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COMMENTARY

INTERVIEW

ORIGINAL PAPERS

In this study, Deane et al aimed to generate an age-adjusted D-Dimer cut-off value in a local elderly population, which would potentially lead to increased specificity of the D-Dimer assay, thus reduce the number of false positive results.

Rutherford et al surveyed NCHD awareness of anti-HER 2 therapy and cardiotoxicity. The findings indicate a lack of awareness of the current cardiotoxicity guidelines.

Eakins et al review 79 childhood deaths reported to the Coroner. The ‘non-natural’ causes included 21 homicides, 7 drug intoxications, 7 RTAs, 5 smoke inhalations, and 2 drownings.

ORIGINAL PAPERS (Continued)

USE OF VIDEO CONSULTATION IN IRISH GENERAL PRACTICE: THE VIEWS OF GENERAL PRACTITIONERS

Alsaffar et al describe the use of the video consultation in general practice. The benefits are convenience and flexibility. The negative issues are the impact on the doctor-patient relationship, not being able to examine the patient, and the increased medico-legal risk for the doctor.

ADHERENCE TO RETURN TO PLAY PROTOCOLS IN CHILDREN PRESENTING WITH CONCUSSION

Mac Suibhne et al describe 57 children who suffered concussion. 80% were removed from the field of play. When they attended ED, 93% received advice on return to play protocols.

INTEGRATION OF TWO ACUTE PAEDIATRIC SERVICES DURING COVID-19

Coughlan et al describe the processes involved in the temporary closure of the inpatient paediatric services at Tallaght during the Covid pandemic. Organisation and flexibility were key factors in making it work.

INFANTS BORN IN A NON-MATERNITY HOSPITAL – THE ROLE OF THE NATIONAL NEONATAL TRANSPORT PROGRAMME (NNTP)

Moore et al describe the role of the NNTP in the delivery of 33 infants in non-maternity hospitals because of maternal conditions including cardiac disease and placenta accreta. The mean time taken was 3 hours 26 minutes.

THE IMPLEMENTATION OF CONSULTANT LED MRI PATHWAY FOR ACUTE MUSCULOSKELETAL TRAUMA

de Buitleir et al describe a series of 75 MRIs for musculoskeletal trauma. 90% of the scans found significant trauma including 9 cases with occult fractures.

CANCER PATIENTS' SATISFACTION WITH VIRTUAL CLINICS IN IRELAND DURING COVID-19

Mullally et al surveyed the role of virtual clinics for cancer patients. The patient satisfaction rate was high 96%. On the negative side, 56% missed the face-to-face consultation.

ORIGINAL PAPERS (Continued)

EUTHANASIA AND PHYSICIAN-ASSISTED SUICIDE – ATTITUDES OF IRISH CONSULTANT PHYSICIANS

Crowley et al surveyed Irish consultant attitudes to euthanasia. Overall, 67% opposed the legalising of euthanasia, 14% were in favour, and 18% were neutral.

RECALL TIME TO A SYMPTOMATIC BREAST UNIT FOLLOWING ABNORMAL MAMMOGRAPHY

Fullard et al reviewed 198 cases with abnormal mammogram findings. The average time to reporting the scan was 22 hours. The mean to recall was 17 days.

OCCASIONAL PIECES

THE GROWING APPETITE FOR VEGAN ANAESTHESIA

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LETTERS TO THE EDITOR

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The Neonatal Consultation with Parents Facing the Likelihood of an Extremely Preterm Birth

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

It is usual practice for the neonatologist to meet with parents antenatally when there is a likelihood of extreme preterm labour and delivery. The purpose of the antenatal counselling is to inform parents and to assist them with their decision-making.

The most challenging cases are those at the threshold of viability between 23+0 and 24+6 days gestation. This is commonly referred to as the 'gray zone'. On the other hand, infants born at 22+0 weeks gestation are not offered resuscitation in most countries while for those born at 25+0 weeks gestation and over intensive care is recommended[1].

The key issues for these extremely immature infants are the survival rate and the risk of long-term neurological disability. The discussion between the doctor and parents will centre around whether or not to resuscitate the infant at birth and commence on neonatal intensive care.

The quoted survival rates are fairly similar across data series. The Irish survival rate at 23 weeks gestation is 33% and at 24 weeks gestation it is 51%. The corresponding UK figures are 4 out 10 survivors at 23 weeks, and 6 out of 10 at 24 weeks[2]. Among survivors, the rate of severe disability at 23 weeks is 25% and at 24 weeks it is 15%. The problem at the antenatal consultation, however, is that one does not know which ones will do well and which ones will have an adverse outcome. There are, however, a few pointers that may help including gender, girls have a week advantage over boys, poor intrauterine growth and multiple births on the other hand are adverse factors. Time is frequently mentioned during consultations. At 23 weeks gestation, every additional day in the womb increases survival by 3%.

Making sense of numbers in life or death situations is very challenging. The problem with risk is that it only addresses the downside of the situation. The parents may view a 25% risk of severe disability differently and consider that it indicates that the infant will have 75% chance of not developing a severe disability. David Spiegelhalter, author of the Art of Statistics 2020, states that it is better to think in terms of both harms and benefits[3].

The consultation is, by its very nature, problematic. Kaemingk et al[4] point out that uncertainty is a central theme. It is difficult to convey this uncertainty in a meaningful and positive way. One has to take into account the parents' age and life experiences, their level of understanding, and their cultural and ethnic backgrounds. An interpreter may be required. When the message is uncertain, there is the temptation for a doctor to provide the patient with ever increasing rounds of details and medical information. It can lead to a long healthcare provider monologue with limited interaction and responses from the parents. This should be avoided. It doesn't help and it only adds to the family's confusion, and sense of hopelessness.

Shared decision making is commonly recommended. It is difficult to achieve. There is an uneven balance between the doctor and the parents. The doctor has the facts and the knowledge while the parents have little. It is important to engage with the parents at an early stage. Good openers are 'what do you already know about premature babies', 'what do you most fear', 'what do you hope for'. Give the parents the time and space to express their feelings and opinions. When they are finished you can summarise by saying 'what I'm hearing you say is _____, is that correct?'. In this way it is possible to open up a dialogue that is meaningful and helpful for parents. This facilitates informed choice.

Following the preliminary interactions, some commentators believe that the best approach is to set out what can be done for the infant and then discuss whether or not it should be done. This gives the family a platform to work from. It should include a brief description of the immediate resuscitation after birth, the ventilation, the intravenous feeding, the scans, the intensive monitoring, and the prolonged length of stay. This will give them an appreciation of the complexity of care that their infant will require.

It is equally important to describe how the infant will be managed if the decision is to not commence resuscitation and intensive care.

In these circumstances the infant will be dried, wrapped in warm blankets and a hat, and handed to the parents. A single room will be allocated. The nursing and medical staff will remain in close contact and will continue to provide support. On average infants born before 24 weeks live for 60 minutes but some may survive for a few hours. A cuddle cot is available for the infant. After the infant's death a bereavement plan should be in place. A follow-up pathway should be arranged for the mother and her partner. Consistent communication is important, and conflicting information must be avoided.

The communication skill is in the ability to provide and equip the parents with the necessary information on the care pathway in order for them to make their own informed decision. They need to know that their decision is not a binary, irreversible yes or no. There will be many opportunities along the infant's intensive care journey to pause and review whether continuation of the neonatal intensive care remains the best option for the infant. The commonly mentioned review points are a poor response to initial resuscitation, development of a large intraventricular haemorrhage, or severe necrotising enterocolitis. However, it must appreciated that parents don't make decisions for their infant based on facts only. They try to work out for themselves, what a good parent would do in this set of circumstances[5]. I am struck by how often parents bring the issue of pain and pain relief even at this early stage before the birth. It is important explain that both pharmacological measures such as morphine and non-pharmacological measures such as NIDCAP with nesting, minimal noise, reduced lighting, and structured care bundles are employed. The other question frequently asked is how long the infant will be in hospital if they survive. The median length of stay for a 24 weeks gestation infant is 123 days (interquartile range being 104 – 139)[6].

It is necessary to point out the uncertainty of medical care in situations like extremely preterm births. Parents need help to cope with this high level of uncertainty. It is difficult for them to walk the tightrope between being realistic on the one hand and being hopeful on the other. The one advantage of the uncertainties is that hope remains an option as any negative outcomes have yet to become a reality.

Building a relationship with the family is beneficial if time allows before the delivery. If one can re-engage with the parents on more than one occasion, they are more likely to express their true feelings around what should be done.

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Covid-19 and General Practice: Part 6

Interview with Dr. Ray Walley MRCGP FRCGP,
Member of the National Covid-19 GP Liaison Committee

General Practice is represented by high level members of the Irish Medical Organisation (IMO) and Irish College of General Practice (ICGP) in liaison with the HSE and Department of Health in response to the COVID-19 pandemic.

This briefing covers the period 15/02/21 – 12/04/21.

The National GP / HSE Liaison Committee teleconference on a formal weekly basis at 7.30am Fridays with further engagement continuing between the secretariats/practitioners of IMO / ICGP / HSE / Dept. of Health where appropriate.

How has General Practice continued to respond to Covid-19:

General Practice has been the first port of call for all initial Covid related engagements including telephone consultations and referral for testing, Respiratory assessment consultations, Covid-19 vaccinations. Practice teams continue to provide non-covid acute and chronic care consultations.

The following are the number of Covid consultation/test referrals done by GPs. Referral for testing was based on satisfaction of criteria set down by the HPSC/HSE algorithm. All referrals and results were in electronic format with results also being texted to patients. GPs followed up results with a telephone consultation.

- During Sept & Oct 2020, there were an average of > 8,000 daily community referrals with a peak of over 15,000 on 19th October.
- Between November and mid December 2020, there were an average of 4,300 community referrals for COVID testing per day (30,000 per week).
- From mid-December onwards there was with an average of over 9,000 community referrals for COVID testing per day between 16th & 25th December.
- Referrals increased further after Christmas, with an average of almost 19,000 community referrals for COVID testing per day between 26th & 31st December.
- Referrals peaked at 28,382 on 30th December, with a 7-day rolling total peak of 132,964 between 29th December & 4th January.

- Referrals trended downwards from mid-January but remained high throughout the month, with an average of over 9,000 per day.

- Referrals during February & March were lower than January, but still higher than last November. Average of over 5000 per day (36,000 per week).

The most recent figure of 4/4/21 showed a weekly referral rate of 38,418 thankfully continuing the downward trend with a 11% reduction on the previous week with an average of 5,488 referrals per day.

Covid-19 Vaccinations:

- By the 11/4/21 454,000 doses of Pfizer / Moderna Covid vaccines had been administered to over 70-year-old patients by GP Practice teams with a further 185,000 doses due to be administered the week of 12th of April then totalling 639,000 doses.

- The reflects the workload of circa 1300 GP practices The focus of the week of 4th of April was largely on completing dose 1 vaccination of the 75-79yo age cohort and commencing the 70 – 74 yo cohort whilst continuing dose 2 for 80-84 yo. Whilst going to press the Cork and Galway vaccine hubs were scheduled for circa 2400 patients with a mix of dose 1 and dose 2 patients due. These hubs were for practices that has 199 or less over 70yo patient cohorts and allowed economies of scale for mass vaccination. By the weekend of 11th April, the DCU Covid Hub over a number of weekends had administered vaccines to 12,000 patients and was gearing up for 2500 on Saturday 17th of April.

- By the weekend of 11th of April general Practice was responsible for half of all vaccines administered in Ireland and all vaccines administered in the community setting to the over 70s population.

- General Practice have also played its part in identifying over 70 yo patients who were too infirm to attend either a GP practice or Hub. This totalled 1800 patients Nationally. Vaccination of this cohort is still ongoing.

- A dedicated webinar was organised by the IMO in regard to the process for ordering and delivery. 2000 participants took part in the webinar.

- GPs were asked to indicate their interest in identifying and vaccinating Very High Risk patients from the NIAC allocation Group 4 – people aged between 16 – 69 who are at very high risk: The greater majority of practices have signed up to this campaign.

  This patient group includes:
  - Diabetics with a Hba1c >58
  - Patients with BMI >40
  - Patients suffering from severe CF / COPD or Pulmonary Fibrosis

Staggered Deliveries to practices are to commence of the Astra Zeneca vaccine on the week of 12th of April with practices advised to await NIAC guidance whilst they are reviewing the most recent EMA advisory.

Education and the Media:

The IMO and ICGP have recognised the importance of continued education of all Medical Practitioners and have organised webinars on a weekly/monthly basis. Most recent webinars have included the planned rollout of the Pandemic vaccine.

Members of the communication committee have been supported by written briefings from ICGP / IMO and HSE.

GP Media expert opinion placement has been a priority for both IMO and ICGP to ensure knowledgeable commentary from General Practice.

The IMO and ICGP have ensured that timely opinion is accessible through their respective public relations units.

The ICGP continues to update its excellent website daily and is the most up to date information point for GP educational issues.

Covid-19 GP Hubs:

Covid-19 Hubs are for Covid-19 + / or Presumed Covid-19 + patients and GP referral only.

Since 12th April 2020, there were a total of 12,256 attendances at community assessment hubs. This equates to an average of 236 attendances per week, with a peak of 785 attendances in the week commencing 10th January.

At the peak of the pandemic in December there were 17 hubs in operation with some hubs referring onwards up to 40% of assessments to Emergency Departments whilst the remaining 60% were managed in the community after discharge from the Hub by their referring GP.

Exclusion criteria for hubs included:

- Acutely unwell patients who require AMAU/ Emergency Dept. referral
- Non Covid-19 patients
- Maternity patients
- Children under 16 years of age

Ongoing challenges for General Practice include (in no particular order):

Representations have been made to the HSE on the following issues:

· Highlighting the importance of hospitals knowing if a first Covid vaccine given in hospital that the hospital was also responsible for the second vaccine dose
· Highlighting the importance of hospitals being alert to cancer referrals and appropriate timely triage.
· Highlighting the increased fragility of elderly patients who have reduced activity and increased falls risk to plan proactively for suitable guidance.
· Highlighting the importance of improved early and accurate communication on vaccine deliveries
· Ensuring there will be a review process in place for vaccinated patients who may acquire Covid-19.
· Advice of how specific needles and syringes allow extra doses from Covid-19 vaccines and if possible, these to be obtained.

Further Challenges:

GP workloads continue to be prioritised on clinical basis with Urgents taking precedence over routines, with the administrative task list secondary to clinical issues.

Personal Healthcare of both GPs and their staff is emphasised to ensure maintenance of good physical and mental health.

This is in no way a complete overview of work done by both the IMO and ICGP liaison group but is a summary of some priorities dealt with to date.

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Generation of an Age-adjusted D-dimer Cut-off Value in Elderly Patients to Exclude Suspected Venous Thromboembolism

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Abstract

Introduction
The D-Dimer assay is an essential diagnostic tool used in the clinical workup of suspected VTE patients. However, its high sensitivity far exceeds the assays specificity as age increases. This study aimed to generate an age-adjusted D-Dimer cut-off value in a local elderly population, which would potentially lead to increased specificity of the D-Dimer assay, thus reduce the number of false positive results.

Methods
Using the Stago STA Liatest D-Dimer assay, 61 patients ≥70 years which presented to the Emergency Department or Acute Medical Unit UHL were tested and assessed for the presence of VTE. Existing and locally derived D-Dimer cut-off values were examined to determine optimal specificity without infringement on assay sensitivity.

Results
With an assay specificity of <2%, results indicated that this population did not benefit diagnostically using the conventional D-Dimer cut-off value of 0.5µg/ml FEU. From the potential age-adjusted values investigated, the receiver operating characteristic (ROC) curve derived cut-off of 1.025 µg/ml FEU would have safely excluded 64% of this population from unnecessary imaging studies by increasing the specificity of the D-Dimer assay to 66.1%.

Conclusions
The combination of the ROC derived cut-off value of 1.025 µg/ml FEU in combination with an “unlikely” Wells score was associated with a higher number of “negative” VTE cases when compared to the conventional cut-off of 0.5µg/ml FEU.

***Keywords**:* D-dimer, age adjusted cut-off values, venous thromboembolism

***Abbreviations**:*

AUC Area Under the Curve
CI Confidence Interval
CLSI Clinical and Laboratory Standards Institute
COPD Chronic Obstructive Pulmonary Disease
CTPA Computerised Tomography Pulmonary Angiogram
CV Coefficient of Variation
DIC Disseminated Intravascular Coagulation
DVT Deep Vein Thrombosis
FDP Fibrin Degradation Product
FEU Fibrinogen Equivalent Units
NPV Negative Predictive Value
PE Pulmonary Embolism
PTP Pre-Test Probability
PPV Positive Predictive Value
ROC Receiver Operator Characteristics
SD Standard Deviation
UHL University Hospital Limerick
VTE Venous Thromboembolism

Introduction

Venous thromboembolism (VTE) is a potentially fatal yet treatable medical condition comprising of both deep vein thrombosis (DVT) and pulmonary embolism (PE)[1]. VTE has an annual incidence of approximately 0.1% in the general population however this increases 10-fold in individuals 75 years or older [2]. Diagnosing VTE provides a challenging task for the physician as signs and symptoms of VTE also share common symptoms with other potentially fatal disease states [3]. For this reason, a sequential diagnostic strategy is used. This involves a clinical pre-test probability (PTP) risk assessment or Wells score, a D-Dimer diagnostic test result and if necessary, diagnostic imaging [4, 5, 6, 7].

Currently, there is no single accurate diagnostic test for VTE. D-Dimer levels are elevated in acute VTE; however, the specificity of the D-Dimer assay is not exclusive to venous thrombosis. Other non-thrombotic conditions result in elevated D-Dimer levels such cancer, recent surgery, inflammation, pregnancy and aging [3]. For this reason, the diagnostic workup involves the use of a clinical pre-test probability (PTP) risk assessment in combination with the D-Dimer diagnostic assay due to its high false positive result rate. It is recognised that aging is associated with naturally elevated levels of D-Dimers in the blood [8, 9].

D-Dimer assays are highly sensitive (≥97%) and also have a high negative predictive value (NPV), meaning that D-Dimer levels below a predetermined cut-off value can safely exclude a suspected VTE case once an "unlikely" Wells score is applied [2,3]. However, this high sensitivity (negative predictive value) far exceeds the specificity (positive predictive value) as age increases [10].

Clinically, a predetermined D-Dimer threshold value of 0.5 µg/ml FEU has been validated by numerous studies [2, 11, 12]. As the consequences of missing a VTE are potentially fatal, this conventional threshold is used universally for all age groups, even though D-Dimer levels increase naturally with age. This means the percentage of elderly patients with D-Dimer levels lower than the conventional cut-off (0.5 µg/ml FEU) in which VTE can be excluded is reduced [11]. This prevents a fragile population group from benefiting from a non-invasive diagnosis [3]. By raising the threshold value which determines a positive result, numerous studies have increased the specificity of the D-Dimer assay resulting in fewer false positive results while still maintaining assay sensitivity [13, 14].

This study aims to generate an age adjusted D-dimer cut-off value for elderly patients (over 70 years of age) with suspected VTE using the STA® Liatest D-Di Kit on the Stago STA-® coagulation analyser (Diagnostica Stago, France). This study will also compare this threshold to other recommended D-dimer cut-off values which are utilised in relevant age-adjusted D-dimer studies [8, 15, 16].

Methods

This observational study investigated patients 70 years or older in which the clinical suspicion of VTE required exclusion. All these patients were out-patients and presented to either the Emergency Department or the Acute Medical Unit in the University Hospital Limerick. Over a 4-month period, 116 patients (56 males and 60 females) were included in the study. Exclusion criteria included a "likely" Wells score, anticoagulants, previous VTE, active cancer, recent surgery immobilisation and severe Chronic Obstructive Pulmonary Disease (COPD). All patients had a "positive" D-Dimer result ranging from 0.53-1.3 µg/ml FEU. Ethics approval was granted by the Research Ethics Committee in UHL on the 26th of February 2018 in accordance with the 'The Code of Ethics of the World Medical Association' (Declaration of Helsinki). Informed consent for the study was obtained from each subject.

Each patient was assessed using the Wells scoring system. A Sarstedt® S-Monovette Sodium Citrate 9 NC/2.9ml specimen was obtained from each patient which had a D-Dimer test requested based on the clinician's suspicion for either DVT or PE. All samples tested were <8 hours old and centrifuged at 2000g at room temperature upon arrival into the haematology laboratory. Samples were quantitatively analysed for the D-Dimer molecule using the Stago STA-R Evolution® (Diagnostica Stago, France). Since all patients had a "positive" D-Dimer result using the conventional cut-off value of 0.5 µg/ml FEU, each patient should have received the necessary imaging technique. This was Doppler ultrasound for DVT and a Computerised Tomography Pulmonary Angiogram (CTPA) for PE. This provided an end-result of "positive" or "negative" for VTE.

Numerous cut-off values were then applied to the study population group. They included the conventional cut-off value of 0.5 µg/ml FEU for the STA® Liatest D-Di assay which is applied to all patients regardless of age, and the age adjusted algorithm proposed by Douma and colleagues (Age (in years) X 10 µg/l) [13]. This study also examined the use of the ROC curve derived cut-off value. This value will maintain 97% sensitivity and exhibit the best available specificity [12]. Finally, this study examined the fixed cut-off value of 1.0 µg/ml FEU proposed by Sharp et al. (15). These comparisons provided calculations of sensitivity, specificity, Negative Predictive Value (NPV) and Positive Predictive Value (PPV). The percentages of patients safely excluded using these various cut-offs were also investigated.

Statistical analysis of the data in this study was performed using SPSS (version 23). For the generation of cut-off values, ROC curves were prepared for each population at a 95% CI, with the area under the curve being calculated also.

Results

Of the 116 patients recruited, 55 were excluded from the study due to failure of performing the required imaging technique (CTPA for PE and Ultrasound for DVT). Of the remaining 61 patients, 44.3% were male (n=27) with a mean age of 77.7 years (70-88, 95% CI). Females accounted for the remaining 55.7% (*n*=34) with a mean age of 78.3 years (70-94, 95% CI). All these patients fulfilled the three stages of the study method as previously described. Patients in this study had a D-Dimer result between 0.5-1.3 µg/ml FEU, with males having a mean value of 0.87 µg/ml FEU and females having a slightly higher mean value of 0.97 µg/ml FEU. The breakdown of positive and negative patient results for VTE are illustrated in Table 1.

Table 1: Illustrating the number of positive and negative VTE patients for the study group (≥70 years)).

Group	**No. of patients**	**No. of positive imaging results**	**No. of negative imaging results**
70-79 years	37	2	35
80 years or older	24	0	24
Whole population	**61**	**2**	**59**

Number of positive and negative VTE cases for each age group. Only two positive results were observed, both in the 70-79 age category. The first patient was positive for PE, with a D-Dimer result of 1.28 µg/ml FEU with a history of chronic bronchitis. The second patient was positive for DVT with a D-Dimer result of 1.03 µg/ml FEU with no previous history.

Performance criteria of the various D-Dimer cut-offs can be seen on Table 2. The optimal manufacturer sensitivity of 97% was maintained for all cut-off values. The most significant increase in specificity was seen in the ROC derived cut-off value of 1.025 µg/ml FEU with an Area Under the Curve (AUC) of 0.822 (95% CI, 0.607-1.0). Applying this value to the population, increased assay specificity to 66.1% while maintaining 97% sensitivity was observed.

Table 2: Performance criteria of the various D-Dimer cut-offs in the whole study population.

	Whole population			
	Conventional cut-off (0.5 µg/ml)	Age adjusted cut-off (Age (in years) X 10 µg/l)	Fixed cut-off of 1.0 µg/ml (Sharp et al)	ROC derived cut-off (1.025 µg/ml; AUC, 0.822, 95% CI, 0.607-1.0)
Sensitivity	97%*	97%*	97%*	97%*
Specificity	<2%	32.2%	61%	66.1%
NPV	100%	100%	100%	100%
PPV	3.3%	4.8%	8%	9.1%

Table 3 assesses the percentage of patients in this study who would be considered negative for VTE when applying these various cut-off values. Since the study only selected patients with a positive D-Dimer result, the conventional cut-off (0.5 µg/ml FEU) failed to exclude VTE in all of these patients. The remaining three cut-offs performed well, with the best results seen in the ROC derived cut-off. Using this cut-off, 39 patients (64%) would have produced a negative D-Dimer result, thus preventing the need for unnecessary imaging techniques in over half of the population group. Table 4 illustrates the mean, standard deviation, and the analytical D-Dimer range of the study population. The most common explanation for patients not scanned was “scan request cancelled/denied by team” and accounted for approximately 30-40% of cases.

Table 3: VTE negative patients when D-Dimer results are applied to the various cut-off values for the whole population.

Group	**No. of patients**	**% neg with standard cut-off (0.5 µg/ml FEU)**	**% neg with age adjusted cut-off (Age x 0.01µg/ml FEU)**	**% neg with cut-off of 1.0 µg/ml FEU**	**% neg with ROC derived cut-off (1.025 µg/ml FEU)**
Whole population (≥70 years)	61	0/61 (0%)	20/61 (33%)	36/61 (59%)	39/61 (64%)

Table 4: Comparison in mean, standard deviation, minimum and maximum D-Dimer value of patients who received scans versus patients who did not.

Group	No. of patients	Mean D-Dimer result µg/ml FEU	Minimum D-Dimer result µg/ml FEU	Maximum D-Dimer result µg/ml FEU	SD
Scanned population	61	0.93	0.53	1.3	0.22
Not scanned population *	55	0.81	0.52	1.3	0.24

**Primary reasons for non-scanning: Scan result denied by radiology (30-40%), symptoms of VTE resolved, lack of availability of scan, alternative diagnosis found/suspected, D-Dimer ordered by on-call team, clinical plan changed by supervising consultant, patient RIP, patient discharged.*

Discussion

The D-Dimer assay is an essential diagnostic tool used in the initial clinical workup of suspected VTE patients [11]. However, its high sensitivity far exceeds the assays specificity as age increases [10]. It is widely documented that D-Dimer levels increase naturally with age often without any underlying thrombotic disease [8, 9, 11]. The most logical solution to this problem is to raise the conventional D-Dimer cut-off in elderly patients. Studies reported the increased utility of the D-Dimer assay when applying an age adjusted D-Dimer cut-off, which resulted in the increased specificity of the D-Dimer assay [8, 13, 14].

Results from this analysis corresponded with other studies which indicated an increase in assay specificity when higher age-adjusted cut-off values were applied to this population group [8, 11, 13, 14]. The performance of the conventional D-Dimer cut-off (0.5 µg/ml FEU) was extremely poor, with a specificity of <2% for this population. This result was somewhat expected as only "positive" D-Dimer results were included in this study (results between 0.53-1.3 µg/ml FEU). Although a small sample size, this result highlights the low prevalence (3.28%) of VTE in this population as only 2 patients were positive for VTE out of 61 individuals.

Utilising the age adjusted algorithm proposed by Douma et al, specificity of the D-Dimer assay increased to 32.2% while maintaining 97% sensitivity [13]. Although, this was a significant increase when compared to the conventional cut-off, other studies reported significantly higher increases in specificity [11, 14, 17]. One possible explanation for such differences may be due to our inclusion of only participants with D-Dimer levels between 0.53-1.3 µg/ml FEU, while these studies had no restriction on D-Dimer values thus a variety of values have been included. For this study, the ROC derived cut-off value performed best. With a value of 1.025 µg/ml FEU, the specificity of the assay increased to 66.1% while maintaining 100% sensitivity.

Similar studies recommending general cut-off values witnessed vastly improved assay specificity. However, they often appeared to affect the sensitivity of the assay. Sharp et al reported 75.4% specificity with 84.2% sensitivity for a general cut-off of 1.0 µg/ml FEU while Granziera et al. reported a sensitivity of >98% and specificity of 39.1% when using a cut-off of 0.98 µg/ml FEU [15, 18].

Focusing on the ROC derived cut-off which provided the highest increase in specificity, 64% of the study population could have been safely excluded for VTE without the requirement of a radiological examination. In contrast, none of the patients were deemed negative using the conventional cut-off. Compared to the literature, the performance of the ROC cut-off appears superior to the age-adjusted algorithm. Righini et al. concluded that the proportion of patients excluded based on D-Dimer result increased from 6.4% to 29.7% while Douma et al. reported 42% of patients could be excluded using the new age-adjusted algorithm versus 36% with the conventional cut-off [8, 13]. In this study, the ROC cut-off could have safely out-ruled 64% of the population, while only 33% would be out-ruled using the age adjusted cut-off algorithm. This increase in assay efficiency offers the potential to limit Emergency department referrals along with unnecessary radiological exposure in the elderly population.

A key secondary finding of this study was the high number of patients with "positive" D-Dimer results (conventional cut-off) that did not receive the necessary radiological examination. Based solely on the D-Dimer result, the necessary scan should have been performed irrespective of the explanations provided on table 4. "Scan request cancelled/denied by team" accounted for the highest proportion of cases (approx. 40%), however further investigations/audits should be performed to recognise the failure to complete the appropriate diagnostic strategy of VTE.

This study confirms that the use of an age-adjusted D-Dimer cut-off significantly can increase the specificity of the D-Dimer assay in elderly patients (70 years or older). Using the conventional cut-off of 0.5 µg/ml FEU, all patients in the study required radiological examination. However, by applying the ROC derived cut-off of 1.025 µg/ml FEU, 64% of the population would have safely been excluded from the diagnosis of VTE while maintaining assay sensitivity, thus minimising the requirement of unnecessary imaging studies. This study provides a practical approach to implementing locally derived ROC cut-off D-Dimer values for small and medium sized laboratories. Given the wide variety of methodologies available on the market, it demonstrates the benefits of D-Dimer ROC cut off values to Irish medical laboratories to replicate the improved specificity findings found in larger age-adjusted D-Dimer publications, systematic reviews and meta-analyses.

Declaration of Conflicts of Interest:

There is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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Cardiotoxicity Monitoring Guidelines in Patients on Anti-HER2 Therapy

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Abstract

Introduction
Anti-HER2 therapies such as Trastuzumab carry warnings for cardiotoxicity, though cardiac assessment and monitoring remains an area of clinical debate. Utility of cardiotoxicity monitoring protocols in light of refined treatment regimens is unknown. The degree to which day-to-day clinical practice is informed by current guidelines is unclear.

Methods
A brief survey was designed to audit guideline awareness relating to cardiotoxicity prevalence and monitoring in breast cancer patients treated with HER2-targeted therapy amongst a representative cohort (n=10) of non-consultant hospital doctors (NCHDs) on the breast cancer surgical service in a large tertiary referral centre.

Results
Some lack of awareness of current guidelines across grades was evident, which likely reflects a disconnect between the theoretical guidelines and their clinical usefulness, as well as the relatively infrequent prevalence of cardiotoxicity. Although understanding of normal parameters was generally good (80% of NCHDs correctly recognising normal baseline LVEF as >55%), appropriate frequency of monitoring (12 weekly) was underestimated by 90% of this cohort (n=10). All respondents also underestimated the recommended frequency of monitoring in patients with cardiac impairment. Prevalence of cardiotoxicity was overestimated by all respondents. Although 90% of clinicians surveyed could suggest several assessment modalities, MUGA scans were not mentioned, despite being the method suggested in the Irish guidelines.

Conclusion
Cardiotoxicity is an infrequent but clinically important adverse event in the treatment of HER2-positive breast cancer patients. This small study suggests the timeliness of reviewing and potentially updating current guidelines to reflect imaging advances, as well as re-examining the criteria for scanning frequency in light of refined treatment protocols.

Introduction

Cardiotoxicity is an established clinical issue associated with the use of the HER2-targeted therapy Trastuzumab, though the mechanisms underlying this clinical problem remain unclear. Given the ever-growing prevalence of cardiac conditions in an aging population (the same population most at risk of developing breast cancer), healthcare providers continue to be wary of cardiac complications, which may range from asymptomatic decreases in left ventricular function to fulminant cardiac failure and arrest [1]. Moreover, as treatment efficacy improves and patients can expect to live longer, the long-term side effects of treatments such as Trastuzumab on cardiac health will become evident. A "risk- benefit" model may be employed, whereby the anticipated clinical benefit of therapies is weighed against risk factors for the development of cardiotoxicity (such as pre-existing cardiovascular disease, advanced age, concurrent cardiotoxic therapies etc.). In this framework, clinicians aim to maximise clinical benefit from anti-HER2 targeted therapies with due regard to potential risks.

Several mechanisms to explain drug-related cardiotoxicity have been proposed, most of which have been developed in the context of concurrent anthracycline and Trastuzumab treatment. Though anthracycline treatment exhibits a dose-dependent, irreversible cardiotoxicity and Trastuzumab-associated cardiotoxicity is broadly thought to be reversible, recent work has suggested that ultrastructural cardiac changes may persist after cessation of Trastuzumab therapy [2]. Thus, although a move away from concurrent anthracycline treatment is noted in our centre in line with Irish and international practice, Trastuzumab related cardiotoxicity remains a valid issue.

Trastuzumab (Herceptin) carries a boxed warning for cardiotoxicity advising the assessment of cardiac function before and during treatment; similarly, newer anti-HER2 targeted therapies such as Pertuzumab and lapatinib also carry warnings for potential cardiotoxicity. Although the development of milder forms of treatment-related cardiotoxicity do not represent an absolute contraindication to therapy, discontinuation of therapy in the short term is advised if a patient's LVEF falls below "institutional limits of normal", a $\geq$ 10% decrease in LVEF (compared to pre-treatment baseline), or an absolute decrease of $\geq$ 16% [3]. The metrics used to delineate clinically important outcomes are variable within the literature. Reported data on incidence and severity of Trastuzumab-associated cardiomyopathy varies somewhat across clinical trials. For example, when asymptomatic LVEF is considered, a decline of 10% is considered significant. 3% of participants in the HERA (Herceptin Adjuvant) study [4] were recorded to have significant LVEF drops (though only 2% had symptoms consistent with congestive cardiac failure); contrasting with 14% of patients in the NSABP-31 trial [5] and 18% of patients in the BCIRG 006 trial [6,7]. In terms of more serious events, one meta-analysis of five major Trastuzumab trials reported a rate of grade 3/4 cardiac toxicity events (inability to carry on any physical activity without discomfort) of 4.5% in Trastuzumab-treated patients [8]. Others have reported a seven-fold increase in relative risk of congestive heart failure in patients receiving Trastuzumab with chemotherapy [9]. An increase in absolute risk of grade 3 and 4 toxicity events varying between 0.4- 3.3%, with a relative risk of 5-10-fold has been described [7]. Adverse cardiac events are more frequently observed in the first three months of therapy in some studies, though there is not universal agreement on this [10].

Overall, the published rates of both asymptomatic LVEF decline and overt heart failure respectively in patients treated with anti-HER2 therapies remain low outside of the setting of anthracycline-based chemotherapy combinations or anti-HER2 therapy in combination with a taxane (3.2% and 0.5% respectively in one study) [11], 5.6% and 0.4% in another [12] (in combination with a taxane and cyclophosphamide).

One possible explanation for discrepancies in reported outcomes is the use of different imaging modalities. Multiple gated acquisition (MUGA) scans (using radionuclide ventriculography) were traditionally the monitoring modality of choice in cardiac monitoring during chemotherapy, due to their high levels of reproducibility [5]. This was the modality used in the NSABP B-31 trial, while the BCIRG-006 and HERA trials used both echocardiography and MUGA. Echocardiography, although safe and inexpensive, continues to show variability in both performance and interpretation [13].

Either MUGA or echocardiography is advised by the manufacturers of Trastuzumab, without any stipulation as to frequency; though more frequent monitoring is advised in the context of any abnormality [14]. In Ireland a baseline assessment of cardiac status is advised, with reassessments at successive 12-week intervals [15]. However, adherence to these recommendations worldwide is variable, with some large studies estimating that less than half of patients undergo guideline monitoring, particularly young patients at low risk of cardiac complications [16]. Other authors have reported similar findings even in an older cohort, with anthracycline therapy in addition to Trastuzumab being the main predictor of adherence to monitoring guidelines [17]. It is clear that there is a disconnect between theoretical guidelines informed by the early trials and everyday clinical practice. This disparity has implications for both exposure of patients with inadequate LVEF to excessive risk, but also for patients who may have treatment suspended inappropriately despite recovery of LVEF. Management decisions must also take into account the prognosis of individual patients, with younger patients often receiving more aggressive therapy. Conversely, patients with metastatic disease may undergo less frequent monitoring in the absence of any symptoms of cardiotoxicity, given the clear benefit of anti-HER2 therapy in this cohort [18]. This work therefore aimed to audit current clinician knowledge of cardiotoxicity monitoring in the context of anti-HER2 therapies

Methods

Clinician knowledge of cardiotoxicity guidelines (and associated parameters) in breast cancer patients treated with anti-HER2 therapy was assessed. Specifically, a brief six-question survey (**Figure 1**) was designed based on the parameters of the monitoring guidelines and reviewed by the senior author in order to conduct an audit on guideline awareness amongst a representative cohort (n=10) of non-consultant hospital doctors (NCHDs) regularly rostered to staff a breast cancer surgical service in a single large tertiary centre (Audit number CA643). Knowledge pertaining to cardiotoxicity prevalence, presentation and management in HER2-positive breast cancer patients treated with HER2-targeted therapy was assessed. NCHDs at all grades (house officer, registrar, specialist registrar) were recruited from an outpatient breast clinic over a period of two weeks. Staff at all NCHD levels were recruited as symptomatic patients may present to any grade. 100% of participants approached agreed to participate.

Knowledge of anti-HER2 therapy-associated cardiotoxicity in clinical staff

Question 1: Some anti-HER2 therapies are recognised as cardiotoxic, causing a decrease in left ventricular ejection fraction and a spectrum of clinical presentations, from asymptomatic to overt cardiac failure. What would you consider a normal LVEF? (Tick one)

- >40%
- >45%
- >50%
- >55%
- >60%
- >65%

Question 2: Echocardiography is a common imaging modality used to assess cardiac function. Are you aware of any other imaging modalities used to assess cardiac function?

……..

Question 3: How often should a patient **without** any cardiac impairment have an echocardiogram during their anti-HER2 therapy according to the Irish guidelines?

……..

Question 4: How often should a patient **with any cardiac impairment** have an echocardiogram during their anti-HER2 therapy according to the Irish guidelines?

……..

Question 5: At what LVEF % value do the Irish guidelines recommend withholding treatment?

……

Question 6: What percentage of patients treated with anti-HER2 therapies suffer any degree of associated cardiotoxicity?

…….%

Figure 1: Six-question survey

Results

Overall, the audit revealed a lack of awareness of the current cardiotoxicity monitoring guidelines across all grades of NCHD, which likely reflects a disconnect between the theoretical guidelines and their clinical utility in the current climate for breast cancer surgical care. Specifically, knowledge of normal baseline LVEF was generally good (**Figure 2**, with 8/10 NCHDs correctly recognising normal baseline LVEF as >55%). NCHD awareness of alternative imaging modalities to echocardiography was poorer; with no clinician mentioning the MUGA scan as an option despite the fact that it is the recommended option in Irish guidelines. However, 9/10 clinicians were able to suggest at least one alternative to echocardiography, with responses including MRI or CT angiography, ECG and cardiac MRI/CT.

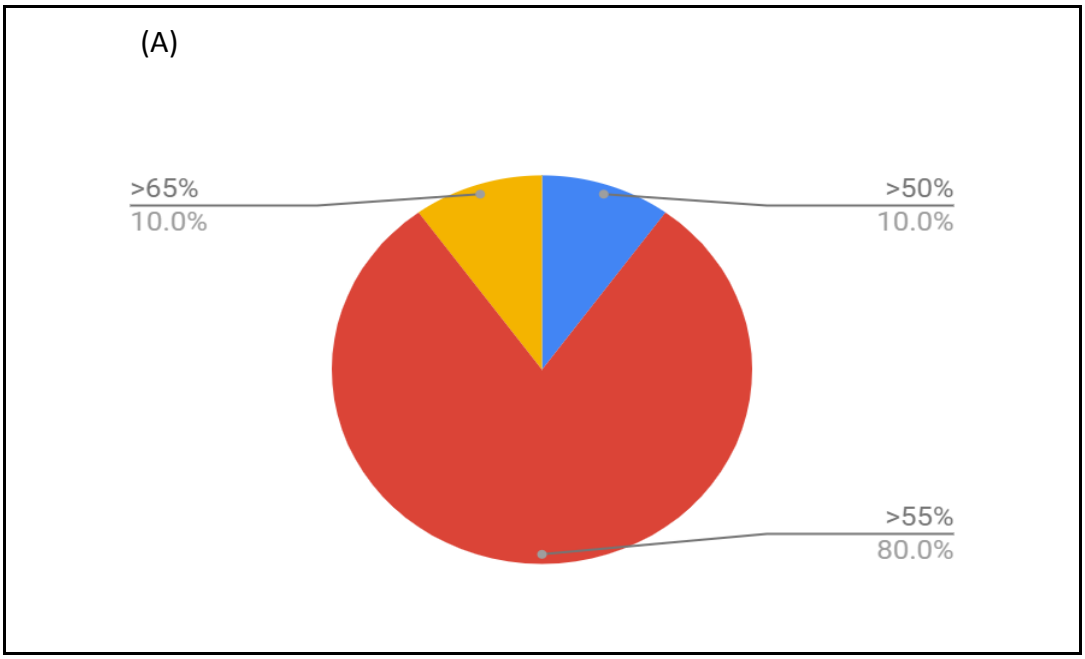

Figure 2: Estimation of normal LVEF (%) by NCHDs in Trastuzumab-related cardiotoxicity. Eight of ten (80%, red section) breast surgical NCHDs surveyed correctly estimated a normal LVEF to be >55%, with one minor over- and under-estimate of 65% and 50% respectively.

However, the recommended frequency of clinical monitoring was underestimated by this clinician cohort as compared to the Irish guidelines. In the context of Trastuzumab therapy for breast cancer patients, assessment every 12 weeks is advised [19]. However, NCHD estimates of cardiac function assessment frequency for patients without cardiac impairment ranged from 12 weeks to two years **(Figure 3)**. Similarly, monitoring of cardiac-impaired patients was underestimated at 2-12-monthly intervals as compared to the recommended 3-weekly interval. Half of respondents (n=5) estimated 6 monthly monitoring to be appropriate, with two respondents estimating annual monitoring to be appropriate in this context and one respondent for each of two- monthly and three- monthly; the final respondent was unsure.

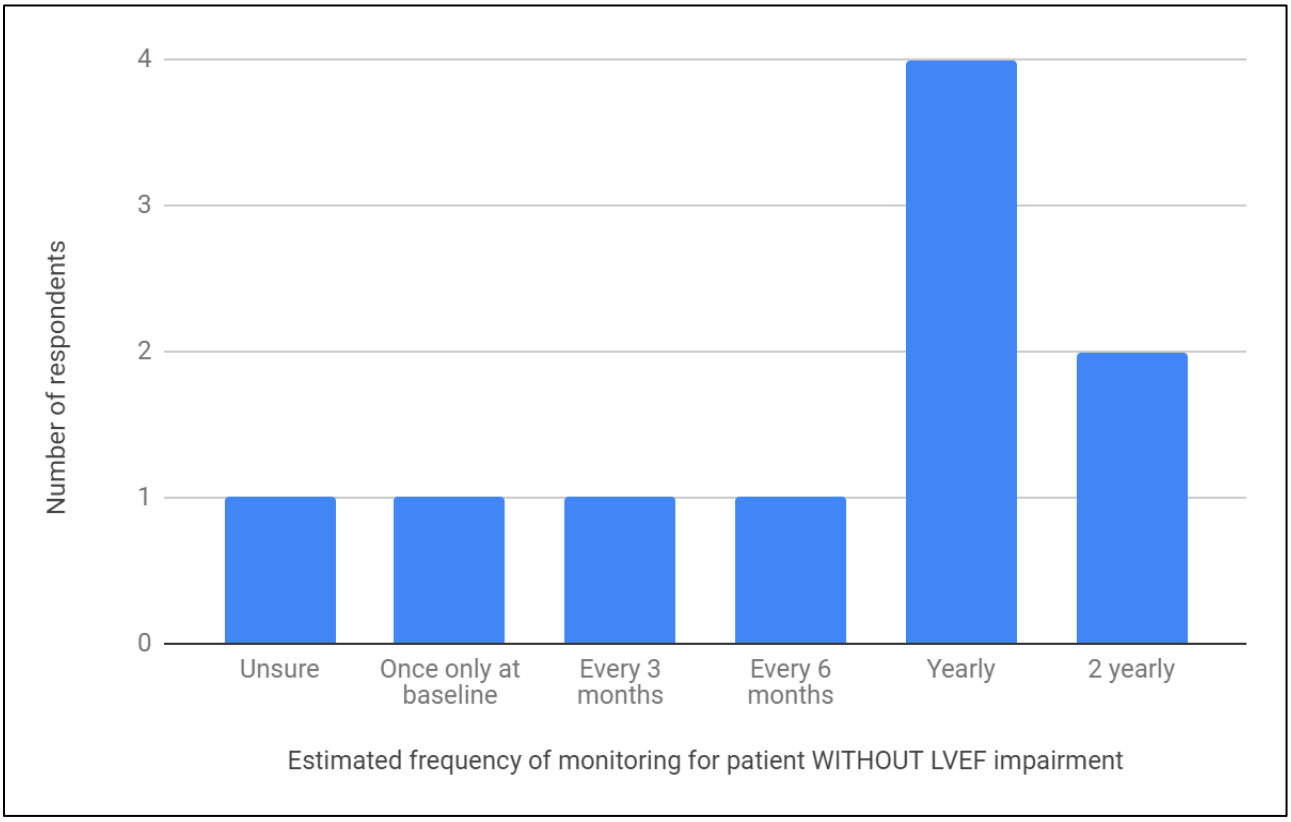

Figure 3: Frequency of appropriate LVEF monitoring in patients without left ventricular impairment was underestimated. NCHDs were asked to estimate the correct frequency of cardiac monitoring in patients with normal ventricular function and no impairment. Only one NCHD correctly estimated the frequency of LVEF monitoring in this patient cohort (every 3 months), with all other NCHDs underestimating the correct frequency.

When participants were questioned about threshold cardiac parameters mandating cessation of treatment, a wide range of absolute values was reported (**Figure 4**). Specifically, a range of values from LVEF of 15-45% was estimated, with only one NCHD correctly contextualising absolute LVEF value relative to baseline. Similarly, a wide range of estimates for the prevalence of any degree of cardiotoxicity in this patient population (including asymptomatic LVEF decreases) was noted. Interestingly, a range of values from 5-20% was returned, which represents an overestimation of risk. Three of ten NCHDs estimated a value of 5%, with a further three estimating a value of 20% and then remainder in between; the final respondent was unsure.

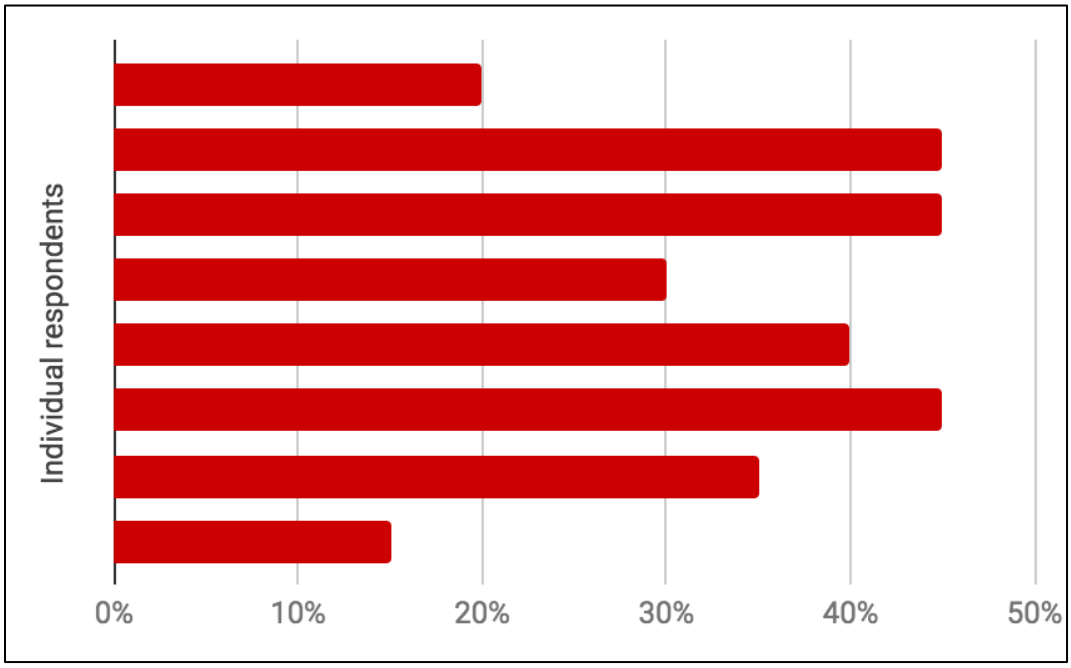

Figure 4: NCHDs reported a wide range of absolute LVEF % values at which treatment should be suspended. LVEFs between 15-45% were estimated by NCHDs (n=8; one further NCHD estimated a relative drop of 10% from baseline and one was unsure). Each individual bar represents a respondent.

Discussion

Cardiotoxicity remains a significant clinical issue in the use of Trastuzumab in HER2-positive breast cancer patients. Thus, this study sought to evaluate trainee clinician knowledge of the prevalence and also their broad knowledge of cardiotoxicity monitoring guidelines in practice.

One method of assessing the clinical significance of an LVEF decrease is to contextualise it within the trajectory of cardiac functioning and disease prognosis. Indeed, the Irish guidelines clarify that an "adverse event" (in an asymptomatic patient) mandating withholding of treatment involves a drop of 10 points from baseline to below 50%. The Irish guidelines also suggest that all such patients should be referred to a cardiology service [19]. UK guidelines advocate a similar approach, with an additional recommendation of formally assessing cardiac risk factors before commencing therapy, and modifying risk factors such as hypertension accordingly [20].

Knowledge of the clinical guidelines amongst NCHDs of all grades on the surgical service was variable, underlining the lack of routine day-to-day utility in the setting of cardiotoxicity as a rare side effect of therapy. In illustration of this point, no clinician mentioned the use of MUGA scan as an alternative to echocardiography, although the Irish guidelines specifically mention this. Indeed, MUGA scanning is decreasingly used in practice, given concerns regarding serial radiation exposure [21] and is not routinely available in this centre. Of note, almost all clinicians could suggest at least one alternative imaging modality, and newer technologies such as cardiac CT and MRI are a potential future avenue of treatment [22].

A wide variety of relative and absolute decreases in LVEF value were suggested by respondents, which may reflect the infrequency of clinically significant cardiotoxicity events in breast cancer patients receiving anti-HER2 therapies. It also reflects a criticism of the clinical utility of echocardiography itself and its potential for inter-observer variation (suggested to be as high as up to 14%) [23], as well as a broader debate regarding the degree to which asymptomatic LVEF decline predicts long-term cardiac safety outcomes [24].

This short study had several limitations, most notably a small sample size and a limited number of questions in the survey. Notwithstanding, as an exploratory study, it served to highlight potentially significant gaps in knowledge of cardiotoxicity monitoring among NCHDs on a busy surgical service; which merit further consideration. The extremely low frequency of presentations of symptomatic heart failure in breast cancer patients may explain the gaps in NCHD knowledge of the guidelines amongst surgical NCHDs. So too would the fact that cancer drug prescribing and monitoring mostly falls under the responsibility of the medical oncology service rather than the surgical service. Initial audit permissions were granted only for the surgical service; however, It would be of value to repeat this survey in a matched medical trainee population. Similarly, consultant awareness is likely much better than that of trainees, though formal assessment of this would be valuable, and the lack thereof is a shortcoming of this study. In conclusion, we suggest that it is timely to implement an educational intervention to increase adherence to the existing guidelines, perhaps in tandem with a review of their clinical relevance at a national level in the context of refined protocols and improved patient outcomes. An expanding portfolio of newer anti-HER2 therapies (such as Pertuzumab and kinase inhibitors) coming into common clinical use also carry the risk of cardiotoxicity. Of note, dual anti-HER2 therapy remains relatively well tolerated from a cardiotoxicity point of view, with significant data describing a minimally increased risk with the addition of further anti-HER2 drugs to existing therapeutic strategies, including in specific cardiac studies such as the TRYPHAENA safety study[25]. In this study, low rates of cardiotoxicity were seen in dual anti-HER2 therapy given with anthracycline or platinum-based chemotherapy, either sequentially or concomitantly, lending further weight to the practice of dual targeting. As expected, a slightly higher rate of ventricular dysfunction was seen in anthracycline containing regimens (5.3-5.6%) as compared to platinum containing regimens (3.9%). Thus, given the recognised side effect profile of anti-HER2 targeted agents, our study highlights that the issue of clinical monitoring, ongoing clinician education and implementation of clinical guidelines in an aging population remains of vital importance.

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

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Paediatric Cases Referred to the Office of the State Pathologist

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Abstract

Aim

The forensic pathology services of the Office of the State Pathologist (OSP) are occasionally requested following the sudden death of a child. This review aims to determine the relevance of forensic pathologists in child death investigations in Ireland, adherence by the OSP to paediatric autopsy guidelines and to analyse the causes of these children's deaths.

Methods

A retrospective review of all paediatric cases referred to the OSP from 2012-2017 was conducted. Relevant information was recorded using Microsoft Excel©.

Results

There were 79 cases included in this review. 61 cases (77%) were referred as suspicious deaths while 18 cases (23%) were referred without documented reason. Paediatric pathologists (PP) were involved in 22 cases (28%). The commonest cause of death in children under the age of three was natural disease (79%). Most of the paediatric autopsy standards were reached by the OSP but there were some shortcomings identified, particularly in cases not involving a PP.

Conclusion

Based on the findings that autopsy guidelines are better adhered to when a PP performs the autopsy, coupled with the higher incidence of natural causes of death in children aged under three, all paediatric deaths, unless a forensic element is apparent, should be referred to a PP in the first instance.

Introduction

The Office of the State Pathologist (OSP) is the only facility in Ireland that employs full-time forensic pathologists to provide a nationwide forensic pathology service. The main role of the OSP is to conduct autopsies to aid in the medico-legal death investigation of cases of forensic significance.

Paediatric pathology is a branch of pathology that specialises in the pathophysiology of disease specific to children. In addition to histological examination, paediatric pathologists also conduct autopsies. Causes of death in the paediatric population are extremely varied, with some unique to children, e.g. Sudden Infant Death Syndrome (SIDS). Natural causes of death in paediatric populations also differ greatly from those of adult populations and require specialist input from a paediatric pathologist. [1,2].

On occasion, paediatric deaths may require the input of a forensic pathologist. These can range from unusual or suspicious injuries noted on the child's body in hospital or at autopsy, to issues such as possible neglect or abuse. The forensic pathologist can help determine the forensic significance of such injuries and determine whether they contributed to death.

We conducted a review of all paediatric cases referred to the OSP from 2012-2017, focussing on three specific points: the relevance of input from a forensic pathologist, the causes of death in different age demographics and the degree of adherence by the OSP to best practice infant autopsy guidelines.

Methods

All paediatric cases (cases involving persons aged under 18) referred to the OSP between 2012-2017 were included in this review. Data was extracted from hard copy files stored at the OSP. The extracted data was analysed and recorded using a Microsoft Excel© spreadsheet on a secure computer within the OSP. The cases were anonymised and recorded by number. Each component of the spreadsheet was scrutinised in accordance with the aims of the review.

The standards selected included The Royal College of Pathologists' autopsy guidelines for neonatal deaths and third trimester antepartum and intrapartum stillbirth, the Coroner's Rules Report, the National SIDS Autopsy Protocol and the Health Service Executive's 'Standards and Recommended Practices for Post-Mortem Examination Services' [3,4,5,6].

Results

There were 79 paediatric cases referred to the OSP between 2012-2017, representing 7.6% of the total number of cases dealt with by the OSP in these years (n=1039). 52 cases involved boys and 27 cases involved girls. Thirty cases occurred in the Dublin district coronial region and the remainder occurred in other coronial regions. The cases were categorised into three age ranges; <1, 1-12 and 13-17.

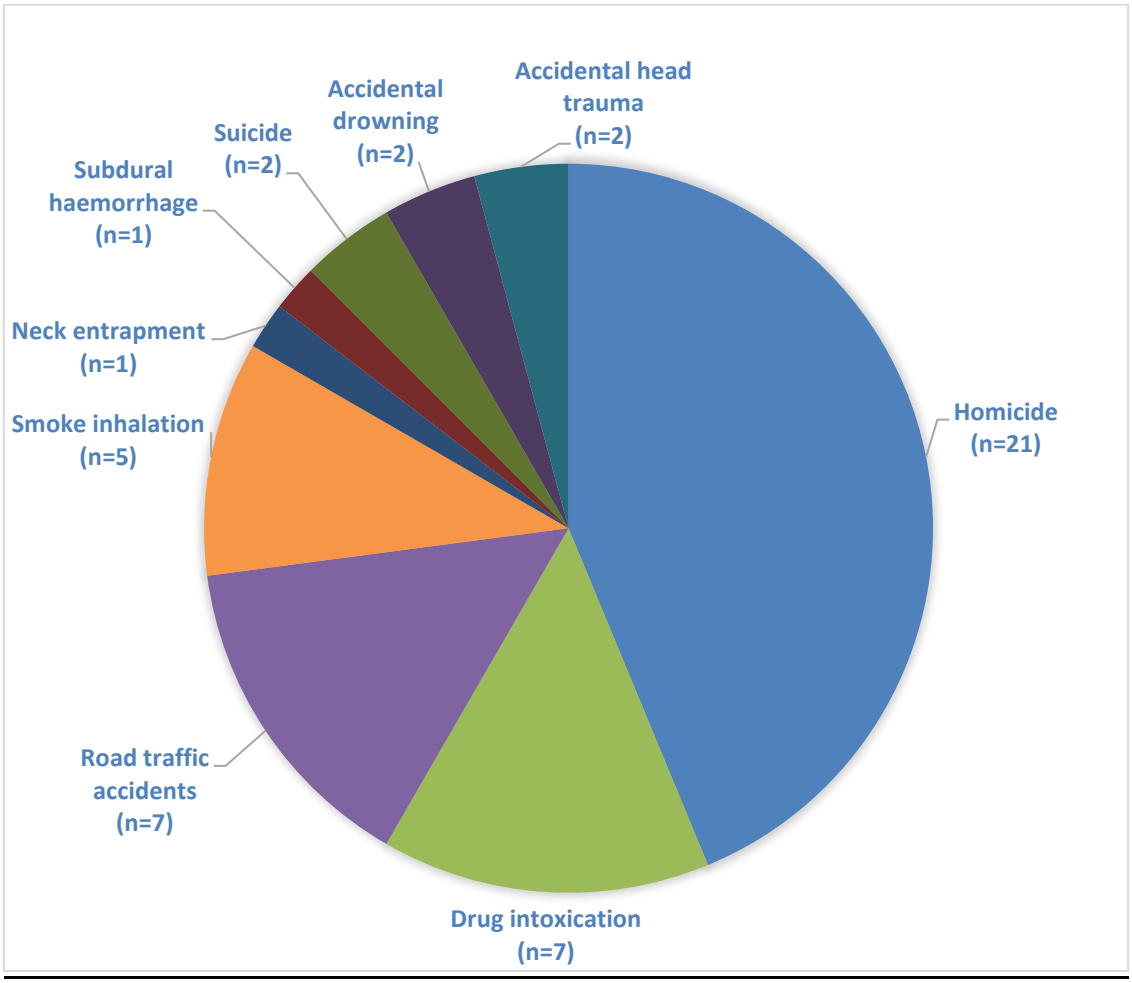

Figure 1: Unnatural causes of death

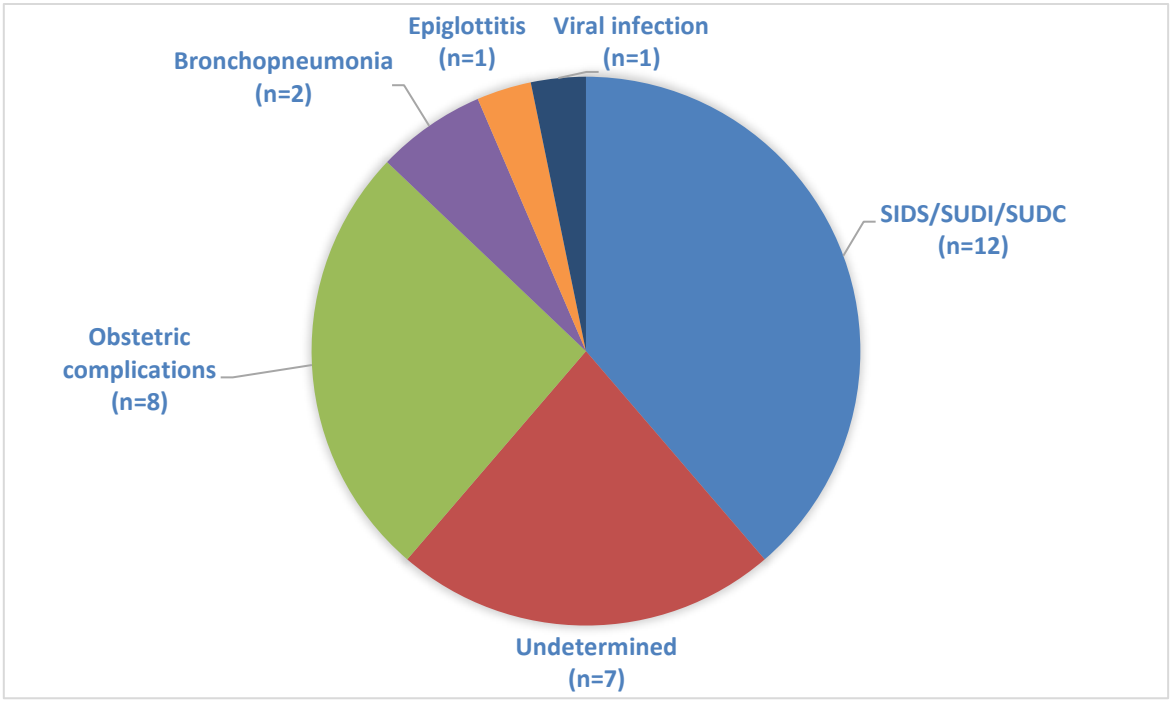

Figure 2: Natural causes of death

Figures 1 and 2 outline the prevalence of all causes of death encountered in paediatric cases referred to the OSP from 2012-2017. Figure 1 details all unnatural causes of death contained in this review (n=48) while Figure 2 describes all-natural causes of death (n=31).

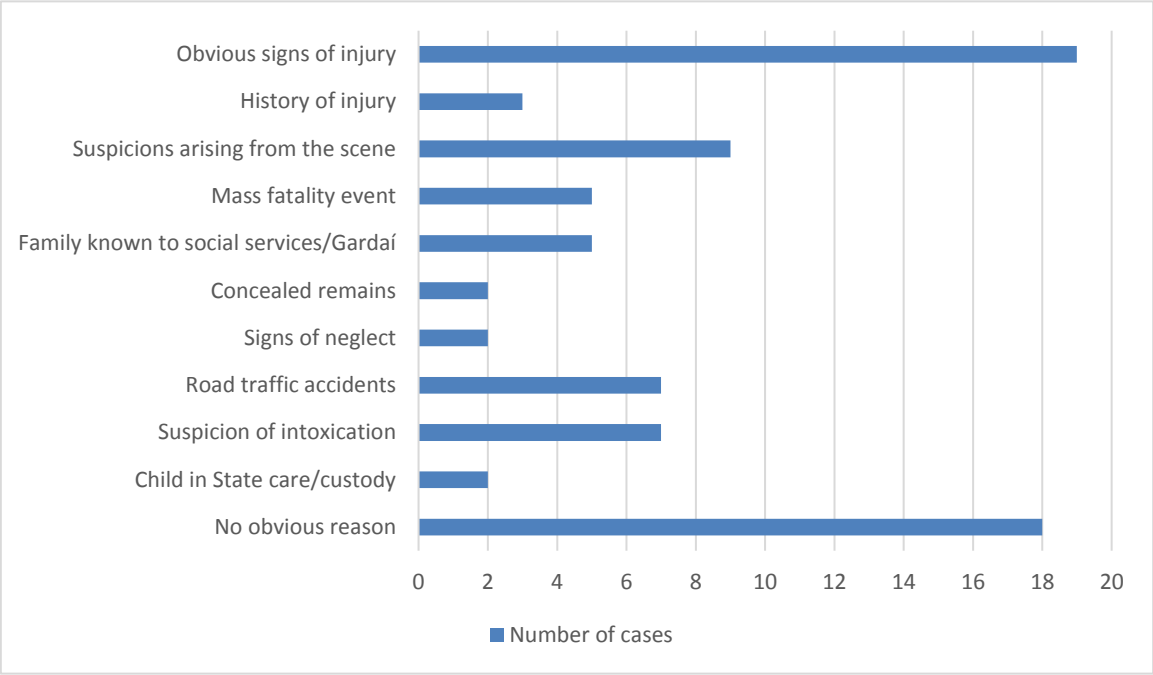

Figure 3: Circumstances of referral of paediatric deaths to the OSP from 2012-2017

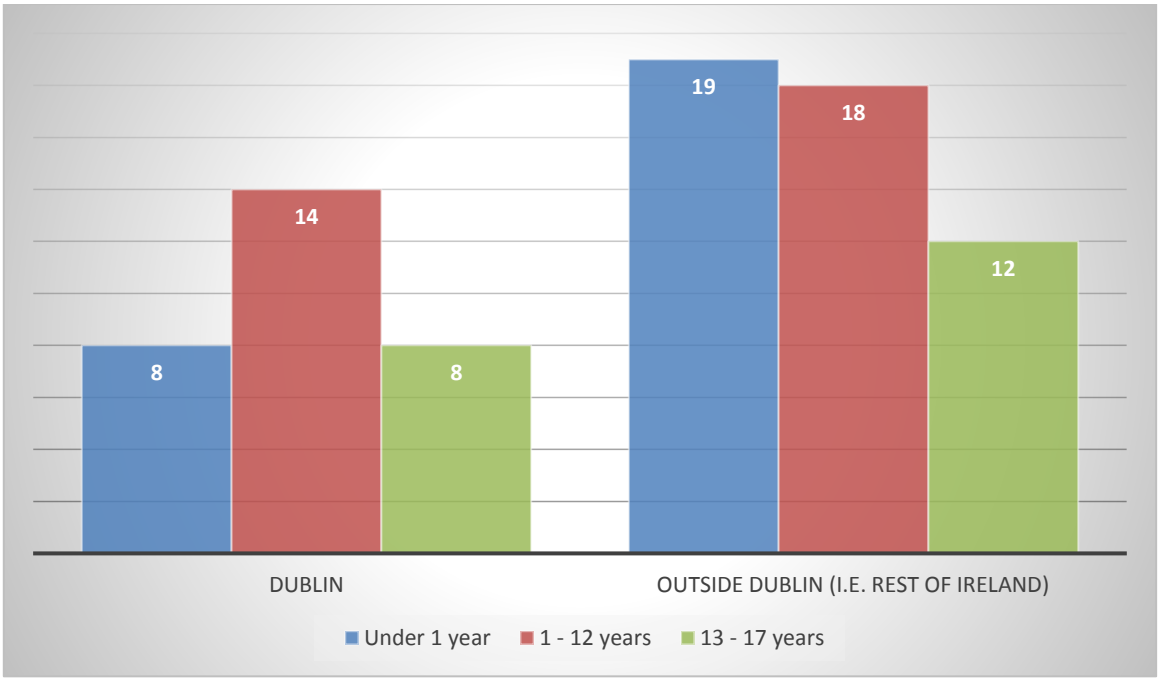

Figure 4: Locations of OSP paediatric cases from 2012-2017 with respect to age of child

Relevance of Forensic Pathologist

Retrospectively, 61 of the 79 cases required input from a forensic pathologist, due to suspicious circumstances surrounding the deaths. In 45 of the 61 cases, the cause of death was unnatural, including 21 homicides, 2 suicides and 22 accidental deaths. The causes of death in the remaining 16 cases were determined as natural disease. However, input from the OSP was justified owing to suspicions surrounding these deaths. Figure 3 provides a breakdown of the reasons for referral in all of these cases.

As shown in Figure 3, there were 18 cases where the reason for referral to the OSP was unclear; there were no worrying external injuries and no obvious suspicious circumstances. Further examination of the case files failed to provide a reason for referral. The majority (n=14) of these cases involved children under the age of two, whose deaths were attributable to Sudden Infant Death Syndrome/Sudden Unexpected Death in Infancy or Childhood (SIDS/SUDI/SUDC) (n=6), traumatic and precipitate births (n=5), epiglottitis (n=1), viral infection (n=1) and bronchopneumonia (n=1). Of these 18 cases, 12 were referred to the OSP by coroners outside Dublin.

Cause of death: Under 1-year-old

There were 27 autopsies carried out by the OSP on children under 1-year-old, including 12 perinatal deaths (deaths occurring at greater than 24 weeks' gestation or less than 7 days of life ex-utero). The most common causes of death in children under 1-year-old were SIDS/SUDI (n=9), undetermined (n=6), traumatic birth/precipitate delivery (n=3), and homicide (n=3). Other causes of death included intrauterine deaths (n=4), prematurity (n=1) and smoke inhalation (n=1). 8 of these cases were referred by the Dublin Coroner, while 19 were referred by coroners from outside Dublin. This is shown in Figure 4, which also details the locations of cases involving older age ranges.

A paediatric pathologist (PP) conducted the autopsy examination with a forensic pathologist (FP) in 13 of the 27 deaths involving children under the age of one. A PP gave their opinion regarding histology taken by a FP at autopsy in two further cases. In 14 of the 15 cases involving a PP, the cause of death was natural. In all of these 15 cases, there were no significant injuries reported by the Gardaí or attending doctor at the scene prior to the autopsy. However, in two of the cases, significant injuries were found at autopsy and on radiological imaging.

In the 12 cases performed by a FP without involvement of a PP, there was no evidence of significant trauma in 10. In the remaining two cases, the cause of death was evidently unnatural from the outset. In three of these 12 cases, two FP performed the autopsy examination together.

Cause of death: 1-12 years' old

There were 32 forensic paediatric cases involving children between the ages of 1-12 inclusive. The most common causes of death in this age group were homicide (n=14), smoke inhalation (n=4) and SUDC (n=3).

Other causes of death included: accidental head trauma (n=2), bronchopneumonia (n=2), drug intoxication (n=2) and one case of each of the following: acute-on-chronic subdural haemorrhage, road traffic collision (due to injuries sustained following unintentional road traffic collisions), epiglottitis, viral infection and accidental drowning.

In six of the 32 cases in this age group, a PP performed the autopsies in the presence of a FP and in one additional case a PP gave their expert opinion on histology that was taken during autopsy examination by a FP. In four of the seven cases involving PP input, the cause of death was not obviously forensic while in three cases, there was clear evidence of traumatic injury.

Cause of death: 13-17 years' old

There were 20 forensic paediatric autopsies performed in the 13-17-year age group from 2012-2017. The most common causes of death in this group were: road traffic accidents (n=6), drug intoxication (n=5) and homicide (n=4). Other causes of death included: suicide (n=2), accidental drowning (n=1), neck entrapment (n=1) and in 1 case, the cause of death was undetermined.

Autopsy standards

There were 12 perinatal deaths in our audit. These cases were scrutinised and compared with the standards referenced above. While the vast majority of guidelines were met, the autopsy reports consistently fell short of the guidelines in some aspects. There were no centiles recorded regarding babies' bodyweights in any case and in one case, there was no documented baby weight (this case was performed by a lone FP). In 10 of the cases, there was no comment on the degree of organ development with respect to the age of the baby. In 10 cases, there was no explicit statement on the presence or absence of infection and in five cases there was no statement on the presence or absence of malformation. In 9 of the cases, there were no reference values or ratios given with the measured organ weights and in three cases, there is no documentation of any organ weights at all (these three cases were performed by a lone FP). There was a list of histology blocks recorded in just two of the 12 cases, both of which involved input from a PP. On examination of all SIDS/SUDI cases, the National SIDS Autopsy Protocol was used as a reference. None of the case files had autopsy reports with an exhaustive adherence to the protocol in terms of reporting on individual physical features, taking histology and measuring weights of certain tissues.

Discussion

Forensic pathologists are medical doctors who are trained in interpreting both pathological disease and traumatic injury at autopsy to aid a medicolegal death investigation. Forensic paediatric autopsy involves determination of the cause of death in a child where death has occurred in suspicious circumstances. These cases demand careful consideration of the possibility that criminal activity may have contributed to the death. The expertise of a forensic pathologist is vital here, as their expert examination and subsequent report are integral parts of death investigation and the criminal justice system. More importantly, they contribute to the overall safeguarding of children in Ireland.

However, interpretation of paediatric pathology at autopsy is highly specialised, and it is necessary that an appropriately trained medical professional is involved in the examination [8]. The British Association in Forensic Medicine recommend that it is best practice for both a forensic and paediatric pathologist to be involved at the autopsy examination in these cases [9].

This review observed 18 cases where no apparent indication was stated for a forensic paediatric autopsy. The deaths were all either natural or birth-related and the need for input from the FP was questionable. Two thirds of these cases were referred from outside Dublin and may reflect the lack of available PP expertise outside Dublin during this time period[7]. We would recommend that in a child's death, where there are no suspicions raised, the expertise of a paediatric pathologist (PP) should be sought in the first instance [8]. A FP may then be involved following assessment by the PP.

The results highlight the differences in the causes of death between different age groups in cases referred to the OSP. In children aged >3, the majority of deaths were due to unnatural causes. In the 22 of 79 forensic paediatric cases, attended by a PP, the cause of death in 18 cases was natural. Perinatal and infant autopsy pathology is significantly different to adult autopsy pathology and requires input from a specialist. Given the high level of expertise required, the Royal College of Pathologists and the Royal College of Paediatrics and Child Health recommend that PP input should be sought in all cases of perinatal and infant deaths, regardless of whether input from a FP is warranted [8]. Furthermore, our review has shown when a PP was the lead pathologist at autopsy, there appeared to be a better adherence to paediatric autopsy guidelines. This finding reaffirms the need for subspecialist involvement for a more robust investigation.

There were 6 cases of infant deaths included in this review where the cause of death was undetermined. A PP was involved in just one of these autopsies. It is possible that the specialist opinion provided by a PP in the other five cases could have contributed towards a more definitive cause of death. The input of the PP at autopsy examination in children aged <3 should always be considered for accurate death categorization, even if there is an obvious forensic element.

In conclusion, paediatric deaths where there are suspicious or traumatic elements should potentially be referred to the OSP. However, the involvement of a paediatric pathologist should always be considered and discussed with the coroner. In non-suspicious paediatric deaths, our review has shown that reporting guidelines are better adhered to when a paediatric pathologist performs the autopsy. These cases should be referred to a paediatric pathologist first. Forensic pathologists should refer to the Royal College of Pathologists' guidelines when performing paediatric autopsies to ensure that the highest standards of autopsy examination are met.

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

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Use of Video Consultation in Irish General Practice: The Views of General Practitioners

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Abstract

Introduction

Video consultation involves the live interaction between the doctor and the patient remotely. Prior to the Covid-19 pandemic, the majority of video consultations in primary care were provided by GPs who were not the individual's own GP, which presented safety and continuity issues. This study aims to determine GPs' attitudes to the use of video consultation for their own patients.

Methods

This was a qualitative study involving semi-structured interviews. Participants were purposively recruited through use of a GP tutor as a key informant and guided by a sampling framework to include those with and without previous video consultation experience. Braun and Clarke thematic analysis was used.

Results

Participants included eight GPs, half of whom had previously worked with video consultation. Four themes emerged: impact on the consultation, the potential role, and the potential threat to current practice and technology and logistics. There were optimistic and cautious observations within all themes.

Conclusion

With the increased use of video consultation, Irish General Practice is in a unique position to frame the future its use. The provision of this modality to one's own patients may provide benefit while mitigating some of the pitfalls but would not entirely avoid the potential dangers of video consultation.

Introduction

Tele-health refers to the provision of personalized health care over a distance.[1] Such a service can be beneficial for patients who are unable to attend practice due to distance and access to transport, mobility issues, or work commitments and may be less time consuming for the patient overall[2]. Prior to the Covid-19 pandemic the majority of video consultations were provided by GPs who were not the individual's own GP. This may present problems for the principle of continuity of care, a core general practice principle[3]. *Atherton et al (2018)* note, of those who use video consultations, 25% of consults result in referral to the patient's own GP for review[4]. A survey of UK-based GPs' uncovered some scepticism towards video consultations as this quote exemplifies "Only politicians and the naive would think this a good idea"[5]. It is noteworthy that of those respondents, (*n = 763),* only 10 indicated familiarity with using video consultations, reflecting perhaps a fear of the unknown[5]. *King et al (2007),* found that GPs in Scotland expressed concern regarding simple but critical tasks in the video consultation[6]. In contrast, Australian GPs' attitudes, to information and communication technologies used in consultations with patients, were more positive – reflected in this quote "*I think that the patients would love it and I as a patient, as a consumer, would love it.*"[7]

Although video consultation is widely available in Ireland, there is limited research detailing Irish GPs' attitudes towards it. Moreover, there is a need for further information on whether factors providing video consultation for patients of the GP's own practice, as opposed to video consultation services available to the general public, might influence GP's decisions to implement video consultation within their own practices.

To address this knowledge gap, this study focuses on the attitudes of GPs towards the provision of video consultation for their own patients, incorporating the means by which such a system could be managed in routine GP practice in Ireland. This study was conducted prior to Covid-19 and the results form an important backdrop by which to gauge any possible changes in attitudes that may arise as a result of the increased use of video demanded by Covid-19 restrictions.

Methods

This was a qualitative study. Semi-structured interviews were used as the data collection instrument as they afford flexibility and the opportunity to generate rich data .[8] Purposeful sampling was used for the identification and selection of information-rich participants. Potential participants were identified through a key informant, based on a typical case purposeful sampling framework. [9] The key informant was the programme director for the Western Training Scheme in General Practice and the sampling framework included: rural and urban practices, participants from different age profiles, and those with and without previous experience with video consultation. Recruitment was done by sending an invitation letter to potential participants. This was followed up by a phone call two weeks later to arrange a time for interview for interested participants. The option of a phone-based interview was offered where face-to-face was not feasible. Written consent was obtained prior to the interview and reaffirmed following interview completion. Interviews were carried out using a topic guide (Table 1), based on the literature review.

Question structure and wording were informed by best practice guideline. [10, 11] The topic guide was piloted with an Assistant Programme Director of the GP training programme. The interviews were recorded, transcribed and anonymised. Participants were given the opportunity to review their interview transcripts and redact/clarify at their discretion.

Initially three participants provided by the key informant were invited all of whom accepted the invitation, a further seven participants were identified through the initial participants, five of whom agreed to participate. The study team interviewed participants until saturation of themes was reached. This was achieved after the inclusion of eight interview participants. Although this would be a relatively smaller sample size, having longer more in-depth interviews meant that fewer participants could achieve saturation [12].

Data was thematically analysed according to the *Braun and Clarke (2006)* method [13]. Investigators first analysed the data independently, then together they agreed a set of descriptive codes, to ensure consistency in the application of codes. All authors were involved in the generation of themes. The agreed themes were then reviewed by all investigators with a final review of original transcripts.

Results

Demographics

Participants included 8 Irish registered GPs, half of whom had no prior experience with video consultation and the other half of whom had previously worked with video consultation. Our demographic was predominantly female, aged 30-39 years with less than 10 years' experience in General Practice.

Table 1: Topic Guide

Domain	Sample Questions
Knowledge	What do you know about video consultation in Ireland? What do you think it involves? What barriers to may exist to setting up video consultation in your practice? How would it fit in your working schedule?
Experience	Have you any experience with video consultation including Facetime or Zoom? How was it arranged? How did it differ from an in person or telephone consultation? How did it affect your work/life balance?
Opinion/ Values	What is your opinion on the use of video consultation for your own patients? What are the potential advantages or disadvantages of video consultation? Can video consultation be done safely? Do you think video consultation is worth the time and effort?
Feelings	How would you feel about using video consultation for your own patients? How do you think patients would feel about using video consultation in your practice?
Demographics	See Table 2

Table 2: Self-Reported Characteristics Irish GPs Participating in this study	
	n
Age (Years)	
<30	0
30-39	6
40-49	0
50-59	1
>60	1
Sex	
Male	2
Female	6
Year Experience in GP	
0-10	6
10-20	1
20-30	1
Practice Location	
Urban	4
Semi Urban	2
Rural	2
Previous Experience	
Yes	4
No	4
Type of Practice	
Single Handed Practice	2
Group Practice	6
Previous Experience with Video Consultation	
Yes	4
No	4
Total	8

Four themes emerged- Impact on Consultation, Technology and Logistics, Potential Role and Potential Threat to Current Practice. Key and emblematic quotations from each theme are provided below.

Impact on Consultation

The theme describes how the use of video consultation affects the dynamics of the consultation, as compared to other modes of consultation that are commonly used.

The majority of participants were concerned that not being face-to-face would have a detrimental impact on the doctor-patient relationship, and for some this extended to the relationship with the practice as a whole.

> *"our doctor-patient relationship face-to-face in real life is so special, so important, it goes back generations in some practices, you know, people really regard their GPs well in this country, and they go to their GPs looking for help as individuals, and they pick their GPs to fit their own personality"* -GP 2 (previous video consultation experience)

> *"Will you be able to develop a rapport with them as well as you would if you were to if they were sitting in front of you?"* -GP3 (no previous video consultation experience)

A number of participants felt that it could be used as an improvement to the telephone consultation which is an accepted form of consultation in certain circumstance.

> *"I think a lot of things can be misinterpreted over the phone. It just clears things up and everyone's on the same page when you just see each other face-to-face."* -GP7 (previous video consultation experience)

There was widely expressed concern about not being able to physically examine the patient and the risk that involves.

> *"I suppose common day to day, you can't put a stethoscope down a camera, so if you can't do that, then that should generally rule out anything that you would generally be using that for."* -GP7 (previous video consultation experience)

> *"I think it's a lot more advantageous for the patient than it is for the doctor, I think it puts the doctor in a somewhat risky position."* - GP7 (previous video consultation experience)

Potential Role

This theme describes specific medical instances that video consultation may be useful and other potential benefits it may offer to patients and GPs.

Two of the participants who had experience in video consultation commented on the job flexibility that it offered.

> *"I could log on at night when my husband came home from work or I could have a babysitter in the morning and do it then and pop down during my break and play with the kids"* -GP2 (previous video consultation experience)

Participants identified video consultation as potentially useful for review appointments.

> *"Possibly for results, where you've done a workup, the consultation would be review visit to decide on established therapy to either alter it or adjust it or establish risk"* -GP4 (no previous video consultation experience)

Some participants felt video consultation would be particularly useful in the follow up of patients with mental health presentations.

> *"I think good from a mental health point of view if there's those patients that you do want to touch base with but you don't need to, they don't need to come in"* - GP1 (previous video consultation experience)

Generally, it was accepted by participants that video consultation could be utilised in consults that are perceived as routine or straightforward.

> *"So, let's say sore throat query tonsillitis, I need a prescription for my pill, that kind of thing, who didn't have time, because of their working hours, to get a GP"* - GP8 (previous video consultation experience)

Potential Threats to Current Practice

This theme describes GPs' views of the potential threats that video consultations poses. Participants had significant reservations that video consultations may in time be used as a replacement for traditional face to face consultation, and in this way pose a threat to general practice as it is currently delivered.

It was a concern to a number of participants that the widespread usage of video consultation might reduce the value of General Practice.

> *"My own thinking is that it won't enhance the value of the GP, it's just like a takeaway coffee, you can just go, and it'll be cheaper and there'll be no waiting"* – GP6 (no previous video consultation experience)

> *"It comes across as a very easy simple thing, whereas any of us who are in the cold face of medicine, the nuance of a consultation and picking up on the verbals and nonverbals cues is extremely difficult"* - GP4 (no previous video consultation experience)

One participant identified the concern that GPs have towards video consultation, but this participant did not agree with those views entirely.

> *"I think GPs feel threatened by it, I don't think there's any need to. I don't think it will ever replace general practice; it will just be an add-on"* – GP8 (previous video consultation experience)

One participant felt that GPs should actually embrace video consultation and use it to improve practice.

> *"I think if we have some control on it and we can see how possibly we could make our workload safer and in certain niche scenarios more convenient for patients and doctors alike there would be merit in it"* -GP4 (no previous video consultation experience)

However, the overarching view was concern regarding the uncertainty of what the future holds and that there needs to a conscious method of adoption that does not compromise the current role of a GP.

> *"I think we just need to be careful that[…]our role as the gatekeeper isn't taken from us"* – GP8 (previous video consultation experience)

Some participants recognised that without appropriate guidelines for its use, video consultation could pose a potential threat to patient safety. They expressed caution, and some recommended that there should be a restriction on the extent of video consultation use.

> *"…there should be maybe a limit as to how many video consultations you could have in a row before coming in to see a doctor"* - GP1 (previous video consultation experience)

> *"I think it would have to have very clear guidelines and very clear boundaries about what can be assessed safely over video consultation, and what can't"* - GP7 (no previous video consultation experience)

Technology & Logistics

The theme describes GPs' views of the hard and soft infrastructure requirements for the use of video consultations and the implications of their implementation. GPs with and without previous video consultation experience recognised that the introduction of video consultation would present many challenges.

> *"The main barrier would be implementing it in the practice. Is that going to take time, training, who pays for it, will it be HSE funded? Are there going to be teething problems with the technology? Would there be connection problems?"* - GP3 (previous video consultation experience)

Security and confidentiality were of particular concern to most GPs and many had specifically mentioned the need for GDPR compliance.

> *"I think that if there was some platform within our software package that's GDPR compliant where we can view that patient in a clinical setting with good background information and experienced clinicians on the far side"* - GP6 (no previous video consultation experience)

Discussion

Our study, to the best of our knowledge, is the first to explore GP's attitudes to video consultation within their own practice. Our themes are in keeping with the extant literature and reflect both appreciation of the possibilities and potential roles of video consultations, in addition to concerns of potential threats and risks.

The benefits of convenience and flexibility for the patient and in some ways the GP appear to be its main attraction and will drive its general uptake.

The main concern appears to be that GPs recognise there is more lost in video consultation than just the lack of physical exam, and GPs feel patients may not immediately recognise what they miss out on.

On the whole our participants felt that video consultation should be used with caution, in the appropriate clinical context; as a tool to reach out to the right kind of patient- to address health issues and provide opportunistic health promotion, without fully replacing the invaluable clinical examination or face-to-face consultation.

The use of video consultation by Irish GPs has changed significantly in the past 6 months due to the Covid-19 pandemic. Many GPs who would not have engaged with this medium hither-to-fore were suddenly faced with having to embrace it in daily practice. Given the increased uptake of the modality there is an opportunity to explore a wider demographic, as this paper included mostly females aged 30-39, there are likely a more diverse group of GPs using video consultation at present. Future research should seek to explore the views of Irish GPs towards the use of video consultation as compared to telephone consultations and how their opinions may have been impacted by the Covid-19 pandemic.

Declaration of Conflicts of Interest:
I hereby declare to the best of my knowledge that I, nor members of the research team, do not have any conflict of interest in the production of this research.

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Adherence to Return to Play Protocols in Children Presenting with Concussion

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Abstract

Introduction

There is a paucity of documentation on parental and child adherence to return to play (RTP) protocols in the context of Ireland. Failure to adhere to guidelines can lead to a prolongation of symptoms; the risk of recurrent injury with the associated complications and a repeat presentation to the Emergency Department (ED). Our aim was to assess and evaluate parental adherence to RTP protocols in children who sustained head injury during a sporting event.

Methods

Parents or guardians of children were contacted by telephone and asked to complete an online survey in relation to the initial head injury.

Results

Fifty-seven responses were recorded. 80.7% of patients were removed from the field of play at the time of head injury. Of those attending the ED, 53 patients (93%) were advised on RTP protocols at discharge. Nine patients (15.79%) were assessed by a physician prior to returning to play.

Conclusion

Whilst there is a strong awareness of management of concussion on the sporting field itself, there is a paucity of understanding and implementation in the post injury phase, particularly RTP. In addition, and in contrast with international guidelines, most children were not medically cleared appropriately before returning to play.

Introduction

Engagement in sporting activities is essential for the growth and well-being of children, with documented benefits to general health, fitness and social development[1]. With active participation in sports comes the risk of injury. In particular, children frequently present to the Emergency Department (ED) with head injury following engagement in sports. 65% of all sports-related head injuries presenting to ED's in the United States are in children between the ages of 5 and 18 years[2]. In Ireland, in adolescence, boys represent 70% of head injury presentations, half with sport related injury, with 40% from rugby[3].

The management of concussion has evolved to focus on programs incorporating cognitive rest, physical rest, neurocognitive testing and the utilisation of return to play guidelines. Concussion management and return to play protocols are modelled on adult return to play (RTP) protocols, recommended by the Concussion in Sport Group (CISG) 2012 Consensus Statement [4]. However, there are no such protocols or guidelines specific to paediatrics. There therefore remains significant confusion and variability among athletes, parents and coaches as to the gold standard of management in children[5].

Irish sporting bodies, including the Gaelic Athletic Association (GAA), the Football Association of Ireland (FAI) and the Irish Rugby Football Union (IRFU) advise graduated return to play (RTP) through a guideline-based system. Both the GAA and IRFU advise set timeframes for RTP; including a specific duration of time, in addition to monitoring symptoms with a step-up or step-down approach which is based on an individual's response to each stage of the programme. The FAI too, recommend a stepwise approach to RTP, although they do not provide guidance on a definitive timeline. In all cases, a medical assessment is recommended prior to the child re-engaging in full-contact sporting activity

There is a paucity of documentation on parental and child adherence to RTP protocols in the context of Ireland. Failure to adhere to guidelines can lead to a prolongation of symptoms; the risk of recurrent injury with the associated complications and a repeat presentation to the ED. Post-concussive physiological changes have been shown to increase the brain's vulnerability to further injury, especially in cases where a second concussive injury is sustained within days of the first. This phenomenon can lead to severe and permanent deficits[6]. Internationally, adherence to RTP guidelines is poor[7 8 9].

We aim to assess and evaluate parental adherence to RTP protocols in children who sustained head injury during a sporting event.

We sought to ascertain adherence to the return to play protocols and concussion management in relation to on field head injury management, administration of RTP advice upon discharge from the emergency department, duration of concussion symptoms, if a medical assessment was conducted prior to going back to play and time to return to play from concussive event. We sought to assess the factors influencing early RTP and the effects of early RTP on the patient.

Methods

All children between the ages of 8 and 16 years, who presented to the ED with a head injury and concussive symptoms, sustained in an organised sports event were included, and all those who had presented to the ED, who met these inclusion criteria, between June and December 2019, were retrospectively identified via the electronic patient records system in the Emergency Department.

Parents or guardians of children were contacted by telephone and asked to complete an online survey in relation to the initial head injury. Informed consent was obtained prior to commencing the survey. Participants were contacted a second time as a reminder to complete the survey. The survey of ten questions, focused specifically on the event surrounding the head injury and the patient journey from the time of injury to RTP.

Ethical guidance was sought and granted from the hospital ethics committee.

This was a single-centre study conducted in a tertiary level paediatric hospital. Children's Health Ireland (CHI) at Temple Street. CHI at Temple Street has an annual ED attendance of approximately 49,700 patients.

Results

Ninety-eight patients fulfilled the inclusion criteria and were included. Only one parent declined to participate. Each participant was contacted twice to ensure completion of the survey. Fifty-seven completed survey responses were recorded, with 40 surveys uncompleted. Only completed surveys were included in the study.

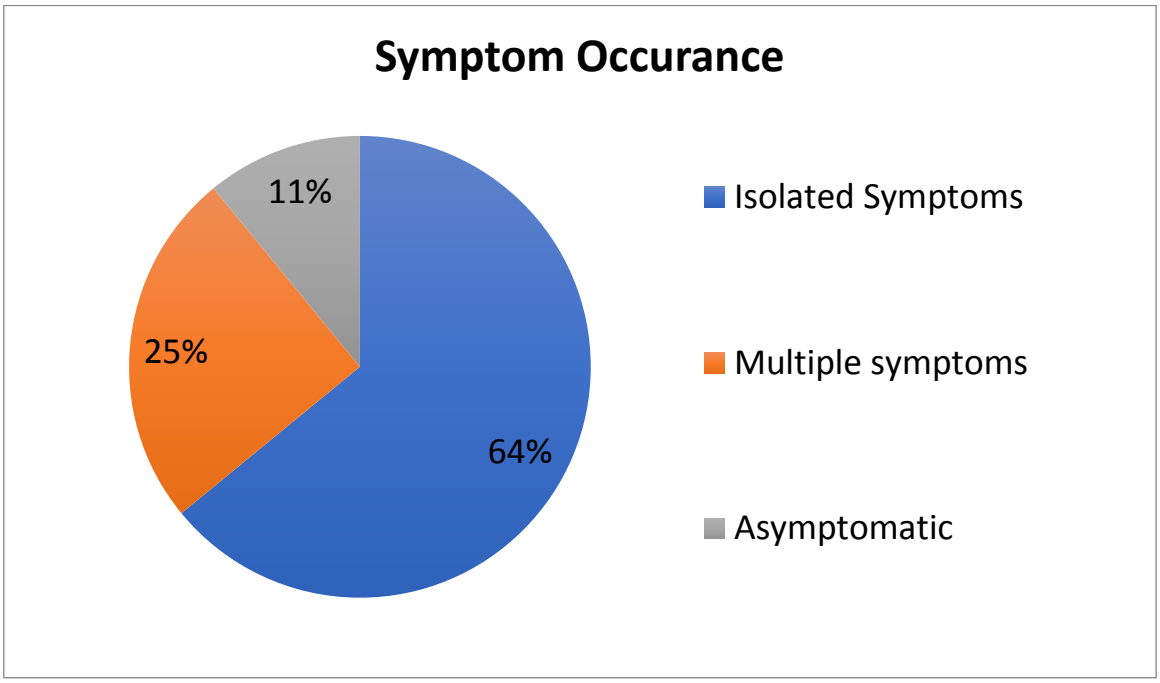
The sports in which patients were involved at the time of head injury were: gaelic football (42.1%, *n*=24), rugby (29.8%, *n*=17), soccer (10.5%, *n*=6) and hurling (7%, *n*=4). Other sports included horse-riding, baseball, hockey and basketball.

80.7% of patients were removed from the field of play at the time of head injury. Most children reported isolated symptoms at the time of injury, with headache the most frequently reported symptom (47%, *n*=27). Table 1 details all reported symptoms.

Table 1: Reported symptoms among patients

Reported symptoms	***N***
Headache	27 (47%)
Nausea	15 (26%)
Vomiting	6 (10%)
Irritability	4 (7%)
Dizziness	23 (40%)
Poor concentration	7 (12%)
Asymptomatic	4 (7%)
Other	9 (15%)

Figure 1: Symptom morphology amongst respondents



Of those attending the ED, *n*=53 (93%) were advised on RTP protocols at discharge. However, of those, n=6 (11.3%) children returned to play prior to the recommended RTP advice. *n*=7 (13.2%) reported returning to play sooner than advised due to external pressure from their team-mates or coach. Most (*n*=48, 84.2%) children returned to play without a medical assessment. Ten (17.5%) participants experienced persistent symptoms following their head injury; and of those *n*=5 (50%) reported intermittent headaches and n=3 (30%) experienced dizziness.

Table 2: Time from ED presentation to next game

<1 week	N=1 (1.75%)
1-2 weeks	N=8 (14.03%)
2-4 weeks	N=30 (52.63%)
1-2 months	N= 9 (15.79%)
>2 months	N= 7 (12.28%)
Unknown	N=2 (3.5%)

Thirty-two (56.14 %) participants reported no effect on their performance following RTP. Of those remaining, 25 (47.2%) experienced some degree of negative impact on their performance, involving dizziness, headache and fatigue.

In all, two (3.5%,) participants took one week to return to their normal level of play, 13 patients (22.8 %) took 2 to 4 weeks and 10 (17.5%) took more than 4 weeks until they felt they had returned to their normal level of performance.

In terms of individual sports breakdown and length of time until return to play, children participating in rugby; 62.5% returned within 2-4 weeks, with 25% within 1-2 months. A further 12.5 % returned after 2 months.

With regard to children participating in GAA; 3.4% returned within one week, 17.24% returned within 2 weeks and 34.48% returned to play between 2-4 weeks post concussion event. 13.79% of children returned after 2 months.

Children who presented following a soccer match, 25% returned between 1-2 weeks, 37.5% between 2-4 weeks and a similar 37.5% returned within 1-2 months

Duration of symptoms were noted to be greater than 1 week in 22.81% of respondents with the majority (47.37) reporting symptom resolution at 3 days.

Only 9 patients (15.79%) of all participants were assessed by a physician prior to returning to play. All patients reporting external pressures to return to sports did not undergo a medical assessment.

Discussion

Return to play protocols are a fundamental component of concussion management, particularly in a paediatric population where a significantly more conservative approach is recommended [9] [10].

There is emerging research in the field of adolescent and paediatric concussion[11], however there are few studies concerning the adherence to return to play protocols and their effect on concussion management in the paediatric population. Protocols for children are different than those for adults and should be used accordingly. Current recommendations for an immediate period of cognitive and physical rest for 1–2 days while initiating a gradual RTP protocol align with the best available evidence. Of the literature available, a systematic review noted that increased adherence to protocols predicted successful return to sport without symptom exacerbation. The evidence suggests that protocols with short rest periods and graduated physical and cognitive activity may best facilitate successful RTP while enhancing the patient's experience during recovery[12].

An Australian study in 2015 conducted on children with sports related head injury noted a 72% compliance with Return to play protocols. The authors expressed concern that 17.6% of patients studied returned to play with symptoms or did not follow appropriate remedial action following symptom onset during the RTP process. Potential causes for poor compliance were identified as; poor parental understanding, lack of medical supervision during the step-wise programme and the difficulty of using a process primarily designed for adult athletes in a non-professional paediatric sports setting[13].

With 47.2% of participants in this study reporting negative effects of concussion on performance upon return to sport, the potential causes identified in the study above may also be applicable to Ireland.

The 2016 Consensus statement on concussion in sport—the 5th international conference on concussion in sport[14] held in Berlin, noted that the management of sports related concussion in children requires special paradigms suitable for the developing child. It was recommended that child and adolescent guidelines refer to individuals 18 years or less.

Child-specific paradigms for sports related concussion (SRC) should apply to children aged 5–12 years, and adolescent-specific paradigms should apply to those aged 13–18 years. No studies have addressed whether sports related concussion signs and symptoms differ from adults. The expected duration of symptoms in children is up to 4 weeks.

The overall increased awareness of concussion and its management by those involved in team sports is reflected in our results, with most (80.7%) patients presenting following a head injury having been removed from the field of play at the time of injury. What is concerning is that most children, 84.2%, returning to play were not reviewed by a medical professional prior to doing so. With no established concussion clinic or indeed, a pathway that would facilitate medical input; patients, their parents and coaches are left to interpret guidelines whilst experiencing continued pressure to RTP. A concussion clinic could provide the ideal means to assess and review patients who are experiencing persistent symptoms.

There is international consensus on the importance of medical assessment post-concussion and prior to re- engaging in sports following head injury. This affords not only the opportunity to assess the clinical status of a player prior to their return to the game, but the time to identify areas for modification in order to optimise players' protective behaviour and provide education on concussion to players. Particular emphasis is placed on the paediatric population and the importance of children being completely symptom-free prior to RTP. It is strongly recommended that RTP, and its potential impact, should be discussed with both player and parents.

This review highlights an untouched area in Irish paediatric trauma and exposes a gap in how healthcare is provided to patients presenting with concussion. It supports the need for players, parents and those involved in organised sport for children to adhere to RTP guidelines. This needs to be continually stressed both to patients and parents and should be overseen by a medical professional experienced in dealing with concussion. Symptoms of concussion usually persist for more than 4 days in many patients: this should be reflected in RTP programmes.

The study is limited in its scope due to the data being obtained in a single centre. Methods were potentially exposed to recall bias. A relatively low number of respondents limits the generalisability and reliability of the results.

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

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Integration of Two Acute Paediatric Services During COVID-19

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Abstract

Introduction

To describe our experience during the COVID 19 pandemic when the acute in-patient service in CHI at Tallaght was relocated to CHI at Crumlin.

Methods

We describe the change management and the hospital activity across the two tertiary centres during the early pandemic (March-June 2020) and compared this to the same period in 2019.

Results

We compared activity during the pandemic to the same period in 2019, as the in-patient unit in Tallaght closed but day-care and OPD care continued. In CHI at Tallaght the number of day-cases and the new and review patients at 'face to face' OPD reduced by 76.29% (370), 67.06 % (1899) and 72.58% (2448) respectively. Similarly, in CHI at Crumlin, the admissions from ED, the day-cases, the number of new and review patients at 'face to face' OPD decreased by 21.74% (593), 29.14% (1442), 66.88% (2870) and 67.13% (8009) respectively. However, the number of patients managed in the virtual clinics increased significantly on both sites. All education sessions were delivered online.

Conclusion

With leadership, good decision making and the flexibility of clinical staff, we demonstrated how a rapid integration of services can be achieved. Whist activity levels reduced initially; new ways of working allowed us to continue to care for patients. Our shared experience was positive as we devised new team-working schedules, delivered remote education, and learned together in the midst of a crisis.

Introduction

The infection rate of COVID-19 disease in paediatric population is generally low with children accounting for <2% of those infected by SARS-CoV-2[1-3]. Ireland had its first SARS-CoV-2 infection reported on 29th February 2020; with a phased lockdown commenced from March 12th; a full stay-at-home order was communicated on 27th of March 2020. In Ireland only 2.0 % of SARS-CoV-2 cases were in children aged 0-14 years[4]. The characteristic features of COVID 19 infection in children has been published[5-8]. CHI at Tallaght (Children's Health Ireland) has 42 acute in-patient beds, 10 day-ward beds, a children's Emergency Department (ED) and an outpatient's department (OPD). CHI at Tallaght occupies part of the first floor of the Tallaght University Hospital (TUH) campus that has 562 beds in total. In anticipation of the surge in COVID-19 cases an executive decision was taken in March 2020 to temporarily close our paediatric in-patient facility and relocate to CHI at Crumlin, a larger tertiary hospital with 233 paediatric beds. This provided greater adult in-patient capacity on the TUH site and allowed our paediatric anaesthetic staff to join their adult colleagues in caring for ICU cases. On Friday 20th March this decision was communicated to our staff and we were informed we would join our colleagues at CHI Crumlin on Friday 27th March partaking in their on-call rota that weekend and thereafter for a minimum of 3 months. This relocation was subsequently extended by a further 3 months.

Methods

We describe the change management and the hospital activity across the two tertiary centres during the early pandemic (March-June 2020) and compared this to the same period in 2019. Data collected throughout examined ED, OPD and Day Care attendances for the initial 3 months. The utilisation of new virtual clinics was also tabulated. The clinical activity data was sourced from the Business Intelligence (BI) team at CHI offices.

Results

There were 9 consultants (7.5 WTE) providing acute medical on-call cover in CHI at Tallaght who relocated to CHI at Crumlin. Prior to the pandemic, the team at CHI Crumlin operated their acute medical service with 7 WTE. We organised ourselves into five new teams with three consultants minimum per team. Each team had at least one consultant from the CHI at Crumlin site to facilitate local integration and provide local knowledge and liaison for the new staff.

For the duration, each week was covered by two teams, of whom one covered Monday-Thursday, with a second team commencing Friday morning through until Monday morning. At each change of teams, there was an extended handover twice weekly. In addition, there were at least two shorter daily handovers to coincide with trainees completing their shifts. The nine hospital wards were divided into three clinical pods, each pod manged by a team of one consultant and their NCHDs each day. All the trainee medical staff from both sites operated as a single unit.

The Tallaght consultants and trainee staff continued to provide OPD services on the CHI at Tallaght site. All leave for staff was cancelled for the first 8 weeks of the pandemic.

Table 1 demonstrates clinical activity across the two tertiary centres during the pandemic (March-June 2020) and compared this to the same period in 2019. Activity recorded included ED, In-patient, OPD, and Day Ward attendances.

Table 1: Hospital activities across the two tertiary centres: CHI at Tallaght, CHI at Crumlin.

	CHI at Tallaght -2019*	CHI at Crumlin -2019*	CHI at Tallaght 2020**	CHI at Crumlin - 2020**	CHI at Tallaght: difference%	CHI at Crumlin- difference %
Day Cases	485	4948	115	3506	-76.29%	-29.14%
Inpatient Admissions	1327	2728	43	2135	-96.76%	-21.74%
Emergency Department (ED) Attendances	8581	9903	264	8820	-96.92%	-10.94%
Admissions from ED	1013	1405	35	1104	-96.54%	-21.42%
New OPD Attendances (Face to Face)	2832	4291	933	1421	-67.06%	-66.88%
Return OPD Attendances (Face to Face)	3373	11930	925	3921	-72.58%	-67.13%
New OPD Attendances (Virtual)	3	612	347	1174	Increase >100%	91.83%
Return OPD Attendances (Virtual)	465	46	2565	4982	Increase >100%	Increase >100%

* March-June 2019; ** March-June 2020

CHI at Tallaght: during that period the number of day-cases significantly reduced by 76.29% % (370) (Table 1). The number of OPD new and return patients who attended 'face to face' visits decreased by approximately 67.06 % (1899) and 72.58% (2448) respectively. There was a shift to new virtual telephone clinics. We adapted to this new way of working with many staff concluding that telemedicine suited many consultations, particularly review appointments but were not appropriate for new referrals.

CHI at Crumlin: during the same period, the inpatient admissions from ED decreased by 21.74% (593) admissions and the day cases decreased by 29.14% (1442). Moreover, during this period the number of new and review patients at 'face to face' OPD clinics decreased by 66.88% (2870) and 67.13% (8007) respectively. There was a significant increase in the number of patients managed in the virtual clinics however.

All journal clubs, grand rounds, and departmental education sessions were delivered online. Whilst a significant change there was a huge benefit in that each of us now had access to education from the other hospital sites. Also, rather than each site preparing a grand round weekly, one site was scheduled on a Friday lunchtime with Zoom access codes circulated to all beforehand.

Staff Nurses had a choice of relocating to ward service or the ED in CHI at Crumlin. Seven nurses including one nurse manager took up ward duties on the new site. In addition, 19 nurses including five shift leaders (CNM 2), moved to the ED department in CHI Crumlin. There was an increased onus on the remaining liaison nurses and nurse specialists working in general paediatrics to prepare OPD virtual clinics in advance, to follow up laboratory results, and answer telephone queries from parents and GPs alike, while maintaining continuity on the CHI at Tallaght site each week.

Discussion

The medical and nursing staff adapted to the relocation to CHI at Crumlin in the shortest of periods. This transition created flexibility in the system demonstrating how beds and services can be reorganised quickly. The move was facilitated as the Children's Health Ireland (CHI) had been legally established as a single organisation in accordance with the Children's Health Act 2018, to provide children's health services in Dublin. Children's services in the city continue to evolve with new models of care, care pathways, and better integration of subspecialties in anticipation of the opening of a new national children's hospital in 2024 that is currently under construction.

Each site had its own directorate team. We continued to meet virtually every second week with our Clinical Director to discuss any clinical or professional issues during this transition period. The initial perception was that this closure could have a negative impact on patients' care as well as staff welfare. However, the team instead took this an opportunity to explore a new way of working in a different location with new teams. Almost akin to the stages of loss[9], as the weeks passed, we started to accept the transition arrangements and frankly enjoyed our new work environment and developed closer working relationships with new team members.

People had a positive attitude and every effort was made to ensure safe care. Social distancing was paramount; lunches were eaten in solitude and IT support was offered to facilitate working from home as required. However, some clinicians found that this was quite a lonely time at work and found new work patterns difficult to adapt to.

There was a marked reduction in clinical activity over this period both in Dublin and in international centres [10]. Whilst virtual clinics were offered on both sites, these did not always obviate the need for in-person consultation at a later date. The virtual clinics were deemed to suit review appointments more appropriately than new appointments. Elective activities including day care were significantly curtailed.

In conclusion, this relocation was successfully implemented and allowed a continuance of clinical care and staff education during the pandemic. The new cross-city working fostered collaboration and teamwork. Old silos were dismantled, and new teams formed. There was a great sense of solidarity throughout and a foundation built for more integration and cross-city working into the future. Further challenges will include having surge capacity into the future, managing deteriorating OPD waiting lists, and allowing better access to OPD and elective day care over the 2020/2021 winter period.

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

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Infants born in a non-maternity hospital: The role of the National Neonatal Transport Programme (NNTP)

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Abstract

Aims

There is only one tertiary maternity hospital co-located with a tertiary subspecialist hospital in the Republic of Ireland, and so pregnant women may deliver in a non-maternity hospital if they require tertiary subspecialist care. Since 2015 National Neonatal Transport Programme (NNTP) attend deliveries in non-maternity hospitals on request when available.

Methods

This was a retrospective review of five years of NNTP records, 2015-2019, with cases identified using the NNTP database.

Results

The NNTP attended 33 (82.5%) of 40 deliveries in Dublin non-maternity tertiary hospitals, of 50 nationwide. All babies were delivered via caesarean section. Median gestation at birth was 35 weeks and the median birthweight recorded was 2.79kg. Eighteen (58%) babies required respiratory support on transport. The main reason for maternal delivery in a tertiary adult hospital was maternal cardiac disease, with placenta accrete spectrum the second most common reason.

Conclusion

Non-maternity hospital births account for 1.1% of NNTP workload. One quarter of the transports were unplanned – due to sudden requirement for delivery. Twenty-seven (82%) cases were undertaken during the day shift. Each call took on average almost a third of a shift (3h26min).

Introduction

Expectant mothers with serious underlying medical or surgical conditions may - on occasion - have to be delivered in a specialist non-maternity hospital. This causes logistical problems. The process necessitates that in addition to obstetrics, a neonatal nursing and medical team needs need to be in attendance. There is only one tertiary maternity hospital co-located with a tertiary hospital in the Republic of Ireland[1], therefore pregnant women who require tertiary subspecialist or ICU care may deliver in a non-maternity hospital when required. These patients include women with significant pre-pregnancy co-morbidities such as cardiac disease and cystic fibrosis, women with high-risk pregnancy-related co-morbidities like placenta accreta, and women who become very unwell during pregnancy. There is minimal data available on the neonatal workload associated with deliveries in non-maternity hospitals in Ireland.

Children transferred by a specialist service have better outcomes than those who are not[2], and babies born to unwell mothers are at risk of neonatal morbidities and mortality.[3] Since 2015, the National Neonatal Transport Programme (NNTP), with midwifery and obstetric teams from affiliated maternity units, attend deliveries outside maternity hospitals on request subject to availability. The NNTP is a 24/7 service operated out of the three Dublin maternity hospitals.[4] This study describes the workload undertaken by the NNTP in the provision of this service.

Methods

The study period was 5 years, 2015 – 2019. Cases were identified using the NNTP database. The details of each case were examined retrospectively. Nursing and medical rcords were checked in order to ensure full ascertainment of cases. Data collected included the following: the underlying maternal condition, mode of delivery, infant gestation and birthweight, and APGAR score. Similarly, all neonatal transports from non-maternity hospitals for the same period, as reported on NNTP's national neonatal daily activity census, were also reviewed.

Each non-maternity hospital that facilitates delivery of a baby maintains a resuscitaire, and other equipment, however the NNTP team bring a specialised ambulance with power, air and oxygen, as well as a high tech transport incubator and equipment and medication for full resuscitation and stabilisation of the unwell newborn.

Results

The NNTP attended 33 deliveries in non-maternity hospitals for neonatal care, accounting for 1.1% of the 2885 transports completed by the NNTP in this timeframe.

Analysis of NICU census records identified seven other transports from Dublin non-maternity hospitals in this timeframe meaning that the NTTP attended 82% of all Dublin deliveries.

NICU census records also demonstrated 10 other transports from non-maternity hospitals outside of Dublin – namely from University Hospital Limerick to University Maternity Hospital Limerick. One of these cases did not result in the birth of a baby, and another case was to the emergency department of a non-maternity hospital to a preterm baby who had been born at home.

Maternal diagnosis recorded	**N = 29**	**100%**
Cardiac diagnosis	13	45%
Placenta Accreta Spectrum	6	21%
Neurological/neurosurgical	3	10%
Severe Cystic Fibrosis	2	6%
Severe pneumonia	1	3%
Bowel obstruction	1	3%
Behçet's disease	1	3%
Sickle cell crisis	1	3%
Splenic Aneurysm	1	3%
Metastatic cancer	1	3%

Table 1: Maternal morbidities

The most common maternal diagnosis (45%, n=13) was maternal cardiac disease, which included cardiomyopathy as well as repaired congenital heart disease. Placenta accreta spectrum including placenta accreta, increta and percreta accounted for 21% (n=6) reasons for delivery in a non-maternity centre.

	Median	**Range**
Birth gestation	35 weeks	27 – 38 weeks
Birth weight	2.79kg	2.12-3.29kg
Weight not measured	13	45%
	Median	**Range**
APGAR at 1 minute	9	2- 10
APGAR at 5 minutes	9	5 - 10
APGAR at 10 minutes	9	8 -10
	Number	**%**
Birth by LSCS	31	100%
Gender recorded	28	90%
Male	16	57%
Female	12	43%

Table 2: Neonatal characteristics

The median gestation at birth was 35 weeks (27 – 38 weeks) and the median birthweight was 2.79kg (2.12-3.29kg). Of note only 45% (n= 13) birthweights were recorded on documentation. All births were by LSCS.

Intervention	**N=31**	**%**
Intubation and ventilation	4	12.5%
Nasal CPAP	13	41%
Supplemental Oxygen	1	3%
No respiratory support	13	41%
Vitamin K recorded	17	53%
IV cannula and fluids	26	81%
Formula feed prior to transport	2	6%
Breastfeed prior to transport	1	3%

Table 3: Neonatal interventions

Twenty-four (75%) cases had evidence of being planned the preceding day. 28 of these calls were initiated during the day shift – between 07:00 and 20:00. Twenty-three (72%) births had a neonatal consultant, NICU registrar and NICU nurse present. Nine (28%) births were attended by an NICU registrar and nurse. The median time spent on the transport was 3 hours and 26 minutes (range: 1 hour 35 mins to 5 hours 10 minutes). The most time-consuming part of the service was setting up and waiting for the delivery of the baby.

Discussion

The delivery of a mother in a non-maternity hospital is an uncommon but high acuity exercise. It requires considerable planning. In addition to skilled, experienced neonatal staff, the NNTP must bring all of the equipment necessary to manage the infant after birth. All eventualities must be covered.

Improved medical care has enabled women with medical conditions including repaired congenital heart disease to achieve and survive pregnancy, and so the number of women who require delivery in a tertiary non-maternity centre may continue to increase.

All of the babies in this cohort were delivered by LSCS for maternal reasons. We do not have complete records of the type of anaesthesia used, however most but not all cases were undertaken under general anaesthesia. This can have an adverse effect on the respiratory status of the baby and may account for some of the broad range of APGAR scores at one minute in our cohort.

We feel that the low rate of recorded vitamin K administration was due to poor documentation, although we have no evidence that it was not forgotten.

We do not have any records of the Rhesus status of the mother and baby – however that is normally attended to by the midwife that attends for maternal care.

Unfortunately, there are no facilities to provide postnatal neonatal care with the mother in the tertiary non-maternity hospitals and so baby and mother are unavoidably separated. In one hospital the clinical photography team record the baby's birth with photographs and videos, while in every hospital effort is made to get photos of baby for their parents. Recent visiting restrictions have improved the provision of information and photos and videos to parents remotely from the NICU using systems like vCreate and AngelEye. Babies have been brought to visit their mothers prior to current infection control concerns.

This is the first known quantification of the neonatal workload associated with births attended by a neonatal team in non-maternity hospitals in the Republic of Ireland. This is limited to the cases attended by NNTP and does not include cases for which the NNTP did not attend. For logistical reasons the NNTP are unable to provide this service to hospitals outside of the Dublin area given the acute nature of our service. This data supports the utility of co-location of a maternity hospital with a tertiary sub-specialist adult hospital, however given the wide range of cases (neurosurgical, cardiac and haematology) there is no single centre in Dublin that is a national referral centre for all subspecialties and so maintaining expertise in non-maternity hospital deliveries is important. This data also supports maintaining this service provided by the NNTP, as referenced in the National Model of Care.[5] The lack of consistent measurement of birth weight was likely due to the lack of weighing scales in the non-maternity hospitals and that can be improved. A checklist to include documentation for these deliveries could be developed between the NNTP and involved maternity hospitals in order to optimise documentation for these high-risk cases.

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

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The Implementation of Consultant Led MRI Pathway for Acute Musculoskeletal Trauma

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Abstract

Aim

To describe the introduction of an Emergency Medicine led MRI pathway for acute joint injuries, and review patient diagnoses and outcomes.

Methods

MRIs referred from the ED for acute MSK trauma were reviewed retrospectively for a six-month period from July 2018 to January 2019 (scaphoids and spines excluded). Patient records were interrogated to determine time to MRI and ascertain the follow up and further management of injuries.

Results

Seventy-five MRIs were performed. Sixty-eight scans (90.7%) found clinically significant pathology including nine occult fractures of the shoulder or knee joint. Mean time to MRI was 165.5 hours/6.8 days (SD 162.4). Mean time to MRI knee (n37) was 91.2 hours/3.8 days (SD 92.2).

Conclusion

An Emergency Medicine led imaging initiative can facilitate timely and diagnostic imaging for patients with musculoskeletal trauma, identify significant injuries and instigate appropriate management for these injuries.

Introduction

Musculoskeletal (MSK) trauma accounts for a considerable proportion of attendances to Irish Emergency Departments (EDs). A 2005 study found that soft tissue injuries and fractures may account for approximately 20% of all presentations to EDs in Cork[1]. Plain radiographs remain the first line radiological investigation for MSK trauma in the ED however a normal x-ray does not rule out the presence of significant injury, in particular to the soft tissues.

Newer imaging modalities such as Magnetic Resonance Imaging have demonstrated superiority in this setting[2, 3]. While a normal x-ray is helpful in the management of MSK injuries patients may sustain significant ligament, tendon, or muscular injuries that require further diagnostics, and an alternative management plan other that the traditional rest, ice, compression, elevation (RICE) approach may be needed[4]. In the case of the patient who presents with a MSK trauma and has a subsequent normal x-ray, MRI has been shown to be a useful diagnostic tool. In the case of rotator cuff tears, anterior cruciate (ACL) ruptures and undisplaced fractures not visible on x-ray, a positive MRI scan can change management[5-8]. This is of course dependent on the clinical gestalt of the ED clinician and the reserving of MRI for patients who are most at risk of having significant pathology based on history and examination. At present there are also significant waiting lists for outpatient MRIs for patients with chronic MSK conditions and historically patients with acute injuries can face delays because of this. Cost analysis within the NHS revealed that early MRI specifically for knee injuries led to faster diagnoses and management of internal joint injuries when compared with standard treatment. This results in a reduction in missed workdays, less pain, less limitation on activity and also improved patient satisfaction scores[11].

In 2018, the Emergency and Radiology Departments at Sligo University Hospital agreed on a dedicated clinical pathway for adult patients with acute MSK trauma who would benefit from an urgent MRI. Suitable patients are referred by a Consultant for expedited advanced imaging following a focussed clinical history and examination. The Radiology Department facilitated two dedicated knee slots per week for ED patients. The knee is the joint most commonly injured within the body and accounts for the majority of presentations both in this ED and internationally[4]. Patients are either referred directly for MRI on the same day of attendance, or asked to re-present to a review clinic, usually within two weeks for a consultant review. This allows for a delayed examination, when swelling and pain has improved. This delayed assessment has been shown to have a demonstrable benefit when assessing the severity of a suspected ligamentous injury[9, 10]. Following MRI, patients are then directed to the most appropriate management pathway based on their results: either referral for orthopaedic outpatients follow up, physiotherapy or discharge back to their GP.

This pathway was initially established to expedite imaging and treatment for the relevant patient cohort. At the time of data capture we found that the mean wait time for an MRI booked via the community in this hospital was 7300 hours, as compared to 91.2 hours for our knee patients. This study describes the benefits of this process over a six-month period and demonstrates the successes of this Emergency Medicine (EM) led initiative in terms of imaging utility, patient outcomes and cost savings.

Methods

This is a retrospective observational descriptive study. We included all patients who had had MRIs ordered using the National Integrated Medical Imaging System (NIMIS) from the ED over a six-month period from July 2018 to January 2019. MRIs of the scaphoid were excluded as these patients are placed on an existing separate pathway, and spinal MRIs were also excluded as these patients typically have more complex pathology and clinical course. Once patients were identified, their Emergency Department records were interrogated to determine outcome and management.

Information pertaining to patient demographics, referral source (direct from ED or review clinic), time to MRI, results of the MRI, and ultimate disposition of the patient was collected.

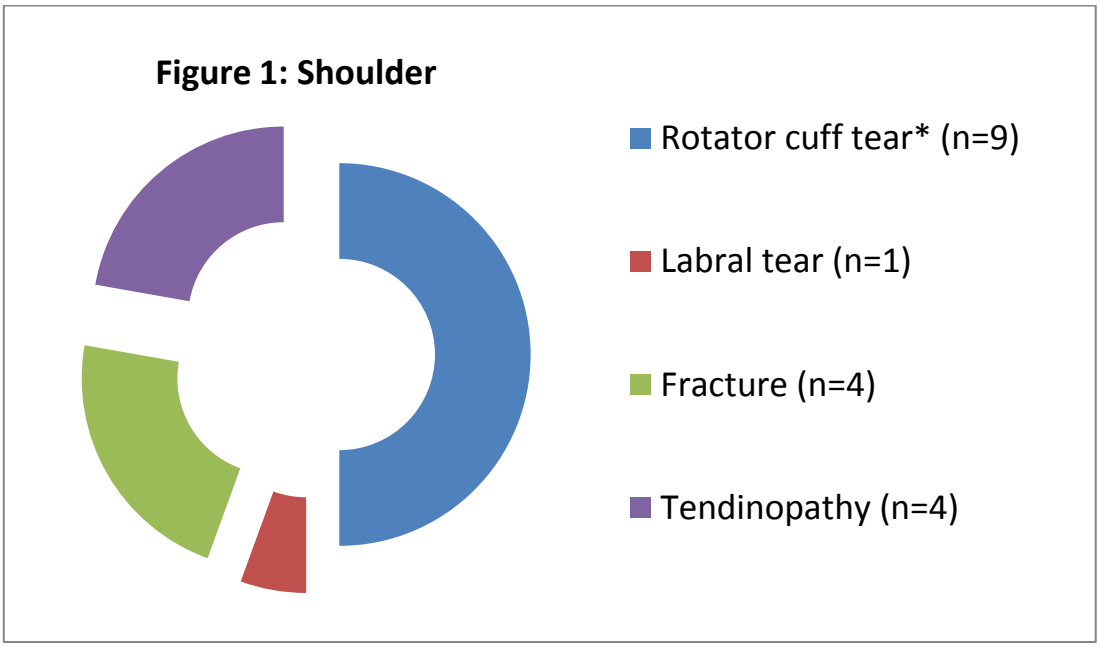
Results

Demographics

There were seventy-five patients suitable for inclusion that had MRIs ordered by EM clinicians during the study period. Of these, fifty (66.7%) were male. The mean age was 39 years (SD: 18.5, Range 15 - 81). Patients attending for review accounted for forty-eight (64%) of scans ordered, with twenty-seven (36%) ordered on first presentation to the ED. Of the MRIs ordered thirty-seven (49.3%) were of the knee, seventeen (22.7%) of the shoulder, seven (9.3%) of the wrist, six (8%) of the ankle, with foot, elbow, hip, pelvis, and thumb accounting for the remaining eight (10.6%).

Results

In sixty-eight (90.7%) scans clinically significant pathology was found. In MRIs of the knee thirty-one (83%) found a significant abnormality related to trauma. The range of injuries is described in figures 1 and 2. In both figures the number of injuries is greater than the number of scans performed due to the presence of multiple injuries in single patients. The mean time from ordering to MRI was 165.5 hours (SD 162.4, range 0.4 – 816). The mean time to MRI knee (n=37) was 91.2 hours (SD 92.2, range 0-456). Mean time to MRI of other joints (n=38) was 235.2 hours (SD 185.1, range 0-816).



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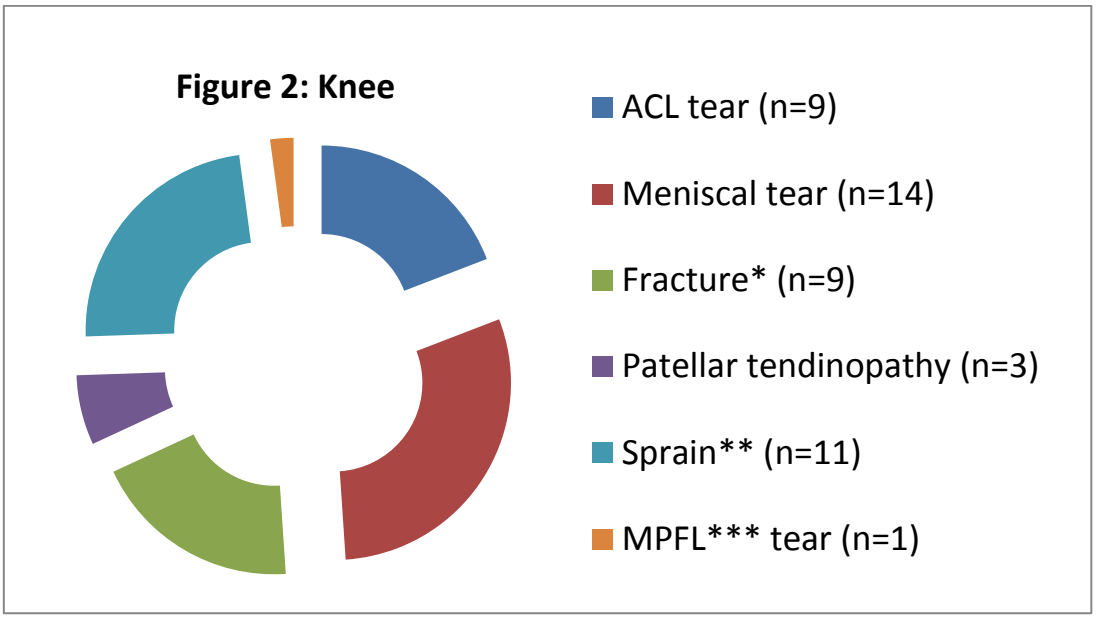

*Fracture: Tibial plateau (n=5), femoral condyle (n=2), femoral epiphysis (n=1), patella (n=1)
**Sprain: MCL (n=9), ACL (n=1), PCL (n=1)
***Medial patellofemoral ligament

Disposition

Forty-two patients (56%) had an injury diagnosed on MRI which required follow-up in Orthopaedic clinic. Nineteen patients (25%) were referred to Physiotherapy. Referral to other institutions +/- physiotherapy accounted for four (5.3%). In the case of ten patients (13%) either no further follow-up was required or there was insufficient data to reach a conclusion.

Discussion

Our study demonstrates the benefits of prompt access to MRI for patients presenting to ED with acute limb injuries. The provision of protected time slots for acute injuries within our pathway allow for a mean time to scan of 6.8 days. The ED review clinic allows patients to undergo serial examination by experienced EM clinicians once their initial joint swelling has subsided. This has been shown to lead to a more accurate assessment particularly for ligamentous injuries[9, 10, 13]. Dedicated extremity MRI for acute injuries has been shown to improve the prediction of the need for further intervention[12]. There is also evidence that using MRI in acute MSK works best in conjunction with physical examination. The clinical accuracy of practitioners with experience in assessing MSK injuries is significantly greater than those without such experience[9, 10, 14, 15]. This finding is supported locally by the overwhelmingly positive findings of the scans performed (90.7%), the majority of which were clinically significant. Clinical assessment alone has its limitations in making accurate diagnoses in these patients. Combining the clinical assessment by an experienced clinician and the use of MSK MRI in a timely manner allows for a more rapid accurate diagnosis and subsequent definitive care[16].

An accurate diagnosis following early imaging allows the commencement of a targeted physiotherapy program prior to review by an Orthopaedic specialist for example[17, 18]. Similarly the pathway allows for patients with acute pathology to be referred to orthopaedic fracture clinic where indicated, as opposed to being discharged to await outpatient imaging followed by referral to an elective clinic. A definite diagnosis allows for the appropriate rehabilitation programme and potentially improves symptoms faster than if waiting for definitive diagnosis and management.

The presence of nine fractures (including five tibial plateau fractures) is a further reminder of the limitation of plain radiographs. With regards to the tibial plateau fractures specifically, without the existence of this pathway these patients would likely either be discharged following their normal x-ray or referred to physiotherapy with ongoing pain. MRI has a clear role in the classification and treatment of such fractures and so if performed can affect management and outcomes[19].

We did not specifically measure the cost savings in this study. Most of MRIs were ordered from the review clinic rather than on the initial presentation to the ED so an expectant approach can help limit the number of MRI scans carried out. A Dutch study from 2009 showed that the careful application of MRI for knee injuries does indeed lead to savings both in terms of medical costs but also to the patient and exchequer as a whole through a reduction in time off work/convalescence[20].

We have described the introduction of a pathway to fast track patients presenting to ED with acute musculoskeletal injuries to serial clinical examination by senior decision-makers and to MRI. This can facilitate timely and appropriate imaging and subsequent treatment for patients with musculoskeletal trauma. Patients with injuries requiring surgical management (e.g. ACL ruptures in the young athlete) can be referred for early pre-operative physiotherapy, and thus improve their ultimate recovery. An EM-led MSK MRI pathway has potential for quality improvement for both patients and the healthcare system.

Declaration of Conflicts of Interest:
The Authors have no conflict of interest to declare.

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Cancer Patients' Satisfaction with Virtual Clinics in Ireland During COVID-19

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Abstract

Aim

To measure cancer patients' satisfaction with telephone consultations during the COVID-19 pandemic.

Methods

Cancer patients on active treatment or surveillance in an Irish University hospital were invited to complete a questionnaire issued via "Survey Monkey". It comprised ten questions and assessed patients concerns including preference to continue with virtual consultations. Patients recorded what was absent from the current environment when compared with previous clinics.

Results

This survey was issued to 180 cancer patients with a median age of 65 (range 20 – 92) years. Fifty-four patients (30%) completed this anonymised questionnaire. Over 96% (n=52) of cancer patients agreed/strongly agreed their concerns were addressed satisfactorily and similarly 93% (n=50) felt reassured after this consultation. One-third of patients (n=18) would prefer for all out-patient consultations to revert to those in the pre COVID-19 era and 11% (n=6) agreed all future consultations should continue virtually. The remaining, 30 patients (56%) agreed with the later though only in certain circumstances. Twenty-eight patients missed (56%) missed the face-to-face interaction and reassurance provided by a physical examination.

Conclusion

This is the first Irish oncology study which examined cancer patients' perspective of Health Service Executive directed virtual outpatient clinics. Face-to-face consultations are crucial for optimal cancer patient care and cannot be eliminated completely.

Introduction

The COVID-19 pandemic has led to an unprecedented lockdown of Ireland and significant challenges to the national healthcare system, with the closure of elective day case procedures and outpatient department (OPD) clinics. In accordance with the national Health Service Executive (HSE) recommendation, all cancer related activities were transferred from public to private hospital facilities to reduce patient risk of exposure to COVID-19 [1] . Cancer patients are a vulnerable group and data from the first Chinese national study [2] identified those treated with anti-cancer therapies had almost a five-fold increased risk of death or need for intensive care unit (ICU) requirements when exposed to COVID-19. Accordingly, the decision to continue or stop cancer therapies were based on risk assessments as per international (American Society of Clinical Oncology & European Society of Medical Oncology) & national (National Cancer Control Programme NCCP) guidelines [3] . National guidelines recommended reducing hospital visits by postponing all routine outpatient department (OPD) visits. In order to continue to deliver a medical oncology service, we continued all return patient OPD visits virtually by telephone.

Methods

Cancer patients on active cancer treatment or surveillance (post treatment) in University Hospital Waterford (UHW) were invited to complete an online questionnaire (Survey Monkey). The study aims were to measure patient satisfaction with virtual (telephone) clinics when compared with previous OPD clinic reviews. Full ethical approval was granted by National Research Ethics Committee for COVID-19-related Research (NREC COVID-19) in May 2020. Verbal consent was obtained during/following these virtual consultations. Patients were also required to confirm consent prior to completing this study questionnaire. This comprised of ten questions, which were structured as a statement, with answers ranging from two to five options. It assessed whether patients' concerns were addressed, if they had sufficient time to address their concerns and their preference to continue with virtual consultations. The final question enabled cancer patients to document what was absent from virtual clinics when compared with traditional OPD clinics.

Continuous variables were reported as medians with the corresponding range. Categorical variables were reported as frequencies and respective percentage. The cumulative positive (agree) and negative (disagree) result was calculated by combining agree with strongly agree responses and disagree with strongly disagree responses, respectively.

Results

This survey was issued to 180 cancer patients including 65 (36%) men and 115 females (64%) with a median age of 65 (range 20 – 92) years. This included 79 (44%) breast cancer patients, 37 (21%) gastrointestinal and 23 (13%) lung cancer patients (Figure 1). Fifty-four patients (30%) completed this anonymised questionnaire and the median duration was 3 min 34s.

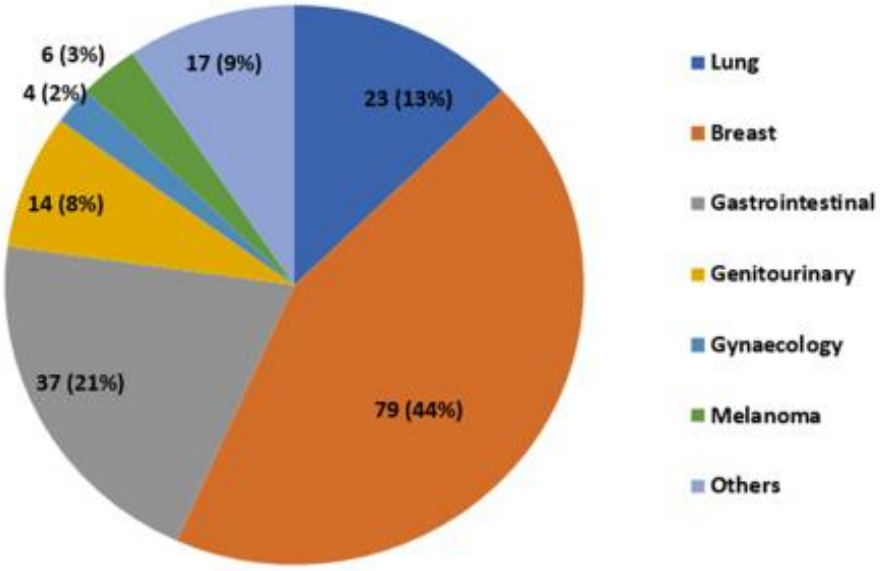

Fig.1 Frequency of cancer diagnosis. Numbers depicted as n (%)

Over 98% (n=53) of patients identified the clinician introduced themselves and explained why the virtual clinic was taking place. Almost 70% (n=37) received prior notice of this clinic and over one-fifth, 21% (n=11) were not familiar with the clinician conducting this clinic. Almost seven in every ten patients knew their follow-up plan, 69% (n=37) and over 94% (n=51) had the oncology department contact details. The below summaries the findings from the structured statements with multiple choice options and patients selected the best option.

Question 1: I felt my concerns and questions were addressed.

Over 96% (n=52) agreed / strongly agreed their concerns were addressed (Figure 2a).

Question 2: I felt there was enough time to address my concerns.

Almost 95% (n=51) agreed/strongly agreed sufficient time was given to address their concerns and 2% (n=1) neither agreed nor disagreed with this statement (Figure 2b).

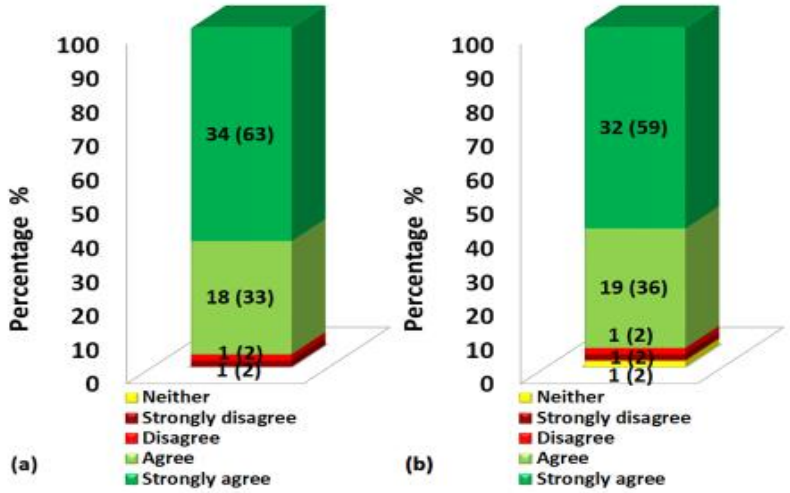

Fig.2(a) Concerns addressed **(b)** Sufficient time. Numbers depicted as n (%)
Note: Upon rounding of percentages, all total may not add to 100%

Question 3: I felt reassured after the consultation.

Over 92% (n=50) agreed / strongly agreed with reassurance following the virtual consultation. The remaining four patients reported: 4% (n=2) neither agreed nor disagreed and 4% (n=2) disagreed/ strongly disagreed with such reassurance (Figure 3a).

Question 4: Would you be happy to receive another virtual OPD instead of a face-to-face OPD?

One-third of patients (n=18, 33%) opted to meet a clinician for all future OPD clinics. Over 11% (n=6) would prefer all OPD reviews to take place in the virtual setting. The remaining 56% (n=30) favoured the virtual clinic for some OPD clinic reviews (Figure 3b).

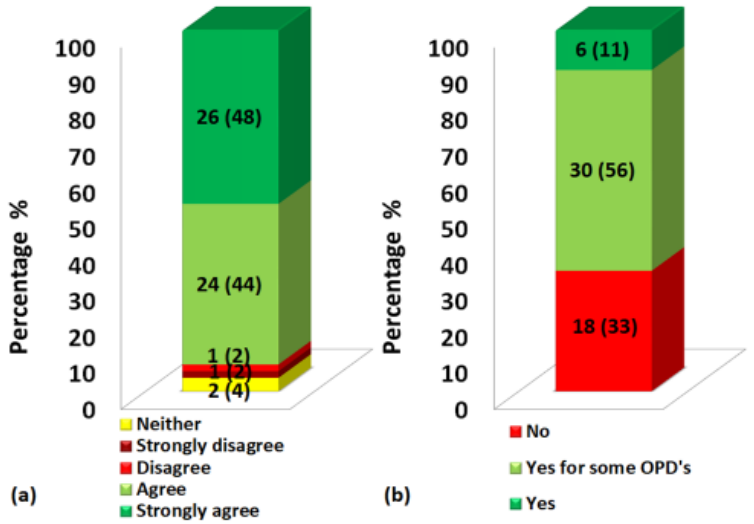

Fig. 3(a) Reassurance following OPD **(b)** Preference to continue with virtual OPD clinics. Numbers depicted as n (%)

The final question asked patients to document what was absent from the virtual OPD when compared with the traditional OPD clinic. Fifty patients (93%) answered this question. As per Table 1, 30% (n=15) identified advantages by avoiding hospital OPD clinics, including 6% (n=3) reduced risk of COVID-19 exposure and 4% avoiding ancillary costs (n=2). There were more patients, 66% (n=33), who identified challenges with the new virtual clinic. Over one-third of patients (n=17) missed the face-to-face interaction with the clinician. There were 22%, (n=11) who identified the lack of physical examination as a challenge. The remaining patients found it easier to understand information in the traditional OPD setting (n=3, 6%) and identified (n=2, 4%) the lack of support from meeting other patients as a challenge.

Table 1: Comparison of pre-COVID-19 OPD clinics with virtual OPD clinics.

Response	**n**	**%**
Face-to-face interaction	17	34
Physical examination	11	22
Nothing	10	20
Glad not to attend during Covid-19	3	6
Easier to understand information in OPD's	3	6
Did not miss clinic delays/parking costs	2	4
Support from meeting other patients	2	4
Other	2	4

Discussion

To the best of our knowledge this is first Irish study to assess the opinions of cancer patients in Ireland using telemedicine during COVID-19. We identified most patients were in, agreement / strong agreement that there was sufficient time to answer questions and were adequately addressed (95%) with over 92% reassurance with this clinic. However, 66% expressed concerns with continued use of telemedicine when compared with the traditional face-to-face OPD setting.

The merit of OPD clinic cancellations is obvious through avoiding potential iatrogenic COVID-19 exposure, needs to be balanced with patients' needs[4]. Only 6% (n=3) identified this as a justifiable measure to reduce such exposure. One third of patients (n=18) in this study wanted *all* further OPD clinic visits to be held in a face-to-face setting and an additional 22% felt reassured by a physical examination at these clinics. The latter also poses a challenge for clinicians; the previous social cues acquired from a face-to-face interaction to further explore potential patient concerns are absent. Similarly, a surveillance scan can offer reassurance within the imaging field though any new palpable mass clinically identified is no longer possible. In the event of extending telemedicine to include video, challenges are presented by poor room lighting[5] and General Data Protection Regulation (EU GDPR) compliance.

In a rapidly expanding area of research, different outcomes for patients with cancer who have had COVID-19 are being reported. Fortunately, recent data from the UK Coronavirus Cancer Monitoring Project (UKCCMP) did not identify any increased mortality from COVID-19 cancer patients on systemic therapy when compared with those not on active systemic therapies [6]. This was a prospective observation study which included 800 cancer patients and included 43% metastatic cancer patients and 58% on chemotherapy, endocrine/targeted-therapy or immunotherapy within four weeks of a COVID-19 diagnosis. Particular concerns have been expressed with the use of anti-PD-L1 therapy and potential cytokine storm risk in the current era, however use of such therapy in lung cancer patients did not result in more severe COVID-19 illness [7].

There are limitations to this study, including a low response rate. Participation in health surveys are known to be on the decline since the 1980's when a participation rate of 80% was possible [8]; nowadays participation rates of 40 – 50% are the norm. However, one would expect higher rates in patients with chronic illness to voice their concerns, though perhaps COVID-19 fatigue a contributing factor. This survey required access to a smartphone which have limited patient uptake of this survey in an older cohort of patients. As this study was GDPR compliant there is no way to identify the individual patient concerns and examine if there are any differences between the gender, age or cancer subtype. This is a voluntary study; it does not capture the responses of those who opted out or why these opted out.

It is too early to determine if the current OPD clinics may lead to delays in recurrent cancer or metastatic cancer diagnoses. It is encouraging more recent cancer patient treatment does not identify any significant increase in mortality with COVID-19, when on active treatment. There may be an opportunity to continue with virtual clinics for a cohort of cancer patients without compromising health outcomes and yielding a more efficient cancer OPD clinic service.

Acknowledgements:
Participating cancer patients.

Ethics Approval & Consent to Participate:
All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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

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Euthanasia and Physician-Assisted Suicide: Attitudes of Irish Consultant Physicians

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Abstract

Introduction
This study examines the attitudes of Irish consultant physicians towards euthanasia and physician-assisted suicide.

Methods
Data were collected between May and October 2016. A questionnaire was distributed to all consultant physicians listed in the Irish Medical Directory under general internal medicine specialties. Demographic details were collected. Likert-type questions assessed attitudes towards euthanasia and physician-assisted suicide.

Results
The overall response rate was 28.7% (238/830). The majority, 67.2%, opposed legalising euthanasia, with 14% in favour and 18.8% remaining neutral. A majority, 56.3%, also opposed legalising physician-assisted suicide, while 17% were in favour and 26.7% remained neutral. Over one-third, 37.5%, had received a request from a patient to hasten that patient's death. Receiving such a request did not significantly influence attitudes towards either euthanasia ($p=0.53$) or physician-assisted suicide ($p=0.48$). There was a significant association between self-expressed level of religiosity and opposition to both euthanasia ($p<0.001$) and physician-assisted suicide ($p<0.001$). Attitudes were not significantly affected by respondents' age.

Discussion
The majority of Irish physicians who responded to the survey were opposed to euthanasia and physician-assisted suicide. This is the first published study of the attitudes of Irish physicians in this regard and constitutes an important contribution to the ongoing national debate on these issues.

Introduction

In Ireland, subject to some limited exceptions[1], a patient of full mental capacity has the right to refuse medical treatment even if such refusal will result in the patient's death[2]. However, a patient does not have a right to demand that active measures be taken to hasten their death[3]. Euthanasia and physician-assisted suicide are illegal.

Debate on the issue of legalising euthanasia and physician-assisted suicide has once again been cast into the public spotlight by the recent introduction of the Dying With Dignity Bill 2020. This Bill proposes to make it lawful for a medical practitioner to assist a mentally competent terminally ill patient (aged ≥18) resident in Ireland to end his/her life provided the patient has a clear and settled intention to do so and has made a declaration to that effect in the presence of an independent witness. This declaration would then have to be countersigned by two medical practitioners, both of whom are satisfied that the patient is terminally ill, is of full mental capacity and has a clear and settled intention to end his/her life, which has been reached voluntarily, on an informed basis free from any coercion or duress.

In recent times, support for legalisation of euthanasia and physician-assisted suicide appears to be growing among the general public[4]. It has been recognised, however, that physicians' opinions on euthanasia and physician-assisted suicide are particularly authoritative given their direct experience with end-of-life care[5]. Furthermore, it is inevitable that physicians would play a key role in any proposal to legalise euthanasia and physician-assisted suicide.

While the Royal College of Physicians of Ireland (RCPI) has issued a position paper opposing the legalisation of assisted suicide[6], to our knowledge there has to date been no study of the attitudes of Irish physicians towards euthanasia and physician-assisted suicide.

The aim of this study is to analyse the attitudes of Irish consultant physicians towards euthanasia and physician-assisted suicide.

Methods

A cross-sectional study (survey) was conducted between May and October 2016. Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals. A novel questionnaire containing Likert-type questions to analyse attitudes towards euthanasia and physician-assisted suicide was distributed to all consultant physicians listed in the latest edition of the Irish Medical Directory[7] as working in the following 14 specialties: Cardiology, Emergency Medicine, Endocrinology, Gastroenterology, Geriatric Medicine, General Internal Medicine, Haematology, Infectious Disease Medicine, Nephrology, Neurology, Medical Oncology, Palliative Care, Respiratory Medicine and Rheumatology. Physicians were excluded if stated in the Irish Medical Directory to work predominantly with paediatric patients. In total, the potential sample included 830 physicians.

Previous studies had indicated that use of the terms 'euthanasia' and 'physician-assisted suicide' could influence responses, both because of the emotional response those terms tended to elicit[8] and because of confusion surrounding the exact meaning of the terms[9, 10]. Therefore, descriptive language was used instead to explain precisely the practices referred to.

Euthanasia was defined as a doctor administering drugs to a mentally competent terminally ill patient, with the purpose of ending that patient's life, if the patient voluntarily requests the doctor to do so. Physician-assisted suicide was defined as a doctor helping a mentally competent terminally ill patient to end his/her life, by providing drugs for self-administration, if the patient voluntarily requests the doctor to do so.

In addition, demographic details such as age, medical specialty and level of religiosity were ascertained.

The questionnaire was pilot tested for face validity among an anonymous group of consultant physicians in Cork University Hospital. This study used mixed methods sampling. The questionnaire was distributed in person to all consultant physicians in Cork University Hospital. It was distributed by email to all consultant physicians for whom an email address was provided in the Irish Medical Directory. All remaining consultant physicians in the potential study population were sent the questionnaire by post.

Data were analysed using the Statistical Package for Social Scientists (SPSS) version 23. All responses received were coded and manually entered, dichotomizing variables where appropriate. Five-point Likert scales were consolidated into three points for the purposes of analysis. As most data were not normally distributed and ordinal, Chi-square and Fisher's exact tests, the Mann–Whitney U test or Kruskal-Wallis test (three or more) were used to compare samples. Somers' Delta (D) was used to measure agreement between pairs of ordinal variables.

Results

The overall response rate was 28.7% (238/830). Respondents ranged in age from 35 to 76, with a mean age of 48 years. In total, 67.2% (154/229) of respondents expressly opposed legalising euthanasia, while 14% (32/229) were in favour and 18.8% (43/229) remained neutral. Similarly, only 17% (39/229) were in favour of legalising physician-assisted suicide, while 56.3% (129/229) were opposed and 26.7% (61/229) remained neutral.

Despite the low level of support for legalisation of euthanasia and physician-assisted suicide, only 41.2% (94/228) of respondents felt that the doctor-patient relationship would be adversely affected by such legalisation. Less than half (46.7% or 107/229) felt that legalisation would violate the doctor's role as a healer. Nevertheless, only 27% (62/230) agreed that euthanasia and physician-assisted suicide are consistent with a doctor's role in providing relief from suffering and pain.

In all, 37.5% (72/192) of respondents had received a request from a patient to hasten the patient's death. However, receiving such a request did not result in any statistically significant difference in attitudes towards either euthanasia (p=0.53) or physician-assisted suicide (p=0.48). Most (61.8% or 141/228) agreed that, if euthanasia and physician-assisted suicide were legalised, even the most careful regulations would not be sufficient to prevent potential abuse.

Of the 226 respondents who stated their level of religious commitment, the respective frequencies were as follows: Deep 6.2%; Moderate 31.8%; Minimal 36.3%; None 25.7%. There was a statistically significant association between self-expressed level of religiosity and opposition to both euthanasia (Somers' D = -0.310, p<0.001) and physician-assisted suicide (Somers' D = -0.290, p<0.001). This is despite only 18% (41/228) of respondents directly admitting that their religious beliefs influenced their attitudes towards euthanasia and physician-assisted suicide.

Age, regardless of how it was categorised, did not have a significant effect on attitudes towards euthanasia and physician-assisted suicide. The proportion and distribution of responses regarding euthanasia and physician-assisted suicide in each of the different specialties are detailed in table 1.

Medical Specialty	**Response Rate** (%)	**Euthanasia**			**Physician-Assisted Suicide**		
		% For	% Neutral	% Against	% For	% Neutral	% Against
Cardiology	22/98 (22.45)	18.18	31.82	50	27.27	31.81	40.91
Emergency	23/89 (25.84)	26.09	13.04	60.87	30.43	21.74	47.83
Endocrinology	7/54 (12.96)	0	14.29	85.71	0	14.29	85.71
Gastroenterology	18/88 (20.45)	0	33.33	66.67	0	38.89	61.11
Geriatrics	32/90 (35.56)	3.125	15.625	81.25	3.125	25	71.87
Haematology	13/50 (26)	23.08	23.08	53.84	23.08	30.77	46.15
Infectious Diseases	2/15 (13.33)	0	0	100	50	0	50
Nephrology	14/39 (35.9%)	7.14	21.43	71.43	21.43	21.43	57.14
Neurology	13/59 (22.03)	30.77	7.69	61.54	30.77	15.38	53.85
Oncology	15/41 (36.59)	6.67	13.33	80	13.33	26.67	60
Palliative Care	10/32 (31.25)	10	0	90	10	0	90
General Internal	16/50 (32)	12.5	12.5	75	12.5	31.25	56.25
Respiratory	23/79 (29.14)	21.74	26.09	52.17	21.74	30.43	47.83
Rheumatology	12/56 (21.43)	25	25	50	25	50	25
Unspecified	9	11.11	11.11	77.78	11.11	22.22	66.67
Total	229/830 (27.59)	14	18.8	67.2	17	26.7	56.3

Table 1. Response rate and attitudes towards Euthanasia and Physician-Assisted Suicide per specialty.

Discussion

This study found that the majority of Irish physicians who responded to the survey were opposed to the legalisation of euthanasia and physician-assisted suicide. Despite this, a relatively large proportion were undecided, remaining neutral on the topic. Most considered that even if tightly regulated, the practices of euthanasia and physician-assisted suicide would still be open to potential abuse, reflecting concerns raised by the RCPI[6].

The position of Irish physicians on these issues appears to stand in marked contrast to the attitudes of the Irish public. While differences in the wording of questionnaires render direct comparison between studies challenging, it is nonetheless notable that a Behaviour & Attitudes/Sunday Times opinion poll, conducted in October 2014, found that 71% of the Irish public favoured legalisation of physician-assisted suicide[4]. Similarly, in October 2020 an Irish Times/Ipsos MRBI poll of the general public showed that 52% of respondents agreed that medical assistance should be provided to allow people end their lives, while 26% were undecided[11]. Internationally, numerous studies have consistently demonstrated lower levels of support for euthanasia and physician-assisted suicide among physicians than among the general public[12, 13, 14].

The reasons for this divergence of opinion between physicians and the general public is important to understand. It is possible that the difference relates to physicians' greater experience with end-of-life care. Studies outside of Ireland have frequently found stronger opposition to euthanasia and physician-assisted suicide among physicians with greater experience of caring for terminally ill patients[8, 9, 10, 13]. While the matter was not directly addressed in this study, it is nevertheless noticeable that opposition was particularly strong among specialties such as Palliative Care, Geriatric Medicine and Medical Oncology that would be expected to have a greater proportion of older and dying patients.

Our study also found a statistically significant association between religiosity and opposition to euthanasia and physician-assisted suicide. Studies in other countries have consistently shown that religious views are a significant factor in determining physicians' attitudes towards these issues[10, 12, 13, 14]. It is interesting, therefore, to speculate whether declining religiosity in Ireland[15] will lead to increasing support for euthanasia and physician-assisted suicide among Irish physicians in the future and whether it explains the high levels of support found in recent public opinion polls.

A strength of this study is that it included a large sample of consultant physicians in the Republic of Ireland with a broad age range suggesting largely generalisable findings. However, the relatively low response rate raises the potential for non-response bias. No effort was made to analyse the reasons for non-response. The use of three different methods of questionnaire distribution may have further introduced a bias into the data collection[16]. Surveys are prone to missing data, although the number here was low. The rationale underlying Irish physicians' attitudes towards euthanasia and physician-assisted suicide was not investigated and should be examined, particularly given the ongoing debate over the Dying With Dignity Bill 2020.

Data collection for this study preceded the publication of the Dying with Dignity Bill 2020. Hence, the definitions of euthanasia and physician-assisted suicide utilised in this study were not based on anything contained within the Bill or the 2017 RCPI position paper. While the Bill may be said to provide primarily for physician-assisted suicide, as defined in this study, provision is also made for direct administration of lethal substances by medical practitioners in sections 11 (2)(c) and 11 (5)(d) thereof, which would come within the definition of euthanasia utilised in this study.

Further, this study did not define what was meant by "terminal illness". The Dying with Dignity Bill 2020 states that a person has a terminal illness if they have been diagnosed by a medical practitioner with an incurable and progressive illness that cannot be reversed by treatment and they are likely to die as a result of that illness or complications relating thereto. This definition has been criticised for being too broad[17]. It is interesting to speculate whether defining "terminal illness", either in broad or narrow terms, would have affected the results of this study.

In conclusion, this is the first study of the attitudes of Irish physicians regarding the legalisation of euthanasia and physician-assisted suicide and, as such, represents an important contribution to the ongoing national debate on this issue. It is hoped that this study can provide a baseline from which future studies can track the attitudes of Irish physicians towards euthanasia and physician-assisted suicide over time.

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

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Recall Time to a Symptomatic Breast Unit Following Abnormal Mammography

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Abstract

Aims

The primary aim was to identify the time taken to recall patients to a Symptomatic Breast Unit after filming of an abnormal mammogram and compare to BreastCheck standards. Secondary factors such as time taken for mammography and pathology reporting were also analysed.

Methods

A retrospective study analysed all patients who underwent mammography in the Symptomatic Breast Unit in University Hospital Limerick in 2017. Abnormal mammogram in this study is defined as those rated radiologically as R3 (with a confirmed malignancy on biopsy), R4 and R5.

Results

198 patients had abnormal mammograms results. The average length of time taken from detection of abnormal mammogram to recall to clinic was 17.61 days. Median time for mammography reporting was 22 hours and for pathology reporting was 9 days.

Conclusion

Recall to clinic in the Symptomatic Breast Unit does not meet the recommended standard of two weeks. However, mammogram reporting is very efficient. The time spent awaiting pathology reports may impact the time taken to return the clinic.

Keywords: symptomatic breast unit, breastcheck, recall time, pathology, mammography.

Introduction

In Ireland approximately 3,500 people are diagnosed with breast cancer each year[1]. One in nine women will develop breast cancer in the course of their lifetime[2]. Breast Check, the national breast cancer screening program in Ireland, provides a free mammogram to all women age 55-69 every two years. Women with breast symptoms can attend Triple Assessment Clinics offered at various centres nationwide for rapid access to comprehensive assessment, with clinical examination, imaging and biopsy, if required, in a single visit. If additional imaging is required in order to identify cancer, and subsequent biopsies performed women are then recalled for diagnosis.

Breast check provides national data for practice benchmarks for the appropriate timing for recall and recall evaluation after an abnormal mammogram. Breast Check aim to offer a recall appointment to women who have an abnormal mammogram result within two weeks of being notified[3]. The National Quality Assurance Standards for Breast Cancer identifies this obligation and states that women with signs of breast cancer should be offered an appointment in clinic within two weeks[3]. Delays in recall time following abnormal mammography can lead to patient distress and poorer outcomes[4]. Screening for breast cancer leads to reduced morbidity and mortality when patients receive timely follow up and appropriate treatment[5] . Delay in subsequent evaluation, diagnosis and treatment following mammography revealing breast cancer can be associated with larger tumours, advanced disease and reduced survival[6,7].

The primary aim was to identify the length of time taken to identify the length of time taken to recall patients to a surgical review clinic in the symptomatic breast unit, after filming of an abnormal mammogram. Subsequent results were then analysed to determine if they met BreastCheck standards. Secondary outcomes included identifying the length of time taken from filming the abnormal mammogram to generating the report and to receive the offical pathology report after biopsy and any potential delaying factors.

Methods

A retrospective study was conducted over a one-year period, which analysed all patients who underwent mammograms in the Symptomatic Breast Unit (SBU) in University Hospital Limerick in 2017. Ethical approval was provided by the University Hospital Limerick Ethics Committee. 6307 mammograms were performed during this time period. Results of these were systematically analysed and any that yielded an abnormal result was included in the study. All abnormal mammograms carried out in 2017 were included. Abnormal mammogram in this study is defined as those rated radiologically as R3 (with a confirmed malignancy on biopsy), R4 and R5. Normal mammograms or those reported as R3 with benign or normal histopathology were excluded. This generated a result of 198 patients. All statistical analysis was performed using Microsoft Excel 2010 and STATA version 13.

Results

In 2017, 198 patients had abnormal mammography and required recall to a surgical review clinic in the Symptomatic Breast Unit for further investigation. All patients were female. The average age was 60 years.

Recall to SBU clinic

The average length of time taken from detection of abnormal mammogram to recall to clinic was 17.61 days (SD 6.16). The majority of patients were recalled to clinic within 30 days. 33% of patients (n=65) within 14 days or less, 60% of patients (n=119) were brought back to clinic within 15-30 days. The remaining 7% (n=19) were recalled after thirty days (Figure 1).

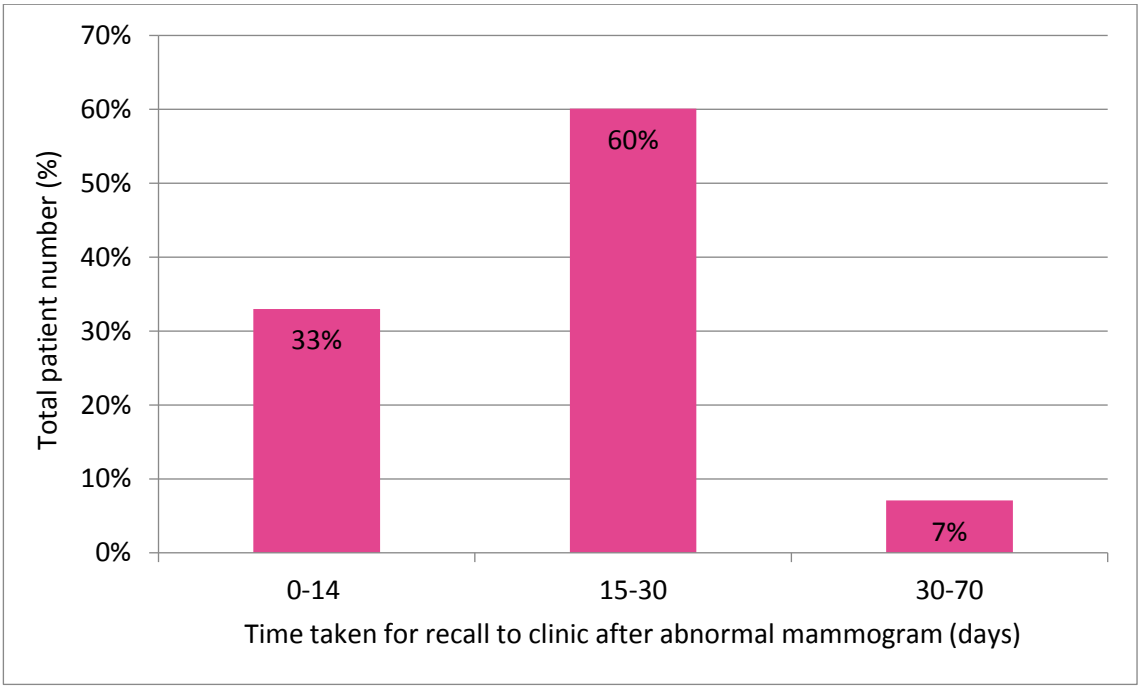

Figure 1: Distribution of time taken for patients to be recalled to Symptomatic Breast Unit clinic following filming of abnormal mammogram and biopsy (days).

Mammography

Once mammograms were filmed the median time for a radiological report to be released was 22 hours with an interquartile range of 21.36 hours. 68% (n=135) of mammograms were reported within twenty-four hours after filming, 26% (n=51) between 25-48 hours and 6% (n=12) in 49-120 hours (Figure 2). 61% (n=121) of reports classified as R5, indicative as highly suspicious of cancer. 37% (n=74) were classified as R4, suspicious for cancer and 2% (n=3) as R3 with equivocal findings.

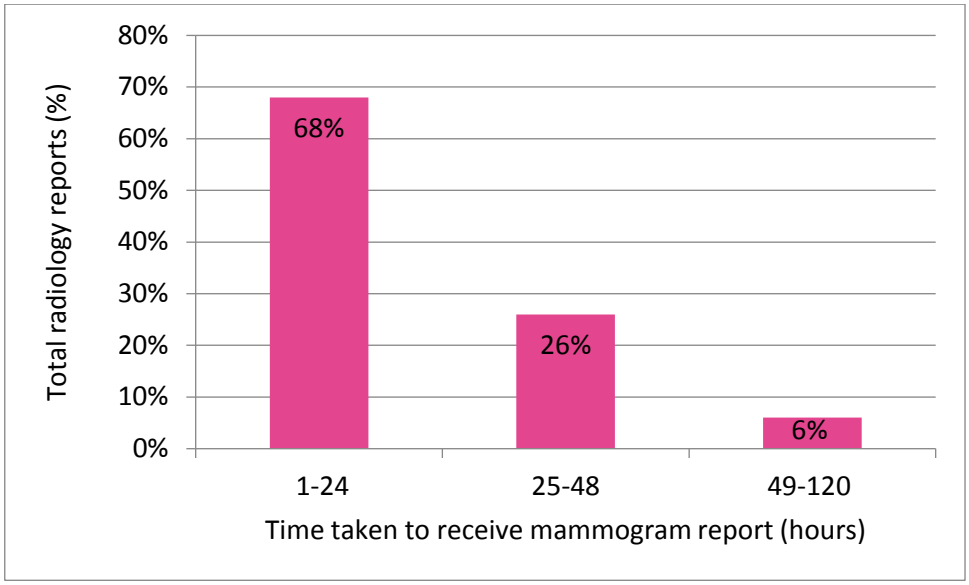

Figure 2: Distribution of time taken for generation of mammogram reports (hours).

Histopathology

Median time for official pathology report to be received after biopsy had been taken was nine days with an interquartile range of 5.75 days. 86% (n=170) of pathology reports were received within fourteen days, 22% within seven days and 64% between eight to fourteen days (Figure 3). 14% (n=28) of pathology reports took between fifteen to forty-one days to be received and 2% (n=5) reports only being obtained between twenty-three to forty-three days post-biopsy.

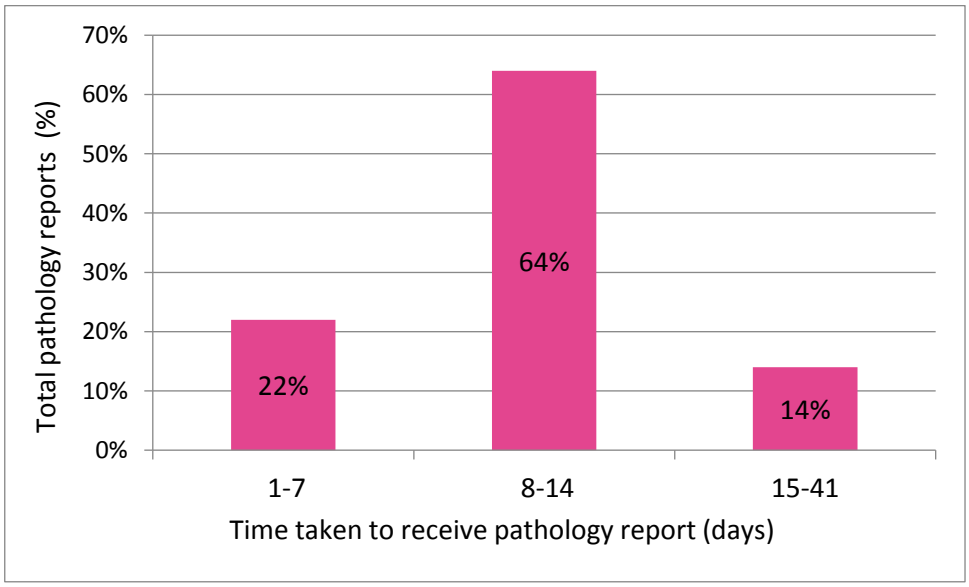

Figure 3: Distribution of time taken to receive official pathology report after biopsy.

Discussion

Mammography remains the cornerstone investigation for diagnosis of breast cancer, demonstrating a sensitivity of 77.6%, specificity of 98.8%, negative predictive value of 99.8% and positive predictive value 35.8% for detection of breast cancer[8]. Breast Check sets the standard for symptomatic breast care centres in Ireland specifically for recall times. It is paramount that patients are recalled quickly, and all centres should aim to meet the Breast Check standard of within two weeks. The importance of prompt recall and subsequent initiation of therapy was highlighted by Richards et al. This systematic review found that delay from detection to the start of treatment could decrease survival rates; most notably a delay of three months or more, which could have a 12%, lower five-year survival than those with shorter delays[7]. Quicker recall times also allows better psychological adjustment for patients[4].

The pathway to cancer diagnosis in the symptomatic breast unit includes numerous disciplines-clinical, radiology and pathology rather than just mammography as is the case in BreastCheck. Delays in recall time may result from any of the steps involved. The importance of identifying the potential delaying factors in the pathway is paramount to enable quality improvement within departments.

The most recent annual report issued by BreastCheck revealed that in 2017 91.8% of women were offered an appointment at an assessment clinic within two weeks of receiving an abnormal mammogram result[3]. This data indicates that this institution does not currently meet these standards. Timing of abnormal mammogram detection to recall to clinic in this study is 17.6 days, just above that of the standard. Overall, only 33% of patients (n=65) seen within fourteen days vs. 91.8% of BreastCheck patients. This again is not in keeping with 91.8% of Breast Check figures. This study demonstrated that number of factors may contribute to the observed discrepancy.

Mammography remains the cornerstone investigation for breast cancer. Thus, it is not surprising that radiological reporting is prompt with a median time of twenty-two hours for radiological report generation. It is probable that the ten outliers reflect scans that may have been verbally reported consultant to consultant to expedite recall, with the official report generated later. This conclusion is drawn, as the time to report was longer than time to recall for each of the patients involved.

Another factor in the pathway impacting time to recall is the time taken to issue pathology reports from biopsies. The Women's Charter Standard indicated that 94.7% of women were given a biopsy result within one week of attending an assessment clinic (standard: >90%). The National Quality Assurance Standards for Symptomatic Breast Disease Services states that 90% of patients should receive prompt and accurate diagnosis of cancer or benign diagnosis[9]. In this study it took a median of 9 days to receive a pathology report. The eight outliers again, as with the radiology outliers reflect those patients in which official reports were received after the recall appointment. Pathological reports are of the upmost importance for patients as they allow for targeted treatment strategies. The major discriminatory factor between the BreastCheck pathway and that of the SBU is BreastCheck involves radiology but not pathology. BreastCheck pathway back to assessment clinic timeframes are impacted only by time taken to receive radiology reports whilst Symptomatic Breast Units must await biopsy pathology reports as well.

The evolution of Fluorescent Immunohistochemistry in situ Hybridisation (FISH) has recently transformed breast surgery, often defining the type and urgency of surgery needed. Subsequently allowing a thorough overall clinical assessment of individual patients' disease and the formation of future treatment plans. Most importantly these treatment plans can be then explained to the patient at the recall clinic appointment which allows the aptient the benefit of what to expect going forward.

However, this symbiosis between surgical planning and new histopathology techniques may account for the delay in recall times. New techniques are often difficult to adopt in every labarotory and it raises the question of whether sufficent resources are available to adopt these methods and provide results within a prompt timeframe. Indeed, this is the case in UHL as all specimens requiring FISH investigations are outsourced. However, this also highlights the need to instigate processing onsite at the largest tertiary referral centre of the Mid-Western area and to provide its catchment area of 400,000 people a recall pathway within a Gold standard timeframe.

The lack of resources to initiate new investigatory models is an ongoing issue. To combat this, research is ongoing to identify more efficient and applicable techniques with similar efficacy rates as the more expensive models. A recent study by Halilovic et Bulte revealed that a new brief fixation method of ER, PR and E-Cadherin IHC and HER2 FISH allows for same day results with equivalent sensitivity and sensitivity of the more time consuming traditional fixed resection specimens[10]. Furthermore, newer techniques of chromogenic in situ hybridisation (CISH) and microfluidic-assisted chromogenic in situ hybridisation (MA-CISH) exist which offer faster and more accurate diagnosis of breast cancer and receptor status but are currently in their developmental stages. Revolutionary, new techniques like these, that require less manpower and offer overnight results may potentially be the answer to rapid recall times.

Overall, the only existing guideline which recommends a standard timeframe for recall to clinic after abnormal mammography pertains only to BreastCheck patients. The BreastCheck recall pathway includes clinic review and further imaging, whilst SBU cases incorporate further definitive diagnosis and management plans. Hence, the BreastCheck pathway may not be directly comparable to a SBU pathway, but it is the best available guideline in a reasonable time frame on recall to the clinic. Furthermore, it is also a standard that the symptomatic unit realistically could strive to achieve and therefore it was chosen as the comparable standard for this audit.

In 2017, time from abnormal mammogram to recall to a surgical review clinic in the SBU, University Hospital Limerick was 17.6 days. Thus, this does not meet the Breast Check standard of two weeks. However, mammogram reporting is very efficient. The time spent awaiting pathology reports may impact the time taken to return the clinic. Outsourcing of pathological specimens for processing may represent the delay. However, with newer histological processing methods this may change.

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The Growing Appetite for Vegan Anaesthesia

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Introduction

In recent years there has been an increasing number of vegans and vegetarians worldwide.[1,2,3] This introduces a novel and unfamiliar challenge for anaesthesia providers as the incidence of patient refusal of animal-containing drugs, of which there are many[6,7], with a subsequent request for alternatives is rising.[4,5,6] This is especially challenging as the perioperative assessment and discussion does not traditionally broach the subject of patient preference relating to veganism. Moreover, while some literature exists about the general suitability of common drugs[4], there is a dearth of literature on this matter under the purview of anaesthesia.

The aim of this article is to discuss the perioperative considerations in delivering safe and patient-centered anaesthetic care to patients who strictly adhere to the vegan and vegetarian philosophy. Furthermore, it purports to provide relevant information pertaining to potential drug alternatives.

Vegans and Veganism

Veganism is a lifestyle choice which seeks to exclude, as far as is possible and practicable, all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose.[8] Historically, records of vegetarianism date back to as early as the 7th century B.C.[9] A vegetarian is someone who lives on a diet of grains, pulses, legumes, nuts, seeds, vegetables, fruits, fungi, algae, yeast and/or some other non-animal-based foods with or without dairy products, honey and/or eggs. A vegetarian does not consume foods which consist of, or their production involves any part of the body of a living or dead animal. This includes meat, poultry, fish, shellfish, insects, by-products of slaughter or any food made with processing aids created from these. [10] By-products of slaughter include gelatin, isinglass (used for fining of beer and wine) and rennet. There are several types of vegetarians based on the inclusion or exclusion of eggs and milk products - lacto-ovo-vegetarians, lacto-vegetarians and ovo-vegetarians. Vegetarians generally abstain from the consumption of meat and flesh and may also include abstention from by-products of animal slaughter. Vegans abstain from the consumption of all animal derived products.

Raw food vegans and/or vegetarians believe in eating only plant-derived foods that have not been cooked, processed, or otherwise altered from their natural state.[12] Vegan and vegetarian philosophy are not limited simply to a dietary lifestyle but extends to a profound moral and political commitment not only to matters of food but also to wearing or using animal products for any purpose.[10]

Health Implications of Vegan Diet

The nature of vegan diet confers a relatively higher intake of dietary fiber, magnesium, folic acid, vitamins C and E, iron and phytochemicals. Vegan diets also tend to be lower in calories, saturated fat and cholesterol. However, these are also deficient in vital dietary components such as long chain omega-3 fatty acids, Vitamin D, calcium, zinc and vitamin B12. As a consequence of the latter, the addition of fortified foods is necessary in order to prevent conditions associated with vitamin deficiencies.[11]

On a whole, vegans and vegetarians tend to have lower incidence of cardiovascular disease, diabetes and are comparatively thinner with less body fat [12] which bears its own anaesthesia related benefits in terms of patient risk.

Clinical Implications

As alluded to above, the positive health effects of a fortified vegan diet are numerous.[11] Such patients would, in the absence of significant co-morbidities, generally be deemed low risk candidates for routine anaesthesia.

Nevertheless, certain forms of veganism such as raw veganism have been found to be associated with lower bone density in clinically important areas.[12] Patient positioning for prolonged surgery or the necessity of compressions in the event of cardiac arrest[13] are important considerations. Vegans without supplementary dietary fortification with associated vitamin D and B12 deficiencies may present with osteomalacia or anaemia both of which may require preoperative optimisation and intraoperative attention. Enteral or parenteral supplementation of the aforementioned deficits is easily achieved preoperatively and is in keeping with the vegan and vegetarian philosophy. Anaemia in a vegan patient may prompt further investigations to out rule a non-dietary cause.

Chronic B12 and folate deficiency in parturients are well known to be associated with increased incidence of neural tube defects of the newborn[14] which could result in clinical ramifications perinatally.

Further consideration must also be afforded for patients with a lower body mass index as drugs that would not otherwise require weight-based dosing may require adjustment at the extremes of weight to avoid toxicity.[15]

Conflicting drugs and alternatives

All drugs used in practice are required to undergo animal testing.[17] Moreover, a considerable proportion of drugs, in their final form, are also found to contain animal products.

A limited study on patient and physician awareness of drugs containing animal products, however, revealed that both patients and physicians alike were unaware of animal-based ingredients that were contrary to the patients' religious beliefs.[18] The majority of the physician group (70%) deemed that disclosure of the fact to the patient was important.[18]

As part of this review a thorough product specification review of the most common drugs used in our anaesthesia practice was carried out. The drug forms containing animal products were highlighted as either compatible with vegetarians (depicted in green) and incompatible with both groups (depicted in yellow). Drugs that are appropriate for the vegan and vegetarian patient population are provided along with potential alternatives in so far as is reasonably possible.

The table **(Table 1)** provides a rough guide only as different manufacturer formulations might contain different additives. Reference to the manufacturer's Summary of Product Characteristics (SPC) is recommended for clarification.

Table 1: Drug Formulations

Drug	ANIMAL	TYPE OF ANIMAL PRODUCT	ALTERNATIVE
Adrenaline	No		
Atropine	No		
Amiodarone	No		
Buscopan (hyoscine	Yes	White Beeswax, Talc	Topical form,
Bisoprolol	Tablet form -Yes	Lactose monohydrate	i.v. form
Bupivacaine	No		
Capsaicin	No		
Chlorphenamine	No		
Clonidine Tablet	Yes	Lactose, Talc	IV form
Clonidine IV	No		
Dexamethasone	No		
Doxapram	No		
Dexketoprofen (keral)	No		
Diazepam (oral, i.v., rectal)	Tablets -Yes	Lactose	IV/PR
Digoxin	Tablets -Yes	Lactose	IV
Diclofenac Sodium	Suppositories yes, Tablets yes	Suppositories: Hard fat Tablets - Lactose monohydrate, Talc	IV
Dopamine	No		
Dobutamine	No		
Ephedrine	No		
Esmolol	No		
Flumazenil	No		
Gelofusine	Yes	Gelatin	Other colloids.
Glucose	No		
Glycopyrrolate	No		
Glyceryl Trinitrate	No		
Heparin	Yes	Sodium heparin (from porcine	Argatroban[5]
Hartmann's	No		

Table 1: Drug Formulations (Continued)

Drug	ANIMAL	TYPE OF ANIMAL PRODUCT	ALTERNATIVE
Hydrocortisone	No		
Insulin	No		
Intralipid	Yes	Purified egg phospholipids	Not available
Ketamine	No		
Keral (dexketoprofen)	No		
Lidocaine	No		
Labetalol (IV)	No		
Levetiracetam	Yes	Talc	Not available
Metaraminol	No		
Magnesium sulphate	No		
Midazolam (i.v. or buccal)	No		
Milrinone	No		
Morphine	No		
MST	No		
Naloxone	No		
Nifedipine	Yes (capsules)	Lactose monohydrate	Tablets
Noradrenaline	No		
Nicardipine	Capsules yes	Gelatin	IV form
Ondansetron	Tablets Yes	Lactose	IV form
Pancuronium	No		
Paracetamol (including	Tablets - Yes,	Tablets - Talc	Oral
Phenylephrine	No		
Phenytoin	No		
Pregabalin (Lyrica)	Yes	Lactose, Gelatin, Talc	
Protamine	No		
Propofol	Yes	Egg phospholipid	Thiopentone,
Quetiapine	Tablets Yes,	Lactose monohydrate	Oral
Ranitidine (oral and i.v.)	No		
Rocuronium	No		
Salbutamol	No		
Seretide	Yes (Accuhaler)	Lactose monohydrate	Evohaler
Sugammadex	No		
Suxamethonium	No		
Tinzaparin	No		
Temazepam	Tablets yes,	Lactose monohydrate	Oral solution
Tramadol	Tablets yes,	Xanthan gum	IV
Thiopental / Thiopentone	No		
Tranexamic Acid	Tablets Yes	Talc	IV
Zopiclone	Yes	Lactose monohydrate	Not available
Fentanyl	No		
Fentanyl Lozenge	No		
Remifentanil	No		
Tapentadol	Yes	Lactose	Not available
Targin (naloxone +	Yes	Lactose monohydrate	Not available
Oxycodone (oxycontin)	Yes	Lactose monohydrate	Not available
Oxycodone (oxynorm)	Yes	Gelatin	Other opioids
Oramorph	No		

*Note: Paediatric drug formulations are also often available as suspension forms with different inactive ingredients. Check SPC for clarification.

Consent

Consent is a ubiquitous factor in the practice of medicine. Initiating a discussion about the inactive ingredients in commonly used drugs as part of the perioperative assessment might currently be considered beyond the scope of the anaesthesiologist. Every drug used in practice is required to undergo animal testing.[17] A limited study on patient and physician awareness of drugs containing animal products revealed that both patients and physicians alike were unaware of animal-based ingredients that were contrary to the patients' religious beliefs.[16,18] The majority of the physician group (70%) deemed that disclosure of the fact to the patient was important.[18] The question then arises as to whether the responsibility lies with the patient or the physician in terms of initiating this conversation. In the absence of literary guidance, it is suggested that once the patient has declared their dietary status, the relevant information should be disclosed, and the option of alternatives considered.

Delivering safe and patient centered health care may give rise to a number of challenges in an ever changing and culturally diverse society. Up to now, there has been minimal literary guidance on the use of animal-free perioperative medications.

If the patient expresses preferences against animal-based products, a number of suitable and equally effective alternatives may be offered. This should be done at the discretion of the anaesthesiologist where deemed appropriate.

In conclusion, the increasing numbers of vegans and vegetarians worldwide is likely to impact on our practice. As clinicians, we should be in a position to provide anaesthetic care tailored to the individual patient's needs. The table provided is a compilation of the most commonly used drugs in our practice, highlighting unsuitable drugs and could be used as guidance to choosing equivalent alternative where available.

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Clinical Management of Avoidant Restrictive Food Intake Disorder (ARFID)

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Abstract

Avoidant Restrictive Food Intake Disorder (ARFID) is a feeding disorder resulting in persistent failure to meet one's nutritional and/or energy needs. Recently included in the DSM-V, it differs from Anorexia Nervosa by lack of any body image disturbance but may carry a similar high risk of adverse outcomes if not appropriately treated. This article provides an overview of assessment, emerging treatment options and the need for input from a multi-disciplinary team. Medical providers are an essential component of the team and it is therefore important to be aware of the modifications to the diagnostic criteria and the advances in the management of these disorders.

ARFID differs to Anorexia Nervosa as there is no dissatisfaction with body image, fear of weight gain or drive for thinness. However, ARFID can have serious consequences and to meet the DSM-5 diagnostic criteria, the restrictive or avoidant eating behaviours must lead to a persistent failure to meet nutritional requirements and must be associated with one of the following; significant weight loss, faltering growth or nutritional deficiency, dependence on nasogastric feeding (NG) or nutritional supplements, or a significant impact on psychosocial functioning.

As ARFID is a relatively new diagnosis, there is a limited amount of epidemiological data available. An interview-based study in Australia of 5737 adolescents, 15 years and older, reported a 3-month point prevalence of ARFID of 0.3%.[1] In Switzerland, a study based on a self-report questionnaire, in a younger cohort of 1444 schoolchildren aged 8–13 years, reported a higher point prevalence of 3.2%.[2] This emerging data suggests that ARFID may be as common as Anorexia Nervosa and Bulimia Nervosa. North American studies have shown that between 5–12% of patients presenting for eating disorder care at outpatient clinics[3-5] and 22.5–24.6% of patients presenting at day programs[6,7] met DSM-5 criteria for ARFID.[8]

Preliminary studies suggest that, compared to patients with Anorexia Nervosa or Bulimia Nervosa, patients with ARFID are more likely to be younger,[9,10] include a greater proportion of males,[9,11] experience a longer duration of illness before treatment presentation,[9] and are more likely to have a co-morbid medical condition.[10]

The symptoms of ARFID include weight loss, restricted range and amount of food, avoidance of certain food textures, fears of choking or vomiting, lack of interest in food, vague gastrointestinal symptoms at mealtimes ("upset stomach", "feels full") and no dissatisfaction with body image or weight. The physical signs and symptoms of ARFID are similar to those of Anorexia Nervosa and include dry and brittle skin, hair and nails, lanugo hair on body, abdominal pain, constipation, bloating, cold and mottled peripheries, orthostatic hypotension, syncope, bradycardia, amenorrhoea, delayed puberty, growth retardation, poor concentration, and mood changes.

The medical provider plays an essential role in recognising ARFID, out-ruling alternative diagnoses (thyroid dysfunction, coeliac disease, inflammatory bowel disease), and assessing for medical complications. If there is suspicion of an eating disorder or ARFID then both a psychological assessment and a medical assessment should be carried out. The PARDI (PICA, ARFID and Rumination Disorder Interview) is a recently developed structured interview that is currently under evaluation for the assessment of and severity of these diagnoses. [12]

Using a simple conceptual framework, BBI (devised by one of the authors, F. McN.), provides clinicians with a helpful framework to distinguish ARFID from other eating disorders. This concept divides the presentation into three different domains: Behaviour, Belief and Impairment (BBI). Applying this to ARFID, the presenting behaviour includes dietary restriction leading to reduced caloric intake and limited, unbalanced nutrition, avoidance of specific types of food textures, colours and smells or eating at an abnormally slow pace. In ARFID, there is an absence of excessive exercise, (unless designed to speed up gastric emptying and associated discomfort) and there are no compensatory behaviours, such as, bingeing or purging. Associated beliefs include fears of choking, vomiting or physical illness as a consequence of eating certain foods. Younger children may have difficulty in accurately reporting their feared belief and origins of same. For example, children who experience delayed gastric emptying after eating fatty foods, may associate this with increased pain and specifically avoid fatty foods, leading clinicians to misinterpret this as fat phobia. A child with autism or learning difficulties, may have sensory hypersensitivity, and may experience both the abdominal distension linked with delayed gastric transit, or re-establishment of peristalsis as severely painful. An avoidance of a 'fat' (i.e. distended) abdomen may once again erroneously be attributed to underlying eating psychopathology. A patient with ARFID, often has an insight into their low weight and may have a desire to gain weight. Co-morbid mental health difficulties can also be present, including Autistic Spectrum Disorder, separation anxiety, attachment disorder or intellectual disability, and contribute to the intensity of the presentation. Impairment includes medical complications secondary to weight loss, nutritional deficiencies, and psychological impairment including anxiety, low mood, irritability, social isolation and difficulty concentrating.

Figure 1: The BBI Model of Clinical Assessment.

Behaviour: • **Calories:** restricted, normal, excessive • **Nutrition:** limited, balanced, loading • **Exercise:** none, healthy, excessive • **Compensatory behaviours:** none, medication, binging, purging
Beliefs: • **Body image:** dissatisfied, neutral, satisfied • **Mental health:** healthy, distressed, anxious, depressed, obsessive
Impairment: • **Weight:** below expected, average, above expected • **Physical health:** healthy, borderline, unhealthy

Best practice treatment guidelines have not yet been developed for ARFID due to the shortage of empirical data available. Until there is more evidence-based guidance available, it is reasonable to use guidelines for other restrictive eating disorders to assess risk and to formulate treatment goals.[13] The Royal College of Psychiatrists utilise a colour-coded risk assessment framework in their Junior MARSIPAN Guidelines for the management of young people with Anorexia Nervosa.[14] The Society for Adolescent Health and Medicine uses similar parameters for the indications for inpatient management of restrictive eating disorders.[13] Important aspects of the risk assessment include physical parameters such as, weight and extent of weight loss, percentage median BMI or percentage ideal body weight, cardiovascular assessment (including blood pressure, heart rate and ECG assessing for bradycardia and QTc prolongation), hydration status, temperature and electrolyte disturbances. Acute food refusal and a comorbid psychiatric or medical condition may limit outpatient management options.[13,14] It is important to note that despite normal BMI, some patients with ARFID may warrant urgent inpatient admission due to medical instability. Medical admission is often indicated if the patient's percentage median BMI is less than 75%.[13]

If inpatient admission is required, multi-disciplinary management is essential with input from medical, mental health, nutritional and nursing departments. Nutritional rehabilitation with a structured refeeding programme, monitoring for refeeding syndrome and cardiac abnormalities are the mainstay of the initial inpatient management.[13] Nasogastric tube (NGT) feeding may be considered if the patient is unable to meet their nutritional requirements orally or fearful of oral intake. Although, there is empirical evidence for the use of NGT feeding in patients with Anorexia Nervosa, this is not the case for those with ARFID, and further studies are awaited. It is important to remember that patients with ARFID may have a hypersensitive sensory state, even in the absence of a diagnosis of ASD, and the visceral sensations associated with NGT placement and refeeding could lead to conditioned food aversions.[15]

When inpatient admission is not indicated, the patient can be managed by a multidisciplinary team in the community. Attention must be focussed on restoring nutritional intake, weight gain, using a graded behavioural approach linked with anxiety management strategies.

Comorbid psychological difficulties, such as anxiety or post-traumatic stress, also need to be addressed and may benefit from referral to community-based counselling, or if severe, specialist child and adolescent mental health services.[8] A specialist outpatient eating disorder programme may be warranted if a patient is not making progress with an outpatient team or if they continue to lose weight and are at risk of requiring an inpatient admission.[8] Significant parental distress may also necessitate more intensive and specialist outpatient support. Weight restoration, reestablishment of growth trajectories and resumption of menses in amenorrhoeic females are reasonable treatment goals.[13] When setting a target weight range, the individual's previous height, weight, BMI percentiles, pubertal stage and growth trajectory should be considered as well as their percentage median BMI.[13] The target treatment weight range needs to be periodically reassessed, especially during periods of growth. Setting too high an initial target, even if appropriate, may induce too much anxiety on the patient, and parents, and be counterproductive. Severe restriction or avoidance of particular food groups in ARFID can lead to nutritional deficiencies. Specific vitamins and minerals should be supplemented if there is laboratory evidence of deficiency or if the patient displays clinically significant symptoms.[8]

Family Based Treatment, which is the first line treatment of Anorexia Nervosa in the outpatient setting, places an emphasis on the role of parents in successful management, and empowers parents to meet this challenge.[13] However, other psychological based therapies are emerging for ARFID. Massachusetts General Hospital Eating Disorders Clinical and Research Program team have developed a cognitive behavioural therapy for ARFID which is currently under evaluation in an open trial showing promising preliminary results.[8]

In summary, physicians can remain optimistic that early and accurate diagnosis, coupled with emerging evidence-based management can lead to good and sustained outcomes for most patients with ARFID. Having an understanding of ARFID, and how it differs from other forms of eating disorders will lead to an improved therapeutic relationship with the patient and family, and improved outcomes.

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The Irish Healthcare System as a Complex Adaptive System

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Abstract

Globally, health systems are struggling to adequately meet the needs of citizens. Improvement efforts have yet to result in meaningful sustained improvement. Appreciating the inherent complexity of human systems is crucial if we are to solve the crisis in health and care. Preiser and colleagues in 2018 proposed six organizing principles that allows a discernment of complex adaptive systems: (1) Are constituted relationally; (2) Are radically open, (3) Are context dependent, (4) Have adaptive capacities, (5) Are dynamic; and (6) Complex causality. In this piece, I make the case for the Irish healthcare system to be viewed as a complex adaptive system. This understanding is of immense importance as it changes how we should envisage, design and deliver health and care.

Introduction

Globally, healthcare systems are struggling to adequately meet the needs of citizens. Inequity of access, fragmented inefficient and poor-quality services remain pernicious. Improvement efforts have yet to result in meaningful sustained improvement [1]. Appreciating the inherent complexity of human systems is crucial if we are to solve the crisis in health and care.

Complexity theory and Healthcare

Complexity theory emerged in the mid-1980s at the Santa Fe Institute in New Mexico. A useful unifying definition is "*the study of phenomena which emerge from a collection of interacting objects"* (Johnson 2009, Pg. 1)[2]. It is increasingly being embraced in healthcare although as Greenhalgh notes "*we embrace the theme of complexity in name only and fail to engage with its underlying logic*" (Greenhagh and Patpoutsi 2018 Pg. 1)[3].

Complex adaptive systems (CAS)

Holland describes CAS as "*systems that have a large numbers of components, often called agents, that interact and adapt or learn*" (Holland 2006 p 24)[4]. Plsek and Greenhalgh define a CAS as "*a collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent's actions changes the context for other agents*". (Plsek and Greenhalgh 2001 Pg 625)[5]. Clarity around typology is important if we are to properly evaluate the utility of complexity informed approaches in healthcare [6]. Preiser and colleagues have proposed a typology of six organizing principles that allows a discernment of complex systems[7]. The six principles are; that CAS: (1) Are constituted relationally; (2) Are radically open, (3) Are context dependent, (4) Have adaptive capacities, (5) Are dynamic; and (6) Novel qualities emerge through complex causality. These principles can be subdivided into structure related features and process related features.

Organising principles of CAS applied to the Irish Healthcare System

Structure related Features:

Principle 1: CAS are constituted relationally

CAS are defined more by the interactions between their constituent parts (agents) rather than by the parts themselves.

The Irish healthcare system consists of a diverse range of agents including patients and families/carers, health and social care professionals, managers and policy makers. These agents exist in a variety of organisations (government departments, hospitals, general practices, community organisations, mental health organisations, home care organisations etc.) and each of these organisations are made up of subgroups such as professional groupings, multi/interdisciplinary teams, management teams and policy groups. Each individual agent can act autonomously but their actions impact other agents and vice versa, through their interactions with one another. These interactions allow self-organization producing adaptive, dynamic, and emergent behavioural patterns [8, 9].

Principle 2: CAS are radically open

In a CAS, each system comprises sub-systems and every system is a subsystem of a larger system. Just as agents interact, so too do systems and subsystems, resulting in effects that have impacts across scales and domains.

In healthcare, boundaries between systems are often indistinct as agents work across organisations and teams. Although agents and subgroups may have strong professional and/or organisational identities, there is interdependence and co-operation across boundaries, allowing flow of information, people and learning.

Roles such as care coordinators are “boundary spanners” with agents exerting influence in multiple systems (primary care team, older persons MDT, social care). Social prescribing (SP) is an example of this principle and in Ireland there is a vibrant network. In SP, traditional clinical practice connects and interdigitates with activities and support services within the community. GPs, nurses and other primary care professionals refer people to a range of local, non-clinical services which are typically provided by voluntary and community-based organisations [10].

Principle 3: CAS are determined contextually

In a CAS, identity and function is defined by the context in which it exists. The function of a system can be restricted or enhanced by changing the environment in which it is embedded [11]. In the Irish healthcare system, different agents interact, communicate, share information, boundary span and navigate the system. This occurs continuously shaped by dynamic interactions within the environment. This environment can be internal or external. There are internal rules set by professional training, codes of practice or organisational values, but also organisational structures and processes that are interpreted by agents in real time and decisions taken. Such decisions may also be influenced by external factors such as resource availability. If a decision has been taken, for example, that home care packages are no longer available, then the decision taken (such as home discharge) may change (to discharge to nursing home) which may have negative consequences for the patient, family and team. Our national context is currently changing as a result of Sláintecare. As the context changes, the system will change, and components of the system may take on a different role or function.

Process Related Features:

Principle 4: CAS have adaptive capacities

CAS have self-organising capacities and can adjust their behaviour as a response to change in their environment.

In the Irish healthcare system, each agent has the capability to change and adapt in response to changes in their surroundings, situations and experiences. Clinicians regularly change/adapt their practice in response to new evidence, models of care, protocols and procedures as evidenced by the changes in practice effected through the HSE National Clinical Programmes and NCEC guidelines. Changes may also come about as a result of an adverse outcome or complaint as seen with Cervical Screening. Whether at micro meso or macro levels, subgroups can learn, adapt and change when confronted with new information or situations.

Principle 5: CAS behaviour comes about as a result of dynamic processes.

In a CAS, there are non-linear dynamic processes that bring about the behavioural patterns.

In the Irish healthcare system, agents such as healthcare professionals are constantly interacting with colleagues with whom they have interdependencies, receiving feedback, within, between and across systems.

These constant interactions result in changes in behaviour of individual agents or groups of agents resulting in co-evolutionary adaptation. These interactions tend to be non-linear i.e., the outputs are greater than the sum of the inputs. Examples in Ireland would be the work of the HSE Clinical programmes. These programmes continue to evolve and adapt in response to new developments and evidence.

Principle 6: Novel qualities emerge through complex causality (Emergence).

Through the interaction of agents, novel qualities and phenomena emerge. This may result in the emergence of system outcomes that were not directly intended and are greater than the sum of the individual agent behaviours. From a health and care perspective, providing person-centred, co-ordinated care may have a positive impact on the health and wellbeing of the patient which will positively impact on family and staff experience which may improve recruitment and retention. This is not directly attributable to, or predictable from, the actions or behaviours of the individual agents. In the Irish Integrated care programme for Older People, a 10-step framework was co-designed which set simple rules. All agents involved had a shared understanding of what 'good' looks like and were empowered to interpret it to their local context. Through the development of networks and continuous feedback, the programme has emerged and from small beginnings is now being implemented system wide.

Discussion

In this piece, I have, I hope, convincingly made the case for the Irish healthcare system to be viewed as a complex adaptive system. This understanding is important as it changes how we should envisage, design and deliver health and care. Too often we seek to find and fix rather than 'learning to dance' with our complex system [12]. We require, as Greenhalgh states, '*rich theorising, generative learning, and pragmatic adaptation to changing contexts*' (Greenhalgh and Papoutsi 2018 Pg 1)[3]. A step in that direction is the adoption of Preiser's organising principles. As the late Donella Meadows said "*We can't control systems or figure them out. But we can dance with them*" [12].

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Retrospective Comparison of Laboratory Based Versus Point-of-Care Haemoglobin A1c Testing

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Abstract

Aim

The aim of this study was to look at the precision and accuracy of Point of Care glycosylated haemoglobin (POC-HbA1c) compared with laboratory-measured HbA1c (Lab-HbA1c).

Methods

Retrospective analysis of the charts of patients attended paediatric diabetes outpatient clinics during January 2018 to July 2019 in University Hospital Limerick (UHL) was conducted.

Results

In total, 163 patients' charts were analysed, including 79 females (48.5%) and 84 males (51.5%). Lab-HbA1c data were skewed positively, with a median of 67mmol/mol (IQR (60 to 76). POC- HbA1c data were also positively skewed, median of 61mmol/mol (IQR (55 to 68). The differences between POC-HbA1c and Lab-HbA1c was skewed negatively, median of -6mmol/mol (IQR (-9, -2). Gender, age and month of testing did not affect results.POC-HbA1c was more reliable and accurate when tested within 14 days of Lab-HbA1c.

Conclusion

POC-HbA1c was comparatively lowered as compared with Lab- HbA1c. The results for POC- HbA1c is most reliable compared with Lab-HbA1c if tested within14 days.

Introduction

HbA1c is a key indicator of glycaemic control in patients with type 1 diabetes(T1D). Point of care HbA1c(POC-HbA1c) is commonly used as it is cost effective and results are immediately available in clinic. In this study, we sought to determine the precision and accuracy of POC-HbA1c compared with Lab-HbA1c in children with T1D attending a dedicated paediatric diabetes outpatients' clinic (PDOPC).

Methods

This is a single centre retrospective observational study done, using data from a dedicated paediatric diabetic outpatients clinic in University hospital Limerick(UHL).The Primary outcome of the study was to compare POC-HbA1c with Lab HbA1c and evaluate any reasons for differences between the two measures. All the patients less than 18 years old who attended PDOPC between January 2018 to July 2019 who had Lab-HbA1c and POC-HbA1c measured within 4 weeks and with diabetes duration longer than 6 months were eligible for study inclusion. Demographic data including age, gender, duration of diabetes and HBA1c were collected. Prospectively collected data in patient charts and on electronic databases were supplemented with retrospective data collection, when indicated. Patients who had their Lab- HbA1c done within 4 weeks of POC- HbA1c were enrolled because usually HBA1c gives you a reflection of diabetic control in last 4 weeks. Capillary blood HbA1c taken by a finger-prick blood sample was analysed on a DCA Vantage Analyzer (Siemens/Bayer, Germany) in the clinic at the time of outpatient visit. Venous whole blood samples were collected in containers with EDTA either on the same day or within 4 weeks either before or after the clinic attendance and were analyzed on Tosoh G8 HPLC analyzer. Patients who had only one reading of HbA1c were excluded from the study.

Results

This report summarises the details of findings we found over 18 months in our hospital. We found point of care testing is equivalent to laboratory testing if they are done within certain time period. In total, 240 eligible patients attended PDOPC during the time frame; of which 163 patients were meeting the inclusion criteria (who had Lab-HbA1c and POC-HbA1c within 4 weeks' time frame). Seventy-seven patients were excluded due to only one HbA1c recorded. Lab-HbA1c data was skewed positively, with a median of 67mmol/mol (IQR (60 to 76). POC-HbA1c data was also positively skewed with a median of 61mmol/mol (IQR (55 to 68). Nonparametric Wilcoxon signed rank test was significant at $p<0.001$ with a downwards trend.

Analysis of demographics showed, 79 females (48.5%) and 84 males (51.5%). Only males demonstrated reduced Lab- HbA1c compared with POC-HbA1c ($p<0.001$). Median Lab-HbA1c 68.5mmol/mol, IQR (63, 76.8) vs. median POC-HbA1c 62.5mmol/mol, IQR (56.3, 68.8) ($p<0.001$). Females only also showed a significant drop Lab-HbA1c compared with POC-HbA1c, median Lab-HbA1c 65mmol/mol, IQR (59, 76) vs. median POC-HbA1c 59mmol/mol, IQR (54, 68) ($p<0.001$).

The differences in readings had a negative skew with a median of -6 IQR (-9, -2). These differences were significantly different between the groups <14 days and >14 days between measures. Median <14 days -5mmol/mol IQR (-7, -2) vs. >14 days -8.5mmol/mol, IQR (-13.3, -2, $p=0.001$). Therefore, there were significantly greater differences (drops) in the >14 days group.

When the differences were plotted against the child's age in years. There was no statistically significant relationship was identified when the differences between Lab-HbA1C and POC-HbA1c were plotted against child's age or gender.

The drop in the measures was not significant when adjusted for gender and the time differences, using exploratory ANOVA to account for skewed distribution. Only the time by difference in measure interaction was significant $p<0.001$ with those having measures taken >14 days having a bigger difference between measures. Females tended to have lower average values when second measure taken >14 days and males tended to have higher values when the second measure taken >14 days. As all results of differences between measures were significant using the Wilcoxon signed rank test for time < 14 days and larger time spans and so the measures were not equivalent. In fact, for all tests there was a significant drop between the lab measurements and the POC measurements.

Discussion

This study clearly shows that in a population of paediatric patients with type 1 diabetes POC-HbA1c results are more reliable if they are done within 14 days of lab-HbA1c testing. To our knowledge, this is the first time that a comparison between POC-HbA1c and Lab-HbA1c has been studied in Irish population. The important finding in this study is that POC-HbA1c results are somewhat lower than Lab-HbA1c, but that the highest correlation between the two measurements was when the samples were drawn within 14 days of each other. There was no effect of gender, age and timing of testing during the whole year. There are several limitations of this study. It is a single centre study with relatively small sample size. This is a retrospective study as well. Ideally it should be prospective study and all patients should be undergoing both tests on the same day by a trained phlebotomist who is performing both tests consecutively. When we looked retrospectively, we found that many patients had not done both POC testing and laboratory testing limiting our sample size. In conclusion POC testing should be interpreted cautiously in clinical decision making and need more multicentre studies with large sample size with contemporaneous sampling and analysis using point of care and laboratory measures to draw definitive conclusion.

Declaration of Conflicts of Interest:

The authors confirm that there are no conflicts of interest regarding the article.

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Resistance to Empiric Antimicrobial Therapy is Associated with Prolonged Length of Stay in Patients Hospitalised with Urinary Tract Infection

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Abstract

Aim

This study aimed to identify the prevalence of empiric antibiotic resistance in acutely hospitalized patients with urinary tract infection (UTI), and to investigate any association with hospital length of stay (LOS).

Methods

Acute hospital admissions with confirmed UTI over an 8-month period were identified. Empiric treatment was with co-amoxiclav.

Results

From 59 screened patients, 45 had confirmed UTI. The mean age was 49.2 years (SD 23.4), 80% were female and the mean LOS was 6.6 days (SD 4.8). The predominant uropathogen was *E.coli* (80%). Bacteraemia was present in 20% (n=8) of patients with blood cultures taken. Co-amoxiclav resistance was detected in 60% (n=27) of isolates. Co-amoxiclav resistance was associated with longer LOS compared to susceptible patients, mean 7.6(SD 5.5) vs. 5.1(SD 3.2) days (p=0.04).

Conclusion

Co-amoxiclav resistance was highly prevalent and associated with a prolonged LOS, highlighting the importance of surveillance of local resistance patterns and regularly reviewing empiric prescribing.

Introduction

Empiric antimicrobial guidelines incorporate knowledge of local resistance patterns and require regular surveillance due to increasing antibiotic resistance. A review at this institute from 1999-2009 showed co-amoxiclav resistance rates for *E.coli* of 10%.[1] International guidelines suggest that a local antimicrobial resistance prevalence >20% should preclude use as empiric therapy.[2,3] A subsequent Irish study from 2005-2014 showed further increasing co-amoxiclav resistance in 48% of hospital admissions.[4]

We hypothesised that the prevalence of resistance to co-amoxiclav (current empiric treatment) has increased, leading to ineffective therapy at admission for some patients and significant consequences for healthcare cost-effectiveness. For example, in community-acquired pneumonia, first-line antibiotic therapies effective against a majority of community pathogens are associated with improved clinical outcomes and cost-effectiveness compared to traditional empiric choices.[5] To investigate the current prevalence of resistance to empirical UTI treatment with co-amoxiclav, and any association with hospital LOS, an observational study was conducted.

Methods

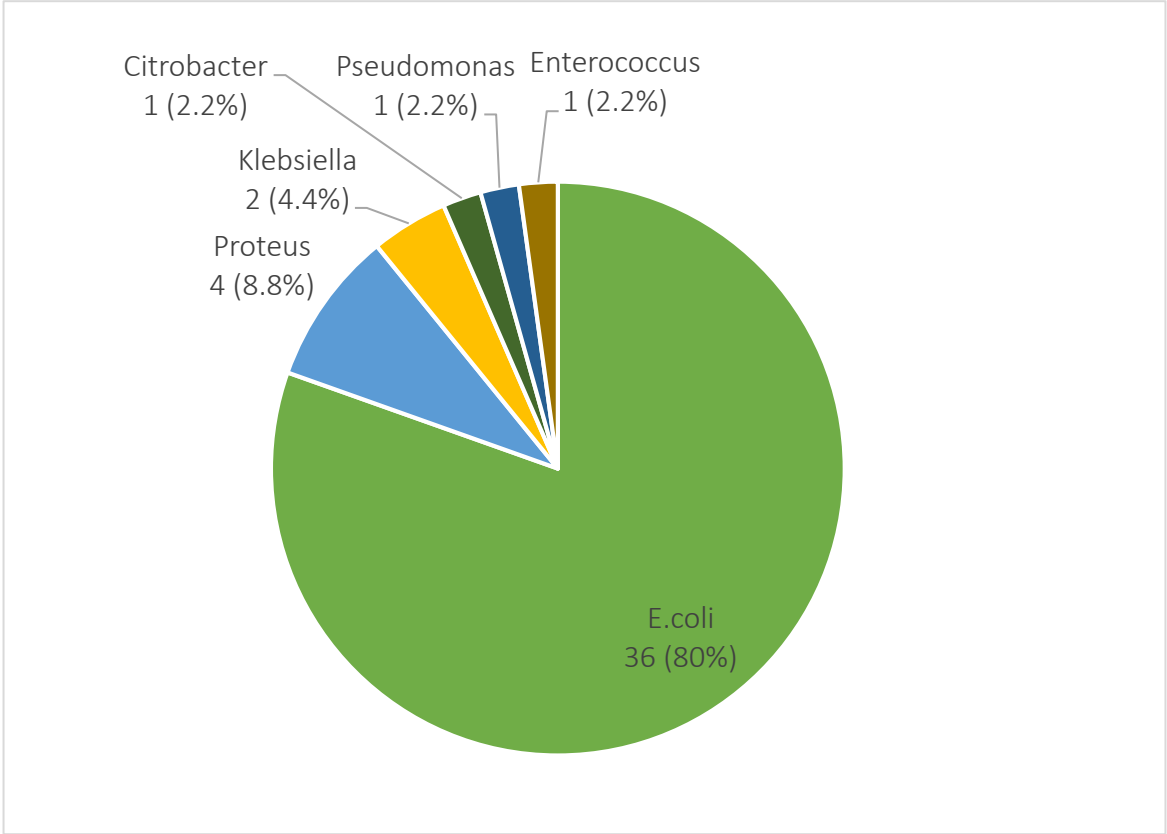
All consecutive patients under the care of the Nephrology service with a primary diagnosis of UTI were retrospectively identified over an eight-month period (July 2019 - February 2020). Inclusion was based on a single uropathogen ($\geq 10^5$ cfu/mL) on admission culture with a clinical diagnosis of UTI, agreed by both the admitting medical consultant and subsequent consultant nephrologist (following transfer of care at a daily "decant" of acute medical admissions). Empiric treatment was with co-amoxiclav, with an additional recommendation for gentamicin if there was evidence of sepsis.

Clinical and demographic details were gathered from paper and electronic records. Primary outcomes were the proportion of patients resistant to empiric treatment and hospital LOS. Categorical variables were presented as percentages and continuous variables as means. The Fisher Exact and Mann Whitney tests were used to examine the association between categorical and continuous variables, respectively. The alpha level of significance was 0.05. Ethical approval was granted by the local Research Ethics Committee.

Results

A total of 59 patients were screened, with 14 excluded based on urine culture results (no growth n=8, sample leaked n=4, mixed growth n=1, no sample n=1). Of the remaining 45 patients, the mean age was 49.2 years (SD 23.4), 80% were female and the mean LOS was 6.6 days (SD=4.8). The dominant uropathogen was *E.coli*, accounting for 80% of cases (n=36) (Fig.1). Of patients with an admission blood culture taken (n=40), 20% had confirmed bacteraemia, all *E.coli* isolates.

Figure 1. Uropathogen Frequency (total cohort n=45)



The overall proportion of patients with urine isolates resistant to co-amoxiclav was 60% (n=27). Comparing these patients to those with co-amoxiclav susceptible isolates (n=18), there was no significant difference in mean age, 51.2 vs 46.3 years (z=0.7, p=0.4), admission serum creatinine, 79.2 vs 103umol/l (z=1.2, p=0.2) or incidence of bacteraemia, 25% of both groups, respectively. There was a trend towards a higher incidence of AKI at admission in patients with co-amoxiclav resistance, 25% vs 5.5% (p=0.12).

In the overall cohort, there was a significantly longer hospital LOS in co-amoxiclav resistant patients compared to susceptible patients, mean hospital LOS of 7.6 (SD 5.5) days vs. 5.1 (SD 3.2) days (z=2.13, p=0.04).

Discussion

The observed high prevalence of co-amoxiclav resistance represents an important finding for local and national policy-makers. We demonstrated continued growth in co-amoxiclav resistance compared to previous Irish studies, consistent with that seen over time internationally also.[2,4,6,7] Co-amoxiclav resistance was associated with an increased hospital LOS, the importance of which cannot be understated in the current environment of healthcare provision.

With efficacious first-line treatment, a more rapid clinical recovery could translate into reduced LOS for patients resistant to empiric treatment. Appropriate empiric antibiotic therapy, coupled with appropriate stewardship and structured de-escalation, has been shown to reduce patient LOS and reduce healthcare costs.[8] The importance of appropriate empiric therapy is highlighted in one large study of patients with bacteraemia, which demonstrated that discordant empiric therapy was associated a 46% increased mortality risk.[9]

This study is limited by small size and single-centre setting. However, the study provides an important insight into increasing co-amoxiclav resistance in patients hospitalized with UTI, and the potential consequence of prolonged LOS associated with ineffective empiric therapy. These findings should encourage surveillance of local resistance patterns and of empiric prescribing, in line with the Health Protection Surveillance Centre (HSPC) national guidelines.[10] Medical personnel should be educated on individualization of antibiotic therapy, with appropriate rationalization of therapy to select the correct drug, dose and course duration for each patient based on the individual presentation and local patterns of anti-microbial resistance.

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

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The COVID-19 Impact on Symptomatic Breast Cancer Referrals and Diagnosis

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Abstract

Aims

To determine the impact of the COVID-19 pandemic on the number of new patients attending a symptomatic breast unit and number of patients diagnosed with primary breast cancer.

Methods

Anonymised data of new attendances and breast cancer diagnoses between February and July 2020 were analysed and compared with data from 2019 and 2018.

Results

The average number of new patient attendances in February-July 2020 was 2,111 vs 3,008 during the same time period in 2018 and 2019 (30% less). The average number of breast cancers diagnosed in April/May 2020 was 36 vs 73 in April/May 2019 and 2018 (50% less). The number of breast cancers diagnosed in July 2020 was 60 vs 35 in July 2019 and 2018 (43% greater).

Conclusion

Less breast cancers diagnosed at the height of our nationwide COVID-19 lockdown and higher numbers diagnosed in July 2020 suggests a delay in presentation of these women to their GPs during lockdown.

Introduction

The COVID-19 pandemic is an ongoing global health emergency caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It has rapidly spread since December 2019 from its origin in Wuhan, China.[1]

The first case in Ireland was reported on the 29th February 2020. On March 27th, 2020, Ireland was placed on full lockdown with all non-essential journeys banned. Easing of COVID-19 restrictions did not start to occur until May 18th 2020.[2,3] The COVID-19 pandemic has led to profound changes of our health-care system with possible impact on the care of patients with cancer.[4]

The aim of this study was to assess the effects of the COVID-19 pandemic on new patient attendances at a symptomatic breast clinic and examine the incidence of breast cancer diagnoses during this time.

Methods

This study was performed at an Irish tertiary referral symptomatic breast cancer centre.

Anonymised data of new attendances at the breast unit during a 6-month period between 1st February and 31st July 2020 were analysed. These data were compared with corresponding data from the same 6-month time period in 2018 and 2019. Anonymised data of cancer diagnosis during these same time periods in 2020, 2019 and 2018 were also collected and analysed. This study was granted approval by the local audit committee at St. Vincent's University hospital, Dublin.

Results

The number of new patient attendances at a symptomatic breast clinic during the February-July 2020 period was 30% less than the corresponding average for the same period in 2018 and 2019 (2111 versus 3008) (Figure 1).

The cumulative number of patients with a new diagnosis of breast cancer in the February-July 2020 period was 195 compared to 197 in 2019 and 205 in 2018.

While there was no significant difference in the total number of cancers diagnosed between February and July 2020, compared to 2019 and 2018, the distribution was different. There were only 36 new cancers diagnosed in April and May of 2020, compared to 77 in April and May of 2019, and 68 in April and May of 2018. Sixty women were diagnosed with primary breast cancer in July 2020 compared to 31 in July 2019 and 38 in July 2018.

There were also fewer return attendances to the breast unit between February and July 2020 compared to 2018 and 2019. There were 934 return attendances between February and July 2020, compared to 2,138 in 2019 and 2,019 in 2018.

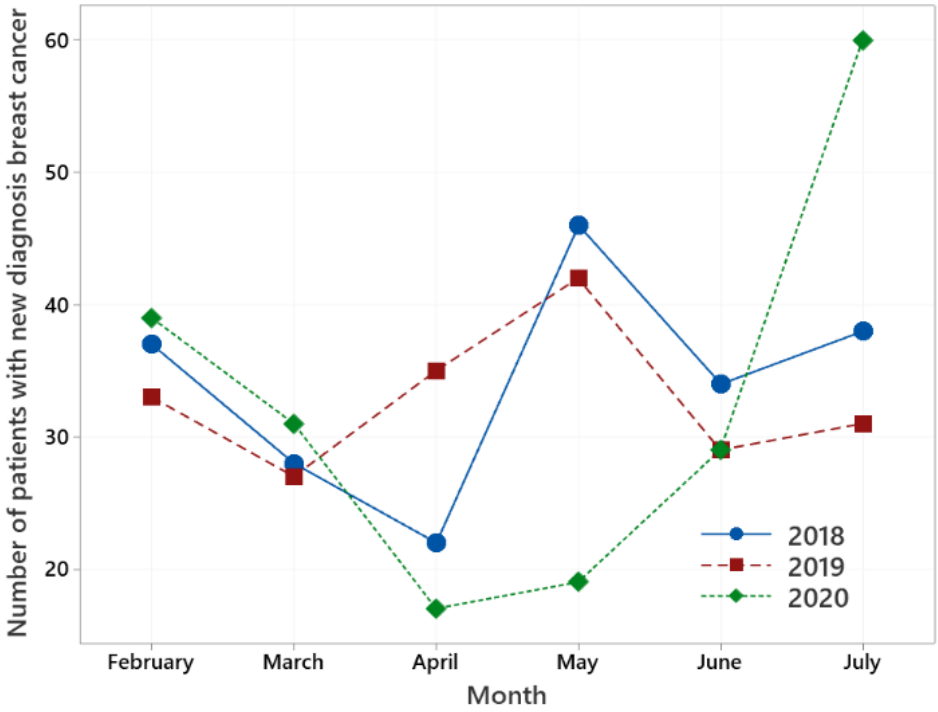

Figure 1: Line graph of monthly number of newly diagnosed breast cancer patients at symptomatic breast clinic for months of February to July.

Discussion

The COVID-19 pandemic has likely had both immediate and delayed consequences on patients with breast cancer. [5,6]

In Ireland, during the months of March, April and May 2020, hospital systems and patient pathways were re-configured in order to meet the health burden of the rapidly escalating numbers of patients with COVID-19. These changes effected a marked reduction of normal outpatient activity in our symptomatic breast clinic, especially during the lockdown months of March, April and May 2020. Although routine clinics were reduced, rapid access clinics continued to operate allowing symptomatic patients referred from primary care to be seen in a timely manner[7] throughout the lockdown months. There were no weeks where no breast clinic was available. Rapid access clinics continued throughout the pandemic. Greater than 95% of urgent referrals were seen within 2 weeks, which meets the recommendation according to the NCCP guideline[7]. 93.98% of patients referred via the non-urgent pathway were seen within the 12-week time period recommended for non-urgent referrals[7].

Teleconsultation was not used for new referrals to the symptomatic breast service. It was used for a select group of return patients (high risk family history and patients with previous breast cancer diagnosis). If any of these patients expressed concern regarding a breast symptom, they were given an OPD appointment.

There were significantly fewer new attendances at the breast clinic between February and July 2020 compared with the same time period in 2018 and 2019. There was no significant change in the number of cancers diagnosed in this time period, however the distribution of numbers of cancers diagnosed was different. There were less cancers diagnosed in April and May of 2020 at the height of our nationwide COVID-19 lockdown. There was a higher number of cancers diagnosed in July 2020 compared with July 2018 and 2019. This suggests a possible delay in presentation of patients to their GPs with suspicious breast symptoms during the lockdown months.

Two papers published in the Lancet in 1999[8,9] concluded that patients with delays of 12-26 weeks had significantly worse survival rates than those with delays of less than 12 weeks. Their analyses indicated that the adverse impact of delay in presentation was associated with more advanced stage. At a national level, ongoing analysis of numbers of new breast cancer diagnoses and stage at diagnosis will inform the impact that this pandemic has had on breast services and guide strategies to ensure continued timely access to care during ongoing restrictions imparted by the pandemic.

Declaration of Conflicts of Interest:
The Authors declare that there is no conflict of interest.

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Supported Discharge for COVID-19

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Abstract

Aims

Assessment of a supported discharge service for a cohort of patients admitted to Cork University Hospital with COVID-19 that were identified as being appropriate for remote patient monitoring.

Methods

Patients uploaded SpO2, subjective breathlessness scores, and temperature readings onto the PatientMpower application, and received a daily phone call from the physiotherapist. Readmission was triggered where appropriate. Patient satisfaction questionnaires were completed following service discharge.

Results

Over 12 weeks, 15 patients had a supported discharge. Readmission was triggered for 3 patients (20%). Compared to non-readmitted patient, readmitted patients had more abnormal SpO2 readings (9 (5.5-22.5) vs 1 (0-1), p= 0.022) and all 6 temperature spikes that occurred, but lower subjective breathlessness scores (3 (1-6) vs 4.25 (2-8), p = 0.003). Differences in mean abnormal SpO2% readings were not statistically significant.

Conclusion

A supported discharge service including remote monitoring and regular contact with healthcare professionals can facilitate safe, and timely discharges of select patient groups.

Introduction

COVID-19 is an illness caused by a novel coronavirus, Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2, 2019-nCoV). Hospitalisation rates currently range from 1% -18% depending on age and comorbidities, with an average length of inpatient stay of 11 days[1,2]. We implemented protocols to facilitate COVID-19 supported discharge, utilising remote patient monitoring and a virtual early supported discharge service to enable safe and timely discharges of COVID-19 patients and maximise hospital efficiency.

Methods

Over a 12-week period from May to July 2020, 28 patients admitted to Cork University Hospital (CUH) with Covid-19 were found to be suitable for a supported discharge, and fifteen of these expressed interest in taking part. Inclusion criteria included stable medical condition, and oxygen saturations (SpO_2) >92% on room air, while access to a smartphone was desirable. Training was given on using the Nonin 3230 Bluetooth® Smart-Pulse device to check SpO_2 4 times per day, which was uploaded together with an oral temperature reading and a subjective breathlessness score to the "PatientMpower for COVID -19" mobile application[3]. Data was reviewed by a respiratory physiotherapist who gave a daily wellbeing phone call for at least 14 days post discharge with advice such as active cycle of breathing and diaphragmatic breathing techniques. SpO2 readings ≤92%, temperature ≥38.3 °C and increasing breathlessness scores necessitated review, and the need for readmission was triggered following assessment by the primary medical team. Patient satisfaction questionnaires were completed upon service discharge. Data was collected in line with GDPR compliance and statistically analysed via IBM SPSS v26.

Results

The characteristics of the cohort and the relevant p-values are shown in *Table 1*. Three patients were readmitted by their respective medical teams. These patients accounted for 81.0% of the 58 abnormal SpO_2 readings that were found to be outside of the parameters accepted by this study, and 31.4% of the total 385 data reviews. The median length of initial hospitalisation was also higher in readmitted patients than those not readmitted at 31 (30.5-35) and 5.5 (3-16.5) days respectively.

The median number of abnormal SpO_2 readings was 9 (5.5-22.5) and 1 (0-1) in the re-admitted and non-readmitted patients respectively (Mood's median test, p = 0.022), while the differences in mean abnormal SpO2% readings were not found to be statistically significant (T-test, p = 0.76).

Only 7 patients (46.7%) entered a subjective breathlessness score. The mean breathlessness score of 4.25 (2-8) was higher in the non-readmitted patients than that of the readmitted patient at 3 (1-6), (T-test, p = 0.003). All of the reported temperature spikes occurred in readmitted patients (*n*=6).

In total, 176 phone calls were made by the respiratory physiotherapists, with 13 and 9 direct communications made to the primary medical teams of readmitted patients and non-readmitted respectively.

Ten patients responded to a follow up questionnaire. All 10 respondents rated the receipt of a daily well-being call as the most helpful aspect of the service, and that they were happy with the level of support they received from the service while at home. Eight patients (80%) reported a preference for home monitoring and 9 patients (90%) found the mobile application and pulse oximeter easy to use.

	All cohort (n=15)	**Readmitted (n=3)**	**No readmission (n=12)**
Mean age	58 (42.5-62.5)	59 (52-61)	57.5 (38.25-62.5)
Male	12	3	9
Female	3	0	3
Median length of initial hospital stay	6 (3.5-18)	31 (30.5-35)	5.5 (3-16.5)
Median length of home monitoring	16 (12.5-32.5)	31 (30.5-35)	15 (11.75-20.5)
Median length of readmission stay	N/A	8 (1.75-16.75)	N/A
Median number of days from discharge to re-admission	N/A	8 (5-13.5)	N/A
Mean number of SpO2 inputs per day	4.6	4.6	4.6
Mean SpO2 outside of parameters (SpO2 %) (T-test, p = 0.76)	91.2 (80-92)	91.2 (80-92)	91.25 (89-92)
Total number of SpO2 inputs outside of parameters	58	47 (81.0%)	11 (19.0%)
Median number of SpO2 inputs outside of parameters (Mood's median test, p = 0.022)	1 (0-2)	9 (5.5-22.5)	1 (0-1)
Number of patients that made a breathlessness score entry	7	1	6
Total number of breathlessness score entries	288	61 (21.2%)	227 (78.8%)
Mean breathlessness score (Score range of 1-10) (T-test, p = 0.003)	4 (1-8)	3 (1-6)	4.25 (2-8)
Number of temperature spikes recorded (>38.3°C)	6	6	0

Table 1: Demographic information and clinical characteristics of the virtual monitoring

All data presented in *Table 1* is expressed as a mean value with ranges in parenthesis, a median with interquartile range in parenthesis or an absolute figure with a percentage of total in parenthesis. Abbreviations: SpO2 = Oxygen saturation, Mean breathlessness score = A higher score indicated a greater degree of breathlessness, a lower score indicated a lesser degree of breathlessness. Where applicable, p values are displayed where $p < 0.05$ is denoted as statistically significant

Discussion

The primary findings of this study were that patients with COVID-19 who required readmission had a greater number of abnormal SpO2 readings during virtual home monitoring than those who did not require readmission. The programme was received positively by the discharged patients and facilitated re-admission in those with clinical deterioration. In support of our findings a similar study remotely monitored oxygen saturations in patients with Covid-19 and concluded that their programme recognised "early recognition of acute deterioration" allowing for readmission where necessary[4], while other studies in severe asthma and pulmonary fibrosis have found a positive role for telemedicine in patient general well-being[5,6].

Interestingly mean breathlessness scores were higher in the non-readmitted patients which may be in keeping with the 'Happy Hypoxia' phenomenon in Covid-19 patients[7] and combined with the need to manually enter this score, explains why only 7 of the patients filled this section.

Although a number of older patients had difficulty accessing a smart phone this did not result in exclusion and was resolved by recording the patient's readings at the daily wellbeing phone call, however this may be an issue when replicating the programme in centres without these supports[8]. The decision against remote spirometry was made due to the potential for poor technique at home by a number of the patients.

This pilot study demonstrates the utility of the CUH COVID Supported Discharge Programme in addition to the positive patient feedback regarding this mode of care.

Declaration of Conflicts of Interest:
The authors have no conflicts of interest to declare. All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report. I certify that the submission is original work and is not under review at any other publication.

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Recurrent Meningitis Due to a Persistent Nasal Discharge

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Abstract

Presentation

We report a case of recurrent meningitis in an adult female who had a delayed cerebrospinal fluid leak (CSF), years after a road traffic accident (RTA).

Diagnosis

Taking a thorough history and correlating with test results confirmed the cerebrospinal fluid leak (CSFL). Magnetic resonance imaging (MRI) imaging identified the location of a CSF communication to the ethmoid sinus.

Treatment

Antibiotic treatment for meningitis lead to full recovery on every admission. The site of the CSFL was later treated successfully by endonasal repair.

Discussion

Recurrent meningitis is rare. This case highlights the importance of taking a thorough history, reflecting on signs and symptoms before ordering the right tests to achieve the appropriate treatment.

Introduction

Recurrent bacterial meningitis is defined as two individual episodes of meningitis separated by a period of full recovery with at least 3 weeks apart, together with abnormal CSF [1]. In adults, head injury is the most common non-iatrogenic cause for recurrent meningitis due to a CSFL. This has even been reported several decades post trauma. The most common causative organism in meningitis associated with CSFL is *Streptococcus pneumoniae* [1, 2].

Case Report

A 47-year-old female, not previously known to be immunocompromised, presented to the hospital with severe headaches, confusion, and neck stiffness. Initial assessment revealed photophobia and ongoing agitation. Her past medical history was significant for sinusitis. Microscopy of CSF from a lumbar puncture showed white cell count (WCC) of 3360 with polymorphonuclear cell predominance, increased protein and very low sugar, suggestive of a bacterial aetiology [Table 1]. CSF culture failed to isolate an organism. An external laboratory performed an in-house (non-commercial) polymerase chain reaction (PCR) assay that detected *lytA* gene which is a target specific for *Streptococcus pneumoniae*. She completed 14 days of Ceftriaxone (2grams twice daily).

Five months later she was readmitted with similar symptoms. CSF analysis demonstrated elevated WCC and protein but failed to culture an organism. Broad range bacterial 16s rDNA PCR and PCR for specific targets for *Streptococcus pneumoniae, Neisseria meningitidis, and Haemophilus influenzae,* performed in external laboratories, did not detect any organism. Two months later, she presented for a third time with meningitis, which prompted a consultation by clinical microbiology team. Remarkably she had a history of a regular nasal discharge dating back 5 years. The discharge was a free flow of clear watery fluid whenever she bent down and was substantial enough to stain her pillow on sleeping. She highlighted her involvement in an RTA 20 years ago but sustained no injuries.

The nasal drip sample was confirmed as being CSF after testing positive for beta-2 transferrin protein. MRI identified a communication from the olfactory bulb to the ethmoid sinus. This was sealed with a fat pad taken from her earlobe using a transnasal endoscopic approach. She remains well with no further nasal discharge or signs of intracranial hypertension.

Table 1: Results of CSF analysis on all three admissions.

	Admission 1	Admission 2		Admission 3
Findings	Day 1	Day 1	Day 13	Day 1
WCC (cell/cmm)	**3360**	**25000**	33	**812**
Cell differential (%)				
Polymorphs	**99**	**100**		**98**
Mononuclear	1		100	2
Protein (g/L) *(Normal range 0.15-0.45)*	**6.18**	**3.5**	**0.49**	**0.84**
Glucose (mmol/L) (*Normal range 2.2-3.9)**	**0**	**0.8**	3.0	2.3
Gram stain	No organism seen	No organism seen	No organism seen	No organism seen
Culture results	No growth	No growth	No growth	No growth
PCR results	**Pneumococcal DNA detected**	Not detected	Not detected	Not detected

**No concomitant serum sample available to provide the ratio of CSF to serum glucose. Normal glucometer readings were recorded.*

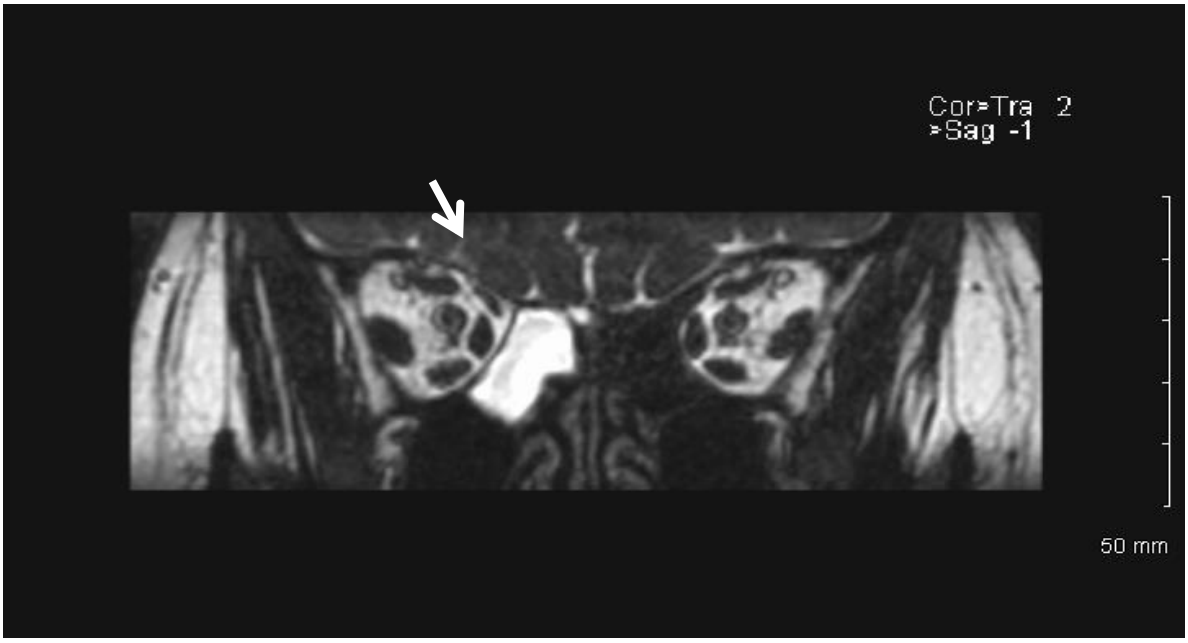

Figure 1: MRI coronal view of the suspected communication of the CSF; descending from the olfactory bulb to the medial wall of the right ethmoid sinus, which is filled with fluid signal. Suspected defect size is approximately 0.8mm.

Discussion

Head injury is the main cause of recurrent meningitis associated with CSFL in adults. CSFL decades after trauma is rare yet has been documented 34 years after head injury. Involutional changes secondary to ageing could possibly contribute to delayed CSFLs[1]. Difficulties in diagnosing a CSFL can lead to multiple episodes of meningitis[2, 3].
Beta-2 transferrin protein is an isoform of transferrin that is produced by neuraminidase in the brain and found exclusively in CSF and vitreous humor, thereby making it a gold standard method for diagnosing a CSFL[3].
For surgical management of CSFL, endonasal repair is the preferred approach as it is very convenient for sphenoid, parassellar and ethmoid regions[2, 3].

In our patient, sinusitis was thought to be the cause of meningitis on her first presentation. Her second presentation prompted further immunological investigations. Clinical microbiology consultation on the third presentation lead to identification and management of CSFL.
The CSFL started about 15 years post RTA. Whether the RTA contributed to the CSFL, is debatable. She had suffered from sinus infections which also could have contributed. However, the follow up scan a few months after surgery showed that the sinuses were clear. Our patient did not suffer further with sinus infections, suggesting that her CSFL could have been the cause of her sinusitis.

In conclusion, this case highlights a multi-disciplinary team approach leading to a successful diagnosis and treatment of a patient with recurrent meningitis resulting in a better quality of life.

Declaration of Conflicts of Interest:
The Authors declare that there is no conflict of interest.

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CALR-positive Essential Thrombocythaemia Preceded by Immune Thrombocytopaenia

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Abstract

Presentation
The patient initially presented with gum bleeding and a petechial rash.

Diagnosis
The patient was found to be severely thrombocytopaenic and bone marrow biopsy showed a marked excess of megakaryocytes consistent with a diagnosis of immune thrombocytopaenia (ITP). She underwent splenectomy. Seven years following splenectomy, her platelet count began to rise again, and repeat bone marrow sampling revealed an increase in megakaryocytes with evidence of clustering. On further testing the calreticulin (CALR) exon 9 variant was found and a diagnosis of essential thrombocythaemia (ET) was made.

Treatment
Thromboprophylaxis and cytoreductive therapy (hydroxyurea) were initiated following ET diagnosis.

Discussion
Possible mechanisms of ET (platelet excess) following ITP (platelet deficiency) include the known associations of autoimmune conditions and malignancy and the effects of immunosuppression and splenectomy in tumorigenesis. To our knowledge, this is the first recorded case of ITP preceding later development of CALR- positive ET.

Introduction

ITP is an autoimmune condition characterised by peripheral destruction of platelets.[1] ET is one of the myeloproliferative neoplasms (MPNs) and is characterised by overproduction of platelets, leading to increased risk of thrombosis. Greater than 95% of ET cases are associated with the Janus kinase (*JAK*)-2, *CALR* or myeloproliferative leukaemia virus oncogene (*MPL*) gene mutations.[2]

Case Report

A 57-year-old female presented in 2004 with a history of gum bleeding and a petechial rash on a background of hypothyroidism. A full blood count (FBC) performed by her General Practitioner revealed a platelet count of 20 x10^9/l with a haemoglobin (Hb) of 147g/l and white cell count (WCC) of 7.9 x10^9/l. Her blood film showed thrombocytopaenia only and her renal and liver function were within normal limits. Her coagulation, serum protein electrophoresis, haematinic, virology and autoimmune screen were normal. Lactate dehydrogenase (LDH) levels were elevated at 596 units/l (normal value 220-450 units/l). Bone marrow biopsy showed a marked excess of megakaryocytes consistent with a diagnosis of ITP. She was commenced on high-dose prednisolone therapy which led to rapid normalisation of her platelet count. Following steroid withdrawal, she relapsed and was referred for splenectomy. Postoperatively she had a significant rebound thrombocytosis with a platelet count increase to 1237 x10^9/l. Repeat bone marrow sampling showed normal megakaryocytes and increased erythropoiesis consistent with a recovering marrow.

Seven years following splenectomy, her platelet count began to rise (see figure 1). *JAK-2* mutational analysis was negative. She was initially started on aspirin but following development of paroxysmal atrial fibrillation (PAF) this was switched to apixaban. Repeat bone marrow sampling following an episode of significant haematoma in her thigh showed an increase in megakaryocytes with evidence of clustering. The *CALR* exon 9 variant was found, confirming a diagnosis of ET. Cytoreductive therapy (hydroxycarbamide) has been commenced.

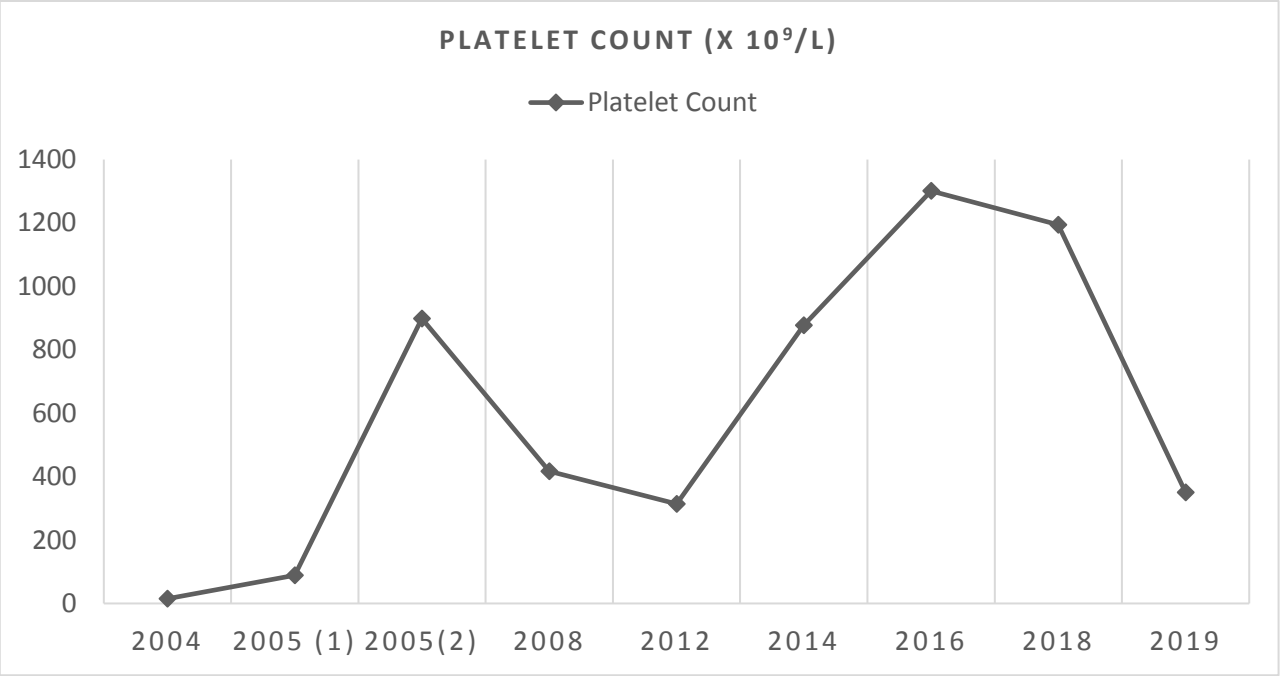

Figure 1: Changes in platelet count during disease course.

Discussion

To our knowledge, this is the first time a patient has developed ET caused by the *CALR* mutation following initial ITP diagnosis. Three patients have previously been described with initial ITP and then ET with an associated *JAK2* mutation.[3,4,5]

A prior history of any autoimmune disease has been shown to be associated with an increased risk of MPN (odds ratio (OR)=1.2; P=0.021).[6] It is likely that the chronic inflammatory state inherent in an autoimmune condition could contribute to tumorigenesis and thus provoke an MPN. Also, use of multiple immunosuppressants could allow a clone to escape apoptosis and promote malignancy (although less likely in our case, where the patient proceeded relatively rapidly to splenectomy). Finally, there may be a shared genetic susceptibility with autoimmune conditions and cancer that renders an individual predisposed to the development of both.

It is possible that splenectomy, when performed for ITP, may unmask ET by removing the function of the spleen in immune-mediated cellular destruction.[4] ET has been seen post-splenectomy for non-ITP causes in patients with initially normal blood counts.[7,8,9]

A key challenge for these patients concerns the diagnosis and management of cytopaenias in the context of both cytoreductive therapy and the potential relapse of ITP. A suggested approach to this is to withhold cytoreductive therapy and treat with immunosuppression, prior to restarting cytoreduction once the platelet count reaches an appropriate threshold.

In summary, this is to our knowledge the first recorded case of ITP preceding later development of *CALR*- positive ET and is illustrative of the complexities of management of patients with concurrent haematological diagnoses.

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

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Pneumothorax and Air Travel

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Abstract

Presentation

A 44-year-old male presented with acute onset of right sided chest discomfort and dyspnoea, on a background of a previous left sided pneumothorax

Diagnosis

A right sided pneumothorax was seen on chest radiograph. Subsequent CT imaging demonstrated presence of subpleural blebs.

Treatment

He underwent a right VATs bullectomy and pleurectomy for definitive management with an uncomplicated recovery. He flew to Florida less than two weeks later.

Conclusion

This case highlights a personalised approach to the management of pneumothorax and provides evidence for safe air travel post definite treatment.

Introduction

Pneumothorax is defined as air in the pleural space and is commonly categorised as spontaneous or traumatic. Spontaneous pneumothoraces are further categorised as primary (PSP) or secondary (SSP), depending on whether underlying lung disease is present. Worldwide, PSP has an annual incidence rate of 7.4 per 100,000 in males, with smoking being the most important risk factor. [1] Air travel poses a risk to patients with a closed pneumothorax due to in-flight pressure changes. During ascent, altitude increases with a fall in ambient barometric pressure, which (as per Boyles law) at typical cruising altitudes can cause expansion of gas within the pleural cavity by 25-38%. In a closed untreated pneumothorax, this may result in symptoms, tension pneumothorax or death. [2, 3]

Case Report

A 44-year-old male current smoker (22 pack-years) presented with acute onset of right-sided chest discomfort and dyspnoea. He was due to fly to Florida (USA) in three weeks' time. His background history was significant for a left-sided PSP occurring 20 years previous while on holidays in Spain, which was treated with chest drain drainage, followed by air ambulance repatriation.

On admission, the examination was notable for an elevated respiratory rate (24 b/min) and oxygen saturation of 92% on room air. Reduced air entry was noted on the right. Chest x-ray showed a large right-sided pneumothorax. An 18 French chest drain was inserted via Seldinger technique with partial re-expansion. A prolonged air leak prompted a computed tomography (CT) of the thorax (Figure 1), which demonstrated subpleural blebs (Figure 1, asterisk).

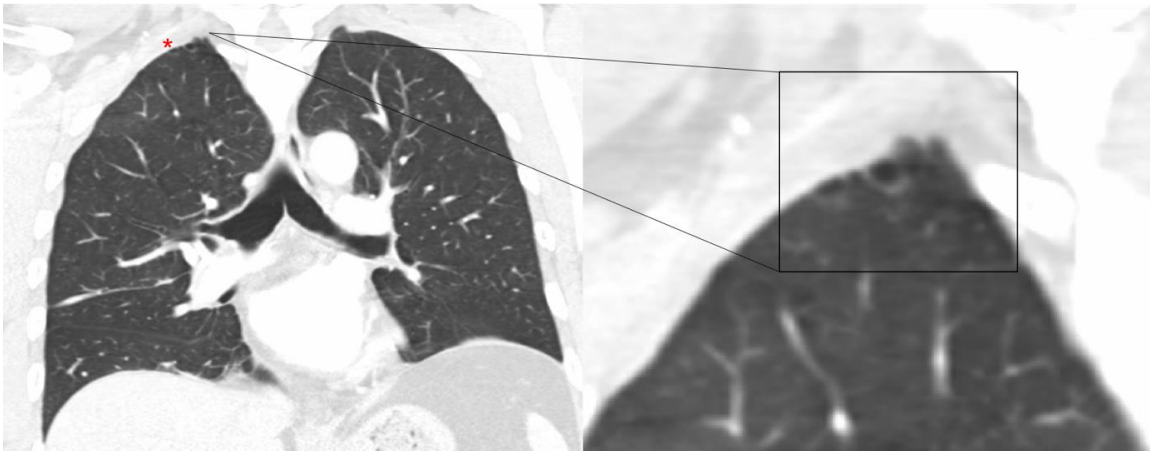

Figure 1. On coronal sections of a computed tomography (CT) thorax, subpleural blebs were noted (red asterisk). A magnified view of the subpleural blebs are also shown (black box).

He proceeded to right video assisted thoracoscopic surgery (VATS) bullectomy and pleurectomy (Figure 2). Histology demonstrated subpleural emphysematous change, subpleural bulla formation and background respiratory bronchiolitis. He was discharged on day 10 and flew to Florida without any complications, two weeks later.

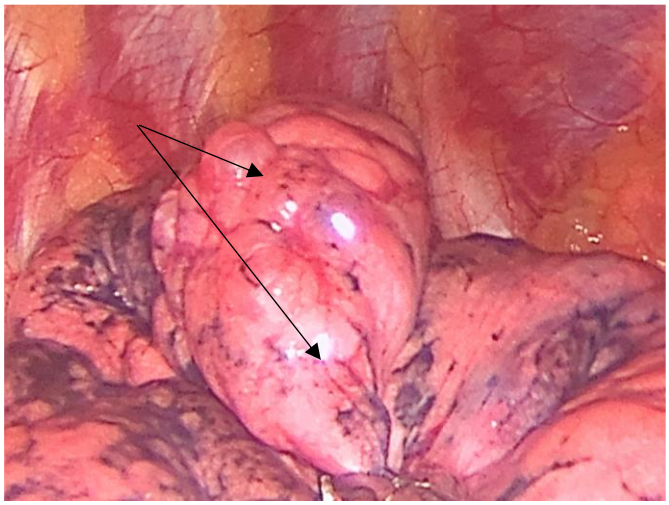

Figure 2. Intraoperative imaging of subpleural blebs (arrows).

Discussion

Diverse treatment options, variable clinical guidance [4, 5] and consideration of the morbidity and mortality risks of a potential recurrence [6] have led to a heterogeneous approach to pneumothorax management. Moreover, management is now personalised and principally informed by risk of recurrence, which is dependent on patient factors, radiological findings [4-7] and by presence or absence of an air leak. [6]

Risk factors for pneumothorax recurrence include; history of pneumothorax, smoking, blebs/bullae on CT and large initial size. [5-8] Management with oxygen therapy, observation, aspiration or chest tube placement maybe therapeutic but will not prevent recurrence. In this case, the patient proceeded directly to chest drain insertion and surgical intervention. The rationale was based on a high risk of recurrence and planned air travel necessitating definitive intervention.

Definite surgical options include thoracotomy and VATS. Surgery is indicated for patients presenting with a second ipsilateral PTX, first contralateral PTX (this case) or a persistent air leak (3-5 days). [4] Optimal surgical management differs between surgeons and institutions. VATS is associated with less pain and a shorter hospital stay. [9] However, a systematic review found a four-fold increase in recurrence rates of pneumothorax when surgery is undertaken with a VATS approach compared with an open thoracotomy, which needs consideration when deciding on optimal treatment. [10]

CT is the gold standard radiological investigation for the work up of pneumothorax. [1] On CT, a bleb appears as a thin-walled cystic air space contiguous with the pleura. [8] Blebs are found in up to 85% of patients with a PSP. [8] CT is useful in the preoperative period as it allows identification of emphysematous bullae/blebs appropriate for surgical intervention and can guide care. Blebs/bullae are known risk factors for recurrence [8] and increasingly CT confirms evidence of lung abnormalities in patients with PSP, which may help stratify patients as high risk of recurrence who may benefit from definitive treatment. [6]

Air travel post resolution or definitive treatment of a pneumothorax is now considered safe. [3] However, the optimal length of time to wait after resolution of a pneumothorax is not known. [2, 3] Nonetheless post definitive surgical intervention, the risk of recurrence is small. [10] The decision to travel should be individualised, considering the presence of underlying lung disease, type of treatment, patient preference, CT findings and more recent evidence suggesting that flying within 2 weeks is safe. [2-4]

In conclusion, this case highlights a personalised approach to the management of PSP, identifies risk factors for recurrence, illustrates causative aetiology, explores the role of CT and adds supportive evidence for safe air travel within two weeks of definitive management.

Declaration of Conflicts of Interest:
The authors declare no conflicts of interest in preparing this article.

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Application of STOPPfrail Tool to Residents of an Approved Residential Unit for Psychiatry of Later Life

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Sir,

Polypharmacy is a common issue in the elderly population[1] There is a direct relationship between increase in polypharmacy and inappropriate prescribing. This high medication burden can have negative consequences such as increase rate of adverse drug reactions, increased morbidity and mortality and economic cost.[2] Therapeutic goals may also change over time because of increasing frailty and shortening life expectancy. Physicians are often reluctant to deprescribe for many reasons including fear of adverse outcomes, fear of litigation, lack of knowledge, time constraint and lack of guidelines.

We recently conducted an audit on current inpatients in an Approved Centre for Psychiatry of Old age using the STOPPfrail tool (Screening tool of older person's potentially inappropriate prescriptions in frail older adults with limited life expectancy)[3]. For each patient the total number of regular medications was noted. The need for each medication was then scrutinised by a panel of three including consultant Psychiatrist, GP trainee and CNM. Inappropriate medications were then stopped. One month later the charts were reviewed, and the number of medications restarted was recorded. The Criteria was reapplied to assess number of inappropriate medications. The standard set was that no inappropriately prescribed medications, according to the STOPPfrail tool, should be prescribed.

A total of 15 inpatients met the inclusion criteria for the audit. Of these 10 were male and 5 were female. The mean age was 79.2(±7.62) years. Total number of medications prescribed was 159 with a mean of 10.6 (± 4.84). The maximum number of medications for one patient was 21. A total of 53 medications were stopped on the medication review. The mean reduction in medications was 3.53 (±1.01). This represents 32.7% reduction in total medications. On average males were prescribed 11.8 (±4.54) medications and 4.1(±1.66) were stopped while females were prescribed 8.2(±4.97) and 2.2(±1.30) of these were stopped.

At the one-month review none of the previously stopped medications had been restarted. A total of one extra medication had been added. No inappropriate medications were recorded. Therefore, according to STOPPfrail criteria the rate of inappropriate prescribing decreased from 32.7% to 0%.

This audit into an elderly inpatient population in an approved psychiatric centre resulted in substantial reduction of almost one third of prescribed medications. The most common reason for stopping a medication was no clear indication, followed by lipid lowering therapies which give no clear short-term benefit to this population. Other common criteria used for stopping medications include stopping memantine where it is not clearly improving BPSD symptoms, proton pump inhibitors at full dose for over eight weeks and multivitamin supplements prescribed with no clear deficit.

The authors found the STOPPfrail tool to be very easy to use and appropriate for the study population. The criteria were clear, limited and there was obvious benefit to each one. Having such a peer reviewed structure for deprescribing in this population provided confidence to discontinue medications where apprehension of adverse outcome may have previously prevented the activity.

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Neonatology Senior House Officer (SHO) Attendance at Newborn Deliveries

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Dear Sir,

Ten percent of term newborns require simple measures to establish effective respirations after birth; 3-5% need basic resuscitation and less than 1% require more extensive resuscitation[1,2]. Many antenatal and intrapartum risk factors have been identified that variably increase the risk of resuscitation being required[3,4]. Early identification of risk factors facilitates preparation and appropriate resource mobilisation. At Cork University Maternity Hospital an experienced midwife, competent in delivering basic resuscitation, is present at each delivery. A neonatal senior house officer (SHO) attends all deliveries deemed intermediate risk and a registrar attends all high-risk deliveries. A crash-call system is in place so that when an infant is born in unexpectantly poor condition, the neonatal response team is immediately alerted to attend.

We reviewed SHO attendance at deliveries in May to June 2020 to determine how many births a neonatology SHO is requested to attend in advance of delivery, the indications for SHO attendance, time spent at the delivery, and level of neonatal resuscitation required. Data was collected over a 28-day period.

SHOs were requested to attend 212/553 (38%) births in advance of delivery, i.e., 7-8 deliveries per day. A mean of 19 minutes was spent at each delivery, accounting for approximately 2.5 hours daily of SHO time. In 177/212 (83%) deliveries simple measures sufficed to establish regular respirations. A further 31 (15%) infants received basic resuscitation with either CPAP or IPPV. Four infants (2%) received advanced resuscitation with endotracheal intubation and/or external cardiac compressions.

Foetal distress was the most commonly cited risk factor for SHO attendance. In 15 of 104 such deliveries, the infants received some resuscitation. Additionally, all 9 infants <35 weeks gestation received respiratory support as did two of 17 of infants born prematurely, >35 weeks. Three of 8 infants with an intrapartum complication and one of two infants born by caesarean section under general anaesthesia received resuscitation. Of the remaining 62 deliveries classified as intermediate risk only two infants received resuscitation.

One of 23 infants born by assisted delivery (vacuum or forceps) for failure to progress and one of 22 infants delivered by NICE Category three emergency caesarean section received resuscitation. Zero of 12 infants received resuscitation where the only identified risk factor was meconium-stained amniotic fluid.

Our data shows that a large proportion of a Neonatology SHO's working week is spent at newborn deliveries, where in most cases little or no intervention is required. Given current practice whereby an experienced midwife, fully trained in basic resuscitation to a high standard (Neonatal Resuscitation Program certified), is present, we propose that indications for SHO routine pre attendance should be reviewed and refined. The change in current practice could proceed in a stepwise fashion, first eliminating routine SHO attendance for those deliveries recognised as low risk both in this study and internationally. To effect change safely, it is essential to ensure that there are clear lines of communication between the obstetric and neonatal services and a well-functioning emergency "crash call" system is in place in every maternity hospital. A process of ongoing audit should be initiated to monitor the impact of the change and provide opportunity to more clearly define those deliveries where neonatal SHO attendance is of value. This will permit greater efficiency in utilisation of the limited workforce, more efficient service provision, and enhance learning opportunity for the SHO.

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Maternal Milk Men; An Untapped Resource

B. Gordon, E. Dunne, A. Curley on behalf of PRIME Group

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Dear Editor,

The importance of maternal milk for premature infants has been well described for protection against necrotising enterocolitis, bronchopulmonary dysplasia and other comorbidities[1].

PRIME (PReterm Infants need Milk Early) is a multidisciplinary quality improvement project in the National Maternity Hospital (NMH) that has developed clinical guidelines and educated obstetric, midwifery and neonatal staff on the importance of maternal milk for premature infants. The project has improved knowledge of and attitudes regarding the importance of maternal expressed breast milk (MEBM) for premature infants amongst hospital staff and has actively promoted knowledge to mothers in the antenatal period leading to decreased median time to first maternal milk for premature babies (17 vs 35 hours).[2]

Mothers of infants' born very prematurely (<32 weeks' gestation) are discharged from the maternity hospital months before their baby is ready to go home. In 2019, 140 babies born <32 weeks' gestation were admitted to our NICU, 15% of whom were transferred from units outside the NMH catchment area. These mothers face additional challenges to providing MEBM including geographical separation, cost of travel and need to care for other children.

In order to overcome these challenges, the PRIME group identified the potential use of Blood Bikes for the transfer of maternal milk from mothers' homes back to the NICU. Blood Bikes East/Cu Chulainn Blood Bikes/Blood Bikes South make up a voluntary group of transport networks that service the HSE all over the country with the collection and transportation of blood, blood products, human tissue and maternal milk. Blood Bikes frequently transport donor milk to tertiary Irish Neonatal units from the Human Milk Bank in Enniskillen however they are not currently routinely used for individual patients.

In 2019, NMH utilised the Blood Bike service five times to collect maternal milk for 8 premature babies. In 2020, we increased our usage of the service to 15 'milk runs' from Donegal, Mullingar and Longford for 24-29-week gestation infants. Blood bikes are a valuable resource that can provide timely, MEBM for vulnerable infants when individual geographical or social circumstances may otherwise affect supply.

By highlighting this vital service, we hope to promote awareness to all other neonatal units nationwide.

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The Impact of COVID-19 Pandemic on Clinical Teaching: A Clinical Educator's Perspective

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Dear Editor,

There is no doubt that the COVID-19 pandemic has had a drastic impact on medical students' clinical education. The inability to deliver face-to-face lectures, students' absences due to illness and self-isolation due to close contact, reduced social interactions with classmates, and reduced clinical exposure are amongst the main challenges that will have a lasting impact. On a positive note, students have received more attention from clinical educators with increased one-on-one teaching, small group teaching and targeted simulation sessions. The challenges outlined above necessitated clinical educators to adapt and enhance innovative teaching methods to meet medical students' learning objectives while aligning with government and public health guidelines.

Clinical teaching is best done at the bedside with 'real' patients as these interactions and dynamics are critical in students' learning. However, the COVID-19 pandemic has presented many organisational challenges for clinical educators, such as limiting the number of students in clinical sites for bedside teaching during the surge and patients' inability to attend the lecture halls and tutorial rooms for teaching. This has led to innovative teaching methods to include several online platforms, asynchronous and blended learning methods to provide educational content to many students. Online delivery of lectures can serve as an effective means of education by considering the factors that improve learning objectives from the online session, such as students' motivation, expectations, and employment of user-friendly technology[2]. Furthermore, to facilitate clinical teaching, we used virtual reality glasses (RealWear) to bring the patient to the students and deliver the final medical curriculum. With patient consent, a student can take a patient history and examine a patient observed by a Consultant, while at other locations, a tutor and a whole class complement can see and hear everything as though physically present. The Consultant can teach, discuss the case and interact with a class full of students. The RealWear glasses allowed minimisation of direct contact but not limit our student's clinical experience and exposure.

As the access to the wards was interrupted due to the surge in cases, RCSI maintained its commitment to graduate doctors by consolidating their simulation teaching with the use of simulated patients', the introduction of simulated ward rounds, simulated medical, anaesthetics and surgical emergencies cases, and simulated intern on-call scenarios to facilitate students' learning. Feedback from students has been positive, citing the excellent value of hands-on teaching with one-on-one feedback and the opportunity for repeated practise to achieve competency.

Another impact of the pandemic on medical students' is mental health, which needs to be addressed by schools. Medical students are affected due to challenges such as uncertainties surrounding their education and future careers and the reduction of social interaction, leading to lonliness[3]. Channels of communication with students addressing academic and non-academic concerns are vital to tackle this significant issue.

Finally, the arrival of the COVID-19 vaccines has given a glimmer of hope for hands-on patient exposure to resume shortly. Meanwhile, adaptability, creativity, and innovation are essential for clinical education's success in the face of the pandemic's continuous challenges.

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Pneumomediastinum in Asthmatic with COVID-19 Pneumonia

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Pneumomediastinum is an uncommon condition with air present in the mediastinum outside the trachea and oesophagus. It is usually self-limiting but occasionally air leaks into the pericardial space causing pneumopericardium which may lead to a life-threatening cardiac tamponade thereby requiring pericardiocentesis.[1] It can be spontaneous in aetiology or secondary to mechanical ventilation, inflammation such as COVID-19, neoplasm or perforation of a hollow abdominal organ. The most common symptom is chest pain. The diagnosis is confirmed by imaging where air can be seen as vertical radio-translucent regions in the mediastinum and along the borders of the heart.[2] We present the case of two patients with asthma and COVID-19 pneumonia who developed pneumomediastinum.

Patient A is a 41-year-old man with a history of well controlled asthma and a Body Mass Index of 36. He was admitted with myalgia, pyrexia, worsening dyspnea and a productive cough having tested positive for SARS-CoV-2 one week prior in the community. He was hypoxic with a PaO2 of 8.5 kPa on 100% inspired oxygen and transferred to ICU where he spent ten days receiving continuous positive airway pressure (CPAP), Tocilizumab, steroids and antibiotics. He avoided intubation and mechanical ventilation. In addition to his COVID-19 pneumonia, a CXR on day 8 of his admission was suggestive of an incidental pneumomediastinum which was confirmed on CT scan of his chest. His pneumomediastinum was treated conservatively and showed subsequent improvement on further imaging with no residual pneumomediastinum evident on a CXR three weeks post initial diagnosis. He continued to improve over the coming weeks and was discharged home with portable oxygen after undergoing pulmonary rehabilitation and is being followed up in the respiratory clinic.

Patient B is a 52-year-old asthmatic man who presented with dyspnoea and central chest pain having tested positive for SARS-CoV-2 eight days prior in the community. He was treated with antibiotics, steroids, tocilizumab and required CPAP. A CXR performed on day 10 of his admission suggested a possible subtle pneumomediastinum in addition to his pneumonia. A CT chest on the same day confirmed a new moderate volume pneumomediastinum with gas locules tracking through the anterior, middle and superior mediastinum and supraclavicular soft tissues. A repeat CT 48hrs later showed interval improvement. Patient B continue to improve and is currently undergoing pulmonary rehabilitation.

The above cases highlight a rare but increasingly reported complication of COVID-19. Interestingly both patients had a history of asthma, COVID-19 pneumonia and was on CPAP. It is thought that the pathogenesis of the pneumomediastinum in the above cases is due to alveolar rupture secondary to barotrauma associated with high PEEP settings via CPAP highlighting the fact that barotrauma associated pneumomediastinum are not solely related to intubation and mechanical ventilation. Pneumomediastinum should be treated conservatively once oesophageal rupture is outruled. Patients should be monitored closely for development of pneumothorax at which point a chest drain insertion may be required.[3]

Reflecting on the above cases, we can conclude that efforts should be made to use the lowest PEEP possible to achieve adequate oxygenation in asthmatic COVID-19 pneumonia who require CPAP.

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