkage) to protein carriers improves immunogenicity by eliciting a T-cell dependent immune response and immunologic memory. Polysaccharide-protein conjugate vaccines are now widely used to protect against IMD caused by serogroups A, C and ACWY. [3] Vaccination of Irish infants with meningococcal C conjugate, in 2000, when IMD was hyperendemic (incidence rate, 14.7/100,000 was the highest in Europe) was associated with a 85% decrease in IMD caused by serogroup C (135 cases in 1999 to 20 cases in 2018; 1.6/100,000). [4] However, concern for autoimmunity because of structural homology between meningococcal B capsular polysaccharide and sugars on the surface of many human cells, especially dendritic cells, required a new approach to vaccine development. 4CMenB was developed using reverse vaccinology - whole genome sequencing to identify protein antigens with protective potential. [5] 4CMenB contains recombinant meningococcal outer membrane proteins shared by serogroup B and non–B meningococci but no B capsular polysaccharide component.

Much of the protective effect of conjugate vaccines is due to a combination of increased immunogenicity and a powerful herd immunity effect. [6] Vaccination of US infants with PCV7 was associated with a 90% reduction in disease caused by PCV7 serotypes of *S. pneumoniae* in all adult populations (not just those vaccinated). [7] Introduction of meningococcal C vaccine in the UK saw a 67% reduction in disease in the unvaccinated population; primarily resulting from immunisation of teenagers, the age group associated with high rates of meningococcal carriage and transmission. [8, 9] And introduction, in 2010, of meningococcal A conjugate vaccine in the sub-Saharan African meningitis belt, where a 1996-97 meningococcal epidemic caused >250,000 reported cases and 25,000 deaths, led to control and near elimination of serogroup A IMD. [10] However, dependence on antigenically variable protein antigens in 4CMenB rather than invariant polysaccharide antigens used in Men A, C and ACWY vaccines, meant 4CMenB would not protect the individual against all serogroup B strains and the ability to reduce asymptomatic carriage, prevent transmission and indirectly protect the population (herd immunity) was uncertain. While small observational studies of 4CMenB in outbreaks of serogroup B IMD in universities in the US showed no significant effect on carriage, it was hoped that shared protein antigens in 4CMenB might reduce carriage of serogroup B and non-serogroup B strains capable of causing IMD. [11, 12]

4CMenB (Bexsero) was licensed in Europe in 2013 as a four-dose schedule based on safety and in vitro serological data predicting protective potential rather than on clinical protection in large population vaccine efficacy trials. The rarity of IMD in Europe and North America (0.1/100,000) - incidence had been declining prior to the introduction of vaccine - and large numbers of subjects required to demonstrate a reduction in incidence of disease made classical vaccine efficacy trials unfeasible.

Ladhani et al. report on the effect of 4CMenB following its inclusion in the national immunisation program in England and its effectiveness in preventing serogroup B IMD in infants and children. [1] In the three-years following its introduction, there was a 75% reduction in incidence of serogroup B IMD (63 observed versus 253 expected cases) in age groups in which all children were eligible for vaccination. Estimated vaccine effectiveness of 59% against all serogroup B IMD among children who received three doses is at the lower end of predictions for the UK and Ireland. [13, 14] While somewhat disappointing, this likely underestimates true vaccine effectiveness because the analysis included all children with group B IMD in the vaccine-eligible cohorts, irrespective of vaccination status or strain coverage and 4CMenB should not protect against all group B strains.

Because carriers of serogroup B meningococcus are an important source of transmission, population meningococcal carriage must be reduced for a herd immunity effect. Marshall et al. provide more clarity on the ability of 4CMenB to eradicate carriage of IMD causing meningococci in teenagers and produce herd immunity. [2] From 2017 through 2018, as part of the “B Part of It” study, 24,269 15 to 18-year old secondary school students in South Australia were randomised according to school to receive 4CMenB. The primary outcome was prevalence of carriage of any disease-causing serogroup of *N. meningitidis* 12 months after vaccination.

Disappointingly, despite a moderate vaccine coverage rate of 62%, there was no discernible effect on carriage of disease-causing meningococci, including serogroup B, between the vaccination and control groups at 12 months. Whilst it is possible that unvaccinated students served as a source of ongoing transmission and that vaccine may have reduced carriage earlier, the effect did not last for 12 months. Receipt of 4CMenB did protect vaccinated individuals; there were no cases of serogroup B IMD in students during the trial and the following year, as compared with 12 cases among students in the preceding year.

These articles provide important information for clinicians on the benefits and limitations of 4CMenB. We now have real-world evidence that the reduced three-dose 4CMenB schedule adopted by the UK and Ireland protects infants and toddlers against serogroup B IMD for at least two years. We also have validation of vaccine licensure based on serological data rather than traditional clinical efficacy trials, which may expedite future vaccine development and licensure. Unfortunately, three doses of vaccine may not protect against IMD caused by close to 40% of serogroup B strains and one dose only provides about 25% protection. So, notwithstanding vaccination, many infants, particularly the very young, will remain susceptible to IMD. In addition, we have confirmation that 4CMenB has no effect on carriage of serogroup B or other disease-causing meningococci and does not protect the unvaccinated population by providing herd immunity. So 4CMenB will not eradicate serogroup B IMD. Individuals at high risk for serogroup B IMD need direct protection and, in the outbreak setting, antibiotics remain necessary to rapidly eliminate carriage. Introduction of 4CMenB undoubtedly represents a major success in the effort to prevent serogroup B IMD but the need for a better vaccine remains.

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Eating Disorders During the COVID-19 Pandemic

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Eating disorders (ED) are serious and potentially fatal disorders, with the highest mortality rates of any psychiatric disorder.[1] The HSE National Clinical Programme for Eating Disorders applies across the age range (child and adult). It focusses on the four main eating disorders that are recognised in ICD11 and DSM5 (Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorders (BED), Avoidant Restrictive Food Intake Disorder).[2]

Though ED's present in a variety of settings, and good inter-professional collaboration is essential in management, this may be challenged at the present time due to the COVID-19 Pandemic. While much treatment is community-based, acute medical services support young people and adults who need medical intervention. Many interdisciplinary health professionals support this vulnerable - general practitioners, social workers, nurses, dieticians, psychologists, family therapists, physiotherapists, occupational therapists and indeed active support groups such as Bodywhys, who offer network and group supports for patients and their families.[2]

Acute hospital admission supports medical stabilisation, initiation of weight restoration and psycho-education. International centres are noting increases in acute presentations, particularly with patients with Anorexia Nervosa. We recently presented data at Irish Paediatric Association Annual Conference showing a 25% increase in patient admissions between March & September 2020, compared to the same timeframe in 2019. 40% of admissions were in males, considerably higher to any previous year. The children admitted had lower median BMI than in 2019. This is in the context of a reduction in overall admissions to the hospital during the pandemic. These children are sicker, presenting with lower median BMI, more medically compromised and more unstable.[3] Now, having reviewed the overall year, we note a 66% increase in admissions in 2020 compared to 2019.

Distress, anxiety relating to the pandemic, pre-existing morbidity, the interplay of social and economic factors, the impact of restriction, and losses of protective factors, all likely play a role.[4] Evaluating and assessing these factors are key to understanding the impact of the pandemic on ED risk and recovery. Pandemic experiences may exacerbate stressors and diminish coping strategies, as Rogers et al recognise "it impacts daily routines, constraints to outdoor activities may increase weight and shape concerns, and negatively impact eating, exercise, and sleeping patterns, which may in turn increase ED risk and symptoms".[5] Social restrictions may mean some young people are less able to engage with protective factors. More online time for example, may facilitate increased exposure to ED-specific or anxiety-provoking media. There may be an impact on young people's view of their own health and may increase ED symptoms specifically related to health concerns.[5]

Adequate resourcing of psychological medicine teams at paediatric sites, and the training of paediatricians with an interest in this arena, are vital and urgently needed. For services, the pandemic and restriction present unique challenges in terms of inter-professional working. Psychological medicine services in paediatric hospitals work closely with interdisciplinary professionals and offer expertise in managing mental health issues across the continuum of paediatric illness, working collaboratively with community teams and National Programmes. A Vision for Change[6] envisaged 13-15 Paediatric Liaison Psychiatry teams nationally - these are underdeveloped presently. Across Ireland, this hampers the ability to respond to the acute needs of paediatric patients during the pandemic. We need the right care, at the right time, in the right place.

Community Mental Health services are also rapidly adapting; recognizing the need to support acute and chronic care and modifying approaches to integrate video platforms and virtual methodologies. Innovations have included moving intake assessments and on-going therapeutic work online. Walsh et al report on moving to home-based sessions by telephone or zoom would replace clinic/hospital attendances. The authors recognise significant carer burden and pandemic-related distress, and the need for both close medical and mental health monitoring. By maintaining close contact and collaboration with parents, it was hoped that is would keep face-to-face visits and carer burden to a minimum.[7] Such approaches provide well-evidenced support in a new format.

Planning for the post-pandemic phase, implementation of the National Eating Disorder programme, with specialist community-based teams offering a range of interventions with a crucial and critical mass of experience, would be a good start. The National programmes and the Paediatric Models of Care recognise gaps in transition, and needs for adolescent health and mental health education, training and research. The advent of a new paediatric hospital is an opportunity to reflect on these needs. Given the recognised knowledge gap in this arena, there is recognition of the need for paediatricians and allied health professionals to develop skills in mental health. Several authors describe a lack of confidence amongst interdisciplinary professionals involved in the assessment of eating disorders and several initiatives have attempted to tackle this.[8,9]

Hudson et al recognise this specifically with regards to eating disorders. Oketah et al surveyed Paediatric trainees in Ireland, 84% of whom reported being involved in the management of a child with a mental health disorder in 2019. Only 8% of trainees felt well prepared in dealing with child and adolescent mental health; 64% of trainees also expressing a lack of support in dealing with presentations to their local hospital. All respondents expressed interest in having more educational and training opportunities for mental health disorders introduced as part of their paediatric training. This need is unlikely to diminish with the Pandemic.

The World Health Organization, who defined Interprofessional education thus: "when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes."[10] MDT teams need to work together and inter-professional education programs are crucial to foster care, and foster communication. IPE can support professionals to engage with each other, and with experts by experience. IPE respects difference and diversity between the professions and those with whom they work. Distinctive contributions from participating professionals can be shared and valued. This can improve quality of care, health outcomes and wellbeing. Innovative solutions might see paediatricians and psychiatrists training together or sharing training and teaching opportunities. Perhaps the pandemic, and new ways of working, present an opportunity to develop truly collaborative working relationships, and new ways to meet training and teaching needs to improve Paediatric Eating Disorder Care.

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Intramedullary Nailing and Prolonged Operative Time Increase Transfusion Rates in Hip Fracture Surgery

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Abstract

Aim

The aim of this study was to investigate the impact of intramedullary (IM) nailing on short-term postoperative outcomes in hip fracture patients undergoing surgery.

Methods

All hip fractures that underwent operative treatment over a six-year period were analysed. Variables assessed included blood loss, postoperative transfusion-rates, day-one mobilisation rates, length of stay, procedure performed, operative time and surgeon grade.

Results

In total, 1,593 procedures performed for hip fractures were analysed. The commonest fracture types were intertrochanteric (39.9%, n=633) and displaced intracapsular (37.9%, n=603). The commonest procedures were hemiarthroplasty (44.5%, n=710), short IM nail (29%, n=468) and dynamic hip screw (DHS) (12.9%, n=206). Consultant surgeons performed 61.18% (n=974) of cases. Mean length of stay was 23.3 days (s=45.31, 1-1227). For short and long IM nails, increased operative time led to increased intraoperative blood loss and postoperative transfusion rates ($p<0.05$). Poorer outcomes were associated with short IM nails exceeding 60 minutes and long IM nails exceeding 105 minutes in duration. Surgeon grade was also a significant predictor of postoperative transfusion rates ($p<0.05$).

Conclusion

IM nail procedures lead to higher intraoperative blood loss and postoperative transfusion rates compared to 'non-nail' procedures. We recommend surgeons remain cognisant of optimum operative times for these procedures.

Introduction

Hip fractures place a significant demand on healthcare services and society as a whole [1, 2]. A wide range of procedures are performed on a daily basis to treat these injuries, including intramedullary (IM) nailing. Little is known about the impact of IM nailing procedures on postoperative transfusion rates and hip fracture surgery outcomes. Some studies have shown lower transfusion rates with IM nailing procedures [3]. This has not been the experience of our tertiary referral centre to date. We describe the effect of intramedullary procedures on short-term outcomes in hip fracture surgery and attempt to identify an optimal operative time to reduce postoperative transfusion requirements.

Methods

The aim of this study was to investigate the impact of IM nailing on short-term postoperative outcomes in hip fractures. Secondary aims included identifying the major predictors of postoperative transfusion rates and blood loss in this patient cohort. The inclusion criteria consisted of any hip fracture that underwent operative treatment since the establishment of our National Hip Fracture Database (HFD) in 2012. Exclusion criteria included any patient with an incomplete dataset or any patient receiving treatment before the database was founded. A retrospective review of the National HFD was performed analysing all patients that were treated in our institution over a six-year period, from the establishment of the National HFD to the time of writing.

Certain parameters that were not recorded on the database included 'intraoperative blood loss', which was collected for each case from electronic postoperative anaesthetic records. Transfusion rates of red cell concentrate (RCC) and the dates of RCC unit administration were cross-referenced against the database allowing calculation of individual postoperative transfusion rates. Postoperative transfusions were instituted if the haemoglobin level fell below 8 g/dL. Perioperative anticoagulant and antiplatelet management were controlled by the anaesthetic department as per the best practice guidelines at the time of the procedure.

The dependent variables assessed included intraoperative blood loss, postoperative transfusion rate, day-one mobilisation rates, length of stay (LOS) and the 'cumulative ambulatory score' (CAS), assessed on the first postoperative day and on the day of discharge. Predictor variables included the operation performed, operative-time and surgeon grade.

Descriptive statistics were used to describe the general demographic of the patient cohort, the fracture patterns observed and the procedures that were performed. Univariate analysis was used to assess predictive patterns between independent and dependent variables. The statistical test used was dependent on the variable types. Simple logistic regression was used to analyse the predictive effect of operative time on categorical outcomes. The statistical software used for the analysis was Stata/IC 13.1 for Mac (64-bit Intel). A p-value of less than 0.05 was taken to be significant.

Results

Descriptive

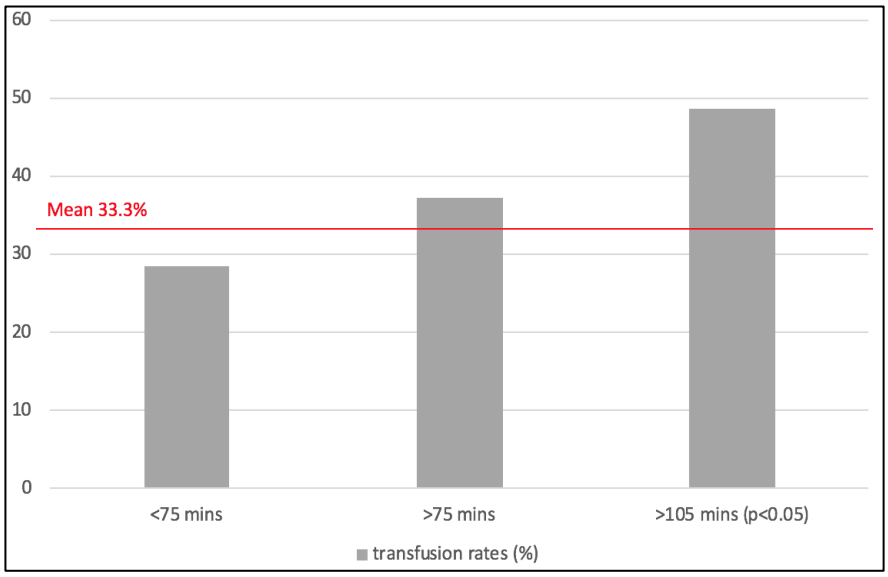
We identified 1,759 procedures performed for hip fractures over a six-year period between September 3rd, 2012 and July 21st, 2018. One hundred and sixty-six did not meet the inclusion criteria. A final patient cohort of 1,593 met the inclusion criteria. The average age was 81 years. The gender profile was 73.5% female and 26.5% male.

The commonest fracture type was intertrochanteric (n=633, 39.9%), followed by displaced intracapsular fractures (n=603, 37.9%). The commonest procedure was hemiarthroplasty (n=710), followed by short IM nail (n=468), dynamic hip screw (DHS) (n=206), long IM nail (n=124), cannulated screws (n=51) and total hip replacement (THR) (n=34). The mean operative-time for all cases was 59.3 minutes (σ=27.52, 9-221). The supervising surgeon performed the procedure in 61.18% of cases. A trainee resident performed 27.4% of the cases while the remaining 11.42% were performed by residents that were not actively engaged with a formal surgical training scheme. Physiotherapists mobilised 62.5% of all patients on the first postoperative day. The mean CAS on postoperative day-one was 1.63 (σ=1.61, 0-7) while the mean CAS on the day of discharge rose to 3.12 (σ=2.04, 0-9). The mean length of stay (LOS) for all hip fracture cases was 23.23 days (σ=45.31, 1-1227).

Univariate analyses

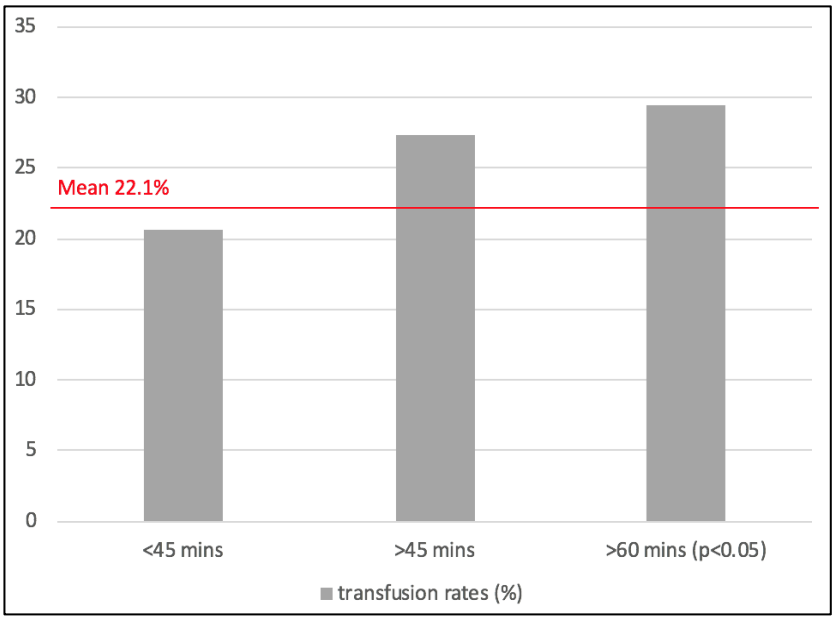
For Long IM Nails, *t*he mean operative-time was 84.6 minutes (σ=36.8, 14-213). There was a 33.3% transfusion rate for all cases with a median blood loss of 500ml. If the procedure lasted less than 75 minutes, the average transfusion rate was 28.5%. If it exceeded 75 minutes, this rose to 37.3%. There was a significantly increased transfusion rate for procedures exceeding 105 minutes in duration ($p<0.05$) (Figure 1). Longer operative times were associated with higher intraoperative blood loss ($p<0.01$).

Figure 1. Transfusion Rates by Operative-Time for Long IM Nails.



For Short IM Nails the mean operative-time was 47.8 minutes (σ=22.59, 9-159). The average transfusion rate was 22.1%. The median blood loss was 250ml with an average LOS of 23 days. Cases under 45 minutes had a rate of transfusion of 20.6% which rose to 27.4% if the operative time exceeded 45 minutes. A significant increase in transfusion rate occurred at 60 minutes where the rate of transfusion rose to 29.4% ($p<0.05$) (Figure 2). Lower operative-times in this cohort were associated with a lower blood loss intraoperatively ($p<0.05$) and a higher rate of day-one mobilisation ($p<0.05$). If the case was under one hour in duration, there was a 48% chance of day-one mobilisation. This dropped to 40% mobilisation when the operative time exceeded one hour.

Figure 2. Transfusion Rates by Operative-Time for Short IM Nails.



The mean operative-time for a hemiarthroplasty was 62.6 minutes (σ= 23.33, 10-202). The median blood loss was 250ml with an average LOS of 23 days. The overall transfusion rate was 10.3%. Procedures under one hour had a transfusion rate of 8.7%, while procedures exceeding one hour had a transfusion rate of 11.8%. The mean operative-time for DHS cases was 55.9 minutes (σ=20.3, 12-134). The median blood loss was 300ml with an average LOS of 19 days. Postoperative DHS transfusion rate was 8.4% on average. The mean operative-time for cannulated screws was 40.1 minutes (σ=22.47, 12-109), with a transfusion rate of 5.8%.

Thirty-four THAs were performed in total. Twenty-five were cemented. The mean operative-time was 101.9 minutes (σ=38.5, 57-212). The median blood loss was 450ml. The overall transfusion rate was 17.6%. Operations performed in under 90 minutes had a transfusion rate of 10.5%. This rose to a transfusion rate of 26.6% if the procedure exceeded 90 minutes. Operations performed in under 90 minutes had a significantly higher rate of day-one mobilisation (<0.05).

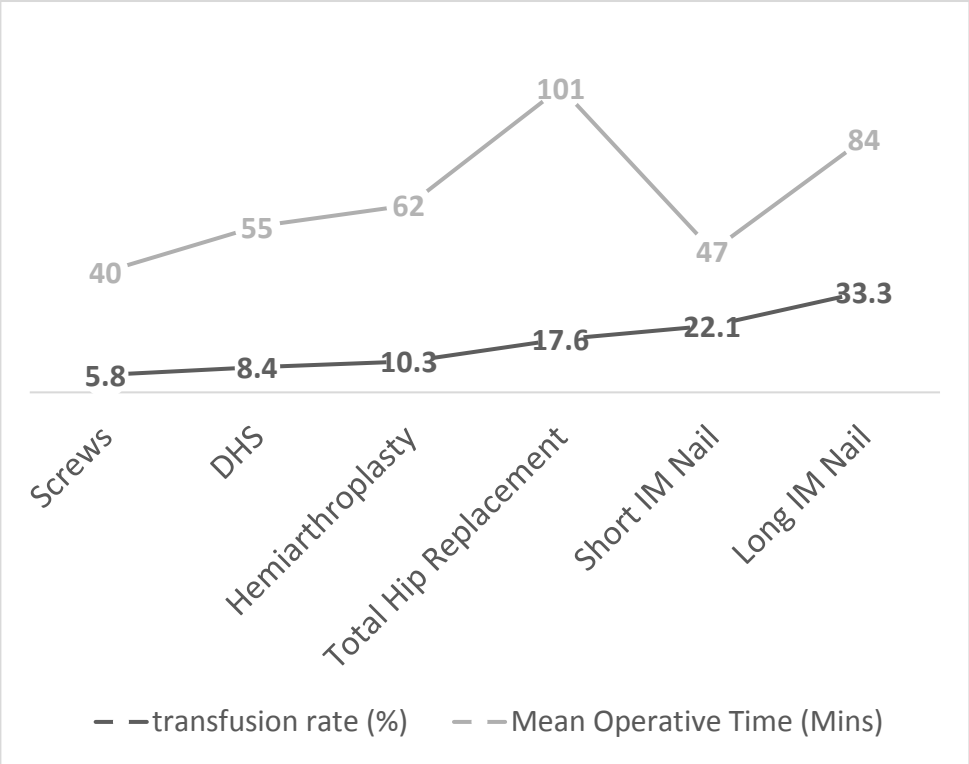
Multivariate analysis

The only outcome variable with greater than one significant predictor was blood transfusion rate in long IM nails, which was significantly associated with both operative-time and surgeon grade. A multilevel logistic regression analysis found that when controlling for operative-time, consultant surgeons still had lower transfusion rates compared to resident surgeons ($p<0.05$).

Inter-procedure analysis

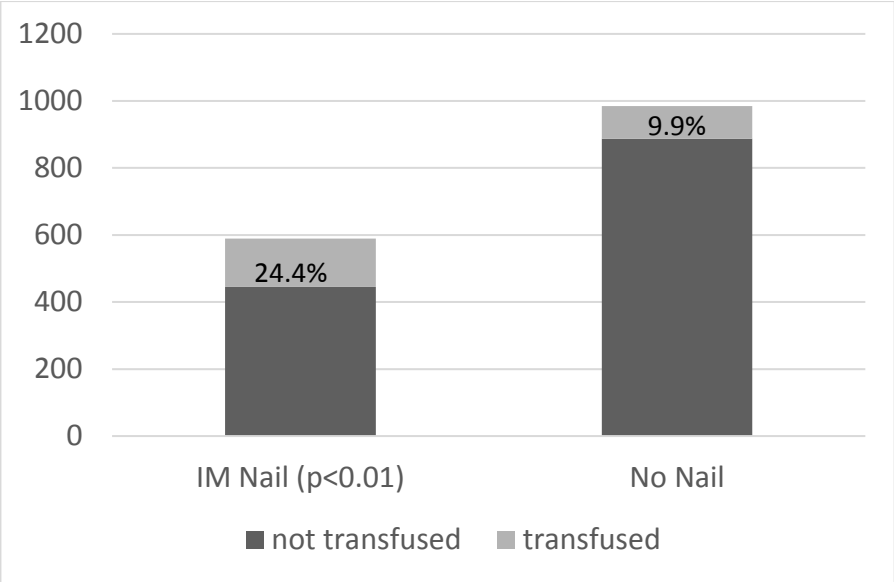
Figure 3 illustrates the mean operative-time and mean transfusion rates for all procedures. Long IM nails had the highest postoperative transfusion rate (33.3%), followed by short IM nails (22.1%). Cannulated screws had the lowest rate of transfusion at 5.8%. Despite the fact that short IM nails were the second quickest procedure to perform, they were associated with the second highest transfusion rate after long IM nails. Long IM Nails had the highest median intraoperative blood loss of all procedures.

Figure 3. Mean Operative-Time and Transfusion Rates for all Procedures.



When comparing IM nail procedures and 'non-nail' procedures, IM nail procedures had a significantly higher postoperative transfusion rate compared to non-nail procedures ($p<0.001$) (Figure 4). Of the 589 IM nails that were implanted, 144 patients were transfused, resulting in a transfusion rate of 24.4%. Of the 985 non-nail procedures, only 98 patients underwent transfusion, resulting in a transfusion rate of 9.9%.

Figure 4. IM Nail vs 'Non-Nail' Transfusion Rates.



Discussion

Operative time can have significant effects on the outcomes of many orthopaedic procedures. The field of arthroplasty has reported the effects of shorter operative times on a range of outcomes. Dicks et al. reported a lower risk of surgical site infection (SSI) in total knee arthroplasty (TKA) patients for surgeons with a lower median operative-time [4]. More recent studies have shown that for TKA, the risk of readmission, reoperation, SSI, wound dehiscence and transfusion are all significantly reduced with reduced operative-time [5]. An operative time of 80 minutes was recommended to reduce complication rates for TKA in this cohort. Surace et al. reported higher rates of readmission, reoperation, SSI, wound dehiscence, systemic complications and blood transfusion in a cohort of 89,802 total hip arthroplasty (THA) procedures when operative-time exceeded 80 minutes [6].

There is little known about the effect of operative time in the setting of trauma. Colman et al. found that for tibial plateau fractures, the only two predictors of increased infection rates were open injuries and operative-time [7]. There is a paucity of evidence in the literature regarding the impact of operative time on hip fracture surgery outcomes. We report a significantly increased intraoperative blood loss and postoperative transfusion rate with increasing operative-time ($p<0.05$) for long and short IM nail procedures. This implies that this specific mode of fixation may incur a higher risk of intra-operative and postoperative bleeding, potentially due to the intramedullary reaming process.

Multiple studies have described an increase in perioperative blood loss and postoperative transfusion rates due to reaming prior to femoral IM Nail insertion [8-10]. We note that short and long IM nails in our cohort had the highest postoperative transfusion rates for all procedures (22.1% and 33.3%, respectively). These results imply that we should view IM procedures as more physiologically invasive than 'non-nail' procedures and should thereby ensure a high level of consultant supervision with an acute awareness of the effect of prolonged operative time.

Operations exceeding 60 minutes for short IM nails and 105 minutes for long IM nails led to a significantly higher risk of postoperative blood transfusion ($p<0.05$). For all procedures, consultant surgeons had lower mean operative-times. Given the effect of operative-time on short term outcomes, particularly for IM nails, we advise close supervision to improve short term outcomes, especially for IM procedures with 'difficult' fracture patterns that are anticipated to require longer operative-times than usual.

Ronga et al. report higher perioperative blood loss rates with Gamma Nails versus dynamic hip screws in trochanteric fractures [11]. These findings comparing Gamma Nails with Dynamic Hip Screws have been replicated in preceding studies also [12]. We report similar findings. Long IM Nails had the highest intraoperative blood loss rates and the highest postoperative transfusion rates at 33.3%, whereas DHS transfusion rates were 8.4%. This strengthens the evidence that intramedullary reaming increases intra-operative blood loss and subsequent postoperative transfusion rates.

Parallels can also be seen when comparing hemiarthroplasty to total hip arthroplasty. Numerous studies have reported that THA incurs a higher risk of postoperative transfusion compared to hemiarthroplasty [13, 14]. We report similar findings, with a transfusion rate of 17.6% for THA compared to 10.3% for hemiarthroplasty. These results are intuitive given the preservation of acetabular bone stock during a hemiarthroplasty and lack of acetabular reaming. We found that for THA, operative-time was a significant predictor of day-one mobility.

Our study had limitations. There were a proportion of patients excluded from analysis due to incomplete datasets. This was due to a lack of comprehensive recording of all parameters pertaining to the HFD in its infancy. This issue has since been addressed and all cases recorded now have fully completed datasets.

IM Nailing procedures lead to significantly higher intraoperative blood loss and postoperative transfusion rates when compared to 'Non-Nail' procedures in hip fracture surgery. In the IM Nail group, prolonged operative-time and surgeon grade led to higher intraoperative blood loss and postoperative transfusion rates. We recommend an operative time of less than 60 minutes for short IM nails and 105 minutes for long IM Nails to reduce postoperative transfusion requirements. We also recommend a renewed vigilance towards the apparent time sensitivity of intramedullary procedures with appropriate supervision from a consultant surgeon at all times.

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

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Extending Pharmacy Services to the Point of Discharge

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Abstract

Aim

The aim of this study was to determine the impact of introducing a clinical pharmacist led discharge service on medication safety at the point of discharge and its acceptability to healthcare staff.

Methods

A retrospective chart review to identify medication discrepancies was undertaken before and after the introduction of a pharmacist led discharge service. An evaluation was undertaken by means of a questionnaire to community pharmacists, GPs and hospital clinicians.

Results

The pharmacist led discharge service significantly reduced errors from 50% (n=17) to 7% (n=2) of patients ($p<0.001$) and 10% (n=22) to 1% (n=2) of medication orders ($p=0.001$). The evaluation revealed that the majority of clinicians found the service useful, had the potential to reduce errors and improve communication.

Conclusion

Pharmacist involvement at the point of discharge had a significant impact on medication safety. Crucially, in this project, we show the service was received well by medical personnel and improved communication between primary and secondary care, enhancing implementation potential.

Keywords: pharmacy, point of discharge, medication reconciliation, medication error, safety.

Introduction

It has been suggested that one of the greatest risks to patient safety occurs when the patient passes across the boundaries of care, whether between professionals or between organisations[1-2]. Medication reconciliation has been proposed[3] and the inclusion of clinical pharmacists and physicians in the process shown to enhance patient safety[4].

In the Republic of Ireland, hospital pharmacists are not routinely involved in the discharge process[5]. The discharge medication list is transcribed, usually by the most junior doctor of the treating team, onto the discharge prescription and the discharge summary for the patient's community pharmacist and general practitioner (GP), respectively. This process raises concerns as medication errors at the point of discharge are common, affecting 11%-66% of patients[6-12]. Furthermore, adverse drug events represent the most frequent cause of patient harm post discharge and approximately one-third of these are the result of preventable errors[2,13]. The risk of re-admission is also increased. Williams and Fitton reported that 59% of unplanned re-admissions could have been prevented with improved discharge planning, including providing timely and accurate information to the GP and more effective management of medication[14]. Medication safety, including effective communication between care environments, is therefore of vital importance.

The aim of this study was to determine the impact of introducing a clinical pharmacist led discharge service on medication safety at the point of discharge and its acceptability to healthcare staff.

Methods

Medication discrepancies were those identified if the medication list across the admissions drug history, inpatient prescription chart, discharge prescription and medication list on the discharge summary revealed an inconsistency, and the reason for such was not clinically apparent and/or documented in the patient notes. Omission of medication prescribed on a "when required basis" during inpatient stay was not recorded as a discrepancy. A prescribing error was defined as a prescribing decision or prescription writing process that results in an unintentional, significant reduction in the probability of treatment being timely and effective or increase in the risk of harm, when compared with generally accepted practice[15]. Any medication discrepancy detected by the pharmacist was discussed with the prescribing doctor and if unintentional, was recorded as a prescribing error.

Phase 1 consisted of normal practice, where the treating doctor hand wrote the prescription and hand wrote the discharge medication list onto the discharge summary. The pharmacist was not involved in the discharge process. In phase 1, over a three-week period, a retrospective clinical review of the discharge medication lists was undertaken by the pharmacist, reconciling the pre-admission medication and inpatient prescription chart with the discharge medication lists. Any discrepancies/prescribing errors identified were discussed with the treating team. Patients who were discharged from the study ward during pharmacy business hours and received reconciliation of pre-admission medication by a clinical pharmacist were included.

As part of the pilot introduction of a pharmacist led service (phase 2), electronic prescription and medication report (see supplementary material) forms were designed for the patient's community pharmacist and GP. In addition to the standard information required for a prescription, the electronic format included information on allergies, notes relevant to the discharge medication and changes to pre-admission medication made during the inpatient stay. The medication report also included reasons for changes made to pre-admission medication, as well as indications for the discharge medications prescribed. Both documents were generated simultaneously with single data entry. The pharmacist generated the documents, reconciling the pre-admission medication with the inpatient prescription chart and undertaking a clinical medication review.

The doctor from the treating team reviewed both documents electronically and if an amendment was required, the pharmacist was contacted. When satisfied, the doctor printed, signed and dated both documents as per legal requirements. Controlled drug prescriptions and discharges out of pharmacy hours were completed by the doctor in the traditional handwritten format. Patients included were those who were under the care of the endocrinology and the gastroenterology teams, were discharged from the study ward during pharmacy business hours and received reconciliation of pre-admission medication by a clinical pharmacist.

In phase 2, over a five-week period, a clinical review of the discharge medication lists was undertaken by the pharmacist, reconciling the pre-admission medication and inpatient prescription chart with the pharmacist then creating an accurate discharge medication list. A retrospective review was undertaken post discharge by a senior pharmacist of the discharge medication lists generated by the pharmacist.

Anonymous study evaluation data was extracted retrospectively by the pharmacist for both phases. While part of the clinical treatment of patients, data was identifiable to those on the treating team. The data extracted for use in the research component was anonymous with only aggregated fully anonymous data extracted.

It was intended to use the same study period for both phase 1 and phase 2 data collection, however, as only two units were included due to training time constraints in phase 2, the study period was extended due to lower patient through-put.

Prescribing errors were independently reviewed and categorised into their potential to cause patient harm by a panel consisting of two medical consultants, two senior pharmacists and a clinical nurse manager using the Dean & Barber visual analogue scale[16]. A mean score of 8-10 had the potential to cause severe patient harm, 3-7 moderate or <3 minor/ no harm.

In order to evaluate the service introduced, a questionnaire was developed and sent along with the prescription and medication report via the patient to the community pharmacist and GP, respectively. A questionnaire was also completed by the hospital doctors who participated in the study. Questionnaires were returned on an anonymous basis.

Analysis was carried out using the SPSS Statistics Package Version 17. Chi-squared analysis was used to compare proportions between Phase 1 and Phase 2. Analysis of variance (ANOVA) was undertaken to compare the mean number of errors between phases. Regression analysis was undertaken to determine the relationship between the number of errors and number of medications listed. A p-value of <0.05 was considered statistically significant.

Results

A total of 62 patients were included in the study: 34 patients in the Phase 1 and 28 in the Phase 2. Table 1 compares the baseline characteristics of discharge medication lists completed by the doctor to those completed by the pharmacist.

Table 1: Baseline Characteristics.

	Phase 1	*Phase 2*
Number of patients	34	28
Mean age (median; range)	70 (77.5; 37-90)	62.6 (67; 25-90)
Mean duration of stay (median; range)	12 (9.5; 1-33)	10.7 (5.5; 1-77)
Mean number of med orders (total)	6.5 (222)	7.4 (208)

The proportion of patients and medication orders affected by a prescribing error is illustrated in Table 2. A total of 22 and 18 errors were detected on the doctor written prescriptions (phase 1) and discharge summaries (phase 2), respectively. Of these, 61.5% were judged to have the potential to cause moderate patient harm and 38.5% minor/no harm. Omissions were the most frequently occurring errors (Figure 1). Examples of errors are provided (Table 3).

Table 2: Patients/medication orders affected by discharge prescribing error(s).

	Phase 1 N (%)	*Phase 2* N (%)	p-value
Patients	17 (50)	2 (7.1)	<0.001
Med orders	22 (9.9)	2 (0.96)	0.001

Figure 1: Types & frequency of errors per prescription & discharge summary/ medication report.

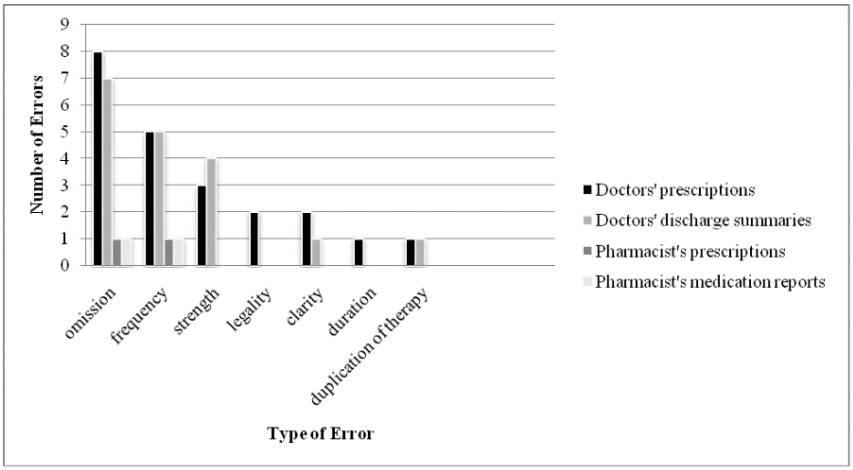

Table 3: Examples of errors detected.

Examples of errors on doctor written discharge medication lists (phase 1)					
Potential to cause	*Admission drug history*	*Inpatient prescription chart*	*Discharge prescription*	*Discharge summary*	*Indication*
Moderate harm	n/a	*Aspirin 75 mg daily*	*Omitted*	*Omitted*	*NSTEMI*
Moderate harm	*Novomix 30 bd*	*Novomix 30 bd*	*Omitted*	*Omitted*	*Type 2 diabetes*
Moderate harm	n/a	*Atorvastatin 10 mg nocte*	*Omitted*	*Omitted*	*NSTEMI*
Errors on pharmacist generated discharge medication lists (phase 2)					
Potential to cause	*Admission drug history*	*Inpatient prescription chart*	*Discharge prescription*	*Medication report*	*Indication*
Moderate harm	*Vitamin B12 inj. monthly*	*Omitted*	*Omitted*	*Omitted*	*Vitamin B12 deficiency*
Moderate harm	*Nebivolol 5 mg bd*	*Nebivolol 5 mg bd*	*Nebivolol 5 mg daily*	*Nebivolol 5 mg daily*	*IHD/ STEMI*

Two errors, one omission and one error of frequency were detected, by the senior pharmacist's retrospective review of the pharmacist's generated lists (phase 2). Both were considered to have the potential to cause moderate patient harm. In one case, corrective action was taken by contacting the patient's GP. The errors that occurred are listed (Table 3). No errors/amendments were detected/requested by the prescribing doctor.

Evaluation Surveys

Thirteen community pharmacists (46%) completed the survey. In terms of the content of the new prescription format, 31% found it useful and appropriate and 69% found it very useful and appropriate. All were of the view that it had the potential to reduce the risk of medication errors and all felt it improved communication between secondary and primary care. The majority (85%) considered that the additional information on medication changes and allergies/adverse reactions should accompany all discharge prescriptions.

In particular, community pharmacists noted the avoidance of confusion:

"Many patients are confused about their medications when they are discharged and we regularly have to phone to clarify", "Printed prescription and clear indication of change to medicines will definitely help to reduce risk of medication errors".

Eleven completed (39%) GP questionnaires on the medication report were returned. In terms of the content of the new prescription format, 18% found it useful and appropriate, 73% found it very useful and appropriate while the remaining 9% found it partly useful and appropriate. All GP respondents were of the view that it had the potential to reduce the risk of medication errors, that it improved communication between secondary and primary care and that the information should accompany all discharge summaries.

GPs referred to patient safety improvements:

"List of changes to pre-admission medication very useful", "Much enhances safety of prescribing", "The communication of discharge medicines is of vital importance".

All five relevant doctors completed the hospital clinician questionnaire regarding the pharmacist led discharge service. All agreed that the pharmacist led discharge service saved a significant amount of time, reduced the risk of medication error and improved patient adherence:

"*Safer, ensures correct medications, encourages compliance, informs GPs", "Time saved in doing patient discharge. Also saves on unnecessary calls from GPs asking about changes in medications". "Patients more aware of the medication they are taking and dosing regimens", "Patient has better understanding of the indication of each medication and when they present to outpatient clinics or Accident and Emergency have a legible record of all current medications".*

According to respondents, the most positive aspects of the service were:

"*Reduces risk of errors on prescriptions*", "*Time saving*" and "*Safety – pharmacist is very thorough at reviewing why/when/which medications stopped*". No comments referred to any negative aspect of the service.

Discussion

Overall, 50% of patients were affected by at least one prescribing error on the doctor written discharge medication lists. While high, this is lower than that reported elsewhere in the Republic of Ireland and abroad, up to 66%[7,11]. The number of medication orders affected, 10%, was similar to that reported elsewhere in Ireland and in the UK[11,17,18].

The pharmacist led service resulted in a significant reduction in the proportion of patients affected (50% to 7%) and is comparable to that reported in the UK: 32% to 8%[19]. The reduction in discharge medication orders affected, from 10% to 1% was also statistically significant.

The questionnaires returned by the doctors involved in the pharmacist led service highlight the significant impact made and the need to develop pharmacist involvement in this area.

The survey data highlights the problems inherent in the traditional discharge process: patients are often confused about their medicines post discharge, medicines not relating to stay in hospital are omitted from prescriptions and community pharmacists frequently have to phone to clarify discharge medication. Therefore, enhanced communication between healthcare sectors is required, as previously identified in the UK[20-21].

As part of the pharmacist led discharge service, discharge medication lists were generated electronically. It is important to highlight that electronic prescribing support was not provided as data required manual entry.

Studies that have shown error reduction with electronic systems utilised comprehensive prescribing support[22-24]. Use of the electronic system did however reduce transcription burden, which has been associated with reduced error rate[25]. How significant this was in influencing the error rate on the pharmacist led service is unknown.

The response rate to the surveys on the new prescription format and medication report was moderate for both community pharmacists (46%) and GPs (39%). A limitation to the method of distribution was that patients were responsible for delivering the survey to their community pharmacy and GP. Therefore, it is not known whether all surveys were distributed. As surveys were fully anonymous, there was no follow up of non-responders. The survey results are based on a self-selecting sample which comes with inherent bias. This study was conducted in a real-world setting and was not designed to show causation; the patients included were a presenting sample over the study timeframe. A further limitation is that an economic assessment was not undertaken.

Pharmacist involvement at the point of discharge had a significant impact on medication safety. The pharmacist-led discharge service conferred a number of additional benefits: providing additional important information for the community pharmacist and GP, time saving for discharging doctors and improved use of pharmacist expertise. The importance of pharmacist involvement from admission to discharge and the benefits of a team-based approach in Ireland is supported by published evidence[4]**.** Crucially, in this project, we show that the service was received well by medical personnel and improved communication between primary and secondary care, enhancing implementation potential.

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Ethics approval:
Approval was granted from the Clinical Research Ethics Committee, University College Cork.

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

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Cost Awareness of Interventional Radiology Devices Among Radiology Trainees

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Abstract

Aim
To assess radiology trainees' ability to identify and estimate costs of common disposable radiological devices and identify deficiencies in postgraduate teaching in terms of healthcare economics.

Methods
Postgraduate radiology trainees were invited to partake in a questionnaire via email. An anonymous online survey consisting of 26 multiple-choice questions (MCQs) was administered. Respondents were asked to identify and then cost 13 devices.

Results
The questionnaire was delivered to 82 Radiology trainees. The response rate was 60% (49/82). The mean percentage of correct answers was 91.6%. No trainee accurately estimated the cost for all 13 devices assessed. The cost of devices was underestimated by trainees 48.9% of the time and overestimated 32.3% of the time.

Conclusion
Radiology trainees are deficient in cost awareness of a number of common IR devices used. A health economics module in postgraduate radiology training may improve the efficiency of healthcare expenditure within radiology departments.

Introduction

Interventional Radiology (IR) is a vital component of modern healthcare. During a standard day in the IR suite, numerous disposable devices are utilised including guidewires, stents, needles and catheters. Both specialized IR trained consultants and Diagnostic Radiology consultants used many of these devices.

Radiology trainees receive no formal training or assessment on the cost and identification of these devices. Educating trainees and surgeons on disposable devices has been shown to reduce procedure costs in other surgical disciplines[1]. Furthermore, surgeons tend to underestimate the cost of high-cost items and surgical experience does not correlate with estimation accuracy[2]. Since the recent economic downturn, there has been a vogue in the health service to 'do more with less', however there is very little formal education for trainees surrounding these topics. The aim of our study was to assess radiology trainees' ability to identify and estimate costs of commonly used disposable interventional radiological devices and identify potential deficiencies in postgraduate radiology teaching in terms of healthcare economics. We also wish to add to the growing body of literature demonstrating poor cost awareness amongst physicians.

Methods

The postgraduate radiology training body of a European country was consulted to obtain accurate numbers of all current radiology trainees. Trainees were invited to partake in a questionnaire via email. Non-respondents were sent a reminder email or text message on a 2-weekly basis for the duration of the study (2 months). The trainee database was inclusive of all radiology trainees.

An anonymous online survey consisting of 26 multiple-choice questions (MCQs) was created using Survey Monkey©. Respondents were asked to provide their year of training (first to fifth year) and subspecialty of interest. Fellows (Year 5 trainees) were also asked to participate in the study.

Respondents were asked to identify 13 devices, using a combination of in vivo and ex vivo images. These images are provided in the supplementary material. They were subsequently asked to estimate the cost of each device. The devices were as follows: PICC line (6-Fr dual lumen, Bard), Angioseal Closure device (6 Fr, Terumo), Tunnelled dialysis catheter (AshSplit 32 cm), Port-A-Cath (PowerPort, Bard), pigtail drainage catheter (8 Fr, Uresil), guidewire (hydrophilic, Terumo), biopsy needle (18 x 10 mm Max-Core, Bard), micropuncture kit (Cook Medical), angioplasty balloon (5 Fr x 40 mm, Boston Scientific), IVC filter (ALN Optional vena caval filter), covered metal vascular stent (Atrium 5 x 60 mm), gastrostomy tube (MicKey 14 Fr x 3 cm, Avanos), and EVAR graft (Endurant II, Medtronic). Following each question, the trainee was asked to estimate the cost of each device. The hospitals procurement department was consulted to cost each device.

Regarding cost estimation, trainees were deemed correct if they responded to within 25% of the true cost. Respondents were not provided with a range of costs when answering.

Results

Response Rate

The questionnaire was delivered to 82 Radiology trainees and the response rate was 60% (49/82). All questionnaires were fully complete. Analysis was performed on every returned survey. The response rate varied by year of training - fourth year trainees (32.7%, n=16), third year trainees (24.5%, n=12), second years (16.3%, n=8), fifth year trainees (14.2%, n=7) and first year trainees (12.2%, n=6).

Interventional Radiology was the subspecialty of interest for 8.1% (n=4/49). All respondents were working in the public healthcare sector at the time of the study and all were enrolled in Higher Specialist Training in Radiology.

Identification of Devices

Table 1 demonstrates trainees' responses for correctly identifying each disposable radiological device. The mean percentage of correct answers given was 91.6% (13 questions). The guidewire, co-axial biopsy system, stent graft and EVAR trouser graft were correctly identified by all trainees. The tunnelled dialysis catheter was the most unrecognisable device and was correctly identified by 65% (n=32) of respondents.

Cost of Devices

Table 1 also demonstrates cost estimation for interventional radiological devices among trainees. No trainee accurately estimated the cost for all 13 devices assessed. The cost of devices was underestimated by trainees 48.9% of the time. The cost of devices was overestimated by trainees 32.3% of the time. After correct identification, trainees accurately estimated the cost of devices 18.8% of the time. These results are summarised in Figure 1. Trainees scored highest when estimating the cost of the AngioSeal closure device, accurately priced by 37.7% (n=17) of trainees. Trainees scored lowest in accurately costing an IVC filter with 0% (n=0) of respondents correctly pricing this device. The three most expensive items (IVC filter, stent graft and EVAR trouser graft) were the most frequently underestimated, at 100%, 87.8% and 98% respectively.

Name of device	**Correctly identified (n)**	**Cost (€)**	**Correct responses for cost (n)**	**Underestimated**	**Overestimated**
PICC line	90% (n=44)	85	31.8% (n=14)	27.2% (n=12)	41% (n=18)
AngioSeal Closure device	92% (n=45)	142.50	37.7% (n=17)	44.4% (n=20)	17.9% (n=8)
Tunnelled dialysis catheter	65% (n=32)	217.49	25% (n=8)	50% (n=16)	25% (n=8)
Portacath	98% (n=48)	230	18.75% (n=9)	47.9% (n=23)	33.3% (n=16)
Uresil pigtail drainage catheter	98% (n=48)	105.80	10.2% (n=5)	75% (n=36)	14.8% (n=7)
Guidewire	100% (n=49)	40	32.7% (n=16)	32.7% (n=16)	34.6% (n=17)
Co-axial biopsy needle	100% (n=49)	27.39	16.3% (n=8)	4% (n=2)	79.7% (n=39)
Micropuncture access kit	90%(n=44)	65	29.5% (n=13)	25% (n=11)	45.5% (n=20)
Angioplasty balloon	94% (n=46)	50	8.6% (n=4)	4.6% (n=1)	86.8% (n=41)
IVC filter	96% (n=47)	1365	0% (n=0)	100% (n=47)	0% (n=0)
Stent graft	100%(n=49)	1450	8.6%(n=4)	87.8% (n=43)	3.6% (n=2)
MicKey RIG tube	69% (n=34)	108	23.5% (n=8)	41.1% (n=14)	35.4% (n=12)
EVAR trouser graft	100% (n=49)	7000	2% (n=1)	98% (n=48)	0% (n=0)

Table 1 - This table displays each item, the number of trainees who correctly identified the item, it's cost, the number of correct responses for cost estimation and the number of trainees who underestimated the cost.

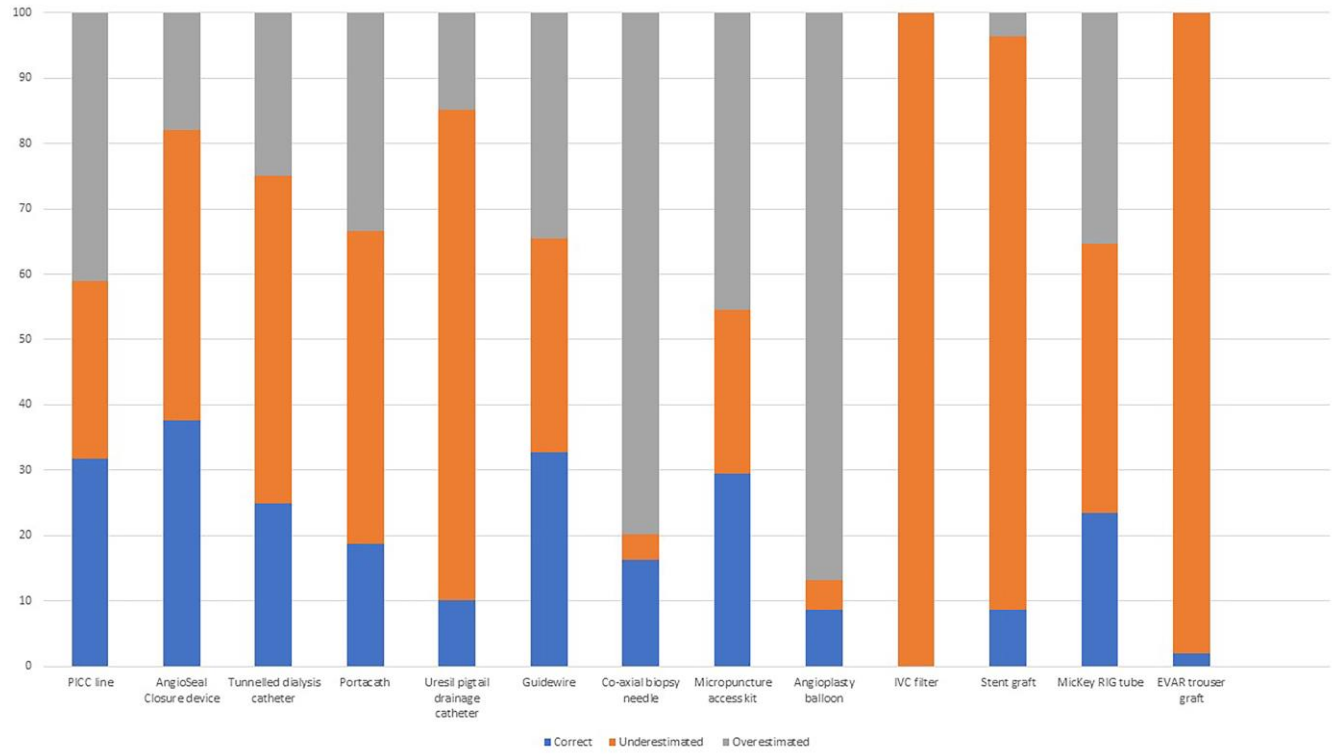

Figure 1 – Bar chart displaying the percentage of trainees who accurately estimated, overestimated and underestimated the cost of each item.

Discussion

Many modern hospitals operate a devolved budgetary management process[3]. This gives greater financial responsibility to those at the point-of-delivery of service, assuming they will be in the best position to make informed choices about the allocation of limited resources. Guidewires, drains, biopsy needles and angioplasty balloons are used on a daily basis in most radiology departments. Despite their widespread use there are no taught modules dedicated to interventional radiological devices and their economic impact on the department. In this study, we identified broad variations in the perception of cost of commonly utilised disposable devices among radiology trainees. Trainees were accurately able to estimate the cost of a device less than 20% of the time. We also demonstrated that the cost of disposable devices, was frequently underestimated by trainees. Finally, we identified that more expensive devices are more commonly underestimated. In order to maximise the cost-effectiveness of the interventional radiology department, it is important to address knowledge deficiencies in healthcare economics in the near future.

Although doctors are responsible for a considerable portion of healthcare spending, their knowledge of health economics has been traditionally poor as demonstrated in one study where 80% were unaware of the costs of medications and only 13% had been formally educated on drug costs[4]. A number of papers have demonstrated that surgical trainees demonstrate poor knowledge of the cost of surgical equipment and that the price of high cost items tends to be underestimated[5,6].

To combat these deficiencies, the General Medical Council suggest that undergraduate medical training should encourage medical schools to teach issues relating to health economics[7], however health economics is taught differently across medical schools[8]. Educating medical professionals should not only include health economics modules as part of their undergraduate education, it should involve continuous education and assessment of postgraduate trainees by their training bodies. This module could be incorporated online or presented at training days. Informed trainees may exercise greater financial responsibility and generate cost saving opportunities.

Different surgical subspecialties have investigated whether educating surgeons on the cost of disposable devices can increase savings. A recent initiative by Vigneswaran et al., provided general surgeons with information on the cost of commonly utilised disposable devices[1], resulting in cost savings due to a reduction in the use of certain disposable devices and selective use of certain fixation devices and trocars[1]. Furthermore, Zygourakis et al[9], calculated the cost of unused disposable devices in the neurosurgery operating theatre which resulted in a significant cost to the hospital. They also noted that the particular surgeon was an important factor regarding unused supply cost.

There is a steep learning curve associated with deployment of certain devices used in interventional radiology, particularly the more complex and by extension, more expensive devices. Wang et al published a large cross-sectional survey on the level of cost awareness of attending interventional radiologists and vascular surgeons. 19.8% of their respondents were able to cost items accurately[10]. Our study differs in that we targeted trainee radiologists only, but only 18.8% of trainees were able to accurately cost items. The similar response rate amongst our surveyed cohort suggests greater experience with techniques involved does not necessarily translate into greater cost awareness. Ryan et al demonstrated that accuracy in estimating cost awareness does not improve with years of surgical training[5].This study adds to the growing body of evidence that knowledge of cost awareness amongst medical trainees is poor and highlights the need for this to be addressed in the near future.

While some of the devices included in our study are exclusively used in the Interventional Radiology suite, others would be used by general radiologists on a day-to-day basis. PICC lines, drainage catheters and biopsy needles are all commonly used by many different subspecialist radiologists. Analysing the data on these three devices shows that only 19.4% of trainees were accurately able to estimate the cost of these items. This demonstrates the importance of these concepts to Radiology as a whole, rather than being limited to Interventional Radiology.

A limitation with the present study is its response rate. Although the sample size was representative of all radiology trainees in the country; the response rate was 60% (49/82). A further potential limitation is the differences in prior clinical exposure to IR among surveyed trainees. Exposure to IR varies hugely between hospitals and medical schools.

In conclusion, radiology trainees are deficient in cost awareness of a number of common IR devices used. This adds to the growing body of evidence suggesting that physicians across a number of specialties demonstrate poor cost awareness. Designing a health economics module into postgraduate radiology training may improve the efficiency of healthcare expenditure within radiology departments.

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

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Feasibility and Parental Attitudes to Universal Cholesterol Screening in Paediatric In-Patients

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Abstract

Aims

Dyslipidaemia is a treatable risk factor for atherosclerosis, and the 2011 National Heart, Lung and Blood Institute (NHLBI) guidelines recommend universal lipid screening at 9-11 years. This study aimed to assess the number of children with cardiovascular disease risk factors and parental attitudes regarding cholesterol screening and management.

Methods

Parents of children aged 3-14 years admitted to the paediatric wards at University Hospital Limerick received questionnaires over a 4-week period. Data collected included demographics, cardiovascular risk factors, and parental attitudes to lipid screening and management.

Results

A total of 53 parents completed the questionnaire survey and of those 40% (n=21) of patients met criteria for targeted screening, while 53% (n=30) met criteria for screening as per NHLBI guidelines. Restriction to those aged 9 and over resulted in 100% (n=26) being screened based on NHLBI guidelines with 38% (n=10) being screened using targeted screening. Ninety eight percent of respondents (n=52) had no objection to lipid analysis being performed.

Conclusion

A significant proportion of children would not be included with targeted screening that would be included on screening as defined by the NHLBI guidelines. Almost all the of study group had no issue with lipid testing being carried out and so may be an avenue for future intervention to help prevent development of cardiovascular disease.

Introduction

Dyslipidaemia is a risk factor for atherosclerosis, which is an early step in the development of cardiovascular disease (CVD) [1] [2]. The process of atherosclerosis begins in childhood and causes cardiovascular morbidity due to coronary artery disease, stroke, and peripheral arterial disease [3] [4]. In addition to dyslipidaemia, other risk factors for the development of atherosclerosis and CVD include obesity, hypertension, smoking, hyperglycaemia, and a positive family history of CVD. The severity of atherosclerotic plaques in adults correlates positively with the duration of the dyslipidaemia and as a result early intervention in children with dyslipidaemia has been recommended as a preventative therapy against CVD development, although the issue of screening and exact treatment remains controversial [5] [6].

In 2011 the National Heart, Lung and Blood Institute (NHLBI) Expert panel formulated guidelines for Cardiovascular health and risk reduction in children, recommending age-dependent universal screening for children between 9-11 years, as opposed to targeted screening, which had previously been recommended [7] [8]. These recommendation changes were considered the best method of identifying all children with severe dyslipidaemia and allow for the earliest treatment and follow-up [5] [6]. The guidelines differ from the selective screening recommended of children and adolescents by the 2007 US Preventive Services Task Force [4]. Screening variables in selective processes include, a positive family history of cardiovascular disease or dyslipidaemia, or where family history is unknown, any patient with any risk factor associated with CVD which include obesity, hypertension, diabetes, or tobacco usage. Recent studies have shown that screening only patients with risk factors fails to identify some patients with genetic or acquired dyslipidaemias [8]. Addressing childhood dyslipidaemia is of significant public health importance due to the high mortality rate associated with CVD, and this is particularly true within the Irish population.

We report a pilot questionnaire-based study, on a general paediatric in-patient population at University Hospital, Limerick (UHL). UHL is a university-affiliated regional paediatrics unit, serving a catchment area of approximately 1.1 million people. The aims of this study were to evaluate the incidence of CVD risk factors within a general paediatrics hospital inpatient population and to explore issues relating to parental concerns or barriers to undertaking universal screening for dyslipidaemia.

Methods

A questionnaire was designed based on the NHLBI Expert panel guidelines recommendations for paediatric lipid screening [7], and was formulated to investigate the number of cardiovascular risk factors within the patient cohort including; family history of CVD, tobacco exposure at home, self-reported history of hypercholesterolaemia in parents, current diagnosis of diabetes mellitus, hypertension, or any other reported condition pre-disposing to secondary dyslipidaemia. Patient demographic data including age, height and weight was collected where possible. The questionnaire also examined specific questions regarding parental concerns to having additional blood samples taken for lipid analysis and also regarding willingness to attend a dietician for diet and lifestyle advice and additionally, if there were issues with the use of a lipid lowering medications.

The questionnaire was validated, and a pilot-study was conducted on a sub-sample of the target population, with the questionnaire revised subsequently for any ambiguity.

Pilot data was excluded from the final analysis. The survey required an average of 5 minutes to complete. This study was approved ethically by the University Hospital Limerick ethical committee.

Inclusion criteria included**:** the ability to speak and understand English, parents being present at the time of interview and being admitted onto the paediatrics ward at UHL. Exclusion Criteria included**:** the inability to speak and understand English and where siblings had already participated in the study. Patients were not excluded on the basis of medical background. The lower limit of 3 years was chosen as screening is not recommended below this age, while the upper limit of 14 was chosen as this is the age limit for admission of newly diagnosed patients to the Paediatrics ward at UHL.

The sample method consisted of systematically approaching the parents/guardians of patients who were inpatients within the Paediatrics ward at UHL over the course of the sampling period. The questionnaires were completed over a 4-week period in February 2015. Parental consent was obtained, and answers were self-reported. The completed questionnaire data was coded into SPSS version 20 for further analysis. An overall summary of the questionnaire data was analysed, and summary data compiled.

Results

Number of questionnaires

A total of 66 patients fulfilling the inclusion criteria were admitted during the study period, of whom 63 consented to participate and 3 declined. Fully completed questionnaires were returned by 53/63 parents/guardians (84%). The majority (over 75%) of the questionnaires were returned without a weight or height recorded and as a result BMI was not recorded as the questionnaire was anonymous and these variables could not be added later.

Description of risk factors

Twenty-one (40%) of those surveyed had at least one CVD risk factor, while 60% (n=32) had no cardiovascular disease risk factor (Fig. 1). Of the 53 patients, 28% (n=15) had a family history of CVD, 9% (n=5) had a parent/guardian with a previous diagnosis of dyslipidaemias, 8% (n=4) patients had type 1 diabetes mellitus (T1DM) and 30% (n=16) lived with someone who smoked within the home (Fig. 2).

Children who would fulfil screening guidelines as per 2011 NHLBI guidelines:

Eleven (40%; n= 11/27) of patients below the age of 9 years fulfilled the criteria for screening. All children between the ages of 9-11years (n= 12/12) were recommended for screening based on age as per 2011 NHLBI guidelines, while 25% (n= 3/12) of the children aged 9-11 years fulfilled the criteria for targeted screening. 50% (n= 7/14) of those aged 12 or older fulfilled the criterion for screening as per guidelines.

Overall 40% (n = 21/53) of patients surveyed met the criteria for targeted screening (11/27 aged up to 9 years, 3/12 aged 9-11 years, and 7/14 aged 12-14 years), while 53% (n= 30/53) met the criteria for screening per the 2011 NHLBI guidelines when universal screening in all patients aged 9-11 years is taken into account.

If this is restricted on the basis of age to those aged 9 and over, 100% (n=26/26) would be screened on the basis of 2011 guidelines with 38% (n=10/26) screened on the basis of targeted screening.

Parental Attitudes to Cholesterol analysis

Fifty-two of those surveyed (98%) had no objection to the possibility of a cholesterol analysis being performed on their child. When those surveyed were asked regarding management of lipid issues, 93% (n=49) stated they would be happy to receive advice from a dietician regarding management of dyslipidaemia. When asked regarding the possibility of cholesterol lowering medication being prescribed in the case of raised cholesterol, 58% (n=31) of parents surveyed expressed concerns such as lack of information, dietary preference and long-term medication effects (Table 1).

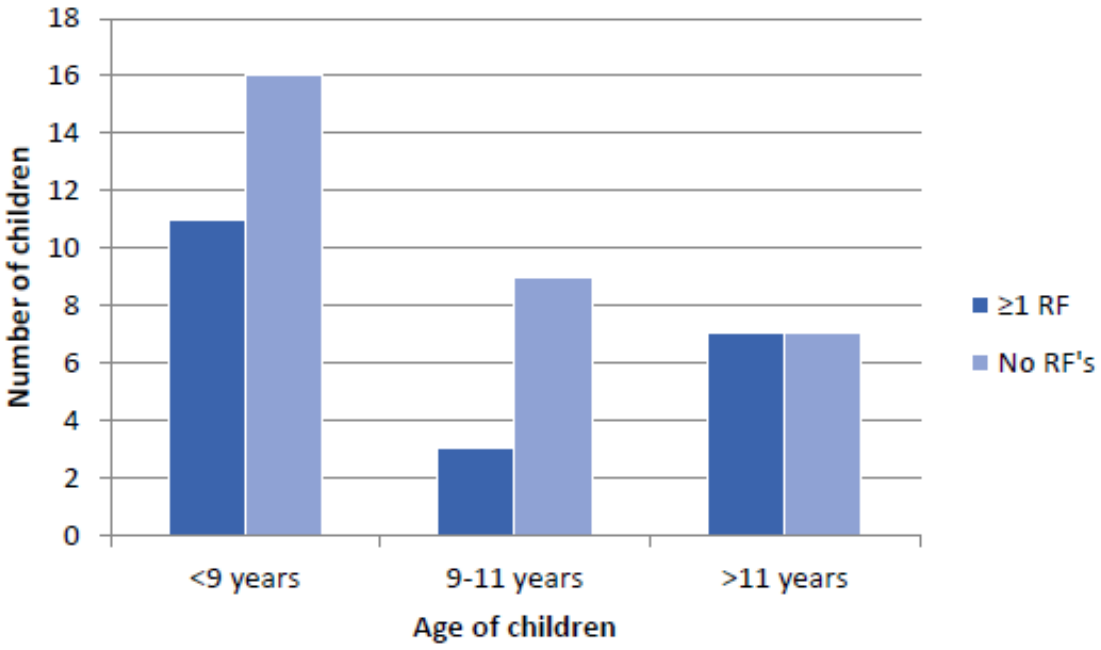

Figure 1. Number of risk factors of included patients grouped by age.

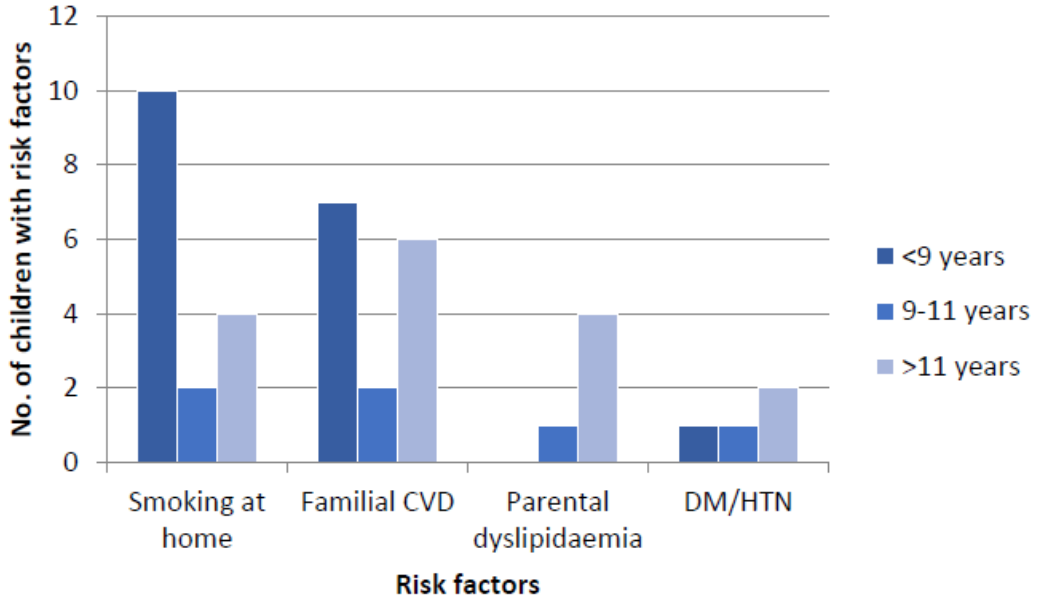

Figure 2. A breakdown of the risk factors identified in patients in each age range.

No. Parents	*Primary Concern listed by parent*
17% (n=9)	Lack of information about statins
11% (n=6)	Prefer to exhaust dietary measures
9% (n=5)	Concerns about long term effects of statin medications being prescribed to their children
4% (n=2)	Only agreeable to statins as a last option
17% (n=9)	No reason given

Table 1. Concerns from parents in relation to treating their child with a statin.

Discussion

Lipid disorders in the paediatric population are often missed [9 10], with previous research on selected screening demonstrates that as many as half of children with genetic and acquired cholesterol disorders are missed in the absence of routine screening [6 11]. NHLBI recommendations are aimed at providing screening to the whole paediatric population and this has not been previously studied or examined for feasibility. Our results showed that within this group 40% of children had at least one cardiovascular risk factor. This 40% met the criteria for targeted screening, and this increased to 53% when the 2011 NLHBI guidelines were applied. Additionally, further restriction to those aged 9 years and over where full population screening is advocated in the 2011 guidelines, resulted in 100% meeting the criteria for screening with only 38% meeting criteria on the basis of targeted screening. Thus, although a significant proportion of those surveyed have CVD risk factors, a large number of those surveyed would not be screened on the basis of targeted screening but would be included for screening based on the NLHBI guidelines.

Prior to the 2011 NLHBI guidelines, groups such as the American Academy of Paediatrics had guidelines which recommended screening with a fasting lipid profile for all children between 2 and 10 years old with an identified positive family history or patient risk factors [12]. However, in order for this type of selective screening program to work, the patients that meet screening criteria needed to be properly identified and there are no set standards for assessment of family histories, accurate blood pressure measurement and interpretation, and thus risk factor identification is in itself a difficult process to undertake. In addition, in order for any selective screening program to work, the screening criteria needs to be sensitive enough to detect affected patients. Unfortunately, for paediatric dyslipidaemias, significant evidence exists to indicate that using family history of premature CVD or cholesterol disorders as the primary factor in determining lipid screening for children misses between 30% to 60% of children with dyslipidaemias, and accurate and reliable measures of family history are not available [11].

Although universal screening of all children aged 9-11 years is the current recommendation in the American guidelines, there are no plans currently to introduce this screening in Ireland. There are cost implications for any screening policy. Additionally, the logistics of providing follow-up care and the uncertainty about the use of statins in children are concerns which would have to be dealt with. Given the high prevalence of CVD in adults in Ireland, there is a rationale for further and larger studies in populations of Irish children, but, notwithstanding, clinicians should consider screening and counselling for CVD risk factors in individual children who are known to have one or more CVD risk factor, albeit with the inherent limitations of risk factor screening as previously addressed.

In our study population, 98% of the study population had no issue with lipid testing being carried out, although a proportion (19%) expressed concern that lipid analysis would require additional phlebotomy. 93% of those surveyed were willing to receive advice from a dietician regarding management of dyslipidaemia, however, over half (58%) expressed concerns at the use of medications to treat dyslipidaemia. Professional advice regarding dietary modification and introduction of exercise are the key initial elements of tackling paediatric dyslipidaemias with family-based therapy recommended in order to achieve best results [8]. It is encouraging that only 3/53 patients would object to a dietician consultation to initiate management of dyslipidaemia.

To our knowledge, this is the first study of its kind in Ireland and its results are important in interpreting Irish cholesterol screening practices and parental attitudes, in an international context. The study, however, is not without limitations. The sample size used was small; 66 patients with 53 questionnaires returned. We also evaluated only paediatric hospital in-patients, who are by definition currently of poor health. The responses within the questionnaire were self-reported and thus subject to recall bias. Although the questionnaire contained a section for height and weight, the reporting of these in the questionnaires was so low (<50%) that BMI could not be calculated. The study was questionnaire-based, and thus although parental concerns to screening were examined, a more comprehensive qualitative study would be required to fully appreciate parental expectations and concerns within this area. However, despite these limitations this study gives valuable insight into the potential and drawbacks associated with adoption of universal screening within an Irish context.

Overall, dyslipidaemias are common and increasing within the paediatric setting and are frequently missed with selective screening, while the identification of CVD risk factors in children can be challenging and can be missed. The results from this study show that the use of targeted screening would miss a significant proportion that would be included on the basis of universal screening. Further studies are required to evaluate if routine or indeed targeted cholesterol screening may be appropriate to apply to the Irish child population.

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None.

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Association Between Clinical Frailty Scale Score and Length of Stay in a Complex Discharge Unit

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Abstract

Introduction

Older frail individuals are at risk of prolonged hospital stays which can lead to negative health outcomes. Evidence suggests that frailty, measured with the clinical frailty scale (CFS), is associated with longer acute hospital stay. Recently, St. James's Hospital Dublin, opened a sub-acute complex discharge unit (CDU) which aims to reduce length of hospital stay in older individuals by providing optimal inter-disciplinary team discharge planning. The aim of this study was to investigate if frailty was associated with length stay in the CDU.

Methods

Grip strength timed up and go (TUAG) and CFS rating were recorded for 104 participants admitted to the CDU over a 6-month period. Reason for hospital admission, length of stay (LOS) and discharge destination were also recorded.

Results

There was a significant positive correlation between TUAG and LOS ($r = 0.22$ $p < 0.04$) and CFS and LOS ($r = 0.29$, $p < 0.004$) while regression analysis of the data revealed that only CFS was a significant predictor of LOS ($r = 0.44$, $p < 0.05$).

Discussion

Higher CFS score is associated with longer LOS in the CDU. Therefore, the CFS may be a simple tool for identifying patients at risk of prolonged length of stay.

Introduction

People over the age of 65 represent approximately 13% of the population of Ireland and it is predicted that the number of people living in Ireland over the age of 65 will increase by 59% by 2031 [1]. In addition, this population accounts for approximately 45% of acute hospital admissions in Ireland [1]. Recent evidence has shown that in older individuals, prolonged length of hospital stay is associated with an increased risk of infection and mortality during hospital admission and is associated with deconditioning, cognitive impairment, decreased functional independence and reduced mobility[2-4]. Therefore, the ability to predict length of stay and to identify factors that may influence length of hospital stay is becoming increasingly important. It has relevance to both the individual patient in terms of planning care and enhancing quality of life and to the acute hospital setting in terms of providing, resourcing and developing an effective and safe service[5].

Among older individuals, the frail person is at particular risk of hospitalisation and is predisposed to adverse events and complications during hospitalisation. Frailty has been defined as a significant decline in physiological reserve capacity across several of the body's organ systems resulting in an increased vulnerability to stressors [6]. Attempts have been made to objectively measure and stratify frailty in both clinical and research cohorts. For instance, the frailty index aims to provide a definition of frailty through counting various clinical deficits while other clinical research groups have suggested using a specific phenotype with which to define the frail individual[7]. While both options have their merits and assess for the reduction in physiological reserve associated with frailty, neither of these tools account for the stressor that the frail individual may become vulnerable to. On the other hand, the clinical frailty scale stratifies the individual into a level of vulnerability based on a comprehensive assessment and the use of simple clinical descriptors[8]. In addition, the CFS has been shown to predict length of stay and discharge destination in older individuals admitted to the acute medical setting[9,10].

Recently, St James's Hospital Dublin, developed the 23-bed complex discharge unit (CDU) which aims to reduce the length of hospital stay of frail and older individuals, by providing optimal discharge planning, through inter-disciplinary team input. Individuals admitted to the CDU are transferred from the acute setting when their acute medical needs have resolved, and they are requiring additional therapy or intense discharge planning. The medical governance of patients is overseen by a medical registrar and a supervising consultant physician. The MDT present on the CDU comprises of a full-time physiotherapist and social work and part-time occupational therapist, speech and language therapist and clinical nutritionist. Admission criteria to the unit include but are not limited to, patients of any age, patients who are medically stable and nearing discharge but require further goal orientated input from the MDT, patients who have a Home Care Package approval pending and/or are awaiting funding/a service provider.

It is of interest to examine whether factors such as physical function and frailty adversely affect length of stay in this patient cohort. Therefore, the aims of this study were to establish a physical profile of patients admitted to the CDU and to examine whether frailty, assessed using the clinical frailty scale, was associated with length of stay in the CDU.

Methods

All patients admitted to the CDU over a 6-month period were invited to participate in the study. Patients who were not able to provide informed consent were excluded. Ethical approval for this study was granted by the St. James's Hospital/ Tallaght University Hospital research ethics committee.

Within 24 hours of admission to the CDU participants were assessed and the following measurements were completed: grip strength, timed up and go (TUAG) and clinical frailty scale (CFS) rating. In addition, the following information was recorded during the participant's admission to the CDU: Age, gender, reason for hospital admission, mobility status on admission to the CDU, discharge destination and length of hospital stay.

The timed up and go test is a simple mobility test that is commonly used in in-patient and out-patient settings to assess an individual's risk of falls [11]. Participants were asked to stand from a seated position in a standard ward chair with armrests, walk 3 metres at their usual walking pace to a marker in the floor turn around, walk back to the chair, and sit down again. Timing of the test began from the command "Go" and was stopped when the participant had returned to a seating position. Participants were permitted to use a mobility aid if required.

Grip strength was measured using a digital Smedley Spring handheld dynamometer (Fabrication Enterprises Inc, White Plains, NY, USA). Measurements were taken in the seated position with the arm being assessed supported by the armrest of the chair while the participant was instructed to keep their shoulder by their side and their elbow flexed at 90 degrees. The participant was asked to squeeze the dynamometer as hard as they could for 3 seconds and the maximal force produced was recorded. The test was repeated three times with a 10s rest between each squeeze and the mean of the three measurements was taken as the participant's grip strength. There is evidence to suggest that grip strength, as measured with a handheld dynamometer, is a good proxy for global body strength[12]. Furthermore, it has been shown that reduced grip strength is associated with an increased risk of mortality, cognitive decline and an increased risk of fractures [12, 13].

The Clinical Frailty Scale (CFS) was developed to provide clinicians with an easily applicable clinical tool to stratify elderly adults according to level of vulnerability. The CFS was validated in a sample of 2305 older individuals from the Canadian Study of Health and Aging and has been shown to be a strong predictor of institutionalization and mortality[8,14].

Statistical analysis was performed using SigmaPlot 12.0 (Systat Software, San Jose, CA). Normality of the data was assessed using the Shapiro-Wilk test. Correlations between independent variables were assessed using the non-parametric Spearman-rank correlation coefficient. A logarithmic transformation of LOS (log LOS) produced a normal distribution of the LOS data. The logLOS values were then used as the dependent variable in a multiple regression analysis using CFS, TUAG and grip strength scores as the independent variables. Statistical significance was set at $p < 0.05$. Data are displayed as mean (standard deviation (SD)) unless otherwise stated.

Results

Participant characteristics

One hundred and thirty-one patients were admitted to the CDU of which 104 consented to participate in the study. The main reasons for exclusion from the study included the inability to give informed consent and declining to participate. Participants' characteristics and physical measurements are displayed in Table 1. The mean age of participants was 79.9 ± 10.0 years and 64% of participants included in the study were female. Mean length of stay in the CDU was 22.3 ± 21.8 days but length of stay ranged from 1-116 days (median: 14 days). The majority of the admissions to hospital were due to falls (25%) with other reasons for admission including general decline, respiratory symptoms, cardiac problems and confusion/acute delirium (see Table 2). On admission to the CDU 35% of participants mobilised independently while 65% required some degree of supervision or assistance to mobilise safely. Forty percent of patients admitted to the unit were classed as non-frail or mildly frail whereas 47% were classed as moderately frail and 13% as severely frail.

Table 1. Participant Characteristics.

Age (years)	79.9 (10.0)
Gender (male/female)	37/67
Length of stay (days)	22.3 (21.8)
Timed up and go (s)	29.2 (20.9)
Grip Strength (kg)	15.0 (7.4)
Clinical Frailty Scale rating (a.u.)	4.8 (1.7)

Data are mean (SD). s, second; kg, kilogramme; a.u., arbitrary units

Table 2. Reason for hospital admission.

	n
Fall	26
Stroke/TIA	3
Respiratory symptoms (SOB, LRTI, Cough, wheeze, IECOPD)	16
Confusion/Acute Delirium	13
General Decline	4
Cellulitis/ lower limb ulcers	8
Cardiac Symptoms	8
Other (pain, anaemia, further investigations, day procedure, urosepsis, bowel obstruction, seizures, worsening neurological symptoms)	25

TIA, transient ischaemic attack; SOB, shortness of breath; LRTI, lower respiratory tract infection; IECOPD, infective exacerbation of chronic obstructive pulmonary disease. The above data is based on 103 participants as admission. Data for one participant was unavailable.

Discharge destination

Seventy-six participants were discharged directly home from the CDU with or without support from the community and 9 patients were discharged to a long-term care setting. Nine patients were discharged to convalescence/step down unit from the CDU. At the time of writing, 3 patients were still in-patients in the CDU, 3 patients had been transferred back to the acute hospital setting, 3 patients had not yet confirmed their discharge destination and 1 patient had passed away.

Correlations

There were significant positive correlations between TUAG and length of stay ($r = 0.22$ $p < 0.04$) and CFS and length of stay ($r = 0.29$ $p < 0.004$, Figure 1). There was a positive correlation between CFS rating and age ($r = 0.34$ $p < 0.001$) and TUAG score ($r = 0.69$ $p < 0.001$) and a negative correlation between CFS rating and grip strength ($r = -0.27$ $p < 0.02$). A multiple linear regression analysis, where logLOS was the dependent variable and grip strength, TUAG, CFS and age were the independent variables showed that CFS rating was the only significant predictor for logLOS ($r = 0.44$ $p < 0.05$). A subgroup analysis was performed on the data of patients who were discharged home from the CDU (n=76). There was a significant positive correlation between TUAG and length of stay ($r = 0.31$ $p = 0.01$) and CFS and length of stay ($r = 0.36$ $p < 0.002$) observed in this subgroup.

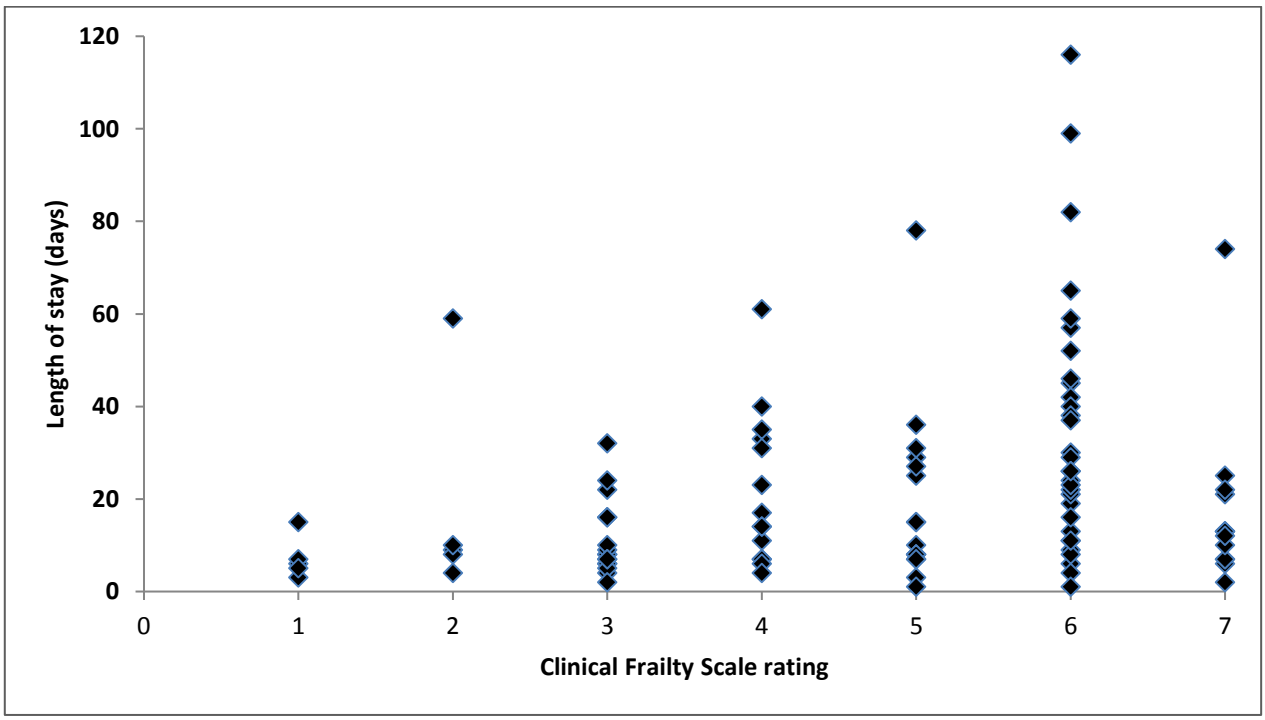

Figure 1. Significant positive correlation between clinical frailty scale rating and sub-acute length of stay ($r = 0.29$ $p < 0.004$).

Discussion

The primary findings of the current study were that CFS rating is a predictor of length of stay in this patient sample while increased TUAG and CFS scores were significantly correlated with increased length of stay in the CDU.

Our results are in agreement with previous studies which have suggested that frailty can predict length of stay in several specific patient populations such as post-surgical[15], subacute medical[16] and patients with acute coronary syndrome[17]. However, it is important to note that these studies have used a variety of frailty scales including the CFS. Recently, a large study including more than 2,000 patients explored the predictive ability of the CFS in patients admitted to an older person's unit for acute medical issues such as delirium, deconditioning, and functional impairment[10]. Frailty was found to predict in-hospital mortality, length of stay and likelihood of discharge to long term nursing home care[10]. In a smaller cohort study CFS rating predicted length of stay in 75 older individuals admitted to an acute medical unit[9]. Furthermore, it was found that the mean length of stay was 8.5 days longer in the those classified as severely frail compared to those classified as non-frail while those classified as moderately frail had a length of stay that was on average 7.1 days longer than that of non-frail patients (Severely frail: 12.6 ± 12.7 days Moderately frail 11.2 ± 10.8 days vs non-frail 4.1 ± 2.1 days)[9]. A similar trend was identified in the current study as those who were non frail had a markedly lower length of stay compared to moderately-frail individuals (Severely frail: 17.3 ± 18.3 days vs Moderately frail 27.0 ± 25.9 days vs non-frail 14.6 ± 14.3 days). Interestingly, severely frail patients had a markedly shorter length of stay than moderately frail individuals. An explanation for this may be that more severely frail patients were admitted from nursing homes and were likely discharged back to their care homes therefore, their discharge planning was at a more advanced stage than the moderately frail patients who may have been awaiting a decision regarding discharge destination or funding for increased home supports. This difference in length of stay between different classifications of frailty is both clinically and economically significant given the increased risk of in hospital deconditioning and physical inactivity as well as the associated significant financial cost of extra days of hospital admission.

The pathway into the CDU is for those patients who require an additional period of MDT input and discharge planning but are medically fit for discharge. This pathway alleviates pressure on the medical beds by transferring patients who don't require significant medical input. Similarly, the CDU reduces the number of patients waiting for intensive rehabilitation beds by identifying those who need only a short period of input from the relevant MDT members. Ultimately, if the correct patients are transferred to the CDU there should be a subsequent improvement in patient flow through the acute hospital setting. Future studies completed on the CDU will aim to validate the pathway to the CDU by examining its impact on overall length of stay in the acute hospital stay. Furthermore, other service indicators such as readmission rate and early identification of potential patients for the CDU in the emergency department and acute medical assessment unit will be investigated.

There are several limitations to the current study. Firstly, we had a relatively small sample size of patients which may reduce the power of the statistical tests used. Secondly, the researcher rating each individual on the CFS was not blinded from the individual's demographic characteristics, co-morbidities, medications or functional status. Thirdly, patients who were not able to give informed consent were excluded from the study which resulted in the exclusion of patients with moderate and severe cognitive impairment. This is a limitation as cognitive impairment is a key contributor to frailty.

In conclusion, CFS score was a predictor of LOS in this sample cohort. In addition, both CFS score and TUAG time were positively correlated with LOS in the CDU. Both the CFS and TUAG are simple, time efficient measures that require little equipment to administer. Therefore, both instruments are useful clinical tools that could potentially identify older individuals who may be more likely to experience a prolonged stay in the CDU.

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

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The Boomerang Study: Increased Hospital Re-admission via the Emergency Department

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Abstract

Aims

This research was performed to assess if a reduced length of hospital stay was associated with increased re-attendances to, and re-admissions from, the Emergency Department (ED).

Methods

Inpatient discharge and ED attendance records over a ten-year period were sampled and collated. Independent sample t-tests and regression were used to assess changes.

Results

The analyses found a statistically significant decrease in inpatient hospital length of stay (7.34 to 6.69 days) and a significant increase in ED re-attendance for recently discharged inpatients from 8.88% (539/6065) to 10.98% (687/6255). However, the overall percentage of inpatients returning to a hospital bed within 30 days of discharge did not change significantly from 12.30% (746/6065) to 12.65% (791/6255).

Conclusion

Results confirm that an increasing percentage of recently discharged inpatients are attending the ED. This finding does not support the hypothesis that increased ED re-attendance of recently discharged inpatients is due to reduced hospital stay because the overall re-admission rate for recently discharged inpatients did not increase. Instead, further analysis revealed a significant change in the re-entry route as the increase in ED attendances is mirrored by a decrease in hospital re-admission via other routes (e.g. outpatient clinics). This change has increased the workload of an already overcrowded ED.

Introduction

Hospital, and specifically Emergency Department (ED), overcrowding has been an ongoing problem in Ireland since it was declared a national emergency in 2006[1]. There has been discussion as to whether or not increased acute hospital bed numbers are required or if it is just a question of using the hospital beds we have more efficiently. Decreasing the number of days that patients spend in a hospital bed increases the number of bed days available for other patients to use the same clinical space. Reduction in hospital length of stay is regarded as a marker of increased efficiency in the delivery of care[2]. This collaborative research was performed to examine a potential association between a reduction in length of hospital stay for inpatients in an academic teaching hospital and the number of re-attendances of recently discharged patients to the ED. The research was initiated on foot of the impression that the Emergency Medicine team had that the ED was getting busier as a result of increasing attendances by patients who had recently been discharged from the hospital. The working hypothesis was that reduced length of in hospital stay was associated with increased re-attendances to the ED.

A number of studies have examined reduction in average length of stay (ALOS) of patients in hospital wards[2–7]. McDermott and Stock concluded that lower levels of ALOS typically indicates better operational performance, but they also recognized that the link between quality of care and ALOS is less straightforward as it could lead to premature hospital discharges[2]. Capkun, Messner and Rissbacher[3] specifically examined the link between service specialisation and operational performance in hospitals, using reduced ALOS as a proxy for improved operational performance, highlighting the perceived industry position that reduced ALOS is a desirable efficiency target.

While ALOS reduction has been generally regarded as an operational improvement in hospitals, a number of recent studies have begun to examine its broader implications. As noted by Andritsos and Tang[5], early discharge may be interpreted as a sign of efficiency if seen in isolation, this can be misleading if a complication-induced re-admission follows, which in turn may lead to tension in the discharge process[8]. One approach is to consider total length of stay (LOS)[5], whereby additional unplanned re-admission LOS is added to the original LOS if re-admission occurs within thirty days after initial hospitalisation; this accounts for the effect of a hospital's discharge policies and the effectiveness of its provided care. It has been noted that re-admissions are expensive and often unnecessary; indeed, re-admissions are typically more expensive than the original visit[9]. McAlister et al. in Alberta, Canada, tested whether improving efficiency of hospital care (e.g. reduced LOS) would worsen post-discharge outcomes[10]. The findings of their study were consistent with the previous research of Kaboli et al.[6], which found that reduced LOS did not lead to an increase in 30-day mortality or re-admissions.

The study presented here was performed to see if the pressure to discharge patients is resulting in increased re-attendance to EDs and re-admission to hospital for those patients discharged following a hospital admission of longer than 24 hours in the preceding thirty days. This research also examined if the increasing average patient age impacted on re-attendance and re-admission. The research was carried out in the context of a sustained effort to reduce average length of stay in the hospital.

Methods

Ethics approval was obtained from the hospital Research Ethics Committee. The hospital in which the research took place has over 680 beds and provides service to approximately 50,000 patient attendances to the ED each year (see ten-year trend in Figure 1). This retrospective study was performed by a team with expertise in process management and data analytics from Dublin City University, Athlone Institute of Technology and the hospital management information services and information technology department and the clinical research team in the ED of Beaumont Hospital, Dublin, Ireland.

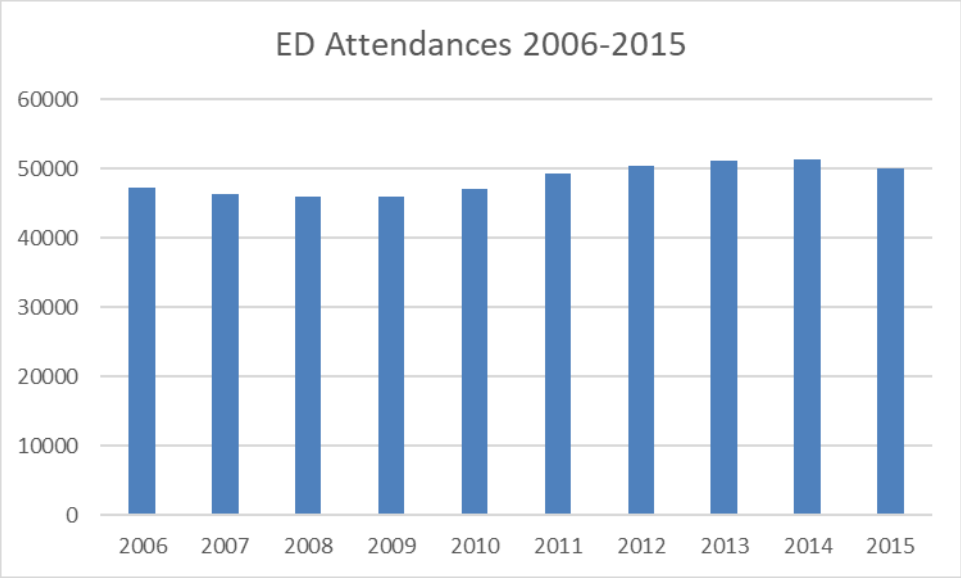

Figure 1: Total Annual ED attendances at the hospital from 2006 to 2015.

The following definitions, in line with those used in other studies[9], were used to inform the study design:

Re-attendance to the hospital is defined as an unscheduled return to the Hospital within 30 days of discharge following an inpatient admission of greater than 24 hours and less than 30 days.

Re-attendance to the ED is defined as unscheduled re-attendance to the ED within 30 days of discharge following an inpatient admission of greater than 24 hours and less than 30 days.

Re-admission is defined as unscheduled re-admission to hospital for inpatient care following a return within 30 days of having been discharged following inpatient admission for in excess of 24 hours.

To avoid missing a seasonal impact, data was gathered relating to ED attendances from one month each quarter (February, May, August and November) over ten years from the Accident & Emergency Oracle Database and the Hospital In-patient Enquiry database. The A&E Oracle database is the ED information system developed in house in the hospital where the research took place. It has been in use for over twenty years. Hospital In-Patient Enquiry (HIPE) data is gathered from the in patient data from the hospital information system. The data was entered into the Diver Solution which is a bespoke software programme which allows merging of data across different databases.

Data was gathered on the age of patients, length of stay in hospital and patients attending the ED within 30 days of hospital discharge following an inpatient admission. Statistical analysis was performed using SPSS. Regression analysis was carried out to measure trends over the 10 years from 2006 through 2015 with time period as the independent variable. Independent sample t-tests were carried out to compare the values of variables at the beginning and end of the timeframe.

Results

The initial anonymised dataset yielded 75,288 records. Patients with a length of stay of zero days (2708 patients) for whom admission overnight was not required and as such their care was likely day case or ED delivered were excluded from the analysis. Patients with a length of stay of over 30 days (4200 patients) were regarded as likely to be experiencing delayed discharge as a result of requiring nursing home or rehabilitative care or increased home support and were also excluded. Acute Medical Unit patients (1776 records) who were frequently discharged with a view to further follow up were also excluded. Patients under the age of 18 (3079 records) were excluded as Beaumont Hospital offers limited provision of specialist paediatric and adolescent care. After applying this exclusion criteria, 63,525 patient records were retained for the study.

Both the regression analysis and independent sample t-tests showed that the average age of patients increased significantly from 55.07 to 57.49 years. Over the same period, average length of stay in the hospital showed a statistically significant reduction from 7.34 days to 6.69 days. Re-attendance rate at the ED of patients within 30 days of discharge for the years 2006 and 2015 also saw a statistically significant increase from 8.89% to 10.98%. However, the re-admission rate back into the main hospital within 30 days of discharge showed no significant change increasing marginally from 12.30% to 12.65%. Regression analyses were rerun controlling for age, with all results holding. The results of the Independent T-test are presented in Table 1.

Table 1: Independent t-test results.

	2006	**2015**	**t**	**p**
Mean Age	55.07 years (95% CI: 54.59-55.55)	57.49 years (95% CI: 57.02-57.96)	7.07	<0.001
Mean Length of Stay	7.34 days (95% CI: 7.18-7.50)	6.69 days (95% CI: 6.53-6.85)	5.6	<0.001
Re-attendance Rate	8.88% (539/6065)	10.98% (687/6255)	3.89	<0.001
Re-admission rate	12.30% (746/6065)	12.65% (791/6255)	0.58	0.27

Initial exploration did show a moderate negative correlation between the changes in LOS and ED re-attendance; however, further analysis was carried out to understand the context of the increase in ED re-attendance. Patients who either re-attended the ED or were re-admitted to the main hospital within 30 days were recorded as a composite inpatient return rate and were found to represent approximately 16% of all inpatient discharges. Two cohorts of re-admitted patients were examined: those who returned via the ED (labelled 'A') and those who returned via other routes (e.g. outpatient and consultant clinics) (labelled 'B'). Patients who re-attended the ED and were then discharged home without admission were also noted (labelled 'C').

A structural change in the way discharged inpatients are re-admitted to hospital was evident (as illustrated in Figure 2): the percentage of patients entering via other routes (B) has fallen by almost 2 percentage points (from approximately 7% to 5%), while re-admissions through the ED (A) have increased by a similar amount. Note that the percentage of patients re-attending with an ED discharge (C) and the percentage of patients being re-admitted (A+B) have remained relatively static over the 10-year period.

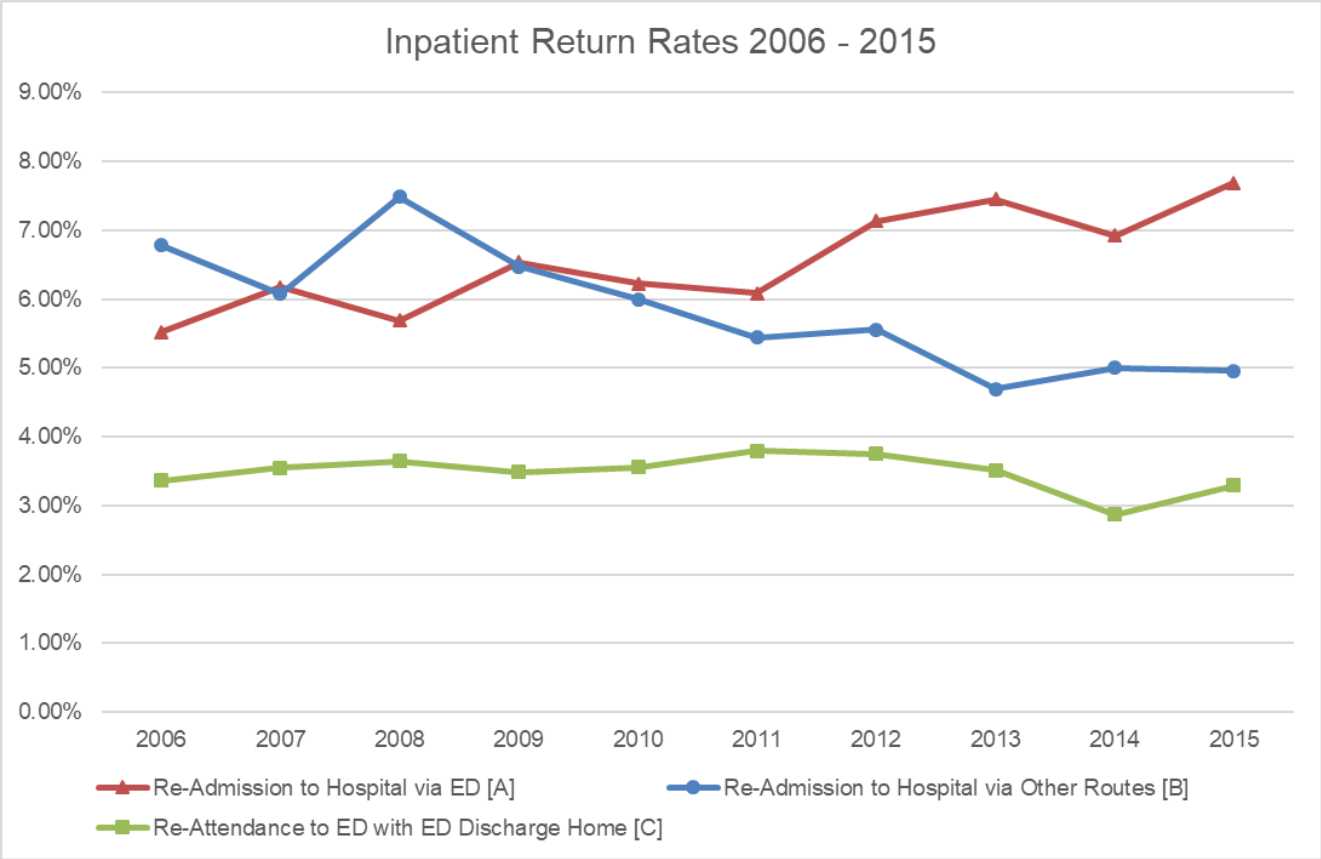

Figure 2: Graphical illustration of change in inpatient return to the hospital.

Trends in percentage of re-admissions via ED for four age related categories of patient (18-30, 31-50, 50-69, and 70+) were examined in the ten-year regression analysis. Interestingly, for patients in the two younger age categories the percentage of re-admissions via ED had increased but not significantly over the period (B=0.003, t=1.61, NS for the 18-30 year olds and B=0.002, t=1.25, NS for the 31-50 year olds), while for the older patients there was a statistically significant increase (B=0.371, t=5.73, $p<0.001$ for the 51-70 year olds and B=0.552, t=6.16, $p<0.001$ for the >70 year olds).

Figure 3 presents re-admission rates by age and by pathway for the base years 2006 and 2015. The results show that over the course of the ten-year period, ED has gone from the less likely, to the more likely, return route to hospital for patients of all ages but the change is more pronounced for those over fifty years of age (from 44.5% to 64.8% of re-admissions being via ED). This is substantial finding given that 69% (unchanged from 2006 to 2015) of re-admitted patients are over 50 years old.

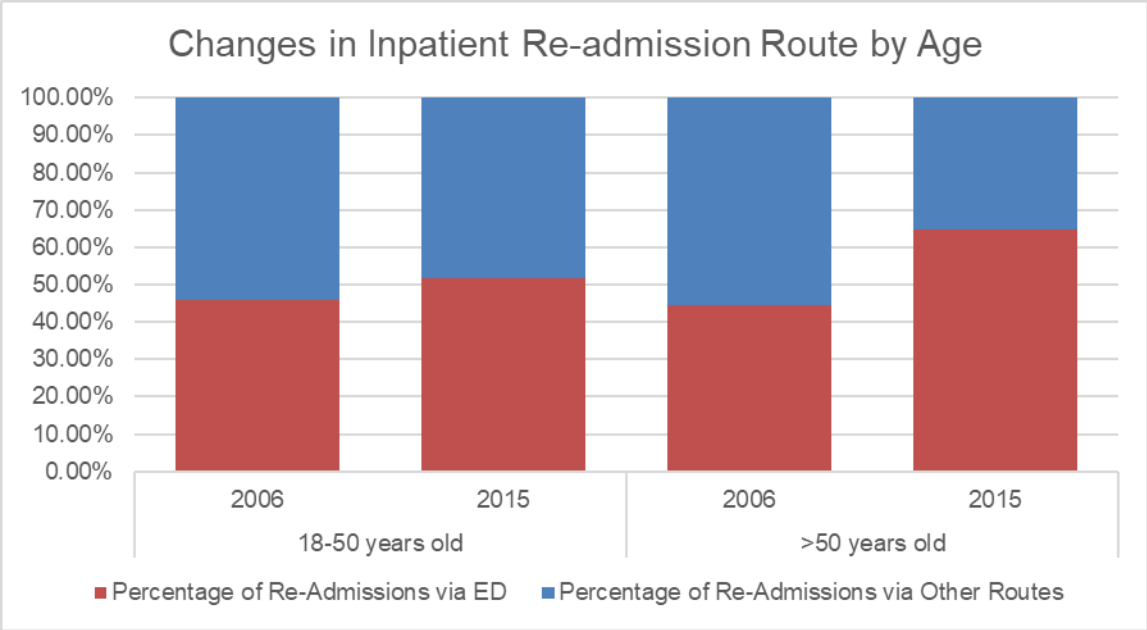

Figure 3: Percentage of re-admissions via ED and via other routes for patients under and over 50 years old.

Discussion

Our research has shown that total re-admissions to the same hospital have essentially remained unchanged despite decreasing inpatient length of stay. The total patient population who re-engaged with the hospital through re-attendance and/or re-admission has remained remarkably constant with a consistent annualised return rate of approximately 16%, with 12.5% being re-admitted to a hospital bed and the remaining 3.5% being cared for and returned home directly from the ED. These metrics are in line with international findings. The re-admission rate of 12.65% for 2015 compares well with 17% of Medicare patients in the US re-admitted to a hospital bed within 30 days of initial discharge[9].

However, the results do demonstrate a modal shift in the way inpatients return to hospital: the rate of patients returning via the ED has increased while the rate of patients returning via other routes has decreased. It was also found that age has an impact on the return route: the older the patient the more likely that the patient will return to the hospital via the ED rather than via alternate routes. Given that older patients form the majority of re-admissions via the ED, and that the general population is known to be aging[11], the implications of this change are substantial. Limitations of our study include that our findings are based on a sampling policy of selecting patient records for one month per quarter but, as the sampling catered for seasonality and is over a ten-year period, it is believed that it is not detrimental to the outcomes. It is recognised that the single site nature of the study may be a limitation as the identified changes in patient flow may well be nation, or even hospital, specific.

It is inevitable that some patients will return following hospital admission and discharge. The data analysis presented here has shown that an increasing percentage of those inpatients re-admit via the ED within thirty days of hospital discharge thus making a busy ED even busier. The reasons behind this change in re-admission route are not yet clear and will require further and broader investigation into the healthcare supports available to discharged patients. However, the fact that overall re-admission rates have remained remarkably consistent, even despite a reduction in hospital length of stay, suggests that they can be planned for and should be monitored. Given the national crisis in ED overcrowding, the apparent expectation that the ED can increasingly act as an admissions lounge for returning inpatients needs to be considered in detail. This re-admission pathway change has the potential to make EDs even busier and more crowded, thus detrimentally impacting the healthcare experience of all ED attendees, and should be explicitly addressed.

Declaration of Conflicts of Interest:
No conflicts of interest to disclose.

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Child and Adolescent Mental Health Service: Extension for Community Health Care Options [CAMHS ECHO]

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Abstract

Aims

To explore the feasibility and identify the perceived barriers and enablers of developing an ECHO programme for CAMHs in Ireland.

Methods

The study adopted a qualitative research design incorporating a CAMHS:ECHO seminar and workshops with (N=29) healthcare professionals working in primary care/ mental health services. Participant consent was received, and thematic analysis conducted on rapporteur notes.

Results

Clinicians reported a high-level of interest in the project. Perceived opportunities included potential reduction in CAMHS waiting lists, opportunity for shared care of ADHD, improved time management, clinical skills, and access to advice on referrals. Perceived challenges included the issue of clinical governance, increased GP workload and the issue of incentives.

Conclusion

Barriers to successful rollout of an ECHO model in CAMHS were outweighed by perceived benefits and enablers identified by participants. Given the increased use and acceptability of telepsychiatry during COVID-19, coupled with the positive support offered by attendees, consideration should be given to more formally piloting CAMHS:ECHO.

Introduction

It is accepted that Child and Adolescent Mental Health Services [CAMHS] in Ireland are currently fragmented, over stretched, and under resourced with staffing levels well below recommended levels[1]. Currently, there are approximately 2,700 children on CAHMS waiting lists, with 14% of these referrals waiting longer than 12 months [1, 2, 3]. With the current operational models of CAMHS overwhelmed by demand, exploration of workable innovative models of care by the HSE is long overdue. It is proposed that CAMHS:ECHO Ireland will enhance available expertise at a community level by providing virtual clinical consultations to GPs by multidisciplinary experts in the field.

The *Extension for Community Health Care Outcomes* [ECHO] was originally developed in New Mexico (United States) to address a lack of access to clinical services for those with Hepatitis C living long distances from centres of care[4]. As such, the ECHO model was developed to improve access to care for persons with complex health needs that were being underserved with the aim of democratising knowledge from specialist medical hubs out into the community[5]. As time progressed the ECHO model has been extended to address a growing awareness of a shortage of specialists, long waiting lists and problems around patients having to travel long distances for care/treatment[,6, 7, 8]. Initially designed for management of medical illnesses, ECHO has subsequently been successfully extended to include neurodevelopmental and mental health (MH) disorders[4]. This model is seen as an affordable healthcare intervention for rural communities where certain chronic diseases have reached epidemic levels and healthcare resources are scarce[4,6]. Moreover, such service inequalities are compounded further by long waiting lists, a scarcity of out-of-hours services, and a deficiency in the number of youth services that are led by specialists in child and adolescent psychiatry[1,3]. To date, the ECHO model has exclusively been used in Ireland to advance specialist knowledge and services for chronic physical illness. Such as palliative care [9], Hepatitis C[10], and heart failure[11]. This paper proposes that CAMHS:ECHO Ireland will allow for the connection between mental health experts, GPs and community health representatives over a telehealth network. Given the expected increase in demand post COVID-19, increased access for GPs to specialist advice and services is welcome.

Using freely available multi-point video technology platform (e.g. ZOOM) to deliver 24 one-hour telemedicine clinics facilitated by expert clinicians, CAMHS:ECHO will be the first program of its kind to provide specialist child and adolescent MH training and supports to GP's in the community. Each session allows up to 100 GPs to sign into a virtual didactic teaching environment and share learnings from case studies provided. Sessions are led by a range of clinical experts. Proposed topics include anxiety, depression, ADHD, eating disorders, neurodevelopmental delays, trauma, medication management and other paediatric mental health issues requested by attendees.

Before developing the programme, stakeholder engagement was identified as essential to informing awareness as to key barriers and enablers of an effective ECHO model for GPs. This study aimed to gather such insights by hosting a CAMHS:ECHO workshop for key stakeholders.

Methods

This exploratory study adopted a qualitative research design incorporating a participant workshop with healthcare professionals working in primary care and MH services (N=29).

Purposive sampling was used to identify Consultant Child and Adolescent Psychiatrists, GP's and Primary Health Care professionals (clinical psychologists, primary care nurses) working within the catchment area for the Lucena Clinic, St John of God Child and Adolescent Mental Health Services (South County Dublin & County Wicklow). The participants selected to take part were potential users of the pilot program and had expertise regarding the management of child and adolescent mental health in primary care in their catchment area. This gave them a unique insight into the potential barriers and enablers of a proposed model CAMHS:ECHO. Participants were invited to attend a workshop that consisted of a series of presentations by The Oregon ECHO Network: *Delivery and Evaluation of the ECHO Model for Child and Adolescent MH*; The Heartbeat Trust: *Ireland's Heart Failure Virtual Clinic*; and University College Dublin's Department of Child and Adolescent Psychiatry: *Piloting CAMHS:ECHO.* Following workshop presentations attendees were split into five groups of 5/6 clinicians. Following a literature review on previous ECHO model development, group facilitators presented participants with a schedule of discussion points to explore potential barriers and enablers, opportunities and challenges associated with CAMHS:ECHO[12, 13,14,15].

Rapporteurs recorded participant insights during the workshops (handwritten notes) and transcripts were analysed using QDA Miner Lite, a qualitative analysis softwear tool. Thematic analysis was selected due to its flexibility and established validity in qualitative studies of this sort[16]. This included data familiarisation, code development, searching, reviewing, defining, and naming themes. A total of 7 major themes (table 1) and 18 subthemes were identified.

Results

Key themes are presented under the headings 'Opportunities' and 'Challenges' and discussed in turn.

Table 1. Major themes identified following thematic analysis.

Opportunities	Challenges
High level of Interest *Timely Access to CAMHS Experts* *Access & Usability* *Managing Specific Diagnoses*	*Responsibility and Clinical Liability* *Time and Workload* *Incentives.*

Opportunities

High level of Interest: Findings indicated a high level of interest in the CAMHS:ECHO model amongst health care professionals. Participants were encouraged by the successful application of the ECHO model to *Ireland's Heart Failure Virtual Clinic*, which was found to improve accessibility and provide a better service for the treatment of heart failure. The CAMHS:ECHO model was perceived to have potential to reduce wait times for patients and enable GP management of specific diagnoses. Finally, participants indicated that there is a demand and market for the CAMHS:ECHO beyond GP's to other health care professionals, such as supporting nurse practitioners and primary care psychologists.

Timely Access to CAMHS Experts: The inability to provide timely access for families to CAMHS clinicians due to long waiting lists and the impact of wait times on patients emerged as a salient discussion point across all participant groups. Attendees felt that adoption of the ECHO model to upskill GPs to provide more first level psychological support, could preserve time and expertise for children and families with more severe psychopathology. Ensuring appropriate referrals and access to CAMHS was also seen to have positive effects on the wellbeing of staff in otherwise over-stretched services. The potential for CAMHS:ECHO to reduce wait times not only emerged as a key motivating factor for 'buy in' but was foreseen by participants as the most valuable potential outcome associated with scale-up.

Access & Usability: Participants viewed CAMHS:ECHO as easily accessible and user friendly. The idea of simply logging into a virtual teaching platform and in turn saving time and energy that would typically be spent travelling to an educational institution was extremely appealing to attendees. Moreover, the incorporation of administrative/IT staff to do most of the work ahead of time was also cited as a major advantage. Participants felt the model was a practical mechanism for professional development that was also conducive to their busy clinical schedules.

Geographical inequalities in service accessibility across urban and rural locations emerged as prominent discussion points on the day. Attendees described the capacity for CAMHS:ECHOs to upskill and provide sub-specialist advice to practitioners, irrespective of their location, as a 'gamechanger'. Individual accounts of difficulties faced when geographically isolated attested to the benefits accrued by program uptake and development of expertise and competence, which was then seen as a valuable asset to share with other colleague in their area.

Managing Specific Diagnoses: Upskilling clinicians in the shared management of children on psychotropic medication, along with access to clinical supervision of patients with specific diagnoses - specifically children with ADHD - was also identified as a key benefit. Participants felt the model would be effective in the provision of guidance to GPs when faced with cases they felt ill-equipped to deal with. In addition, attendees stated that having access to a forum, such as CAMHS:ECHO, to discuss complex presentations and their legitimacy for referral would be an invaluable resource that could help streamline care pathways and abet waiting lists.

Challenges

Responsibility/ Clinical Liability: The biggest barrier to the model's success was the issue of responsibility and clinical liability. Participants expressed concern about who would be held accountable for negative treatment outcomes - the GP, the CAMHS:ECHO facilitator or both? Some GPs expressed feeling uncomfortable and apprehensive about managing patients with diagnoses they have very little previous experience with, even with the advice and support provided via ECHO. In addition, some attendees worried that participation in the program could put patients at reduced access to CAMHS, thus adding to the burden experienced by GP. These findings reveal the necessity to develop specific guidelines concerning clinical liability and who is responsible for quality assurance prior to CAMHS:ECHOs going live.

Time and Workload: Another challenge identified by participants was the issue of time and workload. Lack of protected clinical slots for educational purposes in general practice was identified as a practical barrier. Some GPs felt they simply do not have the time given their own service demand, or financial constraints.

Accordingly, this issue will need to be worked out between the GP and the CAMHS:ECHO facilitator prior to committing to the program. Finally, in the interest of best practice and quality service provision, participants voiced the necessity for GP workloads to be alleviated as opposed to further inflamed. The implementation of the CAMHS:ECHO model would require significant organisational/operational supports. Participants were concerned whether sufficient time would be allocated by the Health Service Executive to ensure the program viability. Given that GPs are already over-stretched, concern was expressed about whether they would have the time to take on such a large project.

Incentives: Whilst upskilling clinicians is of the utmost importance, attendees reported that GP turnover is high and longstanding issues associated with securing and incentivising practitioner 'buy in' to new and innovative models and continued professional development [CPD] programs remain. Accordingly, participants highlighted the importance of offering equitably incentives to entice GPs and make the added work associated with CPD worth their while.

Discussion

This exploratory study indicates a high level of interest and support from CAMHS Consultants, GPs and primary health care professionals in terms of adopting the ECHO model to improve the provision of mental health care to children and adolescents. All participants acknowledged the financial and resource constraints on CAMHS despite recognition of ongoing demand and referral rates. Participants considered that upskilling GPs could help improve preventive MH care, decrease CAMHS referrals and waiting lists and ultimately improve patient experience. The reduction of CAMHS waiting lists was identified as the key motivator for buy in from the health care professionals. A number of perceived benefits of the model were identified, which included reducing waiting times and the accessibility of the model, assistance with the management of specific diagnoses (i.e. ADHD) in primary care, assistance with the management of referrals and the opportunity for upskilling for GPs and psychiatrists. Several challenges to implementing the model also came to light, including the issue of clinical liability, concerns about GP time and workload and the issue of incentives. Addressing these issues prior to the implementation of an ECHO pilot model as has been the case with similar programmes for other conditions such as heart failure, is a priority. Overall, this research reveals that a range of clinical professionals perceive the opportunities associated with CAMHS:ECHO to far outweigh the challenges, indicating impetus to pilot a regional CAMHS:ECHO program with a view to upscaling it on a national level in the future.

The current COVID-19 pandemic has brought unprecedented challenges for health care delivery. Telepsychiatry has come into its own and anecdotal evidence has shown it has been effective and welcome by both providers and patients. Given the recognition of prolonged adverse psycho-social effects of pandemics, it is likely that the demand placed on both GP and MH services will increase. Using this crisis as a time for opportunity and change might lead to traumatic growth.

Declaration of Conflicts of Interest:
The authors have no conflict of interest to disclose.

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The True Cost to the State of Maternity Services in Ireland

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Abstract

Accounting for the cost of delivery of maternity services in Ireland ignores the cost of claims settlements caused by negligence in delivery. We show that the true cost of maternity services is more than double the generally reported cost when proper account is taken of the associated cost of maternity claims. There must come a tipping point, if it is not already exceeded, when the sums paid out by way of settlements for mismanagement of maternity services become larger than the additional costs of operating a sound service.

Introduction

Maternity services in Ireland support approximately 60,000 deliveries each year through 19 dedicated public maternity units.[1] Some 15% of the total availing of these services pay for private maternity care but this care is delivered within these public units. The Clinical Indemnity Scheme operated by the State Claims Agency covers all clinical claims made against maternity services in Ireland for both public and private pathways.

The Rising Cost of Clinical Claims

The State Claims Agency (SCA) operates two insurance schemes for the State, the Clinical Indemnity Scheme (CIS) and the General Indemnity Scheme (GIS). The CIS covers all clinical claims against hospitals (including maternity services), the HSE, and some other parties while the GIS covers all non-clinical claims. Of the total €1.9 billion claims settled by the State Claims Agency over the last decade, €1.7 billion (or 89%) was in respect of the Clinical Indemnity Scheme.[2]

The number of new claims is increasing at a faster rate than the number being resolved in recent years. The rate of growth of both claim settlements and the rise in outstanding liabilities has averaged more than 15% per annum since 2010. At the end of 2019, the estimated outstanding liabilities amounted to €3.63 billion, up from €783 million in June 2010.[3]

Outstanding clinical claims comprise three-quarters of this figure "primarily due to the high estimated liability associated with maternity services claims, particularly those arising from the high cost of settling catastrophic brain-injury infant cases".[3] In 2011, the Director of the SCA estimated that such cases of cerebral palsy at birth, while only 3% of the claims by number, accounted for two-thirds of the CIS liability.[4] Accordingly, we can estimate that the liability to cerebral palsy cases represent about half of the total outstanding liability (that is two-thirds of the CIS which is three-quarters of the total outstanding liability). This is consistent with the NTMA Report and Annual 2017 which reported that estimated liability in respect of maternity services claims was €1.38bn compared to total estimated outstanding claims of €2.66 billion (that is 53%). Already, individual settlements for cerebral palsy and associated birth injuries have exceeded €20 million before legal and other costs.[5]

Cost of Maternity Services and Cost of Claims on Maternity Services

Since 2015 the HSE implemented "Activity Based Funding", which requires estimates of the cost for each procedure (ignoring capital costs), and annually publish such cost estimates. The most recent figures show that the price range for deliveries varies from €2,418 for a Vaginal Delivery with Minor Complications to €10,313 for a Caesarean Delivery with Major Complications.[6] Based on the number of type of each delivery and the estimated price per procedure in each year, we estimate that the average cost to the State per delivery was €3,324 between 2015 and 2020 (see Table 1). An earlier study put the average cost in 2009 at €2,780 including €1,200 attributable to postnatal bed care costs.[8]

Table 1: Number of Deliveries each calendar year in Ireland and Estimated Price per Delivery.

Year	No. Deliveries[7]	Estimated Price Per Delivery[6]
2020	58,718 (estimate based on ABF)	€3,670.43
2019	58,006	€3,348.25
2018	59,608	€3,409.94
2017	60,496	€3,218.75
2016	62,442	€3,169.49
2015	64,115	€3,128.50
2014	65,608	n/a
2013	65,115	n/a
2012	66,098	n/a
2011	71,231	n/a
2010	72,657	n/a
2009	72,864	€2,780[8]

Sources: Number of deliveries as reported each year in Healthcare Pricing Office, Activity in Acute Public Hospitals in Ireland Annual Reports, 2009-2019. Deliveries include live single, multiple and stillbirths. Estimated Price Per Delivery in 2020 calculated from figures published in Healthcare Pricing Office, ABF 2020 Admitted Patient Price List. Figures for earlier years were calculated from figures kindly provided to the authors by the Healthcare Pricing Office for those years and, for 2009, by the referenced source.

Discharges from maternity units in Ireland after delivery accounted for about 3% of all acute hospital discharges[7] but, as noted earlier, gave rise to about half of the overall liability to the State in negligence claims. The NTMA accounts at year end 2016 and 2017 show that the outstanding liability for maternity claims increased from €1.09 billion to €1.38 billion, that is an increase of €290 million. In addition, a total of €282 million was paid out in 2017, roughly half or €141 million could be for maternity claims giving a total estimate of €431 million. There were 60,496 deliveries in 2017. This gives an average estimated claims cost of €7,124 per delivery in 2017. The estimated claims cost per delivery in 2017 was more than twice the cost per delivery in 2017.

Due to long delays between incident and claim, it is necessary to average over a longer period than one year to see if the pattern is stable. A total of €1.9 billion was paid in claims over the last decade and claims outstanding at the end of decade increased by about €2.85 billion (that is €3.63 billion as the most recent available figure at end 2019 less €0.78 billion in June 2010). Hence the estimated liabilities over the last decade is €4.75 billion, about half of which is in respect of maternity services or €2.375 billion. The number of deliveries in Ireland was 645,376 over the decade from the start of 2010 to the end of 2019 (see Table 1) This gives an estimated claims cost of €3,680 on average per delivery over the last decade. This is higher than the cost to the State of providing the maternity service ignoring capital costs.

In short, the figures show that liabilities arising from negligent birth injuries each year are now greater than the amount actually spent by the State in the day-to-day running of maternity services.

Quality of Maternity Services

There have been several reports published over the last decade investigating the functioning of Irish maternity services and the scope for improvement.[9] A recent study overviewed the finding of ten of these national inquiries published between 2005 and 2018 and draws attention to the consistent recommendation that staffing levels and staff training be increased (recommended in all reports) and the need for better risk management practices (recommended in 9 out of the 10 reports).[10] Indeed, the Health Information and Quality Authority's more recent overview of maternity services reiterated these recommendations, alongside its recommendation that "The HSE must immediately develop a comprehensive, time-bound and fully costed National Maternity Strategy implementation plan…".[11]

The independent investigations also give an assessment of how maternity services have been delivered over the last decade across many of the 19 maternity units in Ireland. For example, the 2014 report on Portlaoise Hospital Maternity Services concludes "poor outcomes that could likely have been prevented were identified and known by the hospital but not adequately and satisfactorily acted upon" and, even at the time of review, "PHMS [Portlaoise Hospital Maternity Services] service cannot be regarded as safe".[12] These findings follow the warning by the Health Information and Quality Authority the previous year that due to poor records "…it is impossible to assess the performance and quality of the maternity service nationally".[13]

Improvements in the provision of maternity services over the last decade have been too slow to stop the rise in the number and size of claims. It is clear that institutional learning from these investigations has been limited.

To the national inquiries, we must add the scores of other cases where the Irish courts have been satisfied that the standard of care was unacceptably deficient in a manner that led to injury where compensation is due.

Improving Maternity Services

It is known what must be done to improve the service, the problem is one of implementation. Perhaps the insurer - the SCA since 2002 - should be given a greater role. A case study shows how the withdrawal of insurance from maternity units in Monaghan and Dundalk in 2001 catalysed significant change in the provision of maternity services in that region.[14] The SCA has alerted hospital authorities to elevated risks, as in the case of Portlaoise Hospital when "… the SCA did indeed raise concerns it had in 2007 and 2008 about maternity services in Portlaoise on the basis of the notifications of incidents it was receiving...the response from the hospital was inadequate to none at all"[12] (p. 50). Adopting commercial approaches to insurance, including risk assessments and rating techniques, and communicating to hospital management in financial terms would help management better understand the broader financial implications of their decision making. In short, inactions like not increasing staffing or not improving training, currently accounted for as cost-savings, are likely to be raising overall costs when allowance is made for the consequent costs of the increased associated risks. We suggest that the SCA be given greater powers – powers akin to those that commercial insurers can exercise to control and shape the risks borne. Crucially, the SCA must be enabled to signal publicly when the risks are becoming unacceptable in any maternity unit.

Discussion

There are no winners when it comes to medical negligence cases. The plaintiff suffers a reduced quality (and perhaps quantity) of life that no monetary award can make good. The suffering is shared by parents and family, especially in the case of catastrophically damaged infants. The medical and other hospital staff are demoralised. After the trauma of the incident itself follows the prolonged litigation process, giving years of stress and anxiety to all.

The HSE has made a provision of €400 million in its budget to transfer to the SCA for claims against it expected to settle during the 2020.[15] The same report states that the HSE continues to fail, by a significant margin, to investigate adverse incidents in a timely manner. In 2019, the HSE set as a target that 80% of reviews of serious incidents be completed within 125 calendar days of the occurrence. The actual outcome for 2019 is projected as just 20%. Such delays do not demonstrate an eagerness to learn from such events.

There must come a tipping point when the sums paid out by way of settlements for mismanagement of clinical services become appreciably larger than the additional costs of operating a sound system. Perhaps this tipping point has been reached in the case of maternity services in Ireland.

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The authors confirm that they have no conflict of interest to declare in relation to this work.

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Metastatic Lobular Breast Carcinoma of the Urinary Bladder After Eight Years in Remission

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Abstract

Presentation

We present a very rare case of metastatic lobular breast cancer (BC) to the urinary bladder. A 69-year-old lady presented with abdominal pain, altered bowel habit and urinary frequency. She was 8-years in remission for invasive lobular BC.

Diagnosis

Imaging found a mass involving the terminal ileum/caecum, and the bladder. Cystoscopy and biopsies confirmed a poorly differentiated neoplasm. Immunohistochemistry identified this as metastatic lobular BC.

Treatment

A lapartomy and defunctioning ileostomy was performed without oncological resection as the mass was firmly adherent to surrounding structures. Biopsies of the mass confirmed metastatic invasive lobular carcinoma(ILC).The patient made a good recovery, starting chemotherapy and remains stable.

Discussion

Metastatic breast lesions to the urinary bladder are extremely rare. Invasive lobular carcinoma (ILC) accounts for 14% of primary BC[5]. 19case reports have been documented of living patients with metastatic BC to the urinary bladder, only one-third were (ILC)[2]. Treatment options include surgery, radiotherapy, chemotherapy and hormonal therapy options.

Introduction

Breast Cancer (BC) is one of the leading causes of cancer death worldwide. It remains one of the most common cancers, accounting for 25%of all cancer diagnosis[1].The most common sites of metastases are lung, liver, bone and brain[2].Bladder metastases from BC are significantly rarer, with only 54cases reported to date[2,3,4].We report a rare case of metastatic lobular BC which has metastasized to the urinary bladder. Only 19case reports have been documented of living patients with metastatic BC to the urinary bladder, of these only one-third were (ILC)[2], highlighting this rare diagnosis.

Case Report

We report the case of a 69-year old lady who presented with a five-month history of intermittent lower abdominal pain, altered bowel habit, dysuria, urinary frequency, and microscopic haematuria.

Her past medical history included lobular carcinoma of the right breast, which was managed with mastectomy, axillary clearance, and adjuvant chemotherapy (8 years ago).

Initial laboratory tests noted deranged renal function (creatinine=131 micromol/Litre and urea=6.1 mg/dL) with mildly elevated inflammatory markers (C-reactive protein= 21mg/dL)

Radiological investigation including a CT-scan of abdomen/pelvis observed a large mass involving the terminal ileum/caecum, extending towards the pelvis with bladder dome involvement. There was considerable mass effect causing bilateral hydronephrosis. Colonic endoscopic evaluation did not observe any intra-luminal disease. Cystoscopy noted an inflammatory mass involving the posterior bladder wall and biopsies were taken. Left ureteric stenting was performed, but due to tumour distortion the right ureteric orifice was not identifiable. Biopsy revealed a poorly differentiated neoplasm, with a pattern of infiltrating small cells in single file with immunohistochemistry identifying this as metastatic lobular BC (images 1 and 2)

Image 1: Histological image of invasive lobular breast carcinoma with H&E staining (Haematoxylin and Eosin stain)

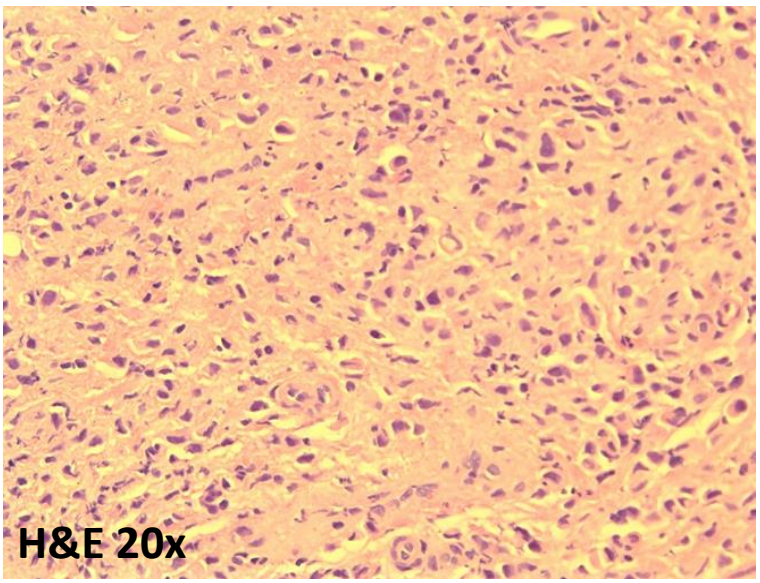
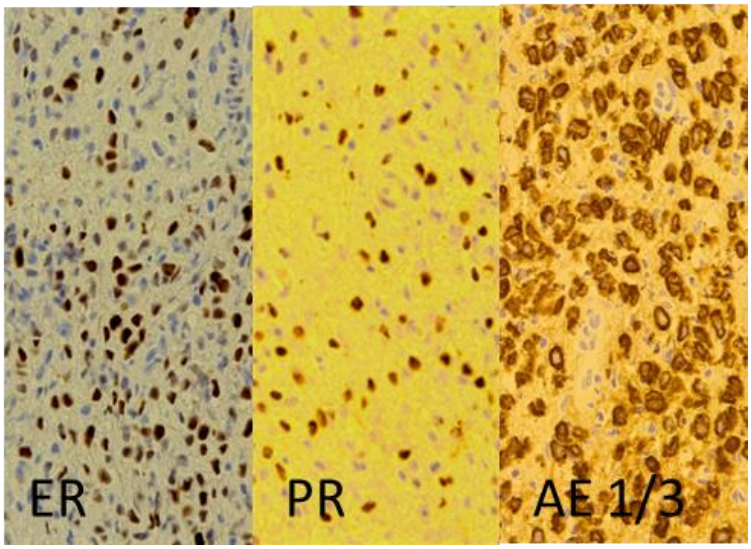


Image 2: Immunohistochemical staining confirms metastatic lobular breast cancer (Estrogen receptor stain, Progesterone receptor stain, cytokeratin AE 1 & 3 stains)



In the coming weeks, the patient had increased abdominal pain and symptoms of intermittent obstruction. MRI of the small bowel noted irregular thickening of the terminal ileum and caecum, with significant peri-enteric stranding. Multidisciplinary input recommended surgical management. Potential options included multi-visceral resection versus defunctioning ileostomy. Initial laparoscopy identified a significant inflammatory mass involving the ileum and conversion to laparotomy was performed to attempt mobilization. The mass was firmly adherent to the lateral sidewall and adjacent structures including the ureters(which were not identifiable).In addition, there was dense nodal disease along the root of the small bowel mesentery and occult peritoneal disease identified involving the small bowel and dome of the bladder. It was decided to perform a defunctioning proximal ileostomy without oncological resection. Biopsies of the mass and peritoneal disease confirmed metastatic ILC at multiple sites. The patient made a satisfactory post-operative recovery and commenced chemotherapy.

Discussion

Metastases to the urinary bladder are rare. The majority are prostate, cervical and colorectal cancers, which can directly invade the urinary bladder[4].Metastatic breast lesions to the urinary bladder are extremely rare. The majority of reported cases have been in the setting of disseminated primary BC[5].Feldman *et al.* suggested that invasion of the bladder is a late complication of primary BC, with a median time of occurrence being 90-months,but may be as late as 30years[2].Our patient presented with bladder involvement around 96-months post initial diagnosis.

ILC (14% of primary BC) is much less common than invasive ductal carcinoma (IDC) (80%)[5]. It has been shown that these two subtypes of BC have very different patterns of metastases. Winston *et al.* suggested that lobular BC migrates via the retroperitoneum to the abdominal region to invade organs such as the bowel and bladder[6].Retroperitoneal extension of ILC occurs in 3.1%compared with 0.6%of IDC patients[7].This is further supported by Feldman *et al.* who observed that ILC accounts for 33%of metastatic breast to bladder cancers[3].

Treatment of metastatic BC to the urinary bladder comprises of surgery, radiotherapy, chemotherapy and hormonal therapy options. Local resection with trans-urethral resection of bladder tumour aids diagnosis, can alleviate ureteric obstruction, and facilitate ureteric stenting. Where ureteric stenting is not possible, percutaneous nephrostomies may be placed to improve renal function[3].Radiotherapy has a role in improving symptomatic haematuria and providing local disease control[8].Definitive surgical treatment can involve multi-visceral resection in suitable patients[9].

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The author declares no conflict of interest.

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46, XX Male Disorder of Sexual Development

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Abstract

Presentation

A 47-year-old male was referred to endocrinology with a 9-year history of primary hypogonadism. Baseline testosterone was 4.3 nmol/L (RR 8-30) with an elevated follicle stimulating hormone (17.5 IU/L) and luteinizing hormone (15.2 mIU/ml). He had a short stature with bilateral small pre-pubertal testicles.

Diagnosis

Karyotyping showed 46 XX, making a diagnosis of 46, XX male disorder of sexual development. Fluorescence in situ hybridization analysis identified the presence of a translocated sex-determining region Y gene.

Treatment

Testosterone replacement therapy (testogel). Monitoring blood markers affected by testosterone therapy and metabolic risk factors.

Conclusion

Primary hypogonadism in males can be divided into congenital and acquired causes. 46, XX male disorder of sexual development is a rare congenital cause, with an incidence of approximately 1 in 20,000 newborn males. This case report highlights the value of karyotyping in the workup for primary hypogonadism.

Introduction

46, XX male disorder of sexual development is a very rare congenital cause of primary hypogonadism, with an incidence of approximately 1 in 20,000 newborn males [1]. Having been initially described in 1964[2], approximately 150 cases had been reported worldwide by 1996[3]. Since then, only over 100 cases are estimated to have been reported globally between 1996 and 2006[4].

The features include a 46 XX karyotype, normal or ambiguous external genitalia, azoospermia and absence of mullerian structures[5]. The vast majority of males (85%) present after puberty with small testes, gynecomastia and infertility, with only approximately 15% presenting with ambiguous external genitalia at birth [5].

Case Report

A 47-year-old male was referred with a history of hypogonadism. History taking revealed he presented to his General Practitioner 9 years previously with sweating, loss of libido, weight gain but denied erectile dysfunction. He has never desired fertility. Baseline hormone profile showed a morning testosterone of 4.3 nmol/L (RR 8-30) with an elevated follicle stimulating hormone (17.5 IU/L) and luteinizing hormone (15.2 mIU/ml). He was commenced on transdermal testosterone (testogel) by his General Practitioner. On treatment, he is shaving, has a normal libido and is sexually active. Past medical history included an undescended testicle and depression. He has no relevant family history.

On review, he was normotensive, height 155cm (less than 3rd percentile) and body mass index 38.8 Kg/m^2. He had no hypogonadal features on treatment or a phenotype characteristic of Klinefelter's syndrome (eunachoid habitus or glandular gynecosmastia). He had bilateral small testicles, less than 4 mls. Ultrasound confirmed atrophic testes. Penile development is normal.

A blood sample was sent for karyotyping. This revealed a 46 XX karyotype. Fluorescence in situ hybridization (FISH) analysis identified the presence of the sex-determining region Y (SRY) gene and its location on the distal region of the short arm of one X chromosome.

Discussion

This is a very rare case of primary hypogonadism. While there are known familial cases, the majority of 46 XX male karyotypes are not inherited [5]. The SRY gene is the major determinant of gender and is responsible for the differentiation of the bipotential gonad into testis [6]. The vast majority of male cases, approximately 80%, are SRY positive[5], as was this patient. Such males generally do not present until after puberty as it is only then that testosterone deficiency becomes apparent[4,7]. In most cases, there is translocation of the Y chromosome to the X chromosome during paternal meiosis [6].

The clinical features of 46 XX males can overlap with Klinefelter syndrome (47 XXY karyotype). Both conditions can present with small testes, hypogonadism and gynecomastia[5]. However, an important distinguishing factor is height [4]. Males with 46 XX karyotype tend to be significantly shorter and have a greater incidence of maldescended testes than males with Klinefelter's syndrome [4,8].

Disorders of sexual development are associated with a heightened risk of malignancy, particularly germ cell tumours and testicular carcinoma in-situ[9]. This is linked to genetic material located on the Y chromosome and to undescended testes[9].

Management of males with 46 XX karyotype involves testosterone replacement with regular monitoring of serum testosterone level, haematocrit, liver profile, prostate specific antigen and bone mineral density.

In conclusion, 46 XX male disorder of sexual development is a differential in the workup for primary hypogonadism and should be considered, especially with a history of maldescended testes and short stature [4].

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The authors have no conflicts of interest to declare.

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Rare Variant of Lateral Medullary Syndrome; Opalski Syndrome with Cerebellar Infarction

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Abstract

Presentation

A 36-year-old female presented with sudden onset neck pain, vertigo, nausea, facial numbness and gait disturbance. Classic features of lateral medullary syndrome (LMS) were elicited; Right Horner's, reduced right-sided facial pain and temperature sensation, left upper and lower limb numbness, dysphonia, dysarthria and dysphagia. Additionally, there was right hemi-paresis.

Diagnosis

CT angiogram showed a poorly enhancing right vertebral artery and MRI showed oedema of the right postero-lateral medulla and inferior cerebellar peduncle consistent with vertebral artery dissection and acute infarction.

Treatment

She was admitted to the stroke observation unit. We commenced high dose aspirin in combination with multidisciplinary team input, risk factor modification and supportive therapies.

Conclusion

This was Opalski syndrome, caused by right vertebral artery dissection extending caudally from the posterior inferior cerebellar artery (PICA). This resulted in ischemia of the lateral medulla, inferior cerebellar peduncle, and corticospinal fibres after the pyramidal decussation, resulting in Wallenberg's syndrome, cerebellar ataxia and ipsilateral hemiparesis.

Introduction

Lateral medullary syndrome (Wallenberg syndrome) is a well-known neurological disorder caused by ischemia of the vertebrobasilar vascular system. The implicated lateral medullary structures include the nucleus ambiguous, the spinal trigeminal nucleus, cranial trigeminal tract, cerebellum/inferior cerebellar peduncle, hypothalamo-spinal fibres and vestibular nuclei. Classically it is manifested by vertigo, diplopia, dysarthria, Horner's syndrome, numbness (ipsilateral face and contralateral limb), and no limb weakness. Opalski syndrome, a rare variant of LMS, is associated with ipsilateral hemiparesis due to the involvement of corticospinal fibers caudal to the pyramidal decussation. Babinski-Nageotte syndrome is another variant which has contralateral hemiparesis because pyramidal tract is affected before decussation.

Case Report

A 36-year-old female, parity 2 gravidity 2, presented with a sudden onset of vertigo, visual disturbance, nausea, gait disturbance, and right facial discomfort. She reported recurrent attacks of right sided neck pain worse when moving head to the left side for few days. On examination, her blood pressure was 168/95, her pulse was 92 beats per minute, and her cardiovascular and respiratory examination were normal. Neurological exam revealed right Horner's syndrome, Nystagmus was noted on right lateral gaze with rapid ocular movement to the right, right-sided ataxia, reduced pinprick and temperature sensations on right side of her face and her left side of body, dysphonia and decreased gag reflex. In addition, there was an evidence of right (ipsilateral) hypotonia and hyporeflexia with hemi-sensory loss. CT angiogram showed a poorly enhancing, small calibre right vertebral artery [Figure 1].

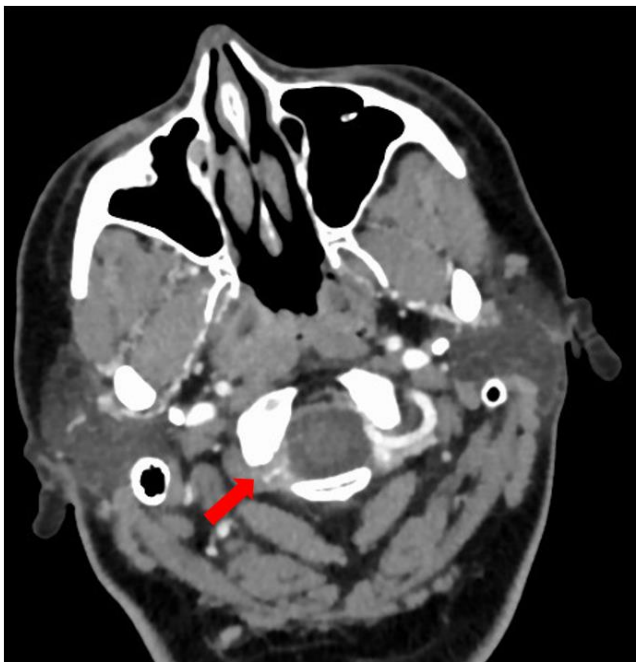

Figure 1. Asymmetrical vertebral arteries, with a small calibre right vertebral artery which is poorly enhancing. This is in-keeping with right vertebral artery dissection.

Diffusion-weighted and T2-weighted brain MRI revealed Oedema of the right posterior lateral medulla involving inferior cerebellar peduncle, in-keeping with infarction [Figure 2].

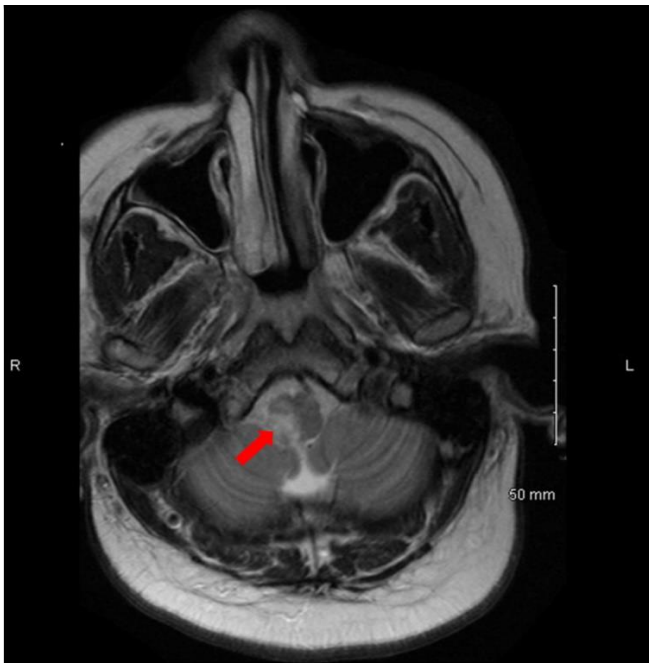

Figure 2. Oedema of the right posterior lateral medulla involving inferior cerebellar peduncle, in-keeping with infarction.

She was admitted to the stroke unit and treated with high dose aspirin. She underwent rehabilitation by the multidisciplinary team with medical risk factor modification. After 10 days, she was discharged to a rehabilitation hospital for further therapy, at this point her right sided power and tone had returned, and she had developed right sided hyper-reflexia with upgoing Babinski response.

Discussion

Opalski syndrome was described by Adam Opalski in 1949, who reported two patients with mild hemiperesis, with hyperreflexia and Babinski's sign on the same side, along with features of LMS.[1] He believed the weakness resulted from involvement of corticospinal tracts extending caudally to the pyramidal decussation. Dhamoon et al. later reported a case with the lateral medullary syndrome and severe ipsilateral weakness following vertebral artery occlusion.[2] Subsequently he reported an autopsy case describing this as a perfusion failure due to severe atherosclerosis and thrombosis in the proximal and distal right vertebral arteries. In our patient, CT angiography revealed severe stenosis of the proximal and distal parts of the right vertebral artery so we may say it was the extensive vertebral artery dissection extending caudally to involve the inferior cerebellar peduncle and the corticospinal fibres after the pyramidal dissection.

Prognosis of vertebral artery dissection depends mainly on the severity of the resulting stroke syndrome. Management comprises antiplatelet agents and anticoagulants; evidence demonstrates equal results between these two modalities.[3] Endovascular and surgical treatments are reserved for patients with concomitant complications while intra-arterial thrombolytics in acute ischemic events presenting within 4.5hrs of symptoms have been utilized safetly.[4]

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Digitalis Poisoning after Accidental Foxglove Ingestion

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Abstract

Presentation

A 22-year-old man presented to the Emergency Department (ED) with a history of persistent gastrointestinal symptoms, drowsiness, light-headedness, blurred vision and numbness of the lips for a day after accidentally ingesting foxglove.

Diagnosis

Serial electrocardiography demonstrated significant changes ranging from sinus bradycardia to varying degrees of heart block with ST segment depression and T wave inversion in the inferior and anterolateral leads. A diagnosis of probable digitalis (cardiac glycoside) poisoning was made.

Treatment

After initial emergency medicine approach and assessment; his treatment included intravenous atropine, antiemetic, activated charcoal and Digibind with referral to the cardiology team for observation.

Conclusion

A high index of suspicion for digitalis toxicity in a symptomatic patient with unknown plant ingestion is crucial in the ED. This case also highlights the emergency management approach of such patients with atropine and activated charcoal.

Introduction

Digitalis poisoning from the therapeutic use of herbal cardiac glycosides (CG) continues to be a source of toxicity today [1]. CG are found in a diverse group of plants, the commonest being, foxglove (Digitalis purpurea). Toxicity may occur after consuming juice or teas brewed from plant parts or after consuming leaves, flowers, or seeds from such plants [1].

Case Report

A 22-year old man presented to the Emergency Department (ED) with a history of persistent vomiting, abdominal discomfort, drowsiness, light-headedness, blurred vision and numbness of the lips for a day. He had blended 2 big leaves of an unknown plant growing wild in his garden with apple, cucumber and lettuce to make a "herbal juice". He became unwell about 2 hours after ingestion and later presented to the ED when his symptoms failed to resolve. Collateral information provided by his parents identified the ingested plant was foxglove. He had no medical background of note and had no regular medications or allergies.

On examination he was stable; orientated; conscious and had a bradycardia of 40 beats/minute. All other vital signs were within normal limits (BP=117/58, RR=16, SaO2=97%, T=36.5). His general examination was normal.

Serial ECGs revealed significant cardiac arrhythmias ranging from sinus bradycardia to 1st degree heart block, 2nd degree heart block (Mobitz type II) and complete heart block with ST depression and T wave inversion in inferior and anterolateral leads (Figures 1 and 2). Serum digoxin level was normal (0.6 µg/L). Renal profile showed acute kidney injury (urea: 9.0mmol/l, creatinine: 125µmol/l) and mild hyperkalaemia (5.3mmol/L). There was leucocytosis (19.5 x 10^9/l) with neutrophilia (17.5 x 10^9/l). He had a normal chest radiograph. A diagnosis of probable digitalis poisoning was made.

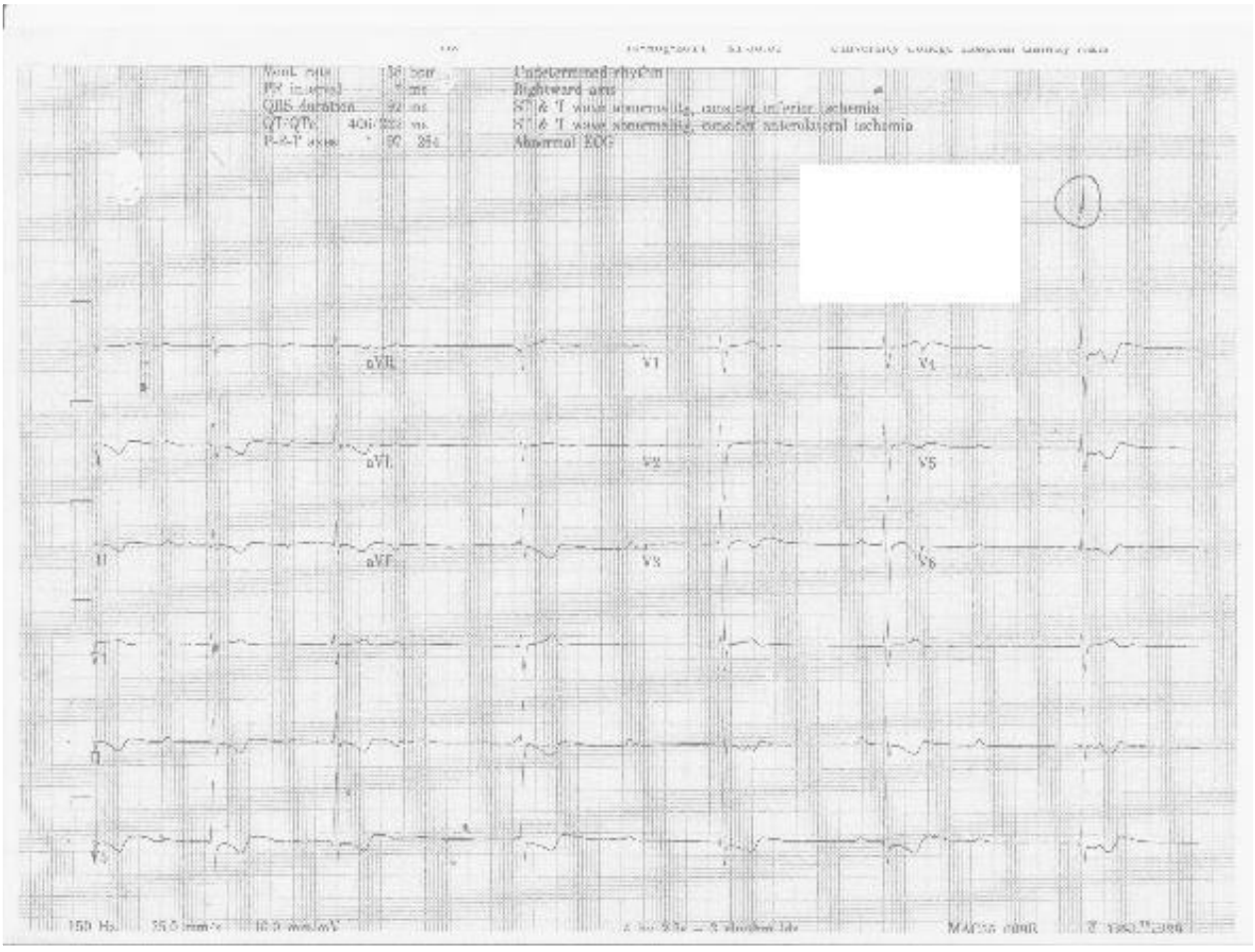

Figure 1: ECG showing complete heart block with ST depression and T wave inversion in inferior and anterolateral leads.

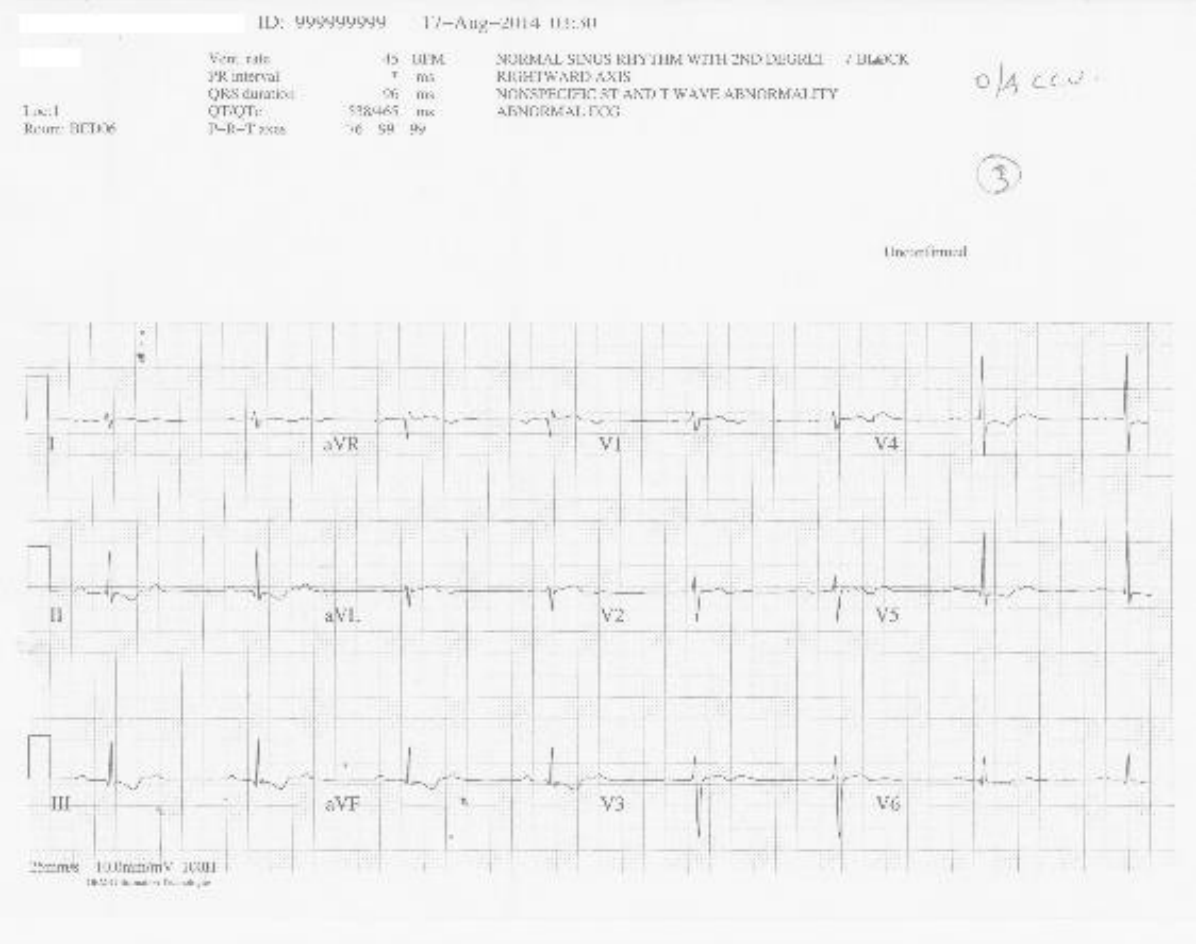

Figure 2: ECG showing 2nd degree heart block (Mobitz type II) with ST depression and T wave inversion in inferior and anterolateral leads.

He was managed according to the Emergency Medicine ABC approach. He was given intravenous fluid and an antiemetic. Atropine 0.6mg intravenously was given to manage the bradycardia with good response. Activated charcoal was administered following Toxbase (an online poisons information database) recommendation. Three further doses of atropine were given because of labile heart rate. A cardiology review was requested, and he was transferred to coronary care unit (CCU), where he had a dose of Digibind (digoxin-specific antibody, an antidote for digoxin overdose) and commenced on telemetry. There were further changes in his ECG but these normalised overtime. His serum digoxin levels progressively decreased to 0.3 µg/L. He was discharged home after ten days on admission with resolution of laboratory parameters.

Discussion

CGs are organic compounds containing glycosides (sugar) that act on the contractile force of the cardiac muscle by inhibiting the sodium–potassium–adenosinetriphophatase enzyme [2]. Arrhythmias are the main cardiac manifestation of CG poisoning, ranging from bradycardias to fatal tachyarrhythmias [3]. Patients presenting with acute ingestion could also develop gastrointestinal (nausea, vomiting and abdominal pain) and neurological (confusion and weakness) symptoms.

The diagnosis of CG toxicity is based on history, clinical manifestations and ECG findings with confirmation of serum digoxin levels [4]. Due to the cross-reactivity of the digoxin immunoassay, the quantitative value does not correlate with the degree of toxicity from exposure to plant-based CG and may even be undetectable. Potassium derangement is the most common electrolyte abnormality with hyperkalaemia being a marker of acute CG toxicity and a predictor of mortality [3].

The management is generally supportive in addition to Digibind. Digibind use should be guided by a robust history and clinical manifestations [3]. Activated charcoal can be considered in the management of patients with CG ingestion as it blocks the absorption and improves elimination of CG [3]. Activated charcoal can be given as single or multiple doses in patients who are symptomatic post plant CG ingestions [5]. Although TOXBASE recommends its use beyond the hour mark there are no randomised control trials establishing its use [5]. Mitchell et al reported successful use of multiple doses of activated charcoal in the treatment of plant CG ingestion [6]. Symptomatic patients with CG poisoning will require admission to CCU for close monitoring until symptoms resolution. Emergency physicians should consider CG poisoning in patients presenting with gastrointestinal symptoms and cardiac arrhythmias following ingestion of an unidentified plant and despite low digoxin levels.

Declaration of Conflicts of Interest:
There is no conflict of interest.

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Management of an Unstable Preterm COVID-19 Pregnant Woman with Emergency Caesarean Delivery

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Abstract

Presentation
A 30-year-old, G2P1, BMI 29.5kg/m2 self-referred at 33 weeks' gestation with a one-day history of fever and nine-day history of non-productive cough with pyrexia.

Diagnosis
A chest X-ray was suggestive of COVID-19. Nasopharyngeal swabs were positive to COVID-19.

Treatment
Due to increasing tachypnoea, hypoxia and fetal tachycardia she underwent an emergency caesearean section under spinal anaesthesia.

Conclusion
Caring for a COVID-19 positive obstetric patient requires multidisciplinary input. Regional technique gives many advantages in unstable patients and should always be considered.

Introduction

While preliminary data showed that a higher risk of miscarriage, preterm birth, preeclampsia and caesarean delivery occur for pregnant women with COVID-19[1], recent researches suggest that obstetric patients are as susceptible to the disease as the non-obstetric population[2], with the majority of patients suffering mild to moderate flu like symptoms[3].

Absence of symptoms is also common in pregnancy with some patients deteriorating postdelivery[4], while late pregnancy infection appears to be associated with a good maternal-neonatal outcome.[5] We present our management of a 30-year-old obstetric patient with COVID-19 infection, in severe respiratory distress, who underwent a preterm emergency caesarean section for fetal tachycardia.

Case report

A 30-year-old, G2P1, BMI 29.5kg/m^2 self-referred at 33weeks' gestation to the National Maternity Hospital with a one-day history of fever and nine-days history of non-productive cough with low-grade pyrexia. On admission she was febrile (38^{o}C), tachycardic at 110bpm with normal respirations and 96% SpO2 on RA. She was started on cefuroxime 1.5g IV eight-hourly and clarithromycin 500mg 12-hourly and isolated in a negative pressure room. A COVID-19 swab was taken. A chest X-ray (Fig1) compatible with COVID-19. Bloods showed lymphopenia and raised bilirubin (Table1). She was confirmed as COVID-19 positive on day4 post-admission.

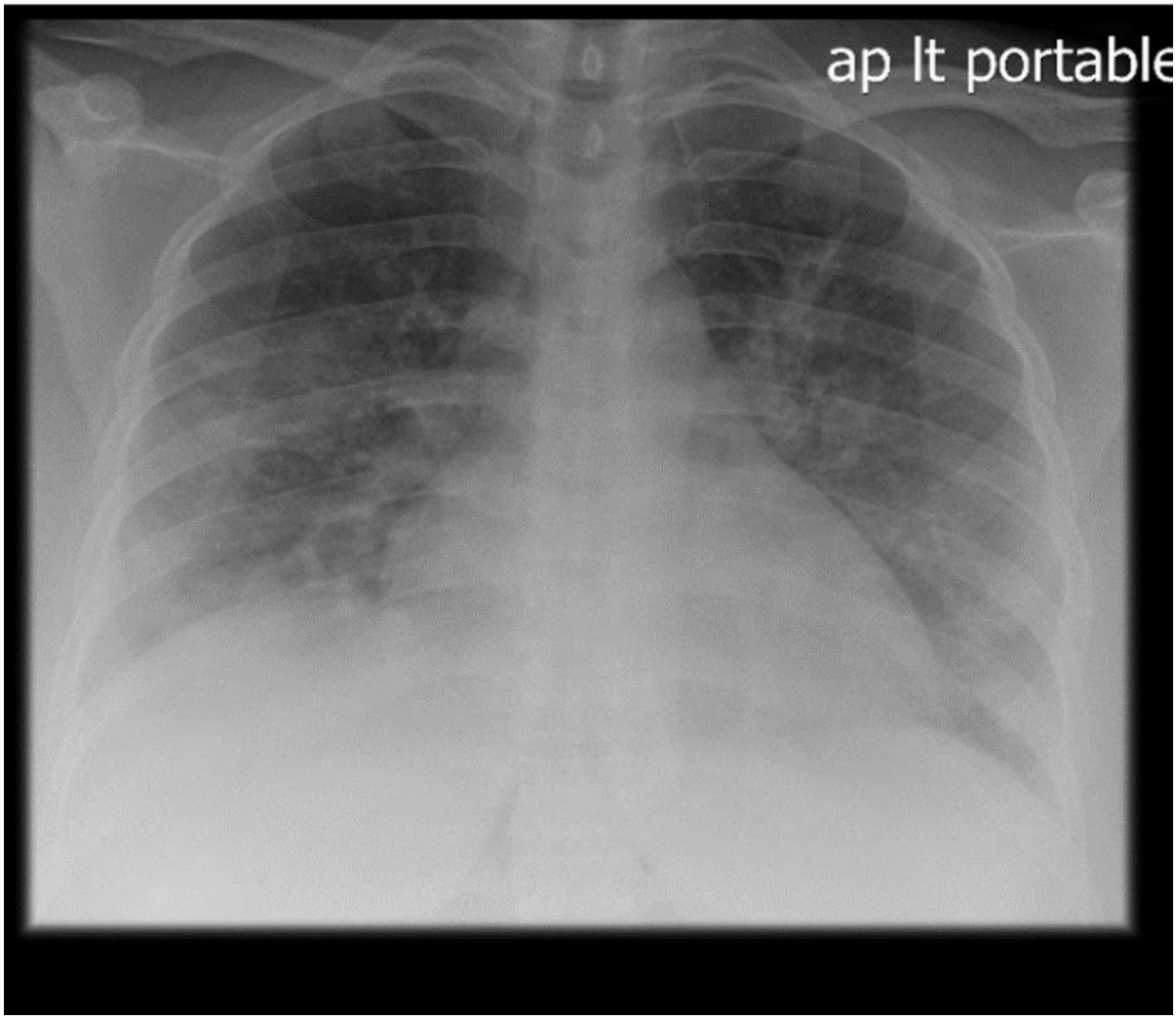

Fig 1: Chest XR at admission: patchy low-density infiltrates in the mid and lower zones bilaterally.

Table 1: Blood values at admission, before and after caesarean section.

	Admission	Before caesarean section	After caesarean section
Hb	11.3	10.7	10.6
WCC	6.4	8.5	9.3
Plt	285	347	358
Neutrophils	5.56	7.36	8.42
Lymphocytes	0.57	0.8	0.63
Monocyte	0.27	0.33	0.24
Eosinophil	0.0	0.0	0.0
CRP	11.3	-	-
Albumin	6.4	27	27
Sodium	133	138	134
Potassium	3.8	3.7	3.6
Chloride	107	108	106
Urea	1.6	2.5	2.8
Creatinine	55	58	54
Bilirubin	16	16	15
ALT	28	43	43
AST	38	60	60
ALP	278	262	238
PT	-	8.9	9.2
INR	-	0.82	0.85
APTT	-	25.8	27.8

She was kept fluid restricted to 1000ml/day, had daily CTGs, 4-hourly measurements of vital signs and antenatal steroid: betamethasone 12mg intramuscularly (2 doses). A venous blood gas showed pH 7.407, pO_2 6.69kPa, pCO_2 4.22kPa, HB 11.5g/dl, BE -4.4 and lactate 1.45mmol/l. A certain degree of respiratory alkalosis with only partial metabolic compensation is to be expected in late pregnancy, but the hypoxia was considered concerning.

She developed tachypnoea (RR 34-42bpm) with HR 104bpm and BP 107/70mmHg. Saturation was 90-92% on RA and O2therapy (2l) was commenced. She became pyrexic (38.7^oC) and unstable. SpO2 dropped to 75% but recovered with 4l O2. ABG showed hypoxia (pO2 8.7kPa), hypocapnia (pCO_2 3.8kPa), pH 7.45, Hb 10.6g/dl and lactate 1.8mmol/l. A full blood set was sent (Table 1), CTG showed fetal tachycardia (180-200bpm). A fluid bolus of 500mls was given with no improvement. An emergency c-section was called due to maternal and fetal concerns.

In the negative pressure theatre, a thorough debrief with all multidisciplinary teams took place to ensure minimal exposure and appropriate PPE equipment was donned. To reduce the risk of virions aerosolisation and to avoid intubation, a C-section under regional anaesthesia was performed, with the option to convert to general if needed. Vitals prior to siting spinal were HR 126bpm, SpO_2 98% on 4 litres nasal oxygen, RR 48bpm and BP 82/62mmHg.

A single-shot low-dose spinal anaesthetic (10mg hyperbaric-bupivacaine, 15mcg fentanyl, 100mcg morphine) was performed in left lateral position with O2 via nasal prongs. A phenylephrine infusion (1.62mg total) was used to preserve desired MAP (>60mmhg) minimising the fluids requirement. EBL was 370mls and a liveborn female infant was delivered weighing 2.23kg, Apgars 9 at 1 and 5 minutes. Baby was admitted to NICU for gestational age, her Covid-19 swabs were negative, and she was discharged home on day14.

The patient was transferred back to the isolation ward. An arterial line was sited, ABG was satisfactory, UO was monitored, O_2 and fluid restriction were continued. Hydroxychloroquine 200mg BD and Azithromycin 500mg OD tapered to 250mg OD the following day were commenced [2]. She was prescribed for 4500IU Tinzaparin. Her condition started improving 24hrs later. She was discharged 4-days post-delivery.

Discussion

There has been some uncertainty about the use of steroids for fetal lung maturation in the setting of COVID-19 infection. In non-SARS CoV-2 viral pneumonia, steroid treatment is associated with increased mortality [3]. Given the likelihood of preterm delivery and the clear benefit to the fetus at this gestational age steroids were deemed appropriate. Interestingly, the preliminary results of RECOVERY trial suggest that dexamethasone improves the outcome of hospitalized patients.[7] The antimicrobial therapy was based on a small clinical trial[8]. Following studies, however, did not confirmed its efficacy[9].

A low-dose spinal anaesthesia instead of CSE was preferred due to urgency of the delivery. We suggest performing regional anaesthesia for caesarean sections in patients with COVID-19 infections [10]. However, the systemic condition of the patient needs to be considered and measures must be in place to deal with potential cardiorespiratory instability.

Declaration of Conflicts of Interest:

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Patient Consent:

The authors declare that the patient provided written consent for the case report to be published.

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Ischaemic Stroke Post-Varicella Infection: A Vaccine Preventable Disease

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Abstract

Introduction

Ischaemic stroke is an established complication of primary varicella infection. We discuss three cases of post-varicella ischaemic stroke.

Case 1

A 4-year-old boy presented acutely with right-sided hemiparesis. Neuroimaging showed an area of ischaemia centred at the left putamen.

Case 2

A 2-year-old boy presented with ataxia and left-sided hemiparesis. MRI brain revealed abnormal diffusion and T2 flair in-keeping with acute MCA infarct.

Case 3

An 18-month-old boy presented with right monoplegia and intermittent ataxia. CT brain revealed low density lesion in the basal ganglia.

Results

Treatment in each case included methylprednisolone and aspirin, with or without acyclovir. Each patient demonstrated symptom improvement while an inpatient.

Discussion

Varicella associated stroke accounts for almost one-third of childhood ischaemic strokes. With the availability of a safe, effective vaccine for primary varicella the argument for universal vaccination becomes stronger when cases with neurological complications are considered.

Introduction

Stroke ranks in the top 10 causes of death among children in high income countries. [1] Childhood stroke has an incidence of 1-13 per 100,000 per year and a reported mortality of 3-7%. [2-6] It is accepted that over 60% of children have persisting deficits following childhood stroke. [3, 5, 7] The past 20 years have seen a 35% increase in the prevalence of paediatric stroke. [8]

Ischaemic stroke is an established complication of primary varicella infection. [9, 10] The varicella vaccine is effective against acute infection and it also reduces the risk of later complications. [11, 12] The chickenpox vaccine is not part of the routine childhood vaccination programme in Ireland. We present 3 recent cases of childhood ischaemic stroke, linked to previous primary varicella infection presenting to our paediatric emergency department (ED).

Case 1

A 4-year-old male presented following episodes of drooling, limp and confusion. He had been well in school until 2 hours prior to presentation when he developed drooling and a limp. The parent was immediately informed, and the symptoms had resolved by the time they arrived at the school. Approximately 1 hour later at home, he had a 2nd acute neurological episode which manifested as being quieter than usual, drooling and not using right upper and lower limbs. He was brought to the ED where, again, the symptoms had resolved on arrival. A 3rd episode was observed in the department with drooling from the right side of mouth and persistent right hemiparesis. His lowest Glasgow Coma Scale (GCS) score was 13/15.

He was generally healthy. His development was appropriate for age. He had experienced primary varicella infection 3 months prior to this episode. He tolerated his primary varicella infection well with only one day of fever.

An urgent computed tomography (CT) brain was performed which showed an area of low attenuation lateral to the genu of the internal capsule. A CT angiogram was performed which showed a possible reduction in the calibre at the origin of the horizontal section (M1) of the middle cerebral artery, but no obvious filling defect.

The neurology team was consulted, and patient was commenced on oral aspirin, intravenous methylprednisolone and intravenous acyclovir in view of the history of varicella infection. On re-assessment 3 hours post-presentation his GCS was 15/15 but mild right-sided weakness with brisk lower limb reflexes were noted.

There was no further deterioration post admission, however mild right-sided hemiparesis persisted. Word finding difficulties were noted and initially the patient would only speak in short sentences. In-patient therapy included physiotherapy, occupational and speech and language therapy.

Magnetic resonance imaging (MRI) on day 7 of admission confirmed a 3cm area of hyper-intensity centred at the posterior aspect of the left putamen and globus pallidus. This was thought to represent an area of ischaemia secondary to post-varicella vasculitis.

Initial cerebrospinal fluid (CSF) polymerase chain reaction (PCR) was positive for varicella. A 7-day course of intravenous steroids was completed. A repeat lumbar puncture 2 weeks into his admission was negative for varicella on PCR. At this point acyclovir was stopped.

A hospital stay of over 3 weeks was required. Symptoms improved throughout admission. On discharge the patient had a very mild residual motor deficit. His speech had improved significantly, approaching premorbid state. Ongoing follow up with multi-disciplinary team input is in place.

Case 2

A 2-year-old male presented with a 2-hour history of failure to habitually suck the left thumb and unsteady gait. A similar episode had been noted the day prior to ED presentation which resolved completely after one hour.

Patient was generally well with no current or recent pyrexial illness. Development was appropriate for age. A primary varicella infection had occurred seven months prior to presentation.

Clinical examination demonstrated an alert child with left-sided hemiparesis, associated drooling and ataxia. Tone and reflexes were normal. CT brain showed no evidence of haemorrhage. CT angiogram showed minor narrowing at section two of the right middle cerebral artery (MCA). MRI brain demonstrated abnormal diffusion and hyper-intense T2 flair within the right putamen, in-keeping with an acute MCA infarct. MRI also revealed an attenuated segment of the MCA consistent with vasculitis.

Treatment was commenced with oral aspirin and intravenous methylprednisolone. Lumbar puncture was not performed. Initial blood tests including coagulation screen were normal. Varicella zoster immunoglobulins confirmed previous infection with IgG >1000 u/ml and negative IgM.

Physiotherapy, occupational therapy and speech and language therapy were provided during his hospital admission. Symptoms improved quickly. Patient was back to baseline on discharge from hospital, six days after presentation. He will continue to be monitored by the neurology team in the community.

Case 3

An 18-month male presented with inability to use his right hand since morning and difficulty crawling, without a history of trauma or fever. His parents had noticed intermittent unsteady gait for the preceding 2 weeks. He had primary varicella infection 5 months earlier and had hand, foot and mouth disease 3 months prior.

A simple febrile convulsion had occurred 4 weeks before presentation and he was treated as an outpatient in accordance with local guidelines. Patient had attained normal developmental milestones.

On clinical examination he was alert and active. His gait was steady with no ataxia. His right hand was held in a fist. There was no facial asymmetry or cranial nerve palsies. Tone in the right upper limb was increased compared with the left, with reflexes present and symmetrical. Power in right upper limb was 3/5 compared with 5/5 in the left. Extensive laboratory investigations were performed, full blood count initially showed leucocytosis with eosinophilia.

CT scan demonstrated subtle low attenuation in the left globus pallidus. Patient was commenced on methylprednisolone, acyclovir and aspirin in the ED. Intravenous acyclovir was continued for 2 weeks.

MRI under general anaesthesia confirmed a small area of diffusion restriction in the left globus pallidus, consistent with ischemia. MR angiography revealed narrowing of the left anterior cerebral artery and left middle cerebral artery. Lumbar puncture was carried out which was negative for varicella zoster PCR.

Motor symptoms improved during the first 2-3 days of his admission. However, he developed a hemi-chorea which persisted at time of discharge; he is being followed by the outpatient paediatric neurology team.

Results

This series presents 3 cases of paediatric stroke occurring as a sequela of primary varicella infection. These 3 cases presented to the ED over a period of 17 months. All 3 cases demonstrated significant clinical improvement while in hospital, but one patient developed a significant complication, chorea. The literature confirms that many children will be left with long-term deficits post-stroke. [5, 7] The 3 cases reviewed demonstrate some variance in management. Patients in Case 1 and Case 3 were treated with intravenous acyclovir and had a lumbar puncture performed. In Case 2 the child did not undergo lumbar puncture and was not treated with acyclovir as his serum showed no signs of active infection. In the literature, benefits and duration of various treatments are debated. A systematic review of reported cases found that 17 out of 29 cases of post-varicella stroke had a lumbar puncture performed. This review also found no difference in outcome whether or not children were treated with antiviral therapy. [13, 14]

In all 3 cases there was a delay in presentation from symptom onset to medical review. The intermittent nature of symptoms or delayed recognition of the seriousness of the symptoms most likely contributed to this delay. The Royal College of Paediatrics and Child Health childhood stroke guidelines provide a comprehensive evidence-based approach to diagnosis and clinical management, along the child's journey from initial presentation, through to rehabilitation and beyond. [15]

Obstacles to accessing hyperacute therapies for suspected paediatric stroke include poor clinical recognition by parents, prehospital and emergency care providers, and the logistical challenges to rapid diagnostic brain imaging. [16]

Discussion

Adult stroke is linked to indirect risk factors such as hypertension or smoking, whereas paediatric stroke is more likely to have a direct risk factor such as congenital cardiac disease, inherited thrombophilia or sickle cell disease. [17] Over 40% of children with ischaemic stroke have at least one direct risk factor for stroke. [18] In contrast to this, in cases of post-varicella stroke, children are much more likely to be previously well. [19] Neurological manifestations of varicella infection have been observed to occur from 1 week to 12 months after primary infection. [20] Askalan et al. reported that varicella-associated acute ischaemic stroke accounts for almost one third of childhood ischaemic strokes.[19] Recurrence of ischaemic stroke or transient ischaemic attacks is reported in one quarter to one third of childhood post-varicella stroke. [11, 20] There is a paucity of data regarding rates of paediatric stroke in Ireland and no incidence rates for post-varicella stroke in Ireland were found.

The varicella vaccine is safe and effective in preventing varicella infection in children. On ten year follow up, the vaccine was shown to be 98.3% effective in preventing primary varicella infection when 2 doses were given. Vaccine effectiveness was also high for a single dose (94.4%); however, children who received 1 dose compared with 2 were 3 times more likely to develop primary varicella infection (2.2% v 7.3%). [11, 12] The World Health Organisation recommends that countries where there is an important public health burden could consider introducing the varicella vaccine into the routine childhood immunisation programme. [21] The varicella vaccine has been used as part of large universal vaccination programmes in other European countries and the USA. [11, 12, 22] In Ireland, varicella vaccines are not yet part of the universal vaccination schedule. Varivax® is the only licenced varicella vaccine in Ireland. It is a live attenuated vaccine, recommended for use in children over 1 year of age and adults. It is given in a 2 dose schedule, at least 4 weeks apart. [23] Acute varicella infection places a substantial burden on Irish hospitals with over 200 admissions annually. Acute varicella infections impact adult health also, with 19% of admissions in those over 18 years of age. Acute varicella infection uses 1100 acute and 160 intensive care bed days each year. [24]

Case reports previously raised the possibility of a link between varicella vaccine and increased risk of ischaemic stroke. As the varicella vaccine is a live vaccine this link was thought to be scientifically plausible. [25] A large population-based study looked at over 3 million children, including 1.14 million that had been given the varicella vaccine. This study demonstrated that children who received the varicella vaccination had significantly lower levels of ischaemic stroke than the unvaccinated children. [11] Therefore this concern is no longer a valid reason to withhold varicella vaccination.

Any child with acute neurological symptoms (intermittent or fixed) consistent with stroke should seek emergency care immediately, with pre-notification to the receiving institution being strongly recommended.

Previous varicella infection should be considered as neurological symptoms can occur up to a year following chicken pox. [20] The management of post-varicella stroke in children remains variable with little high quality evidence to guide management decisions.[13, 14]

Universal vaccination would reduce the burden of hospital admissions for varicella infection in Ireland. [24] With the availability of a safe and effective vaccine against primary varicella infection, the argument for universal vaccination is further strengthened by case series which demonstrate the significant sequelae of infection, such as those detailed in this paper.

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

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Lithium Toxicity; Important Considerations When Treating a Medically Unwell Older Adult Prescribed Lithium

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Dear Editor,

Lithium is a well-established treatment for psychiatric disorders, including Bipolar Affective Disorder, Schizoaffective Disorder and often as an augmentation agent in Treatment Resistant Depression. Older adults are often excluded from drug trials resulting in a limited evidence base, however available research has consistently supported lithium's superior efficacy to other mood stabilisers and demonstrates that lithium is a safe and effective first line agent in this population[1].

The pharmacokinetics of lithium present numerous safety considerations for patients of all ages including the narrow therapeutic index, drug interactions and the necessity for regular monitoring of serum levels[2]. The "therapeutic window" or normal serum range, is often quoted as 0.4-1.0mmol/L, however this may be too high for older adults. It has been recognised that toxicity can occur in older adults at serum concentrations of 0.5-0.8mmol/L, although the majority of this evidence has been published in case reports[3].

The presence of acute medical illness and multiple comorbidities pose significant risks for toxicity. Lithium toxicity can present with a variety of signs and symptoms which are non-specific and range from mild to severe. Although most patients recover well following the management of lithium toxicity, there is a risk of chronic kidney damage, neurological injury, and rarely death.

Data was collected on all patients with lithium toxicity referred to the Old Age Liaison Psychiatry service over a 5-year period to explore common precipitating factors of toxicity and identify any barriers to prompt recognition and treatment.

In total ten patients were diagnosed with lithium toxicity over this period. On admission five patients had lithium levels taken, which ranged from 1.4-1.8mmol/L, a diagnosis of toxicity was made, and their lithium was held. Three patients were likely toxic on admission, however as their levels were <1.00mmol/L there was a delay in diagnosing lithium toxicity and stopping the offending agent.

The two other patients developed lithium toxicity during their admission. The serum concentration of lithium when toxicity was diagnosed ranged from 0.7-2.0 mmol/L.

Patients presented with a range of symptoms of toxicity, the most common being malaise (100%), confusion (80%), dehydration (70%) and anorexia (60%). There were multiple risk factors for toxicity noted in each patient, the most common being polypharmacy (100%), dehydration (60%), infection (50%) and falls (50%).

Our findings highlight the importance of lithium serum level measurement on admission but also the need for regular monitoring during an admission. One of our most striking findings was the number of presentations of toxicity whose lithium levels were within the "normal therapeutic window" (30%). Lithium toxicity should be considered in any patient prescribed lithium presenting with a prolonged delirium and otherwise non specific symptoms[4]. Additionally, the symptoms of lithium toxicity can be vague and often difficult to distinguish from other comorbid medical syndromes, which may contribute to delayed diagnosis.

Although lithium can be a safe and efficacious drug in this population, the risk of toxicity must always be considered during acute illness and expert advice should be sought if there are any doubts on appropriate management.

Ethical Approval:
Ethical approval was obtained from the Research and Innovation Office, St James's Hospital, Dublin.

Declaration of Conflicts of Interest:
There are no conflicts of interests to declare.

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Infantile Hypertrophic Pyloric Stenosis in a Preterm Infant Following Nasojejunal Tube Feeding

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Infantile hypertrophic pyloric stenosis is a disorder of young infants caused by hypertrophy of the pylorus, which can progress to near-complete obstruction of the gastric outlet, leading to forceful vomiting[1].

Hypertrophic pyloric stenosis occurs in approximately 2 to 3.5 per 1000 live births, although rates and trends vary markedly from region to region, it is more common in males and preterm babies. Approximately 30 to 40 percent of cases occur in first-born children (approximately 1.5-fold increased risk). Symptoms usually begin between 3 and 5 weeks of age, and very rarely occur after 12 weeks of age[1].

A baby boy was assessed for poor weight gaining, as he was preterm started on Nasogastric tube feeding, but later found to have poor weight gaining as he was having significant GERD despite treatment. He is an outcome of twin pregnancy delivered at the gestational age of 29+6 days, 2nd twin of primipra mother. The baby had RDS and later developed chronic lung disease.

As he has unsatisfactory weight gaining while feeding on NGT, a Nasojejunal tube was inserted for feeding at the age of 37 weeks corrected gestational age (50 days of age). It remained in-situ for about 5 weeks with good weight gaining.

He was also treated with erythromycin as prokinetic at the age of 8 weeks and continued for further 6 weeks. He was also on diuretics (for bronchopulmonary dysplasia), proton pump inhibitor and food thickener to treat gastro-oesophageal reflux.

Shortly after removal of the NJ tube, he had projectile vomiting. Blood gas showed hypokalaemic hypochloraemic metabolic alkalosis. An abdominal ultrasound was performed, and it revealed significant pyloric stenosis. He required Surgery and had a positive recovery.

The aetiology of IHPS is unclear but probably is multifactorial, involving genetic predisposition and environmental factors. Neonatal hypergastrinemia and gastric hyperacidity may play a role. Prematurity may be a risk factor[1]. Other risk factors are macrolide antibiotics[3].

Infants who cannot maintain adequate oral intake due to pulmonary, cardiac, and/or neurologic disorders often require enteral tube feedings. Initially, such infants need nasogastric tube feeding. Few cases don't get benefit with nasogastric tube feeding as it can cause significant complications such as reflux and aspiration, Trans- pyloric tube feeding usually needed to overcome such complications.

Hypertrophic pyloric stenosis was first mentioned as a complication of trans-pyloric (TP) tube feeding in premature infants by Evans et al. in 1982[2]. Since then, more than 19 cases have been reported. The duration of the TP tube insertion from 2 weeks to several months[4].

The most common symptom of infantile HPS is projectile non-bilious vomiting, whereas the major symptoms of HPS associated with TP tube feeding are said to be an increasing volume of gastric residuals, an increase in the frequency and amount of vomiting and difficulty in establishing oral or nasogastric tube feeding[4]. The risk of developing pyloric stenosis in infants with respiratory distress syndrome who had been fed via the transpyloric tube as 20 times greater than the normal population[4].

In Conclusion, the mechanism of pyloric stenosis following transpyloric feeding is unclear. In Japan, the incidence was 15-fold (2.8%) higher compared to the overall prevalence of infantile HPS. Although it is a very rare complication, it must be taken into account when the symptoms of delayed gastric emptying are seen in an infant being fed via TP tube.

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Pitfalls of the Pigmented Lesion Clinic

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Approximately 1,000 new cases of melanoma are diagnosed in Ireland each year and the incidence is increasing annually[1]. The referral pathway is either by letter or using a form created by the National Cancer Control Programme (NCCP) in 2013 - the pigmented lesion referral form. This system means every patient who is referred is seen in a consultant led clinic.

We evaluated our pigmented lesion clinic in University Hospital Limerick. Data was prospectively collected at pigmented lesion clinics between August 2018 and May 2019. Clinicians were provided with data sheets and asked to provide information pertaining to both the referral and the clinical consultation.

Data was obtained from 727 consultations. The average waiting time was 28 weeks (SD±14.21). Wait times for the 11% of patients (81) whose referral reason was 'a likely melanoma' was 18 weeks. The average wait time for the 4% of patients (30) who clinically on assessment had lesions consistent with melanoma was 20 weeks.

The most common reason for referral, representing 55% of referrals (404) was "a changing mole requires assessment". Of the lesions assessed 34% (248) were benign naevi. A further 30% (223) were classified as other forms of benign lesions (seborrhoeic keratoses, dermatofibromas, solar lentigos).

Our results show that 64% of patients seen had clinically benign lesions which has led to slower access for those with melanoma. The written information in the referral did not allow us to triage or see melanoma quicker, either with the NCCP referral form or by letter.

The Covid 19 pandemic is impelling us to revaluate our entire health system as we cope with limited clinic capacity and thus inevitably longer wait times. Teledermatology is being used in many countries and evidence supports it as a valid and accurate form of practice[2]. For pigmented lesions, it offers the dual advantage of identifying and discharging the clearly benign lesions while expediting review or direct excision of lesions that are clearly malignant.

Camera phone images are not sufficient to improve triage. High quality dermatoscopic images are required to safely assess and discharge patients with benign lesions. In the U.K some dermatology departments use an asynchronous model where patients are invited to attend a hub and trained dermatology nurses take gross and dermatoscopic images of lesions that are promptly assessed on a "dry round" by their consultant colleagues[3]. A secondary gain of this system is that it provides an educational opportunity for general practitioners by facilitating prompt visual feedback of the relevant features of the lesions they referred.

The Scheduled Care Access Plan published by the Dept of Health in March 2019 highlights dermatology as a specialty with long waiting lists in need of more resources[4]. The plan sets out intentions to introduce "see and treat" clinics. Our data highlights the importance of improving the triage system in place so that the appropriate patients are seen at these clinics.

High quality teledermatology combined with teledermoscopy performed in the community, in alignment with the Slaíntecare model, is likely to be the pathway to help us better diagnose and triage benign from malignant.

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A Knowledge Gap in Neonatal Tissue Donation in Irish Maternity Units

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Dear Sir,

Dr John Murphy`s piece on organ donation in young infants aroused curiosity about the understanding and awareness of the process among Health Care Professionals (HCPs), especially when it comes to the neonatal age group[1]. In addition to organ donation after neurological or circulatory death, the discourse must also include tissue donation after death. This includes removal of tissue, usually cardiac tissue such as valves, and/or cornea in the hours after death. Such tissue can be used to provide valuable human allogenic valve repairs to infants and small children, or potentially improve vision in up to 6 people per infant donation. Umana et al concluded that there is a need to increase awareness along with implementation of educational programmes among HCPs regarding organ donation and transplant in their survey which assess the attitudes and level of knowledge of HCPs regarding organ donation[2].

There is a paucity of data about Irish neonatal tissue donation in the literature, which prompted us to undertake a telephone survey of all 19 neonatal units across Ireland, to assess the level of knowledge and awareness of caregivers for this age group. This was performed by targeting Clinical Nurse/Midwife Managers (CN/MM's), advanced nurse practitioners or senior physicians and reflects the average level of awareness about the process amongst the neonatal community. The 'Yes or No' questionnaire focused on the awareness of the process itself, the presence or absence of a written policy relating to neonatal tissue donation in their unit, who to contact in case of donation, what tissues could be donated and finally we asked if information relating to neonatal organ donation would be useful to have in their units.

We found that no single unit across Ireland reported having a written policy or guidelines for tissue donation process in neonates. Only 15% of units contacted were aware about the process itself. When contacted 30% knew what tissues could be donated, and 10% knew who to contact if required. Twenty per cent of units reported having a case of tissue donation in their unit and 94% of units believe that the above information would be useful to have in their units. During the course of the survey a common misconception among HCPs relating to the process of tissue donation/retrieval was noted that it should be carried out in a tertiary centre.

However, this is not the case. The retrieval procedure requires an operating theatre and the assistance of one surgical nurse so that the transplant team can operate in the hospital where the donor is present or has died, thus potentially avoiding having to unnecessarily move families from their support networks and homes in a very trying time.

This survey exposed a gap in the knowledge and awareness of the tissue donation process in neonates in Ireland and sheds light on the importance of having a national policy for it. It also suggests that there is a substantial room for improvement of training and orientation especially for the caregivers who are likely to initiate this process.

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Puff Adder Bite in Ireland

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Legend tells of St Patrick who banished all snakes from the island of Ireland in the 5th century A.D. This case however describes what is thought to be the first potentially fatal snake bite in Ireland.

Great was the surprise, mere days before the annual St Patrick's Day celebrations, when a Regional Irish Emergency Department received a 22 year old amateur Herpetoculturist, with an array of exotic reptiles and amphibians in his collection, who had been bitten by a Puff Adder on the first web space of the right hand.

The Puff Adder (*Bitis arietans*), a heavy-bodied viper species, widespread through Southern Africa, is potently cytotoxic, causing severe pain, swelling, blistering and in many cases, severe tissue damage. Extensive necrosis, compartment syndrome, deep venous thrombosis, hypotension and coagulopathy are uncommon, but devastating complications. Fatalities are rare. Polyvalent antivenom (The South African Institute of Medical Research (SAIMR) Polyvalent Snakebite Antiserum (SAVP)) is effective and should be administered sooner rather than later.[1]

On initial presentation, more than 90 minutes after the bite, the patient complained of severe pain in the right forearm, with extensive soft tissue swelling of the hand. Initial management included the removal of the applied compression bandages, limb elevation and analgesia. Compression bandages are not recommended for cytotoxic snakebites as these are can worsen local tissue damage if done too tightly or incorrectly. An arterial tourniquet should never be used.[2]

Throughout, the patient remained haemodynamically stable with no signs or symptoms of systemic envenomation (hypotension and coagulopathy) - a rare, but severe, life threatening complication.

Within 4 hours, the soft tissue swelling, and erythema extended up to the elbow, with ongoing severe pain in the affected limb, only transiently relieved by opiod analgesia. Swelling up to the elbow within 3-4 hours suggests severe cytotoxic envenomation and is an indication for antivenom administration. The antivenom will not "reverse" the existing tissue damage, but will limited further damage.[2, 3]

The SAVP polyvalent antivenom is not available in Ireland and would typically need to be sourced from mainland UK, with the inevitable delays in administration. On this occasion, fortunately, the antivenom was sourced by the National Poison Centre, from Belfast and arrived in Dublin within 2 hours.

Prior to administration of the antivenom, the patient was pre-treated with adrenaline subcutaneously[2], in anticipation of a potential early anaphylactoid reaction to the antivenom, occurring in up to 76% of case.[4] Thereafter, an initial dose of 50 ml of the SAVP polyvalent antivenom was administered intravenously. No adverse reactions occurred, and no subsequent doses were required.

Subsequently no further significant soft tissue damage developed, and the patient required only analgesia and physical therapy.

The island of Ireland should no longer be believed to be snake-free. These snakes are exotic and antivenom will likely not be available locally. The inevitable treatment delays can lead to significant morbidity and/or mortality.

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A Survey of Parental Experience Within the Neonatal Unit During the Coronavirus Pandemic

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Dear Sir,

In response to the coronavirus pandemic unprecedented restrictions on NICU visiting were introduced to safeguard vital services. To assess the impact of these measures and evaluate supports that could be offered we conducted a survey of parental experiences during the coronavirus pandemic.

Ethical approval was granted, and an anonymous survey of parental experience was performed from 22/06/2020 to 17/07/2020. Parents completed the survey on an opt in basis and 24 surveys were collected. At the time of the study visiting was restricted to 1 hour per day, with one parent visiting per time slot. Of parents surveyed the length of admission was greater than one month in 33%, one week to one month in 42%, four to seven days in 21% and three days or less in 4%. Of these parents, 71% found restrictions an additional stress. Eighty-three percent agreed that restrictions were necessary to protect babies, while 87% agreed restrictions were necessary to protect staff.

The survey showed that 58% felt restrictions affected their ability to bond with their baby and 71% of mothers felt restrictions impacted on their partner's ability to bond. Thirty-three per cent of breastfeeding mothers reported that restrictions affected their breastmilk supply, of importance given the many benefits of breastmilk in the premature population.

Seventy-nine per cent of parents reported that images of their baby sent via secure email alleviated their stress with many requesting more content throughout the day. Additional supports accessed included the Chaplain (16%), Lactation Consultant (42%), Consultant Neonatologist (54%) and Psychologist (42%). The majority (92%) reported that the neonatal unit was a safe place for their baby and felt that they were provided with adequate support.

We utilised the Depression, Anxiety, Stress Scale (DASS21) to assess these emotional domains. Thirty eight percent experienced varying degrees of depression, 29% experienced differing degrees of anxiety and 33% experienced variable degrees of stress. These levels are higher than seen in previous studies.[1]

Many parents relayed stress at being unable to see their baby and bond as a full family unit. Parents found this time limit a negative aspect of their baby's admission. Other parents worried about the possible transmission risk they posed to their baby while visiting. Most families paid tribute to the empathetic nature of the unit staff.

This survey highlights the considerable stress placed on parents during the pandemic. Encouragingly, the vast majority of parents understood the necessity for restrictions. Similarly, the majority of survey respondents felt that they were well supported, and their baby was safe. The completion of the survey has allowed us to identify resources that we can use to support parents including video technology. Additionally, modernisation of hospital infrastructure to allow for recommended patient spacing could improve parental access during restrictions by allowing adequate social distancing. As we look towards the future, we must place value on parental accounts of their experiences during the first wave of the pandemic. This will assist us in formulating a comprehensive plan which safeguards services yet supports families.

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Covid-19 and Teaching Challenges

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Dear editor,

The coronavirus 2019 (COVID-19) pandemic has impacted all aspects of the healthcare system, particularly education. Educators were required to re-evaluate and fundamentally alter the way medical students are being taught, balancing concerns of safety and sufficient clinical learning. Of particular interest is the impact of COVID-19 on clinical obstetrics and gynaecology (OBGYN) rotations for medical students.

As a fourth-year medical student at the Royal College of Surgeons in Ireland (RCSI) in Dublin, the curriculum included five weeks of clinical rotations in hospitals throughout Ireland.

Smaller class sizes, in accordance with COVID-19 social distancing guidelines, allowed for a personalised learning approach; targeted case-based learning with increased student participation and discussion, and flexibility to focus on specific learning objectives, led to solid understanding of concepts.

In order to facilitate teaching, increased number of sessions, for shorter durations is required. Due to limited teaching time, educators are required to consolidate teaching plans and focus on important learning points, resulting in more efficient teaching styles. The end result is positive for educators and students, as learning objectives are conveyed more efficiently, leaving time for questions.

When reviewing medical school teaching to meet COVID-19 guidelines, a critical appraisal of prior curriculum was required to address safety concerns, which inadvertently strengthened the program[1].

While many positives changes have been brought about as a result of COVID-19, it begs the question whether these improvements outweigh the drawbacks felt on the clinical practice front[2]. While RCSI has maintained significant clinical time, time spent in hospital does not always translate to insightful learning experiences. Due to COVID-19 restrictions, many important clinical experiences could not occur because hospitals stopped seeing certain patients[3] like gynaecology outpatients at Our Lady of Lourdes Hospital in Drogheda and gynaecology ward at Cavan General Hospital.

While the missing clinical experience did not negatively impact on the rotation experience, it may have detracted from the specialty, resulting in less consideration by students to pursue OBGYN in training schemes after medical school.

Due to hospital guidelines, restructuring of OBGYN teams left medical students with limited face time with experienced clinicians in the field. Seeking out mentorship was difficult, preventing insightful discussions about OBGYN career development. Furthermore, it was difficult to appreciate the value of the multi-disciplinary team approach often employed in OBGYN. Specifically, when assigned to the labour ward, many healthcare professionals are involved, including OBGYN specialists and midwives. Due to COVID-19 social distancing guidelines, medical students were sacrificed and often asked to leave[4]. Despite RCSI's efforts, one cannot help but wonder whether COVID-19 has resulted in an incomplete, inaccurate representation of the OBGYN specialty.

The COVID-19 pandemic has drastically altered the way OBGYN medical students are taught. It is important to consider these changes, as they may have long term downstream effects on the recruitment of potential candidates entering OBGYN training schemes. While it is too early to determine the impact of these changes, it is vital to consider the benefits and drawbacks, while maintaining safety during the COVID-19 pandemic.

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The Implications of the COVID-19 Pandemic for Bereavement Practice and Support in PICU

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Dear Editor,

The COVID-19 pandemic has given healthcare workers reason to reflect on many aspects of caring for people at the end of life. That reflection extends to looking at the impact of the pandemic restrictions on how holistic family-centred care is delivered [1]. With mounting pressure of health service demand and resource constraints, it is challenging to find time and space to explore the implications for bereavement practice.

In the Paediatric Intensive Care Unit (PICU) we conducted a retrospective review of bereavement supports offered to bereaved families over two 3-month periods, November 1st, 2019 to January 31st, 2020 and April 1st, 2020 - June 30th, 2020. This study was carried out as part of a broader quality improvement project conducted over a period of 12 months. We identified seven domains of practice that are offered to families when a child is at the end of their life in PICU. These include open family visiting, religious or pastoral care services on PICU, co-sleeping, photography, memory-making and follow-up bereavement visits. Not all families avail of all or any supports. On admission, families are routinely referred to our social work team and psychology service. In the period November 2019 – January 2020, more that 90% of families availed of 3 or more supports offered on PICU at the end of their child's life. The study identified key areas for improvement including documentation and communication with community health services.

With the arrival of the pandemic, it became obvious that social and medical restrictions would have an impact on how families could be cared for in a children's hospital and intensive care unit during this difficult time [2].

When we compare the two time periods, there is a difference between the ranges of bereavement supports that could be extended to families during the pandemic. Specifically, due to government mandated restrictions we have not been able to provide open visiting to extended family, external photographers and follow-up bereavement visits.

Some bereavement meetings have taken place off-site, and clinical staff have remained in contact with families by telephone and email, to answer questions and offer emotional support. More widespread use of technology to facilitate video calls for family communication has been explored in adult ICU. This may have less applicability to PICU due to the young age and developmental stages of our patients.

Our audit was designed to describe multidisciplinary bereavement supports in PICU. The landscape of caring for infants and children at the end of life changed in an unforeseen manner during the audit period. As a result, there are consequences of this shift in practice which we have not measured. They include family follow-up and feedback, staff feedback, retention and morale. There are early studies published which indicate that staff experienced moral distress and anxiety during the first 6 months of 2020 [3,4].

As change is forced upon staff dedicated to dignified end of life care, the challenge is to create new ways of delivering compassionate bereavement care to families experiencing loss during the pandemic and after.

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