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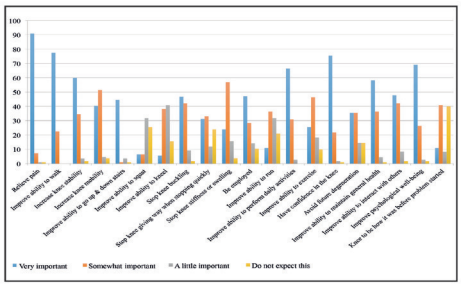
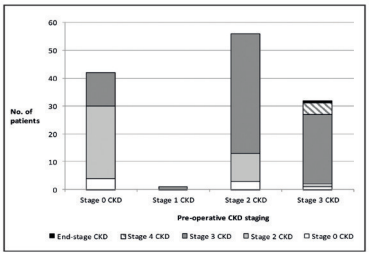
In this Month's IMJ

Expectations of general practitioners for patients undergoing elective total knee arthroplasty: Nugent et al assessed GPs expectations of total knee arthroplasty. There were 111 replies. The GPs had high expectations in relation to pain relief (97.3%), mobility (97.3%), subsequent ability to walk medium distances (85.5%). GPs had low expectations for waiting times for public patients with anticipated waiting times of 1-2 years.



Pattern of change in renal function following radical nephrectomy for renal cell carcinoma: Coyle et al have examined the renal function in 131 patients who had a nephrectomy for renal cell carcinoma. The proportion of patients with chronic kidney disease increased significantly after nephrectomy. Those patients with a pT1a tumour showed a greater decline in GFR.

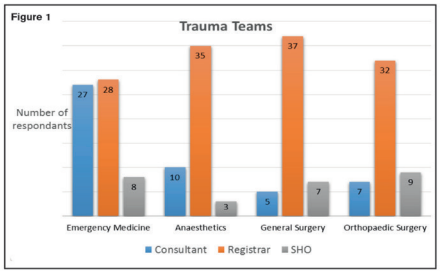


Evolution of carotid surgical practice in the last decade: Hanrahan et al describe their carotid endarterectony (CEA) practice over a 10 period. In the pre-stroke unit era '03-'08 they performed 264 CEAs and in the stroke unit era '08-'13 they carried out 229 CEAs. The proportion of symptomatic patients has increased from 53% to 78%. Throughout the series the 30 day stroke and death rate were <2%.

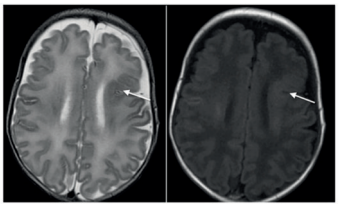
Table 1: Demographics & Mode of Presentation

	Stroke Unit Era (Nov 08 – Nov 13)	Pre-Stroke Unit Era (Nov 03 –Oct 08)	p value
Number of CEA's	229	263	
Male: Female Ratio	168:61(73% Male)	191:72 (73% Male)	
Number of patients <65yrs	69	83	
Number of patients >80yrs	28 (2/28; (7% asymptomatic)	25 (6/25; 24% asymptomatic)	
Number of asymptomatic patients	50/229 (22%)	124/263 (47%)	p<0.0001
Number of symptomatic patients	179/229 (78%)	139/263 (53%)	p<0.0001
Number of symptomatic patients with 50-69% stenosis	42/179 (23%)	25/139 (18%)	p=0.27

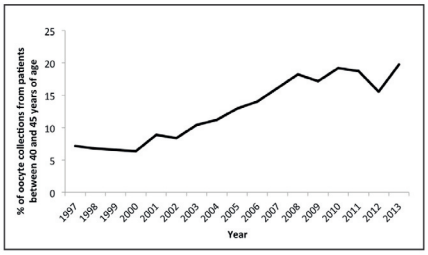
Trauma training and workload: a national survey: McSorley and Quinlan surveyed trainees in emergency medicine, orthopaedic and general surgery regarding trauma training. Most respondents (98.33%) believed that smaller units should be bypassed for major trauma. Also 91.67% felt that the large hospitals should have a trauma theatre available 24 hours. Most of the trainees (91.67%) expected to be covering major trauma when they are appointed as consultants.



Postnatal MRI brain in infants treated for twin-twin transfusion syndrome: Boyle et al describe the brain MRI outcomes in infants with twin-twin transfusion syndrome. This complex disorder is treated antenatally with fetoscopic laser surgery. The proportion of abnormal brain MRIs was 60%, 2 major and 5 minor findings.



Advanced maternal age and assisted reproductive technologies in an Irish population: O'Shea et al describe the success rates of assisted reproductive technology (ART) according to maternal age. Women greater than 43 years had pregnancy rates of 5.04% and those aged 40-42 years had pregnancy rates of 12.52%. There are many challenges as increasing numbers of women over 40 years are requesting infertility treatment.



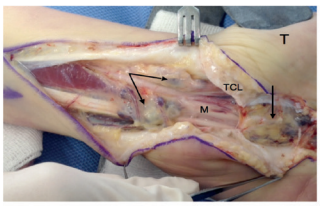
A survey of lung health and COPD awareness amongst participants at a mobile spirometry clinic: Rajgopal et al point out that COPD affects 10% of the population. Awareness of the condition among the general public is low. Only 47.7% knew about COPD although most were smokers or ex-smokers. At the mobile spirometry clinic, 17.9% required onward referral to their GP with abnormal spirometry results.

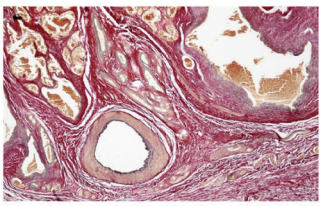
Table 2: Those Referred for spirometry

	Yes		No		P
	N	%	N	%	
Gender	63	100	289	100	0.783
Male	34	54.0	152	52.6	
Female	29	46.0	137	47.4	
Smoking Habits	63	100	289	100	0.003
Smoker/ Ex-smoker	54	85.7	193	66.8	
Non Smoker	9	14.3	96	33.2	
Education Level	63	100	289	100	0.728
Primary	9	14.3	36	12.5	
Junior Cert	23	36.5	48	16.6	
Leaving Cert	10	15.9	113	39.1	
College Degree	13	20.6	47	16.2	
Postgrad Degree	3	4.7	20	6.9	
Missing	5	7.9	25	8.7	
Family History of Lung Disease	63	100	289	100	0.283
Yes	16	25.4	56	19.4	
No	47	74.6	233	80.6	
Symptoms of Lung Disease	63	100	289	100	0.310
Yes	31	49.2	122	42.2	
No	32	50.8	167	57.8	

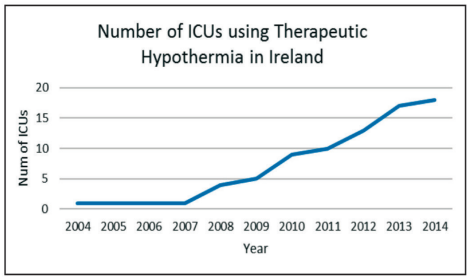
Using social media to increase accessibility to online teaching resources: O'Kelly et al report on the use of Twitter as an online teaching repository. The subject matter was the surgical grand rounds. The presentations were edited to remove any images that might compromise confidentiality. The students found that it was both useful and easily accessible.

Congenital arteriovenous malformation of the forearm and hand: Collins and Cronin describe the surgical management of an arteriovenous malformation of the forearm in an 11 year old boy. It is pointed out that vascular malformations account for 2-6% of upper limb tumours in children.





Therapeutic hypothermia in ICUs: O'Connor et al raise the issue of therapeutic hypothermia (TH) in adult ICUs. The treatment is used after cardiac arrest. Currently TH after cardiac arrest is available in 80% of Irish ICUs. Approximately 50% of ICUs have administered TH to more than 10 patients. The authors state that there is debate about the efficacy of TH. A new international guideline is expected later this year.



Revisiting Higher Hospital Weekend Mortality

The debate about excess hospital weekend mortality was reignited by the British Minister for Health, Jeremy Hunt[1] in a speech delivered on 16th July '15 to the King's Fund, London. Mr. Hunt stated that 6,000 lives are lost in the UK each year because of the lack of a proper 7-day hospital service. The assertion is that a patient is 15% more likely to die if admitted to hospital on a Sunday compared with being admitted on a Wednesday. He said that the lack of senior consultants at weekends is one of the critical points. He added that doctors had a 'Monday to Friday mentality', and that they needed to return to a sense of vocation. The Minister announced that he intends to remove the opt-out of weekend work for doctors and if necessary he will impose a new contract. He said that the BMA, who challenged his statement, is not remotely in touch with what their members feel, and that he will not allow it to be a road block to reform. Among the new demands being placed on doctors are speedier diagnostic tests, timely consultant reviews, consultant directed interventions, and ongoing senior medical management. The BMA has stated that if more consultants are compelled to work at weekends, medical care during weekdays will be reduced.

The concerns about weekend mortality are based on 2 papers by Freemantle et al[2,3] in 2012 and in 2015, both reporting excess weekend mortality. In the more recent paper the authors state that in the UK the number of admissions during weekdays is 2.7 million, 1.2 million on Saturdays, and 1 million on Sundays. The proportion of emergency admissions is 29% on weekdays, 50% on Saturdays, and 65% on Sundays. The relative risk of a death within 30 days compared with on a Wednesday was increased by 2% for a Friday admission, 10% for Saturday admission, and 15% for a Sunday admission. The conclusion of the paper is that patients admitted on Saturdays and Sundays are sicker and more likely to die within 30 days of admission. It is maintained that junior hospital doctors are more exposed at weekends and that hospital chiefs are concerned about the level of week-end cover. It is stated that patients should never have to accept an increased risk because of the way healthcare services are designed and delivered. On the other hand the authors accept that there is no proof that the excess deaths could have been prevented.

Hunt's assertions, however, have subsequently been challenged. A survey of 4,095 consultants, across 15 care trusts, has revealed that only one individual had opted out of weekend call. If this was applied nationwide, only 12 doctors declined to care for patients at weekends. The inaccuracy of Mr. Hunt's statements has caused anger among many groups of doctors. There have been allegations of half- truths and miss-information. Margaret McCartney[4], writing in the BMJ, discussed the 'zomie statistic' behind the push for 7 day working. She explains that a 'zombie statistic' is one that is completely spurious but becomes widely accepted as fact. She points out that the statistics regarding excess weekend deaths were based on a paper by Freemantle et al. In their study of 14217640 hospital admissions there were 187,337 deaths within 30 days, giving a 1.32% absolute risk. The 16% excess deaths at weekends set against this background, is small but is causing serious concerns among UK health chiefs. The absolute increase in week-end deaths is 0.3% points according to University of Manchester calculations.

The debate is compounded by the difference between association and causation. Commentators differ over whether the reported higher weekend mortality rates are due a different population of patients being admitted on Saturdays and Sundays or whether it is caused by reduced levels of care. Various groups have interpreted the same mortality statistics with different conclusions. Patients already in hospital over a weekend rather than admitted during a weekend have a 5-8% lower risk of dying. The likely reason is that fewer major operations and procedures are undertaken over Saturday and Sunday. On the other hand, patients electively admitted on Sundays are more likely to be high-risk and require more extensive tests prior to surgery.

The cost implications of increasing medical manpower presence at weekends has to be weighed against any potential benefits. Some commentators believe that investment in seven day services would increase trust costs by 2%. Also there is no clear evidence that seven day working in isolation will lower the weekend death rate.

McKee states that the issues are not straightforward[5]. While the Health Minister described the excess deaths as avoidable and due to lack of consultants, there are other possibilities. It is possible that with the onset of the weekend, the reduction in community services may lead to the increased transfer of frail, elderly patients to hospital. He also pointed out that in a study of 103 English stroke units, the 30 day mortality outcome was no better in units with seven day ward rounds.

Sue Bailey, chair of the Academy of Medical Royal Colleges, which represents the UK's 250,000 doctors, said that enough staff of sufficient seniority must be available in hospitals at weekends as well as weekdays. This does not mean seven-day working for staff", but the NHS would need more money in order to ensure that happened, she added. However, Professor Jane Dacre, president of the Royal College of Physicians, stressed that increased deaths among patients admitted on Saturday and Sunday "are unlikely to be just due to the numbers of doctors working at weekends. There is new evidence that not all excess deaths at weekends are avoidable."

The debate about excess weekend deaths lacks clarity. Questions that need to be addressed include- is the association valid, is it due to a different case-mix, is it due to shortages in medical and nursing manpower? The outcome of negotiations between the NHS and the BMA will be watched with interest in many countries including Ireland.

JFA Murphy
Editor

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4. McCartney M. The zombie statistic behind the push for seven day working. BMJ 2015;351:h3575
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Ebola Virus Disease – An Opportunity in Crisis?

The recent outbreak of Ebola virus disease (EVD) in West Africa has brought issues of emergency planning and preparedness for emerging viral threats, including Ebola, pandemic influenza and MERS-CoV into focus here in Ireland. Building on existing National Guidelines for Viral Haemorrhagic Fever,[1] this current outbreak has necessitated the development of a range of national management protocols for specific settings. These protocols have addressed presentation, detection, infection control, clinical assessment, case management, laboratory testing and transfer arrangements to the National Isolation Unit at the Mater hospital as well as contact management in healthcare and non-healthcare settings. This work has been coordinated nationally in the HSE through the Health Protection Surveillance Centre (HPSC) and its Scientific Advisory Committee on EVD and the HSE Emerging Viral Threats (EVT) Committee, regionally through Departments of Public Health, and across government via the Department of Health-led EVD Coordinating Committee. It has involved the concerted efforts of multiple different stakeholders, both within and beyond traditional healthcare settings.

In the absence of a confirmed case of Ebola in Ireland thus far, and with the likelihood of that event receding, as numbers of new cases in West Africa decrease substantially, it could be argued that the substantial time and effort devoted to this issue since August 2014 has been misplaced. It may equally be argued, however, that this preparatory work and the experiences so gained are of enormous value, and can be utilised to advance future public health efforts and promulgate understanding across a range of disciplines and settings. This latter argument is easily made with regard to similar infectious threats. Preparatory work for Ebola has mobilised health services, and those who work in partnership with those services, to evaluate their readiness for disease outbreaks in Ireland. Ports and airports, the customs and prison services, educational institutions and social care organisations have had to consider their role in working with Departments of Public Health and the HSE in containing and managing potential cases of Ebola and other communicable diseases. HSE Emergency Planning, in collaboration with Public Health and the acute hospital services, has organised desktop training and practical exercises; these have promoted collaboration between stakeholders and have been carried out across the country, including at our ports and airports. The importance of the Mater Hospital National Isolation Unit, and its relationship with receiving hospitals, has been highlighted, and the roles of General Practitioners, the National Ambulance Service, Dublin Fire Brigade and An Garda Siochána have been clarified. The HSE EVT committee has coordinated significant preparedness activities in the acute receiving hospitals.

The need for inter-departmental and inter-agency collaboration in preparing for Ebola has mandated stakeholders from diverse policy backgrounds, with often competing strategic objectives, to work together. This building of new and strengthening of old relationships has presented an opportunity to promote ongoing collaboration between these stakeholders. And, while the benefits of capitalising on this opportunity are obvious with respect to the management of infectious disease as discussed above, they also hold relevance for our approach to non-communicable illnesses and their prevention. As noted in the 2013 roadmap to improving the health of the population in Ontario, Canada, "effective use of public health expertise and better collaboration with both the health and non-health sectors could lead to better health at lower costs....the public health sector is uniquely positioned to create the bridge between the health sector and all other sectors that influence health."[2]

Our own roadmap for the prevention of non-communicable disease, Healthy Ireland, recognises the need for this bridge and mandates the adoption of a 'health in all policies' (HiAP) approach, one which places the public's health at the centre of decision making across sectors. At issue now is whether all sectors of government and society as a whole can be convinced of the integral role which they must play in moving from rhetoric to action. Recent experience with Ebola preparedness suggests that, when appropriately motivated, stakeholders in Ireland can overcome the tradition of siloed thinking which has hampered cross-sectoral cooperation and development in the past. The lessons learnt and goodwill fostered through this process must now be harnessed to drive greater consideration of the public's health and its determinants at all levels of Irish society.

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Expectations of General Practitioners for Patients Undergoing Elective Total Knee Arthroplasty

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To receive CPD credits, you must complete the questions online at www.imj.ie.

Abstract
Most patients undergoing total knee arthroplasty (TKA) in Ireland are referred to orthopaedic services by their general practitioners (GPs). We aimed to evaluate Irish GPs' expectations for their patients' perioperative experience and post-operative return to function. A questionnaire was mailed to 350 GPs in all provinces. This included questions relating to GPs' expectations for their patients and their knowledge and sources of information on TKA. 111 completed questionnaires were returned (response rate 31.7%). Overall expectations for functional and psychological outcomes were high, especially regarding pain relief (108 (97.3%)) expected relief from most or all pre-operative pain), mobility (108 (97.3%)) expected patients to walk medium or long distances) and psychological wellbeing (95 (85.5%) considered this somewhat or very important). Only 22 (20.2%) reported receiving any relevant information or training within the previous year. Overall expectations for functional outcomes were high, however greater communication between surgeons and GPs may improve GP information.

CPD available online at www.imj.ie and questions on page 255.

Introduction

The number of total knee arthroplasty (TKA) procedures performed has shown a steady increase in recent years in countries maintaining national joint registry data.[1-3] This is likely due to aging populations with greater functional demands.[4] Although the absence of an effective national joint registry in Ireland does not allow direct comparison, anecdotal evidence is suggestive of a consistent pattern here.[5] Modern era patients have high expectations of functional outcomes and perioperative experience and recent literature includes several studies assessing patients' expectations regarding TKA and patient satisfaction with outcomes postoperatively. Despite technical advances, only 81-89% of patients are satisfied with the final result in TKA.[6-8] Many authors focus on the impact of patients' preoperative expectations on their satisfaction with the final outcomes and a correlation between fulfillment of expectations and patient satisfaction has been demonstrated (though not in all published studies).[8-15] Some of the published literature has focused mainly on evaluating the expectations of orthopaedic surgeons for their patients undergoing total knee arthroplasty and on the relative concordance or discordance between the surgeons' expectations and those of the patients. In general, these studies have not shown surgeons' expectations or satisfaction with outcomes to accurately reflect the patient's satisfaction postoperatively.[16-21]

In Ireland, the majority of patients access orthopaedic surgeons via referral from their general practitioner (GP). As the patient's GP is the first and most frequent point of contact with health services for most people, it is likely that he or she may have some influence on the patient's perception and expectations surrounding knee arthroplasty. Therefore the GP's own understanding and expectations for the patient are directly relevant. However, at the time of writing, there are no published studies directly evaluating either GPs' expectations or their influence on patient expectations. In this study we aimed to partially address this deficit by evaluating GPs' expectations of their patients' perioperative experience and return to function following elective total knee arthroplasty procedures.

Methods

A 57-item questionnaire was developed to include some basic demographic data (without identifying information), a series of questions regarding GPs' expectations for their patients' experiences and outcomes and a small number of questions regarding GPs' knowledge and sources of information on TKA. A number of questions pertaining to expectations regarding pain, physical function and psychological wellbeing were identical to those used in the Hospital for Special Surgery (HSS) Knee Replacement Expectations Survey.[22] This is a 17-item self-administered survey that has been validated for use in patients undergoing total knee arthroplasty and these questions were chosen as they are frequently used to evaluate patients' expectations when undergoing TKA. A total of 350 questionnaires were mailed with a very brief covering note and an included prepaid return envelope to GPs in each of the four Irish provinces. Standard mail was chosen as the medium based on consultation with a representative of the Irish College of General Practitioners (ICGP) who advised that they generally receive a higher response rate from their members when using standard mail compared to email or internet-based surveys.

Results

A total of 111 completed questionnaires were returned, giving a response rate of 31.7%. Six respondents (5.4%) did not complete the demographic questions, however as their questionnaires were otherwise completed in full their responses to the remaining questions were included in the analysis.

GP Demographics

A majority of respondents (71 (67.6%)) were male and most (85 (79.5%)) had been in practice for 15 years or more. Only 10 (9%) respondents had been established in practice for 5 years or less. A small majority (56 (51.9%)) were based in a large town or city while the remainder worked in a practice in a small town or rural area. The size of the practices surveyed was variable.

Waiting times

Respondents had low expectations regarding waiting times for publicly funding patients, with the vast majority anticipating waiting times of 1-2 years (42 (37.8%)) or longer (52 (46.8%)) from the time of a routine referral until surgery. Most expected a considerably shorter waiting period for private patients, with 55 (49.5%) anticipating surgery within 3 months of a routine referral and 41 (36.9%) within a 4 to 6 month period.

Functional outcomes

Overall expectations for patients' functional and psychological outcomes were high, in particular regarding pain relief, ability to walk and effect on psychological well-being. 109 (98.2%) of GPs rated pain relief as a very important or somewhat important outcome with 108 (97.3%) expecting patients to obtain relief from most or all pain compared to their pre-operative condition. Improvements in knee stability, knee mobility and ability to perform activities of daily living were also regarded as important while improvements in the ability to squat, kneel or run were regarded as less important. A large proportion of respondents reported an improvement in psychological well-being following knee replacement as very important (77 (69.1%)) or somewhat important (29 (26.4%) outcome. The responses to the questions regarding functional outcome are summarised in figure 1.

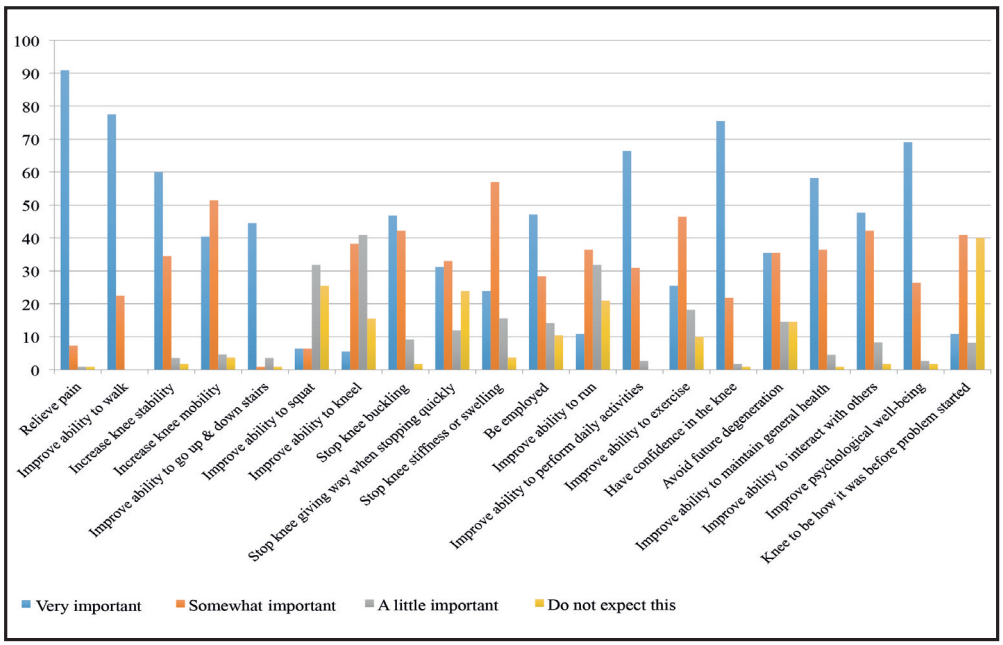

Figure 1 GP expectations regarding functional outcomes for patients undergoing elective TKA (numbers expressed as percentages)

Perioperative and postoperative experience
Most GPs surveyed anticipated a hospital stay of 3-4 days (46 (41.4%)) or 5-6 days (47 (42.3%)) with only a minority expecting a shorter (5 (4.5%)) or longer (13 (11.7%)) period of hospitalisation for a routine elective TKA procedure. 24 (22.1%) would expect their patient to have a general anaesthetic, 65 (58.7%) a spinal anaesthetic and 21 (19.3%) didn't know what type of anaesthetic was likely to be used. A majority of GPs (60 (54.2%)) did not expect their patients to be able to fully weight bear until 4 or more days post-operatively while most thought that patients should be able to drive again at 1-2 months (43 (38.5%)) or 2-3 months (42 (37.6%)) after knee replacement. Expectations regarding time before returning to work were more variable. Most (70 (69.2%)) reported an appropriate level of involvement with the orthopaedic service post-operatively. However 33 respondents (29.9%) felt that more involvement post-operatively was desirable while 1 (0.9%) would prefer less post-operative involvement with the orthopaedic services. Desired information in the post-operative discharge letter included details of the planned follow-up (55.6%), post-operative anticoagulation instructions (33.7%), any peri-operative complications (48.5%) and the appropriate time for suture removal (44.8%). Only 6 respondents (5.4%) were interested in details of the procedure itself.

Table 1: GPs' perceptions of the risks associated with total knee replacement

Risk of death during or after TKA	<0.5%	05-1%	1-2%	3-5%	>5%
	44.4%	32.4%	19.4%	2.8%	0.9%
Risk of wound infection	<0.5%	05-1%	1-2%	3-5%	>5%
	3.7%	26.6%	37.6%	19.3%	12.8%
Risk of DVT after TKA	<0.5%	05-1%	1-2%	3-5%	>5%
	7.3%	17.4%	28.4%	33.9%	12.8%
Risk of dislocation after TKA	<0.5%	05-1%	1-2%	3-5%	>5%
	23.9%	30.3%	29.4%	13.8%	2.8%

Risks and complications
A majority of 91 (82.4%) respondents thought that patients were adequately informed pre-operatively of the risks associated with knee replacement surgery. The GPs own perceptions of these risks are summarised in Table 1.

GP information and education regarding knee arthroplasty
22 (20.2%) reported receiving information or training in relation to TKA during the past year while the remaining 89 respondents (79.8%) said they had received no information during the previous year. Sources of information were primarily orthopaedic surgeons and courses or training days, with 54% regarding orthopaedic surgeons as the source of the most relevant information.

Discussion

To our knowledge, this study is the first to evaluate the expectations of general practitioners for patients undergoing elective TKA and it produces several interesting findings. A large majority of GPs surveyed had high expectations for patient outcomes, particularly in relation to obtaining relief from pain, improving ability to walk and improving ability to perform activities of daily living (ADLs). This is a largely unsurprising finding, given the nature of the procedure involved. However, a large number (106 (95.5%)) also ranked an improvement in psychological wellbeing as an important or somewhat important expectation following TKA. This is perhaps a factor which many orthopaedic surgeons do not routinely consider when evaluating patients for a prospective TKA.

Patient satisfaction with outcomes following surgical interventions is gaining greater attention in recent times, particularly with advent of frequent use of patient reported outcome measures (PROMs). A recent cross-sectional study in Ontario found that 19% of patients undergoing total knee arthroplasty were not satisfied with the outcome at one year post-operatively and the strongest predictors of dissatisfaction after primary knee arthroplasty were a failure to meet pre-operative expectations, a low 1-year WOMAC (Western Ontario and McMaster University Arthritis Index) score, preoperative pain at rest and a post-operative complication requiring hospital readmission.[23] This is consistent with other studies showing satisfaction rates of 81-89%.[6-8] Many GPs have a longstanding relationship with their patients both before and after TKA, and thus are in a unique position to modify or influence patient expectations. Therefore the GP's own knowledge and expectations regarding the process (including factors such as the likely recovery period and limitations post-operatively) are important in ensuring that patient expectations pre-operatively are realistic and well-informed. In this study, GP expectations regarding the logistics of perioperative care including duration of surgery and expected length of hospital stay were largely consistent with usual practice, however knowledge of factors such as the time to post-operative weight bearing were very variable. Clearly the orthopaedic services also have a major role to play in this respect, however it is likely that optimal management of patient expectations and education is attained when both the patient's GP and orthopaedic surgeon are consistent in the type of information given. To this end, good communication and engagement between orthopaedic and primary care services is vital to maximise patient care and satisfaction. Areas of communication which were particularly important to GPs in this study were items normally included in hospital discharge letters such as information regarding planned follow-up with the orthopaedic team and details of any peri-operative complications. However, it is also important for surgeons to ensure adequate pre-operative communication with the patient's GP so that he/she is well briefed regarding the plan for his/her patient.

It is noteworthy that approximately one fifth of respondents did not feel that patients were adequately informed of the risks pre-operatively. This suggests that there may be significant scope for better counselling regarding risks and complications of surgery. While this is primarily the responsibility of the operating surgeon, adequate communication with GPs can help reinforce this information. Given the increasing number of patients undergoing TKA, most general practices would encounter many patients both pre- and post-operatively. It is a particular concern therefore that in this study only 22 (20.2%) of the respondents reported receiving any information regarding TKA within the previous year. Of those who had received information, the source of most relevant information was an orthopaedic surgeon (as reported by 54%), although the internet and courses or training days were also contributory. This is suggestive of a potential benefit to be gained by greater engagement and collaboration between orthopaedic surgeons and general practitioners, particularly in relation to ongoing training and provision of up to date information. We would suggest that further research to evaluate the extent of the GP's influence on expectations of patients undergoing arthoplasty procedures may be beneficial. There is currently a dearth of published evidence in this area despite being a major part of managing patient expectations appropriately.

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Pattern of Change in Renal Function Following Radical Nephrectomy for Renal Cell Carcinoma

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Abstract
Radical nephrectomy (RN) is an independent risk factor for the development of chronic kidney disease (CKD) in those with renal cell carcinoma (RCC). We aimed to examine the pattern of change in post-operative renal function in patients who underwent RN for RCC over a 3 year period at our institution. We performed a retrospective review of histological and biochemical findings in patients undergoing RN for RCC over a 38 month period. Estimated glomerular filtration rate (eGFR) was recorded pre- and post-operatively and at follow-up. We analysed data on 131 patients (median follow-up 24 months). The proportion of patients with advanced CKD increased significantly at follow-up with 48 (85.7%) patients, classified as having stage 2 CKD pre-operatively, being re-classified as stage 3-5. Mean eGFR was significantly lower pre-operatively (76.6 mL/min/1.73 m2) compared to hospital discharge (61 mL/min/1.73 m2, p<0.001) and follow-up (55.5 mL/min/1.73 m2, p<0.001). Those with pT1 tumours sustained a significantly greater decline in eGFR compared to other stages. In conclusion, patients with pT1a and pT1b tumours sustain a disproportionate decline in renal function and may benefit the most from NSS.

Introduction

Renal cell carcinoma (RCC) is the 7th most common cancer diagnosed in Ireland and is the 10th most common cause of solid-organ cancer death[1]. Recent reports have identified an average of 341 new cases each year in Ireland. Rates of diagnosis have been steadily rising over the last decade due to increased use of abdominal radiological imaging and incidental "pick-ups", with a rise of 3.0-3.5% per annum being recorded annually[2]. The most significant increase has been noted in T1 (TNM classification system, AJCC, 2010) disease, which accounted for 5% of all cases in 1994-1998, but now accounts for 37% of new diagnoses[2]. This trend is mirrored internationally with renal tumour size at presentation steadily and consistently decreasing[3]. T1 disease is associated with a 5 year survival of 81%, as compared to 53% and 8% for T3 and T4 disease respectively, suggesting that the increased detection of smaller renal masses could lead to an overall reduction in mortality for RCC[4]. When organ-confined (T1-T2), RCC is treated with curative intent, traditionally with radical nephrectomy (RN). Nephron sparing surgery (NSS) has now emerged as the preferential operative treatment for small renal masses (T1a) in appropriate cases[5]. In patients with metastatic disease, cytoreductive RN has a role in reducing disease burden when used in conjunction with systemic therapy[6].

The majority of RCC diagnoses occur in the 6th and 7th decades of life[7,8]. Given the higher incidence of risk factors for chronic kidney disease (CKD) in this age group, such as hypertension, diabetes mellitus and cardiovascular disease, there is just concern about the impact of RN on renal function. CKD is associated with a significant burden of morbidity and mortality[9]. This burden increases incrementally with reducing

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estimated glomerular filtration rate (eGFR)[10]. Both declining eGFR and microalbuminuria have been reported as independent determinants of cardiovascular outcome in those with CKD. Given that RN – itself an independent risk factor for the development of CKD – essentially only impacts on the eGFR, progression of post-operative CKD may be slower in these individuals than in those with CKD due to medical causes[11-13]. Of concern, however, is that patients with small tumours may be more likely to develop new-onset CKD following RN and appear to have proportionately worse outcomes in this regard than those with more advanced tumours[14,15]. The advent of NSS in selected patients reduces the incidence of post-operative CKD[15]. However, its routine use is still controversial for those with tumours greater than 4cm in size or in those in whom the location of the tumour makes NSS technically difficult[5,16-18]. There have been relatively few studies examining the pattern and magnitude of decline in renal function following RN across the full spectrum of patients undergoing RN. Furthermore, understanding the likely patterns of change in renal function following RN will help determine the schedule and type of surveillance required for patients. We aimed to examine the pattern of change in post-operative renal function in patients who underwent RN for RCC over a 3 year period at our institution, with specific reference to tumour size and stage.

Methods

A comprehensive, retrospective review of histological findings and biochemical profiles was undertaken for all patients undergoing RN for RCC at our institution, a tertiary referral centre, over a 38 month period from January 2009 to March 2012. This population included a very small proportion of patients whose surgery was performed with cytoreductive rather than curative intent. However, it excluded patients with transitional cell carcinoma and those undergoing NSS. The decision to perform RN rather than NSS in patients with small renal masses was based on patient characteristics, tumour characteristics (e.g. location) and surgeon's preference. The study population included those undergoing both open and laparoscopic RN. Basic patient demographics at the time of surgery were identified including age and gender. Histological findings recorded for all specimens included side, size, TNM stage and Fuhrman grade. Biochemical profiles of all patients were examined for patterns of change over time. Specifically, we recorded serum creatinine at several key time points: pre-operatively, at the time of hospital discharge post-operatively, and at most recent follow-up. GFR was estimated using the Modified Diet in Renal Disease (MDRD) formula, taking account of gender and ethnicity. Chronic kidney disease was defined based on the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF-KDOQI) from stage 0 (eGFR>90 mL/min/1.73 m2, no disease) to stage 5 (eGFR < 15 mL/min/1.73 m2, established renal failure). Data recording and statistical analysis were accomplished using a standard statistical software package (SPSS version 18.0).

Results

Clinicopathological characteristics

We examined follow-up data for 131 RN carried out over a 38 month period. The median follow-up of biochemical data was 24 months (0-58 months). The median age at surgery was 64 years (30-84 years). There was a modest male preponderance in the population and right sided tumours were more common than left (see Table 1). Most tumours were histologically T1 (T1a 39 tumours [29.8%], T1b 24 tumours [18.3%]) or T3 (T3a 39 tumours [29.8%], T3b 8 tumours [6.1%], T3c 2 tumours [1.5%]). Only 2 patients (1.5%) had T4 tumours. Over half of all tumours were Fuhrman grade 2 (75 specimens [57.3%]) while grade 1 and grade 4 disease were least common. Four tumours (3.1%) were appropriately not subject to the Fuhrman grading system.

CKD following RN

Pre-operatively, 42 patients (32.1%) had no biochemical evidence of CKD, while 57 (43.5%) had mild (stage 1 and stage 2) CKD, and 32 (24.4%) had stage 3 CKD. There was a significant increase in the advanced stages of CKD at follow-up. In the group with no CKD pre-operatively (n=42), only 4 (9.5%) continued to meet the biochemical criteria for stage 0 CKD at follow-up, 26 (61.9%) had stage 2 CKD, and 12 (28.6%) had stage 3 CKD. At follow-up, 5 patients with stage 3 CKD pre-operatively sustained a sufficient deterioration in renal function to be re-classified as stage 4 CKD (4 patients) or stage 5 CKD (1 patient). Similar trends were observed across the cohort with 43 (76.8%) of those with stage 2 CKD pre-operatively being re-classified as having stage 3 CKD at follow-up (Figure 1).

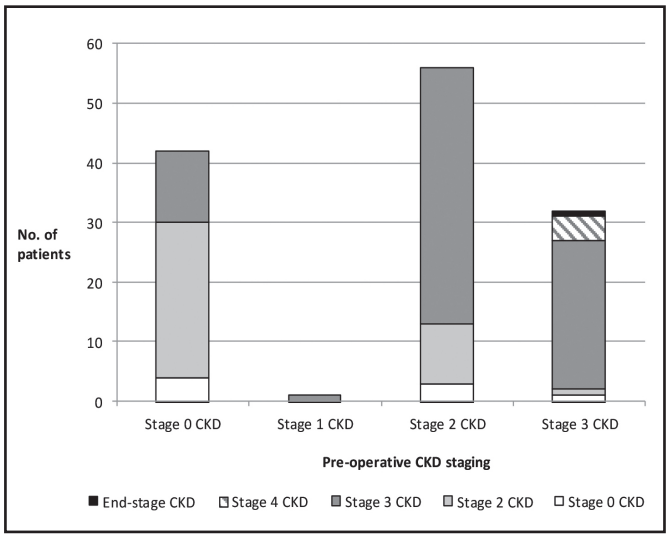

Figure 1 Outcome of patients following radical nephrectomy regarding progression of CKD at follow-up

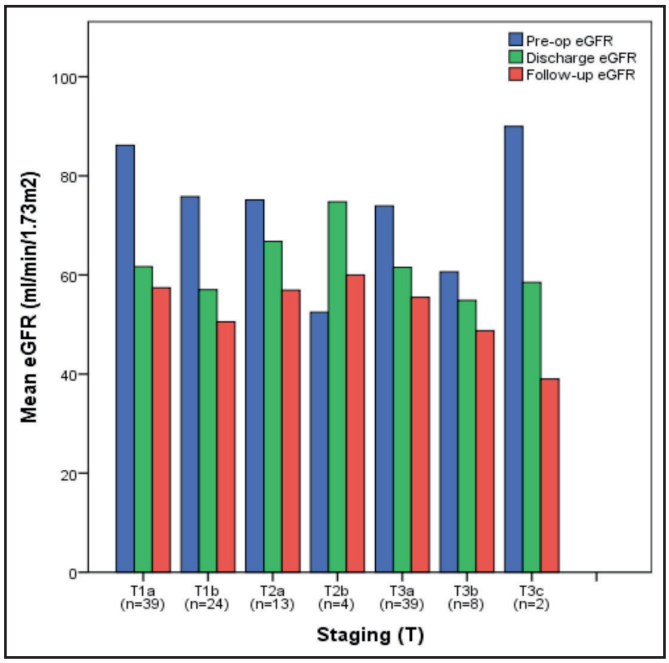

Figure 2 Mean eGFR by tumour stage (T-stage)

Tumour stage and renal function

For the population as a whole (n=131), compared to pre-operatively, there was a significant decline in mean eGFR both at hospital discharge (76.6 mL/min/1.73 m2 vs. 61 mL/min/1.73 m2, p<0.001) and at follow-up (76.6 mL/min/1.73 m2 vs. 55.5 mL/min/1.73 m2, p<0.001). Patients with pT1a tumours had significantly higher mean baseline pre-operative eGFR compared to those with pT2b (p<0.001), pT3a (p=0.004) and pT3b tumours (p<0.001). Similar trends of decline in eGFR were observed for all tumour stages except those with pT2b tumours (Figure 2). The magnitude of decline was highest in those with

T1a (n=39), and T1b (n=24) tumours relative to other stages (Figure 3). In particular, eGFR decline in those with T1a tumours was significantly greater than that seen in patients with T2a (p=0.026), T2b (p<0.001), T3a (p=0.009), and T3b (p=0.002), but was similar to that seen those with T1b tumours (p=0.411, see figure 3). There was a weak negative correlation between tumour size and both pre-operative eGFR (R=-0.227, p=0.009) and the magnitude of decline in eGFR seen at follow-up (R=-0.36, p<0.001).

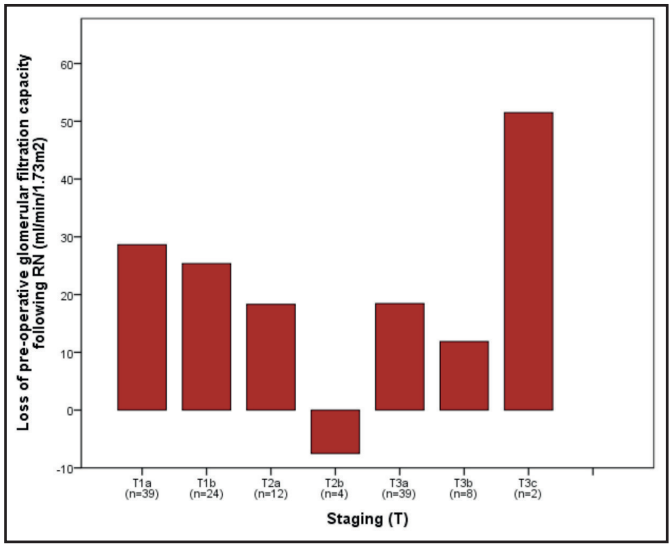

Figure 3 Measured decline in eGFR by tumour stage

Discussion

To our knowledge, this is the largest such national series examining the renal profiles of patients undergoing RN for RCC. Many studies have examined the prognostic value of pre- and post-operative renal function for RCC. There is consensus agreement that NSS leads to a less sustained decline in renal function post operatively than RN for patients with small localised renal tumours[5,19], which is in turn associated with a reduced risk of cardiovascular events and increased mortality[15]. Determining which cohort of patients with RCC will benefit most from NSS in terms of renal function, without compromising oncological outcomes, is imperative. Present guidelines recommend NSS as the treatment of choice for small renal masses (T1a, <4cm in size), those with an affected solitary functioning kidney and those with bilateral RCC[5]. It is also relatively indicated in those in whom the contralateral kidney is poorly functioning or threatened by a disease process likely to lead to diminished function such as diabetes mellitus or hypertension or nephrolithiasis, as well as those with hereditary forms of RCC (e.g. Von Hippel Lindau gene)[16,20]. RN is still the most commonly performed surgical procedure of choice in those with tumours larger than 4cm and a normally functioning contralateral kidney[5]. The role of RN in the treatment of RCC has been somewhat bolstered by recent level 1 evidence demonstrating that, despite improved nephrological outcomes, nephron sparing surgery did not result in improved overall 10 year survival in a cohort of patients with small (< 5cm) tumours[21]. It is widely acknowledged that further prospective studies are needed to examine morbidity outcomes and give greater context to this evidence.

Our findings suggest that, at follow-up, nadir eGFR is similar for patients with different tumour sizes. However, patients with T1a tumours suffer a proportionately greater decline in mean eGFR compared to those with tumours >7cm in size (Stage T2a and greater). The disproportionate effects of RN on loss of renal function in those with T1a and T1b tumours demonstrated in our study suggests that this sub-group of patients will benefit the most from NSS. Tumour size was noted to be inversely proportional to the magnitude of decline in eGFR observed. We hypothesize that larger tumours cause a greater destruction of normally functioning parenchyma resulting in a lower eGFR at presentation. Our study is limited by its retrospective nature, the relatively short period of follow-up, and the absence of data regarding the prevalence of pertinent medical co-morbidities such as diabetes mellitus and hypertension. Comparison of oncological and renal biochemical outcomes in our population with those of a population undergoing NSS is warranted and we are now doing NSS where possible for small renal masses, even with a normal contralateral kidney. We intend to study this prospectively in the future, with particular regard to clinical and biochemical risk factors for progression of CKD, such as microalbuminuria.

In summary, a substantial proportion of patients with stage 2 CKD pre-operatively were reclassified as having stage 3 CKD following RN, at which stage the effects of CKD become clinically significant in those with risk factors for renal disease progression. While patients with RCC collectively sustain a decline in eGFR following RN, those with T1a and T1b tumours appear to be disproportionately affected and stand to derive the most benefit from NSS, given the recognition of its oncological equivalence to RN at this disease stage.

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Evolution of Carotid Surgical Practice in the last Decade

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Abstract
Stroke units provide immediate care and appropriate intervention in the evolving stroke. The aims of this study were to review the practice of carotid endarterectomy (CEA) before and after the establishment of a Stroke Unit in St. James's Hospital. Prior to the introduction of the Stroke Unit, 263 CEA's were performed over a five-year period. 139/263 (53%) of these were for symptomatic disease. 229 were performed in the five years since. 179/229 (78%) of these were for symptomatic disease. The 30-day stroke and death rates were <2% before the introduction of the Stroke Unit, and have remained unchanged. Since the introduction of the Stroke Unit, there has been a slight decrease in the overall number of CEA's performed with a 25% increase in the proportion of endarterectomies performed for symptomatic disease. Despite the reduction in surgery for asymptomatic disease the overall 30-day stroke and death rate remains excellent at 2/229 (2%).

Introduction

Dublin has a high incidence of stroke compared to other European cities. Over a one-year period, 701 patients were diagnosed with new strokes or transient ischaemic attacks (TIAs) in a North Dublin population. At 28 days, 40% of patients with ischaemic strokes had not regained independence and 16% had died[1]. The healthcare costs of stroke are high, and continue to increase as the number of patients with newly diagnosed strokes and the numbers of stroke survivors escalate worldwide[2]. Internal carotid artery stenosis is responsible for approximately 19% of acute ischaemic strokes in men and a further 8% in women[3]. The symptomatic carotid trials demonstrate a six to ten-fold reduction in long-term risk of stroke in symptomatic patients with >70% ipsilateral stenosis treated with carotid endarterectomy (CEA) and best medical therapy (BMT) compared to those treated with BMT alone[4-6]. In the NASCET trial, the number of CEA's required to prevent one stroke (the number needed to treat, NNT) was five[5]. After analysis of these trials, Rothwell has demonstrated that carotid endarterectomy (CEA) was of marginal benefit in symptomatic patients with a 50–69% stenosis[7] and that ideally, patients should undergo carotid endarterectomy within two weeks of symptoms[8]. Carotid endarterectomy for asymptomatic patients remains controversial. Two randomised controlled trials have shown a reduction in the risk of ipsilateral ischemic stroke from 2% per year with best medical therapy (BMT) to 1% with CEA and BMT in patients with high-grade stenoses[9,10]. In ACST, the number of CEA's required to prevent one stroke was nineteen[10].

Since the publication of these trials, BMT has improved, leading to a reduction in the average annual rate of ipsilateral ischaemic stroke in asymptomatic patients with high-grade carotid stenoses to just 0.34%. In this paper, Rothwell and his colleagues defined BMT as antiplatelet agents (aspirin plus/ minus clopidogrel for 30 days, followed by aspirin plus dipyridamole for the long-term), simvastatin 40mg/day, antihypertensive agents (to keep blood pressure below the target 130/80mmHg), glycaemic control and smoking cessation[11]. This improvement in BMT has certainly been reflected by a change in surgical practice in Europe, with Ross Naylor's unit in Leicester reporting an asymptomatic carotid endarterectomy rate of just 14% from 1995 to 2012[12]. This change, however, has not been instituted worldwide. In a recently published American study from 2000-2009 involving more than 220,000 patients who underwent carotid endarterectomy, more than 90% of patients had surgery for asymptomatic disease[13]. Many trials have been conducted to evaluate the safety of carotid stenting. Although the most recent randomised controlled trial (CREST 2010)[14] showed no significant difference between the stenting and CEA arms in terms of a primary composite end-point of peri-procedural stroke, myocardial infarction or death, the peri-procedural stroke rate was lower in the CEA group. The ESVS guidelines (2009)[15] advocate that stenting should be performed in high volume centres or inside a randomised controlled trial. In our centre, all carotid interventions are performed by conventional endarterectomy.

A stroke unit consists of a hospital ward that exclusively takes care of stroke patients and is staffed by a specialist multidisciplinary team. A stroke unit should have constant access to a stroke specialist, as well as imaging and thrombolysis facilities. As well as acute care, access to rehabilitation facilities is often required[16]. Stroke patients who receive organised inpatient care in a stroke unit are more likely to be alive, independent, and living at home one year after the stroke[17]. Since the introduction of the Stroke Unit in St James's Hospital, there is a weekly multidisciplinary meeting (MDMT) involving the Stroke and Vascular services. All patients under consideration for CEA are discussed at this meeting, and a treatment plan for each patient is decided by a consensus based decision-making process involving the full team. The aim of this study was to review CEA practice over the five-year period since the Stroke Unit was established and to compare results to the five-year period prior to this.

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Methods

Data was collected from a prospectively maintained vascular database. Patient demographics including indications for surgery, number of symptomatic/asymptomatic patients, the degree of carotid stenosis (based on carotid duplex in first instance, and a small cohort having imaging with computed tomography of the carotids), the number of patients who had surgery following thrombolysis and 30-day outcomes including mortality, stroke and cranial nerve injury rates were analysed. We also looked at the time interval from onset of symptoms to surgery in two separate sub-groups of patients (2004 and 2013). SPSS was used for all analyses. Findings with p values less than 0.05 were deemed statistically significant.

Table 1: Demographics & Mode of Presentation

	Stroke Unit Era (Nov 08 – Nov 13)	Pre-Stroke Unit Era (Nov 03 –Oct 08)	p value
Number of CEA's	229	263	
Male: Female Ratio	168:61(73% Male)	191:72 (73% Male)	
Number of patients <65yrs	69	83	
Number of patients >80yrs	28 (2/28; (7% asymptomatic)	25 (6/25; 24% asymptomatic)	
Number of asymptomatic patients	50/229 (22%)	124/263 (47%)	p<0.0001
Number of symptomatic patients	179/229 (78%)	139/263 (53%)	p<0.0001
Number of symptomatic patients with 50-69% stenosis	42/179 (23%)	25/139 (18%)	p=0.27

Table 2: Complications

	Stroke Unit Era (Nov 08- Nov 13)	Pre Stroke Unit Era (Nov 03 –Oct 08)	p value
Mortality Rate >80yrs	3/229 (1.3%) 0% (0/28)	1/263 (<1%) 0% (0/28)	0.24
Stroke Rate >80yrs	2/229 (<1%) 1/28 (0.04%)	5/263 (1.9%) 1/25 (0.04%)	0.36
Number of Cranial Nerve Injuries	4 (1.75%)	8/263 (3%)	0.22
Number of Myocardial Infarctions	2/229 (<1%)	2/263 (<1%)	0.33

Results

Over a ten year period from 2003 to 2013, 492 carotid endarterectomies were performed within the department. Patient demographics have remained unchanged over this time. 229 of these CEA's (47%) were performed since the introduction of the Stroke Unit. The reason for this slight reduction of the overall number is that fewer endarterectomies have been performed in the past five years for asymptomatic disease. In the pre Stroke Unit era, 47% of endarterectomies (124/263) were for asymptomatic disease and this has dropped to 22% (50/229) since the introduction of the Stroke/Vascular MDTM (p<0.001). The number of patients having a carotid endarterectomy for symptomatic disease has increased from 53% (139/263) to 78% (179/229). The number of symptomatic patients with moderate grade stenosis (50-69%) has also increased, from 18% (25/139) to 23% (42/179). In terms of the age demographic, during the Stroke Unit era the number of patients who underwent carotid endarterectomies over the age of 80 was 28/229 (12%) compared to 25/263 (9.5%) in the pre Stroke Unit era. Between 2008-2013, 2/28 (7%) of CEA's performed on the 'over 80's' were for asymptomatic disease, which had fallen from 6/25 (24%) during the period 2003-2008.

There has been a reduction in the average number of days between onset of symptoms and procedure date for patients with symptomatic disease. For the period January- December 2004, 59 patients had surgery. 29 patients were symptomatic and the mean number of days between symptom onset and surgery was 65 days. In comparison, 52 patients had surgery in the calendar year October 2012- October 2013. 42 were performed for symptomatic disease and the mean number of days between symptom onset and surgery was 20 days. The percentage of patients operated on in less than two weeks has increased significantly from 10.34% (3/29) in 2004 to 67% (31/46) in 2013 (p<0.0001). From October 2012 to October 2013, 374 stroke patients were admitted. 40 patients were thrombolysed (11%). Just one patient in this thrombolysis cohort proceeded to carotid endarterectomy (2.5%). For this patient, the time interval between thrombolysis to surgery was a total of 12 days.

In terms of complications, over the ten-year period, our rates of death, stroke, cranial nerve injury and myocardial infarction have remained low, at less than 1% each. There have been no significant differences in mortality rates (p=0.24) or stroke rate (p=0.36), cranial nerve injury (p= 0.22), and myocardial infarction (p=0.33) in the last five years, despite the majority of patients being operated upon for symptomatic disease. For the cohort of patients operated on over the age of 80 years there is a similar distribution- a stroke rate of less than 1% and a mortality rate of 0% in both time periods.

Table 3: Time interval between onset of symptoms and surgery date

	Jan 04 – Dec 04	Oct 12 – Oct 13
Total number of carotid endarterectomies performed in the time frame	59 patients	52 patients
Number of symptomatic patients operated on	29 patients	46 patients
Mean number of days between onset of symptoms and operative date	65 days	20 days
% operated on in <2 weeks	10.34% (3 patients)	67% (31 patients)

Discussion

In the last five years, there has been a slight decrease in the number of carotid endarterectomies performed when compared to the previous five years, with a 25% increase in the proportion of endarterectomies performed for symptomatic disease. This has coincided with the introduction of dedicated stroke physicians to our hospital, the development of a Stroke Unit, and regular multidisciplinary team meetings. As a consequence of the results of the symptomatic trials[4-6], major National and International Guidelines all concur that operative treatment of (moderate to) high grade symptomatic carotid disease is indicated[16- 20]. Fewer carotid endarterectomies have been performed in the past five years for asymptomatic disease in our unit. Although the asymptomatic trials[9,10] showed that CEA halved the net five-year stroke risk in patients with 60% stenosis or higher, this resulted in a reduction of average annual stroke risk from 2% to 1%. Since then, BMT has also improved. In 2010, Rothwell's group[11] showed that the average annual rate of any ipsilateral ischaemic stroke in asymptomatic patients with a >70% asymptomatic internal carotid artery stenosis on best medical therapy was just 0.34%. Results of the SPACE-2 three-arm randomised controlled trial[21] comparing outcomes of asymptomatic patients treated with BMT, stenting or surgery are eagerly awaited, and will hopefully guide future practice in this area. Naylor et al. suggested in 2008 that the optimal time to operate on symptomatic patients is two weeks after the onset of symptoms [22]. Our practice has changed significantly in the last five years coinciding with the introduction of the Stroke/Vascular MDTM and the Stroke Unit. Our goal now is to operate on all patients during their index admission and within two weeks of onset of symptoms. Our analysis of the calendar year October 2012 – October 2013, when 67% were operated on within the two-week time frame, reflects this initiative and shows significant improvement when compared to the period January 2004- December 2004, where only 10.34% of patients were operated on in the two-week time frame. This improvement has been driven by the stroke service and the multidisciplinary

team meeting, which aim to identify patients fitting criteria for CEA, so their surgery can be facilitated as quickly as possible.

A 21-year audit of carotid endarterectomy conducted in Leicester[12] quoted a 30-day stroke/ death rate of 1% (6/599) since January 2008. Since November 2008, there have been three deaths (1.3%) and two strokes (<1%) recorded among 229 patients in our unit. The CREST trial has reported a peri-procedural myocardial infarction rate of 2.3% and a cranial injury rate of 4.7% for their 1250 carotid endarterectomy patients[14]. Our results compare favourably with these. This is further encouraged by the fact that we continue to operate of those patients over 80 years of age, for mainly symptomatic disease, where our stroke rate and mortality rate are in keeping with other age cohorts.
The role of carotid stenting remains controversial. Although a meta-analysis of three European randomised controlled trials has favoured carotid endarterectomy over stenting[23], the CREST trial has shown similar rates of primary composite outcome (stroke, myocardial infarction and death) between the surgery and stented groups[14]. The most recently published European Guidelines for invasive treatments of carotid stenosis continue to recommend surgery in favour of stenting[24].

In conclusion, since the introduction of a Stroke/Vascular MDTM and a Stroke Unit in St James's Hospital, there has been a 25% increase in the proportion of carotid endarterectomies performed for symptomatic disease and a major reduction in the time interval from symptoms to surgery. Despite the majority of patients being operated upon for symptomatic disease, there has not been a significant rise in major complications.

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Trauma Training and Workload: A National Survey

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Abstract
Trauma is a major source of mortality and morbidity throughout Ireland. Training in trauma is dependant on experience gained by trainees within specific posts. Trauma services are a topical issue at present with much discussion about delivery and restructuring. With this in mind we conducted an online survey of trainees in emergency medicine, orthopaedic and general surgery to assess current experience and opinions with regard to trauma. The survey was vetted and distributed by the relevant training bodies. 59(98.33%) respondents believed smaller units should be bypassed for major trauma and 55(91.67%) believed that larger hospitals receiving major trauma should have a trauma theatre available 24-hours a day. 55(91.67%) also foresaw themselves covering major trauma as consultants, consequently these trainees will be the consultants developing, moulding and working in this restructured trauma service.

Introduction

Injuries from trauma remain the biggest cause of mortality in people under 45 years of age[1,2] both in Ireland and worldwide. In the hospital setting trauma is managed by multiple specialties depending on the nature and severity of the injuries; including emergency medicine, general surgery, orthopaedics, anaesthetics, neurosurgery, plastic and cardiothoracic surgery. Taking road traffic accidents (RTAs) as an example of one of the major sources of trauma in Ireland we have seen a 44% reduction in fatalities between 2007 and 2013[3]. However, the World Health Organisation (WHO) is predicting an increase worldwide in the number of fatalities from RTAs in the future[4], implying a rise in the number of associated trauma patients. Trauma patients remain a major cause of mortality and morbidity, consuming large volumes of healthcare resources. With this in mind we surveyed non-consultant hospital doctors (NCHDs) currently in training in some of the core specialties providing trauma services in Ireland. The aim was to map current opinions on trauma training Irish hospitals and identify and elucidate trainees' aspirations to manage trauma in the future. For all trauma patients the first point of contact with trainees in the hospital setting is the emergency department. From here the bulk of referrals for admission are split between general surgery and orthopaedic surgery, with smaller volumes going to plastic, neuro and cardiothoracic surgery. Consequently, we chose to survey trainees in general and orthopaedic surgery and emergency medicine.

Methods

An online survey was emailed to all higher specialist trainees in general and orthopaedic surgery and emergency medicine, distributed through the three trainee representative bodies. There were 60 respondents; 16% (10) general surgery, 43% (26) orthopaedics and 40% (24) emergency medicine. This was a non-validated 10-item questionnaire via http://surveymonkey.com that was vetted prior to distribution by the head of each training body.

Results

There was a broad range of responses to the subjective assessment of the burden of trauma on trainees, from under 10% up to 75%, as outlined in Table 1. When asked about referral patterns for specific complex trauma there was a small deficit in trainees' knowledge regarding referring pelvic trauma (6.67% of trainees unaware) thoracic aorta injuries (8.33% unaware) and fractures requiring plastic surgery input (10% unaware). Over 91.67% (n=55) of respondents foresaw themselves covering polytrauma as consultants. 5% (3) of respondents did not foresee themselves involved in these cases and 3.33% (2) were undecided; the most common reason cited was other subspecialty interest (4). Trauma teams composition varied widely with 76.67% (46) of respondents having experienced one. The mix of senior and junior staff is illustrated in Figure 1. When asked about complex polytrauma bypassing smaller units with limited specialties, 98.33% (59) of respondents agreed with it. The limitations of this survey prevented the definition of a "smaller units" but it might include units without an intensive care unit or limited access to radiology investigations e.g. MRI. Along with this, 91.67% (55) believe that the larger receiving hospital should have a dedicated trauma theatre available 24-hours a day. Trainees are entering specialties earlier and earlier narrowing their clnical experience, 80% (48) of those surveyed said they would favour 3-6 month rotations at Senior House Officer (SHO) or Specialist Registrar level (SpR) out of their chosen specialty in another trauma related specialty e.g. orthopaedic trainees rotating through plastic surgery.

Discussion

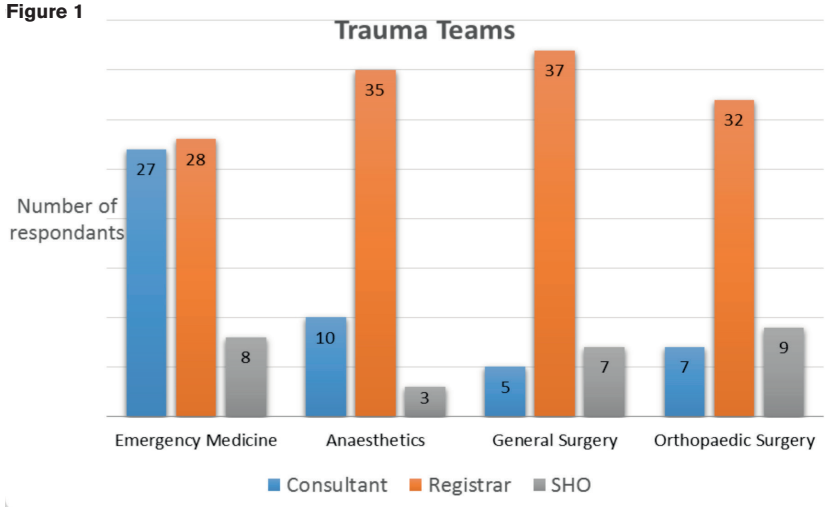
Given that trauma is unpredictable and can affect anyone, at any time, a natural variance in trauma load is to be expected. With appropriate distribution of resources and catchment areas, trauma workload for trainees should have limited variation. However, we observed variation from <10% up to 90% (Table 1). Implying trainees are experiencing different levels of exposure to trauma. The 10% of trainees whose patient workload is more than 75% trauma will consequently spend more time managing and learning about trauma whilst the 22% of respondents who have less than 10% of their patient load associated with trauma will be less likely to manage any significant complex polytrauma. Does this leave trainees' experience dependent upon the volume of complex trauma presenting to the emergency department while they are on duty? This leads to the potential corollary of limited training in the management, stabilisation and tertiary referral of these challenging cases. With rationalisation and shortening of surgical training there is further potential for decreased exposure.

European Working Time Directive (EWTD) restrictions to on-call service and decreased hours will require an increased focus on structured training and an attempt to increase trainees' experience of complex trauma. Given the relatively small catchment areas in Ireland, having specialist centres for spinal, pelvic and cardiothoracic trauma is the best distribution and utilisation of resources. It ensures adequate patient volumes for maintaining skills. It gives trainees experience of higher volumes of specific elements of trauma focused in tertiary referral centres. Depending on a trainee's experience they may or may not have referred to a specific tertiary centre during their training, as they may or may not have experienced trauma requiring such a referral. This was shown by the fact that 100% of those surveyed were aware of how to refer head and spinal injuries whilst 6% and 8% were unsure about less common pelvic and thoracic aorta injuries, respectively. Formal didactic training cannot replace experience but in the absence of encountering these complex cases, formal training on assessment and referral is essential for surgical and emergency medicine trainees to aid initial management, assessment and referral in a timely and appropriate fashion. With decreasing exposure as outlined above and increasing subspecialisation there is scope for consultants in the future managing complex trauma to find themselves out their depth. With trainees focusing on subspecialties earlier and earlier,

Table 1

Trauma as % of Patient Load	Responses %	(n)
<10%	22.03%	(13)
10-25%	27.12%	(16)
25-50%	18.64%	(11)
50-75%	20.34%	(12)
75-90%	10.17%	(6)
>90%	1.69%	(1)
Unable to answer	1.69%	(1)

Figure 1



we asked how many of them intended to cover trauma routinely as consultants, 92% (55) of respondants said they would forsee it. Of those surveyed, 5% (3) did not foresee themselves covering major trauma, while the remaining 3% (2) were undecided. A mix of reasons was cited, the majority stating that other subspecialty interest would prevent them covering trauma on call.

Trauma teams are designed to provide advanced simultaneous care from relevant specialties to patients presenting with complex polytrauma. Since 1985 it has been a topic occupying column inches in letters to editors and journal articles[5,6].

Many different suggestions regarding the optimal composition and co-ordination of trauma teams have been proposed. However, there is yet to be an established standard composition. When asked, 76.67% (46) of respondents had experienced a trauma team in their training. The composition of the teams is illustrated in Figure 1. The mix seen in the table reinforces that there is still no unifying formula for a trauma team. Anaesthetic and general surgical registrars are both present in over 80% of trauma teams. At SHO level, orthopaedics is most commonly represented but still only present in 21% (9) of trauma teams, possibly reflecting the decrease in experience being gained by trainees at this level as described earlier. This shows potential for engaging with SHOs to increase their trauma experience. By ensuring trainee SHOs in emergency medicine, general and orthopaedic surgery are part of a trauma team they will obtain vital experience of initial assessment, resuscitation and management of complex trauma patients. By designating specific trauma hospitals within the newly established hospital groups, complex polytrauma could bypass smaller hospitals with limited specialties. Trauma would then be concentrated in centres with appropriate specialties, facilities and resourcing. Ambulance dispatch, local triage teams and emergency departments would have discretion, supported by agreed management protocols, to decide which cases should bypass to the main trauma centre and which can be managed locally. It would give trainees rotating through the designated trauma centres exposure to higher volumes of trauma while complying to decreased working hours detailed above. With higher volumes, trauma teams could be properly established allowing efficient assessment, resuscitation and management of complex polytrauma requiring input from multiple specialties. This would also make efficient use of on-call 24-hour radiology and theatre resources. With higher throughput of complex trauma these hospitals would need to be allocated appropriate additional funding which fits with the Department of Health's drive towards a payment by results model i.e. money follows the patient[7]. Increasing trauma volumes in specific centres would increase demand on certain resources within the hospitals including designated trauma beds for admissions, radiology, theatre and allied health professionals.

In our survey 92% (55) of respondents supported a 24-hour dedicated trauma operating theatre. This resource would be available in designated centres managing all the complex polytrauma within each hospital working group. This would benefit all staff involved in operative management of trauma. Theatre nursing staff and anaesthetic trainees would see increased volumes and thus have increased exposure to complex cases requiring urgent surgical intervention. As stated earlier this would also benefit general and orthopaedic surgery trainees as they would experience higher volumes of complex trauma while rotating through dedicated centres. This could assist with maintaining EWTD compliant rosters as NCHDs are exposed to sufficient volumes without working more than 24 hours. It would also ensure that the increased volume of trauma cases would not impact on existing operating lists in larger trauma centres if smaller hospitals were bypassed.

Traditionally all surgical trainees and many emergency medicine trainees would complete 4 six month rotations in different specialties prior to entering a specialist higher training programme. These rotations allowed experience in diverse specialties dealing with different aspects of trauma for example plastic, neuro or vascular surgery. They could then bring this experience to their chosen specialty which would be an asset especially when dealing with a polytraumatised patient. For example general surgeons with neurosurgical experience would be comfortable monitoring minor head injuries. Plastic surgery experience would also be useful for all specialties who find themselves managing traumatic lacerations, be it on the face in the emergency department or wounds from open long bone fractures. The benefits of broader specialty experience during training cannot be over-estimated. As specialty training is recruiting doctors earlier in their career and implementing shorter training schemes there is little scope to gain this broader experience. When surveyed, 80% (48) of respondents believed there should be an option to rotate through other specialties as a trainee to gain this experience. For example emergency medicine trainees could rotate through neurosurgery to gain experience of head injuries and their management.

There are several steps outlined above which, if implemented, have the potential to facilitate increased efficiency in patient care while streamlining trauma services. Importantly, the insights gained by continually reviewing current practice within NCHD training ensures that the consultants of tomorrow are trained to significantly higher standards while remaining EWTD compliant.

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Postnatal MRI Brain in Infants Treated for Twin–Twin Transfusion Syndrome

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Abstract
Untreated twin-twin transfusion syndrome (TTTS) is associated with significant mortality and neurological impairment. Fetoscopic laser surgery (FLS) is the treatment of choice. We sought to assess intracranial abnormalities in TTTS twins following treatment. In this prospective, blinded study MRI scans were performed on 3 groups; (1) monochorionic diamniotic (MCDA) twins with TTTS who had undergone FLS (n=10), (2) MCDA twins without TTTS (n=8) and (3) dichorionic twins (n=8). Scans were scored as either normal or abnormal. The primary outcome was a composite of abnormal MRI brain or intrauterine fetal demise. The primary outcome occurred in 6/10 (60%) of the TTTS group versus 3/8 (37.5%) in the MCDA group. The primary outcome was significantly different across all study groups [p = 0.029; X^2 = 7.112]. We found that twins treated for TTTS are more likely to have abnormalities on MRI brain at term than other twin groups. This group merits term-corrected MRI as part of their postnatal assessment.

Introduction

Perinatal mortality and morbidity rates are higher in twins than in singleton infants[1]. Monochorionic twins account for the highest risk group[2] and have higher rates of preterm delivery, lower birth weight and neurodisability[3]. A 7-fold increase in neurologic morbidity has been reported in preterm monochorionic twins compared to matched dichorionic twins, the increase attributed to discordant birth weights and co-twin demise in utero[4]. Twin-twin transfusion syndrome (TTTS) affects monochorionic diamniotic (MCDA) pregnancies and represents a severe complication in 10 to 15% of these pregnancies[5]. Unbalanced, interfetal, transplacental blood flow across deep arterial to venous connections results in progressive reduction of amniotic fluid volume and impaired growth in the donor twin, with polyhydramnios and hydrops in the recipient twin[6]. The risk of in-utero demise of untreated twins is 80% to 100%[7] and carries significant risk of neurological impairment in surviving twins. Cerebral palsy rates of 20% in surviving twins have been reported, with the risk significantly higher in the setting of a co-twin demise[8]. Many treatments have been used including, selective fetocide and amniotic septostomy. Current treatment options favour serial amnio reduction and endoscopic laser ablation of the vascular anastomoses. These options have varying success rates, survival outcomes and neurodevelopmental results. Meta-analyses have shown superiority of fetoscopic surgery over other modalities[9,10]. A recent randomised control trial has also shown that fetoscopic laser surgery (FLS) has more favourable survival rates and a significantly reduced risk of neurodevelopmental impairment when compared to amnioreduction[11]. Despite these advances and improved outcomes, significant rates of fetal demise and neurological impairment such as cognitive and motor developmental delay remain[12-14].

Haemodynamic changes resultant to unbalanced blood flow affects many vital organ functions with cardiac, renal and neurological sequelae[15]. Since FLS has become the preferred choice of treatment, some studies demonstrate haemodynamic changes associated with the procedure, distinct from the primary disease process. An increase in peak systolic velocity in the middle cerebral artery is observed in recipient twins post FLS. However, these changes are transient and have uncertain long-termconsequence[16]. Ultrasonographic evidence of severe cerebral lesions in TTTS infants, post laser surgery, suggests that these lesions result from antenatal injury[17]. Fetal magnetic resonance imaging (MRI) identifies areas of cerebral ischaemia, not obvious on antenatal ultrasound[18], but to date there is a paucity of published postnatal MRI brain studies. Term corrected MRI brain imaging is beneficial for risk stratification of ex-premature infants in predicting adverse neurodevelopmental outcome[19]. The purpose of this study was to evaluate intracranial abnormalities in twins following FLS, using term corrected MRI brain and comparing them with both MCDA twins without a diagnosis of TTTS and dichorionic (DC) twins, in which this is not a clinical entity.

Methods

This study was undertaken in the Rotunda Hospital, a national referral centre for FLS in the Republic of Ireland. MRI brain imaging was acquired on 3 twin groups in a prospective, case control manner at term-corrected gestation (37 to 44 weeks). Three study groups were defined as follows (1) twins with an ultrasound diagnosis of twin-to-twin transfusion syndrome who had previously undergone fetoscopic laser surgery, (2) Monochorionic diamniotic twins with normal antenatal ultrasounds outruling a diagnosis of TTTS and (3) Dichorionic twins. Twin infants who had delivered in the study centre having previously undergone FLS were included; matched pairs of MCDA and DC twins were consecutively enrolled for each TTTS case. Cases on whom FLS had been performed but that delivered elsewhere were excluded, as were infants with an antenatal diagnosis of complex congenital anomalies (cardiac, gastrointestinal tract or respiratory), chromosomal disorders or primary brain abnormalities. TTTS was diagnosed using antenatal ultrasound and staged according to Quintero criteria[20]. MRI's were performed on a General Electric (United Kingdom) 1.5T Signa MRI system a departmental neonatal brain protocol. Chloral hydrate (50mg/kg) was used for sedation.

Table 1. Clinical Demographics and Primary Outcomes

	Group 1 ***TTTS*** (n=10)	Group 2 ***MCDA*** (n=8)	Group 3 ***DC*** (n=8)	
Gestational age (weeks)	32+0 (4)	28+3 (3)	34+3 (2)	P<0.01
Birth Weight (grams)	1796 (737)	1028 (443)	2019 (687)	p=0.13
Male Sex	60% (6)	50% (4)	55% (5)	
Antenatal Steroids	80% (8)	100% (8)	75% (6)	p=0.34
LSCS Delivery	80% (8)	100% (8)	100% (8)	p=0.18
Cranial Ultrasound Abnormal*	75% (6) 16.6% (1)	100% (8) 12.5% (1)	50% (4) 0	
Age at MRI (weeks)	42 (7)	43 (10)	50 (2)	p=0.60
Primary Outcome (Abnormal MRI or Fetal Demise)	60% (6)	37.5% (3)	0	p=0.03

Results expressed as mean (SD) or %. P values to 2 decimal places and / or <.01

Twin-Twin transfusion syndrome (TTTS), Monochorionic Diamniotic (MCDA), Dichorionic (DC), Lower segment Caesarean Section (LSCS), Standard deviation (SD)

Abnormal Cranial ultrasound = evidence of intraventricular haemorrhage (IVH) grade II to IV or cystic periventricular leukomalacia (PVL)

A single attending radiologist (SR), who was blinded to the study groups, analysed each scan and, with the other authors, graded the findings in a pragmatic fashion as either normal or abnormal. The primary study outcome was abnormal findings on MRI brain or fetal demise. Abnormal findings were subsequently subclassified as either a minor (unlikely to be of clinical significance) or major abnormality (likely to have a clinical effect). A comparison of diagnostic efficacy between MRI brain and cranial ultrasound was then performed. A cranial ultrasound was deemed abnormal if an intraventricular haemorrhage of grade III – IV or periventricular leukomalacia was documented[21]. Comparison of proportional differences between groups was performed using Chi squared analysis.

Continuous variables were expressed as means and 95% confidence intervals (expressed in parenthesis). Comparison between continuous variables was made using the analysis of variance (ANOVA), followed by Post Hoc Tukey's analysis, where appropriate. Statistical significance was accepted for alpha< 0.05. The Research Ethics Committee of the Rotunda Hospital granted study approval.

Results

From July 2008 to December 2011, 28 cases of twin-to-twin transfusion syndrome had fetoscopic laser surgery performed at the study centre. 10 cases were eligible for inclusion and 5 subsequently enrolled. The patient sample obtained was representative of the TTTS cases treated with FLS and delivered in this institution during the study period. 4 MCDA twin pairs were enrolled in Group 2 and 4 sets of DC twins in Group 3. Mean gestational age at which FLS was performed was 19 weeks (18.1, 19.9) in line with usual practice. Demographic perinatal data and cranial ultrasound results are presented. There was no significant difference in birth weight between the TTTS and MCDA [mean difference 769g (-32, 1569); p=0.61] or DC [mean difference-223g (-1023, 578); p=0.766] groups. Chi squared test showed a difference in primary outcome between MCDA and TTTS groups [c2= 7.112; p =0.029]. No primary outcome event was recorded for the DC group. 60% of the TTTS group (6/10) had an abnormal scan or either died in-utero versus 37.5% (3/8) of the MCDA group. The TTTS group accounted for 66.7% of patients experiencing the primary outcome. Individual MRI abnormalities across twin groups were heterogeneous.

Table 2. MRI abnormalities recorded

Patient	MRI Result	Group		Significance	Gestation at Delivery
Twin A (1)	Focal cortical migration abnormality – Posterior inferior left frontal lobe	1	Q.2	Major	32+6
Twin B (2)	Focal area T1 hyper-intensity – left deep white matter adjacent to body of left lateral ventricle	1	Q.1	Minor	34+2
Twin D (1)	Thin corpus callosum, Dilatation of lateral and third ventricles	1	Q.2	Minor	35+0
Twin E (1)	Area of haemorrhage in posterolateral right thalamus	1	Q.4	Minor	24+3
Twins H (1)	Small focus of haemorrhage in posterior horn right lateral ventricle	2		Minor	27+6
Twins H (2)	Cystic encephalomalacic change in left cerebellar hemisphere; little remaining parenchyma	2		Major	27+6
Twins J (1)	Foci of blooming artifact in lateral ventricles laterally – prior IVH	2		Minor	25+3

Quintero stage (Q.), Intraventricular Haemorrhage (IVH)

Parenthesised number in Patient column refers to birth order

Group 1 (TTTS) Group 2 (MCDA)

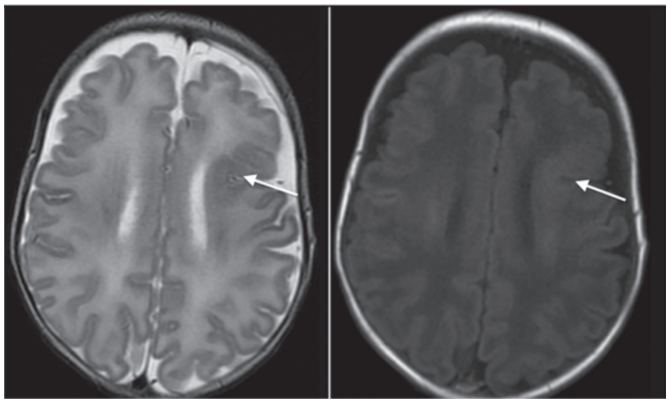

Figure 1 Twin A(1) focal cortical migration abnormality (arrow). T1 (right), T2 (left)

Discussion

In this study, we investigated abnormal term-corrected MRI brain or death as a primary outcome in twin-to-twin transfusion syndrome versus matched MCDA twins and DC twins and demonstrate that this primary outcome occurs with greater frequency in the TTTS group. 1/4 (25%) of the abnormal MRI's in the TTTS group showed a major finding of immediate clinical significance, with the remainder of undetermined clinical significance. The focal cortical dysplasia identified is likely to have occurred during brain development before 24 weeks gestation and not as a consequence of prematurity. Focal cortical dysplasias may occur secondary to abnormal post migrational development caused by injury to the developing cortex and have been reported in twin-twin transfusion syndrome[22,23]. The MRI with a major finding in Group 2 was most likely secondary to complications of prematurity as there was evidence of haemorrhage on cranial ultrasounds during the first 3 days of life. The heterogeneous abnormal MRI findings are not all of equal significance. These range from evidence of prior haemorrhage such as intraventricular

haemorrhage to subtle structural abnormalities such as a thin corpus callosum. This cohort is not large enough to correlate findings with particular twin groupings; however, the long-term consequences and their associations merit investigation. Cranial ultrasound, a readily available bedside imaging tool, is the mainstay of routine imaging in neonatal intensive care units. The finding of the focal cortical migration abnormality, (Twin A1), was not detected on ultrasound and hence would have been missed if ultrasound was used as the sole imaging modality, and in this case was falsely reassuring.

Spruijt et al recently presented the incidence of cerebral injury in twin-twin transfusion syndrome post fetoscopic surgery using cranial ultrasound as the primary imaging modality. These authors present data showing that the rate of injury did not differ between the TTTS group and the matched controls, with an incidence of cerebral injury documented in 8.6% of survivors[24]. We observed that MRI was superior when compared to cranial ultrasound in detecting abnormalities in this group. If cranial ultrasound alone was utilised our rate of abnormalities in the TTTS group, 16.6%, is in keeping with previous reported rates of 3 – 16%[24]. Whilst our numbers are small, we present a similar rate of injury using cranial ultrasound, but show that use of this imaging modality alone can miss significant lesions and under call the true rate of injury as shown using MRI. Merhar and colleagues have previously published an uncontrolled case series, which demonstrates an MRI abnormality rate of 68% in TTTS twins[25]. We present herein a study, which demonstrates a similar abnormality rate of 60% in TTTS twins, a rate that is significantly higher than that of their non-TTTS counterparts. Moreover, we present data, which suggests superior sensitivity of MRI over ultrasound as an imaging modality in this specific clinical situation. While it is difficult to directly infer the underlying cause for the reported outcome from the current dataset, a number of pathogeneses may underlie these findings.

These twins are exposed to a hostile intra-uterine environment pre-treatment and also potential risks and haemodynamic changes, which may ensue from the FLS procedure itself. Fetuses, as with newborns, are vulnerable to changes in blood pressure, blood flow and heart rate. These changes place a demand on fetal cerebral auto regulatory mechanisms to ensure stability and protect the developing brain from injurious consequences. It is known that preterm infants are particularly susceptible to dysregulation of cerebral blood flow, which can result in intracerebral haemorrhages and periventricular leukomalacia (PVL)[26,27]. The preceding stresses of the twin-to-twin transfusion may predispose the twin pair to a reduced ability to regulate cerebral blood flow during and after the fetoscopic laser surgery. Whilst extensive antenatal data has been presented in this high-risk group, formal outcome data from MRI brain studies are scarce. Within the context of this limited study sample, we have shown a clear and definite trend identifying a higher risk for abnormal MRI brain or death in TTTS twins versus other twin groups. These results suggest that there is indeed an increased risk of neurologic injury in TTTS twins, which was already known, but MRI shows this injury in better detail. In successful cases of FLS the pregnancy may continue to delivery at term in the referring unit without need for neonatal intervention or monitoring after delivery. These infants would not routinely have cranial ultrasounds or receive neurodevelopmental follow up at discharge. Identifying infants at risk at the earliest time point affords an opportunity to maximise the neurodevelopmental outcome.

Twin-twin transfusion syndrome is associated with significant rates of neurodevelopmental impairment. Twins who survive without treatment, post conservative treatment and surviving twins post co-twin demise are at the greatest risk[8,28]. Despite improvements in neurodevelopmental outcomes post FLS in recent years, significant rates of neurodisability persist[29]. Further studies are necessary to fully explore the consequences of intrauterine interventions and any correlation with specific MRI findings that may exist. Though larger studies are required both to definitively answer the clinical question, and to incorporate comprehensive long-term neurodevelopmental follow up, we feel that this specific high-risk patient group merit term-corrected MRI brain imaging, as opposed to cranial ultrasound, as part of their postnatal assessment model and ongoing clinical neurodevelopmental assessment.

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Advanced Maternal Age and Assisted Reproductive Technologies in an Irish Population

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Abstract
In recent decades the amount of women over 40 seeking assisted reproductive technology (ART) interventions in order to become pregnant has dramatically increased, both in Ireland and worldwide. This is due to an increase in the average age at which women are choosing to have their first child while additionally, many couples are choosing to have a second family later in life. However, as with natural conception, ART success rates decrease with maternal age. In the present study, we perform a 16 year retrospective analysis on our clinical data of women between 40 and 45 years of age, who have undergone ART at a tertiary referral ART clinic. The percentage of patients in this age group was analysed over time, in order to determine follicle recruitment, % oocyte yield, embryonic quality, positive hCG (pregnancy rate), clinical pregnancy rate and rate of preclinical pregnancy loss. Results from our clinic show that women greater than 43 years of age have a significantly reduced reproductive potential compared to women in the 40 to 42 years age group. Woman in the 43-45 age group showed reduced fertilization rates (53.73% versus 58.82%), reduced positive hCG rates (11.51% versus 19.03%) and clinical pregnancy rates (5.04% versus 12.52%) and increased rates of preclinical pregnancy loss (56.23% versus 34.23%), compared to women in the 40-42 age group. With the age at which couples are choosing to have children constantly increasing, novel ART treatment strategies need to be developed.

Introduction

There is a well-established link between advanced maternal age and reduced reproductive potential. This natural decrease in fertility in women is caused by several factors including reduced oocyte numbers, diminished oocyte and embryo quality and an increase in miscarriage rate[1-3]. In addition, pregnancy at this later stage in life involves increased maternal and fetal risks including: miscarriage, hypertension, preeclampsia, gestational diabetes, placenta praevia, placental abruption, caesarean section, genomic disorders, premature birth, low foetal birth weight and neonatal morbidity[4]. In recent decades the amount of women over 40 seeking assisted reproductive technology (ART) interventions, in order to become pregnant, has dramatically increased. This is due to an increase in the average age at which women are choosing to have children; while additionally, many couples are choosing to have a second family later in life[5]. However, as with natural conception, ART success rates decrease with maternal age. In addition to a reduction in oocyte numbers retrieved during a standard ART cycle, maternal age has a detrimental effect on oocyte competence[6-8]. One major factor evident in aged oocytes is an increase in aneuploidy[9,10]; with chromosomal abnormalities being a major determinant of subsequent embryonic development. Nondisjunction during meiosis is the principle cause of aneaploids. If normal disjunction (chromosome separation) process fails to happen, and two chromosomes go to only one pole n+1 and n-1 gametes are produced. The aim of the present study was to perform detailed analysis of our clinical data on women greater than 40 years of age, who have undergone ART at a tertiary referral ART clinic, between 1997 and 2013.

Methods

A retrospective analysis of clinical and laboratory data was performed by collecting data from our tertiary referral ART academic program. All IVF/ICSI cycles carried out on women between 40 and 45 years of age, at the Human Assisted Reproduction Ireland (HARI) clinic, Rotunda Hospital, Ireland between January 1997 and January 2013 were identified. This clinic has an age cut-off limit for ART of 45 years of age. Patients between 40 and 45 years of age at egg collection were selected for analysis. We also split our patients into two age groups for comparative analysis; 40-42 and 43-45. The following parameters were then analysed: follicle recruitment, % oocyte yield (oocyte follicle ratio), positive hCG, clinical pregnancy rate (ultrasound confirmation of a gestational sac at 7 weeks) and preclinical pregnancy loss (absence of intrauterine sac at 7 week ultrasound scan following previously positive urinary hCG test).There were

three different types of ovarian stimulation protocol employed during the assessment period namely the long agonist protocol, the antagonist protocol and the flare protocol. For patients with a low ovarian reserve, the flare protocol sees patients commencing the buserelin nasal spray (Suprecur, Sanofi-Aventis) on day 2 and uFSH (Menopur, Ferring, Ireland) or rFSH (Puregon, MSD, Ireland) on day 3 of the menstrual cycle providing that the FSH level was below 17IU/L, otherwise the cycle was postponed. Once the leading three follicles reached an average diameter of 18mm or more, for final oocyte maturation hCG 10,000 IU i.m. (Pregnyl, MSD, Ireland) was administered (5,000 IU if the dose of gonadotrophin was reduced). Luteal phase progesterone support was applied in the form of Crinone gel 8% p.v./b.d. (Serono, UK). Oocyte retrieval was carried out under sedation using transvaginal ultrasound-guided puncture of ovarian follicles 36h after hCG administration. IVF and ICSI treatments were carried out as previously described[11].

The following variables were measured for each outcome: stimulation protocol, fertilization procedure and culture media in use. Logistic regression was used to model maternal age as the dependent variable and all other variables as predictor variables. Groups of interest were compared using Mann-Whitney U-test or Wilcoxon's matched pairs rank sum test was used to compare mean values and Pearson chi-square or McNemar chi-square analysis for comparison of proportional values. All statistical analyses were carried out using SPSS statistics, version 20 (IBM Corporation, 2011, Armonk, New York, USA). Differences between groups were considered significant when p-values were less than 0.05.

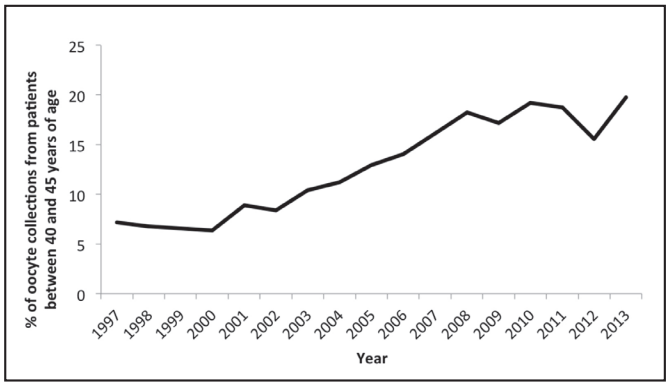

Figure 1 Women over 40 undergoing assisted reproductive technologies

Results

For the study period we identified a total of 2068 egg collections that took place in women between 40 and 45 years of age. The proportion of patients in this age group has grown significantly over this 17 year period; increasing form 7.2% of patients in 1997 to 19.8% in 2013 (Figure 1). The average age of the female patients on the date of egg collection was 41.14 ± 1.28 years and the average age of the male partner was 41.62 ± 5.63 years. Table 1 presents the patient characteristics, including hormone profiles. Table 2 presents the parameters for oocyte retrieval and oocyte competence. The number of follicles aspirated and oocytes retrieved was significantly lower in patients in the 43-45 age group compared to the 40-42 age group (Table 2). Rate of mature (MII) oocytes was similar in both groups. The percentage of normal fertilization (2PN zygotes) was significantly lower in the 43-45 age group compared to the 40-42 age group; this corresponded to a lower fertilization rate per cycle also. This decrease in fertilization rate was observed in both ICSI and IVF fertilized oocytes. Table 3 presents the embryo transfer parameters and clinical outcomes. There was no difference in embryo transfer rates between the two age groups, or the mean number of embryos transferred per group. The pregnancy rate (positive hCG) per cycle and per embryo transfer was significantly lower in the 43-45 age group compared to the 40-42 age group. Clinical pregnancy rate was also significantly lower in the 43-45 age group, while the rate of preclincial pregnancy loss was markedly increased (Table 3).

Table 1: Baseline characteristics of patient parameters, in women between 40 and 45 years of age, undergoing IVF/ICSI.

Parameter	40-45 years
Number of cycles	2068
Number of cycles where no eggs were retrieved	225
Average maternal age (years ± SD)	41.14 ± 1.28
Average paternal age (years ± SD)	41.62 ± 5.63
Infertility duration (year ± SD)	4 ± 3
Previous failed cycle	1.73 ± 1.94
Day 3 AMH (IU/L)*	9.03 ± 11.35
Day 3 E2 (IU/L)	196.23 ± 203.39
Day 3 FSH (IU/L)	9.15 ± 4.28
Day 3 LH (IU/L)	6.23 ± 10.44

*AMH data from March 2010-January 2013

Table 2: Oocyte retrieval and competence, in women over 40 years of age undergoing IVF/ICSI.

Parameter	40-42 years	43-45 years	Total (40-45 years)
Follicles aspirated (mean ± SD)	9.44 ± 5.38[a]	7.57 ± 4.62[b]	8.51 ± 5.0
Oocytes retrieved (mean ± SD)	7.93 ± 4.82[a]	6.28 ± 4.27[b]	7.11 ± 4.55
Oocyte yield (%)	84.07[a] (10141/12062)	82.84[a] (1381/1667)	83.93 (11522/13729)
Mature (metaphase II) oocytes (ICSI only) (%)	78.76[a] (2558/3248)	78.34[a] (416/531)	78.70 (2974/3779)
Normal fertilization (all) (%)	58.82[a] (5965/10141)	53.73[b] (742/1381)	58.21 (6707/11522)
Normal fertilization (IVF) (%)	60.18[a] (4148/6893)	55.53[b] (472/850)	59.67 (4620/7743)
Normal fertilization (ICSI) (%)	55.92[a] (1817/3248)	50.85[b] (270/531)	55.23 (2087/3779)
Number of fertilized oocytes/cycle	3.41[a] (5965/1750)	2.33[b] (742/318)	3.24 (6707/2068)

[a,b,c] Superscripts of different alphabetic characters across rows indicate significant differences (P < 0.05) between groups, whereas presence of identical characters indicates lack of significant differences.

Table 3: Clinical outcomes, in women over 40 years of age undergoing IVF/ICSI.

Parameter	40-42 years	43-45 years	Total (40-45 years)
Embryo transfer performed (%)	89.49[a] (1566/1750)	87.42[a] (278/318)	89.17 (1844/2068)
Transferred embryos (mean ± SD)	2.12 ± 0.93[a]	2.02 ± 0.92[a]	2.07 ± 0.93
Positive hCG/cycle (%)	17.03[a] (298/1750)	10.06[b] (32/318)	15.96 (330/2068)
Positive hCG/embryo transfer (%)	19.03[a] (298/1566)	11.51[b] (32/278)	17.90 (330/1844)
Clinical pregnancy rate/ embryo transfer (%)	12.52[a] (196/1566)	5.04[b] (14/278)	11.39 (210/1844)
Preclinical pregnancy loss (%)	34.23[a] (102/298)	56.23[b] (18/32)	36.36 (120/330)

[a,b,c] Superscripts of different alphabetic characters across rows indicate significant differences (P < 0.05) between groups, whereas presence of identical characters indicates lack of significant differences.

Discussion

Women over 40 represent the fastest growing population of patients seeking ART in our clinic, with numbers increasing

dramatically from 17 years ago. This corresponds with a proportionate increase in numbers worldwide[5]. The ability to get pregnant following ART relies largely on the quality of oocytes retrieved and the subsequent development of high quality embryos for transfer. Although oocyte maturation rate in our study was similar between both groups, fertilization rate was greatly reduced in women in the 43-45 age group, compared to their 40-42 counterparts. This corresponds to data previous reported by Cabry et al[13] and demonstrates how the ability of an oocyte to undergo nuclear maturation is not always a reliable predictor of oocyte quality and subsequent developmental potential. Maternal age is known to be the biggest factor affecting clinical outcome following ART. Our data shows that female patients which an age greater than 42 have a diminished prognosis following IVF/ICSI compared to patients between 40 and 42 years of age. This corresponds to previously published data which clearly shows a cut-off for success following ART in women to be 44 years of age[13,14]. In our clinic the cut off rate for ART is 45 years of age; this study has enabled better counselling of patients beyond this cut off point as to the ethics associated with this decision. Over the past decade many patient management and treatment strategies have been developed for women over 40 years of age. Firstly, patients must be counselled on both the reduced clinical success rates for ART and increased pregnancy risks and miscarriage rates associated with increased maternal age. Here we show a significant reduction in pregnancy rate and clinical pregnancy rate, in addition to a substantial increase in the rate of preclincal pregnancy loss (increase from 34.23 % in 40-42 year olds to 56.23% in 43-45 year olds at 7 week scan). It is known that a large proportion of miscarriages that occur in the first trimester of pregnancy are due to chromosomal abnormalities, a known factor associated with oocytes from women of increased reproductive age[15]. Due to the low success rates observed following ART, women of increased reproductive age often undergo the transfer of multiple embryos in order to obtain a pregnancy. Due to the increased risks associated with multiple births, and the increased pregnancy risk the patient is already subject to, this strategy should be considered very carefully before being initiated.

Other strategies currently in focus for patients of increased age include surrogacy and/or the option of oocyte and embryo donation. Several studies have shown that many infertility issues associated with increased maternal age can be overcome by oocyte donation[16,17]. The Spanish experience shows cumulative pregnancy rates after 4 cycles of embryo transfer from donor eggs reaching nearly 94%, with clinical pregnancy rates of 53.4% per cycle and live birth rates of 42.6%[17]. Therefore, oocyte donation is a very promising option for women over 40 years of age wishing to get pregnant. Before undergoing either oocyte or embryo donation patients need to be extensively counselled about the ethical and legal issues associated with such procedures. At present in many countries, including Ireland, there is no legislation in place to cover the legal issues arising from surrogacy, oocyte or embryo donation. Due to the increased success rates associated with transferring embryos generated from young oocytes to women over 40, one option for women is to 'self-preserve' their own fertility by banking their eggs when they are in their 20's and 30's. However, the large number of oocytes needed, in addition to the risks associated with ovarian stimulation and egg collection may deter women from availing of this 'back-up plan' for their future fertility[19]. Furthermore, the cryopreservation of oocytes does not guarantee a pregnancy and the maternal risks associated with a pregnancy at advanced age are all still present. The ethics of offering such a service at present, giving the cost and the low rate of success, need to be questioned.

The emerging advances in ART techniques possess the ability to allow women to achieve pregnancy much later in life. However, when considering ART at an advanced age it is necessary to take into account the severe risks associated with such a pregnancy[4]. One study observed that 63% women over 50 who achieved a pregnancy through embryo donation needed hospitalization, compared to 22% in women aged between 45 and 49[22]. In such women, surrogacy may be the safer option. The ability to care for a teenager and young adult at ages over 60 remains a challenge nevertheless. The first do no harm principle should be extended to the child to be and its interests considered in each individual case.

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A Survey of Lung Health and COPD Awareness amongst Participants at a Mobile Spirometry Clinic

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Abstract
Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of death in Ireland. It affects over 440,000 people (10% of Ireland's population), but awareness of COPD is low. COPD Support Ireland is a national charity established to advocate for and support those with COPD. For World COPD Day 2013, a mobile clinic visited 5 locations to provide information about COPD and free spirometry testing. In this study, we evaluated participants' level of knowledge about COPD and whether this was correlated with a number of variables. Participants completed a questionnaire (352). Questionnaires were analysed to ascertain this self-presenting population's characteristics. Most (247, 70.2%) were smokers/ex-smokers, yet only 168 (47.7%) knew of COPD. Almost 18% (63, 17.9%) required referral to GPs with abnormal spirometry results. Our findings suggest the need for greater COPD education and awareness to increase earlier diagnosis, reduce health care costs and improve quality of life.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality both in Ireland and internationally[1]. As well as a major source of morbidity and mortality, COPD also places a significant economic burden on healthcare systems[2]. COPD is the most prevalent respiratory disease in adults in Ireland[3,4]. At least 440,000 people in Ireland have COPD, of whom over 180,000 have moderate or severe disease, only half of whom may be diagnosed[1]. Of the 39 countries, which provide data to WHO Europe, the overall age standardised COPD mortality rate is 18/100,000, but Ireland's is 27.87[5]. Of the Western European countries, only Denmark has a higher mortality rate5. Awareness of COPD is low[6] and delay in the diagnosis of COPD is well recognised. A recent UK study of over 39,000 COPD patients showed that more than half had symptoms for six to ten years before the diagnosis was made, and 42% had shown clinical signs that may have been related to COPD between eleven and fifteen years prior to finally being diagnosed.[7] Formed in October 2013, COPD Support Ireland is a charity set up to support and advocate for all those living with COPD and is the country's first COPD national support and advocacy body. It is a patient-led organisation, dedicated to raising awareness about COPD, improving early diagnosis and providing information and guidance to patients and carers living with this condition.

In November of 2013, COPD Support Ireland launched a weeklong, nationwide series of free screening events to coincide with World COPD Day. This was supported by the Irish Thoracic Society and Novartis, a Pharmaceutical Company. Interested participants were invited to complete a questionnaire, were provided with free spirometry screening, and were given information on COPD. Those with abnormal spirometry readings, based on the Global Initiative for Chronic Obstructive Lung Disease (GOLD) Spirometry guidelines[8], were referred to their General Practitioner (GP). The purpose of the weeklong event was to increase awareness of COPD in the general population, provide information about COPD to those presenting to the clinic, refer participants identified as being at risk of COPD for further investigation and build awareness for COPD Support Ireland. The aim of our study was to determine the level of knowledge of COPD among participants, and to determine the association between knowledge of COPD and participants' characteristics such as age, gender, family history, education level and smoking history as well as assess undiagnosed disease in the participant population.

Methods

For World COPD Day 2013, a free COPD Mobile spirometry screening clinic travelled to 5 counties in Ireland from the 18th to the 22nd of November, starting with Dublin followed by Sligo, Mayo, Waterford and finally Cork. Mobile clinics were advertised across local press, radio, TV, medical trade journals and online. Participants presenting at the mobile clinic were requested to complete a questionnaire containing demographic information and information on risk factors associated with COPD. Spirometry tests were carried out by a Respiratory Clinical Nurse Specialist (Respiratory CNS), in accordance with ATS/ERS Taskforce guidelines[9]. The Respiratory CNS did not have access to the completed questionnaire prior to spirometry. Participants were referred to see their General Practitioner if their FEV1/FVC score was outside the GOLD standard. Formal ethics approval was not required. The questionnaire was based on a previous questionnaire used for World Spirometry Day 2012, with additional COPD questions based on feedback of that questionnaire. Anonymous data points were collected on the following: location of clinic, age, gender, education level, smoking history, passive smoke exposure, family history of lung disease, symptoms of lung disease (cough, mucus production, shortness of breath, wheeze), time of day for the worst symptoms, GP visits and knowledge of COPD prior to this event. Data was then compiled in a database and was analysed using IBM SPSS Version 22. Descriptive analysis was carried out to describe the distribution of variables

among participants, summarizing the data using frequencies. We wanted to explore whether knowledge of COPD was correlated with variables such as smoking history, family history, education level, gender and age. Associations between variables were explored using the chi-square test for categorical variables (statistical significance set at $p < 0.05$).

Results

A total of 352 participants completed the questionnaire. Not all questions were answered by each participant. Missing data is included only in descriptive data, but not in exploring association between variables. Demographic details and factors associated with COPD are listed in (Table 1). A slight majority (52.8%) were male. 63.7% were aged 55 or over. Two thirds had completed secondary school education. Over two thirds of participants had a history of smoking. The majority of participants were current or ex-smokers (247, 70.2%). Of these, 43% had symptoms of lung disease (n=105) and 22% had abnormal spirometry and were referred (n=54). However, of those who had never smoked (n=105), 46% also had symptoms of lung disease (n=48), but only 9% had abnormal spirometry and were referred (n=9). There was no difference in the previous knowledge of COPD between smokers and non-smokers. Of those who had prior knowledge of COPD, 69% were smokers and 31% were non-smokers and of those who did not have prior knowledge of COPD, 70% were smokers and 30% were non-smokers ($p = 0.705$). Smokers are those who currently smoke or who are ex-smokers whereas non-smokers are only those who have never smoked.

Table 1: Demographics of participant population

	N	%
Gender	352	100
Male	186	52.8
Female	166	47.2
Age in years		
Mean	55-64 years of age	
21-34	21	6.0
35-44	36	10.2
45-54	72	20.4
55-64	108	30.7
65-74	95	27.0
>75	20	5.7
Education Level		
Primary	45	12.8
Junior Cert	71	20.2
Leaving Cert	123	34.9
College Degree	60	17.1
Postgrad Degree	23	6.5
Missing	30	8.5
Smoking Habits		
Ex-smoker	156	44.3
Current smoker	91	25.9
Never smoked	105	29.8
Passive Smoke Exposure		
Yes	56	15.9
No	256	72.7
Missing	40	11.4
Family History of Lung Disease		
Yes	72	20.5
No	280	79.5
Symptoms of Lung Disease		
Yes	153	43.5
No	199	56.5
Attending GP for respiratory symptoms		
Yes	83	23.6
No	239	67.9
Missing	30	8.5
COPD Awareness prior to event		
Aware of COPD	168	47.7
Not aware of COPD	162	46.0
Missing	22	6.3
Referral due to abnormal spirometry		
Referred (abnormal spirometry)	63	17.9
Not referred (normal spirometry)	289	82.1

In total, 46% of participants had no previous knowledge of COPD (n=162). A higher proportion of males than females had no previous knowledge of COPD (60% vs. 40%) and this difference was statistically significant ($p < 0.05$). Sixty one percent of those who had a college level education or higher had previous knowledge of COPD versus 49% of those who had secondary level education only. This difference was not statistically significant ($p = 0.086$), which may be attributable to a small numbers in each group. Of participants who had previous knowledge of COPD, 61% had a family history of lung disease versus 48% that did not have a family history of lung disease. This difference approached but did not reach statistical significance ($p = 0.066$), which may be attributable to small numbers within groups. A total of 43.5% of participants had symptoms of lung disease. Symptoms of lung disease were defined as follows: breathlessness, wheezing, and/or coughing. Of those with symptoms of lung disease, 69% were smokers/ex-smokers and 53% were male. Nearly 90% of those with symptoms were over the age of 45 ($p < 0.05$). Three quarters did not have a college level education and nearly a quarter had a family history of lung disease. As can be seen from Table 2, of the 63 participants (18%) who were referred to their GP because of abnormal spirometry, 86% were smokers or ex-smokers ($p < 0.05$) and 54% were male. 86% were over the age of 45. Nearly half (49.2%) reported symptoms of lung disease while almost 25.4% had a family history of lung disease.

Table 2: Those Referred for spirometry

	Yes		No		P
	N	%	N	%	
Gender	63	100	289	100	0.783
Male	34	54.0	152	52.6	
Female	29	46.0	137	47.4	
Smoking Habits	63	100	289	100	0.003
Smoker/ Ex-smoker	54	85.7	193	66.8	
Non Smoker	9	14.3	96	33.2	
Education Level	63	100	289	100	0.728
Primary	9	14.3	36	12.5	
Junior Cert	23	36.5	48	16.6	
Leaving Cert	10	15.9	113	39.1	
College Degree	13	20.6	47	16.2	
Postgrad Degree	3	4.7	20	6.9	
Missing	5	7.9	25	8.7	
Family History of Lung Disease	63	100	289	100	0.283
Yes	16	25.4	56	19.4	
No	47	74.6	233	80.6	
Symptoms of Lung Disease	63	100	289	100	0.310
Yes	31	49.2	122	42.2	
No	32	50.8	167	57.8	

Discussion

Approximately one in five people (18%) self-presenting to a mobile COPD spirometry clinic were found to have abnormal spirometry and were referred to their GP. Less than half of the participants were aware of COPD prior to attending this event. While this is a self-presenting population, and therefore results cannot be extrapolated to the general population, these results for an Irish population appear to support what is known from the international literature i.e. that COPD is under diagnosed and undertreated[10,11]. As expected, those from a lower educational background, smokers and males were more likely to report symptoms of lung disease and/or be referred. This is consistent with what is known about the epidemiology of COPD. Since this was a self-presenting population, participants are likely to have

been concerned about or interested in their lung health and their knowledge of COPD to be higher than the general population. The participants may also have been more likely to answer in the affirmative to questions relating to respiratory symptoms, as questionnaires are likely to have a high sensitivity but a lower specificity. Yet, only 48% of this population knew of COPD prior to this event. Those particularly at risk of COPD, i.e. current or ex-smokers, had similarly low levels of knowledge of COPD to non-smokers. Those with a family history of lung disease also had low levels of knowledge of COPD. Smoking is a factor in 85% of those with COPD[5]. The prevalence of COPD is directly related to the prevalence of cigarette smoking[12]. The HSE National Tobacco Control Office reported a smoking prevalence of 19.5% of whom 54.1% were males, and 19.2% aged over 55 years with the highest cigarette smoking prevalence rates in the lower income groups[13].

In this study population, awareness levels were lower in those with lower education levels, despite COPD disproportionately affecting lower socioeconomic groups. In light of this evidence, it is clear that improved education and awareness of COPD is required, particularly for at-risk groups such as smokers. It has been proven that providing educational resources to those at risk for COPD, can significantly improve their knowledge of the disease although it has no significant impact on their behaviour[14,15]. However, by increasing awareness for COPD, more people can attend health-care services, where treatment and prevention can be initiated. There are limitations to this study. Participants self-presented to this clinic therefore results cannot be extrapolated to the general population. Sites for the clinic were chosen on the basis of a local COPD support group in the area. Therefore, the level of knowledge in these areas may be overestimated, due to the presence of a support group in the area. This study, in a self-selected group of participants, identified abnormal spirometry results in 18% of participants, which required referral. Nearly 44% of all participants had symptoms suggestive of COPD and of these participants, a fifth had abnormal spirometry and nearly 60% had not attended any healthcare services in the previous year. Despite COPD being a major cause of death and hospitalisation in Ireland, low levels of awareness of COPD were identified in participants, particularly in those who had lower levels of education. Those at greatest risk of COPD, i.e. current or ex-smokers, had low levels of awareness of COPD, which did not differ from those least at risk. This needs further exploration, as early diagnosis of COPD is associated with reduced health care costs, improved quality of life and improved symptom control.

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Using Social Media to Increase Accessibility to Online Teaching Resources

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Abstract
The key learning points of Surgical Grand Rounds (SGR) are often not accessible at times of exam revision for students. We sought to use Twitter as an online teaching repository. A SGR Twitter profile was created. 23 SGR presentations were made accessible on Twitter over a 3 month period. 93 students were invited to complete a questionnaire assessing usage of the repository. 84 (90%) in total responded, of these, 25 (80.6%) felt that the online provision of SGR through twitter was "useful". The majority (71%) felt that the online content was easily accessible. The novel use of social media is a useful adjunctive educational tool in accessing an online repository of SGR presentations.

Introduction

Surgical Grand Rounds (SGR) have traditionally been a keystone of clinical medical teaching. Despite the educational potential of SGR, often the material presented is not routinely stored. Presentations are often transiently available and not accessible for medical students at key times of revision for examinations. Previous studies have demonstrated the efficacy of novel web-based technology such as Facebook, YouTube and Twitter as educational tools[1-3]. Twitter is an online social media service that enables users to send and read "tweets", a message of 140 characters, and is accessible across a range of platforms including laptops, smartphones and tablets. In this study we sought to describe the usage of Twitter to allow a readily accessible, searchable online repository of SGR presentations for final year medical students.

Methods

The Twitter profile @surggrandrounds was created. Presenters at SGR were asked to email presentations in Microsoft PowerPoint format to a central Royal College of Surgeons in Ireland email address. Presentations were edited to remove any images or text which might compromise the anonymity of the cases being presented. The PowerPoint files were then saved in portable document format (PDF). The website www.SurgInfection.com is one maintained by the authors for the purposes of postgraduate surgical education. A standard network protocol, File Transfer Protocol (FTP), was used to transfer the SGR PDF presentations to the www.SurgInfection.com server. A link to each presentation with a short description was posted as a 'tweet' on the @surggrandrounds Twitter profile. The creation of @surggrandrounds Twitter profile was announced at the commencement of the academic year for the final year medical students attending the Royal College of Surgeons in Ireland. After an initial three month period a Likert scale questionnaire given to students on clinical rotation assessed usage and perceived usefulness of the Twitter based online repository. Data was collated on Microsoft Excel and exported to SPSS version 20 for statistical analysis.

Results

Within a two week period following its launch the @surggrandrounds profile had more than 120 medical students following the Twitter feed. Over the three month period a total of 43 Tweets were sent, and 28 SGR presentations were made available. Overall 93 final year students were invited to complete the Likert-based questionnaire, there were 84 respondents giving a response rate of 90%. A total of 31 respondents (36.9%) used the @surggrandrounds Twitter feed to access SGR presentations over the three month period. Of these 25 (80.6%) felt that the online provision of SGR through twitter was "useful". The majority (n=22, 71%) felt that the online content was easily accessible, with 8(25.8%) undecided, and 1(3.2%) stating the content was not easily accessible. All of the respondents (n=31, 100%) who had used the @surgrandrounds Twitter feed to access SGR presentations felt that it should continue as part of surgical clinical teaching in the Royal College of Surgeons in Ireland.

Discussion

Recent studies have shown that online media tools can be integrated into daily educational practices and augment learning and collaboration[1,4]. In our study we sought to use a social media strategy to improve the uptake and accessibility of SGR presentations. Twitter has an online community of 230 million monthly users and is the 11th most visited site worldwide[5]. 76% of users are using mobile technology[6]. With such ease of access these high quality presentations are available to students at exam time and as a reference in clinical settings. An increased uptake was noted in particular in students who regularly use social media including Twitter. However despite the relatively high levels of social media (92.9%) use, and in particular Twitter (57.1%) usage, only 36.9% of students regularly accessed the @surggrandrounds Twitter feed. This may represent a desire of students to keep their social media identities personal rather than integrate them into their professional lives. The model presented above for ease of access to SGR presentations lends itself to replication. This opens the possibility of expanding the @surgrandrounds Twitter feed to other hospitals associated with RCSI. The novel use of social media is a useful educational tool, allowing ease of access to an invaluable repository of SGR presentations at times of revision. The majority of students using the Twitter SGR feed found it easily accessible, useful and felt it should be continued as part of hospital-based surgical education.

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Congenital Arteriovenous Malformation of the Forearm and Hand

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Abstract
We report the case of an asymptomatic arteriovenous malformation (AVM), extending from the forearm into the palm, in an 11-year-old boy. A debulking procedure was performed meticulously dissecting the lesion from the involved structures. The post-operative course was uncomplicated and no evidence of recurrence was noted at eighteen months follow-up. Extensive AVMs involving structures vital for hand function may be asymptomatic. Clinical follow-up is paramount, due to the inherent risk of recurrence.

Introduction

Vascular malformations account for two to six percent of paediatric upper extremity tumours.[1] The case of an extensive, but asymptomatic, upper limb arteriovenous malformation (AVM) is reported.

Case Report

An 11-year-old, left hand dominant, pubertal male was referred to a specialist paediatric hand service with a four month history of two painless masses in the left forearm and palm. There was no history of trauma. Clinical examination revealed a non-tender subcutaneous swelling in distal third of the left volar forearm measuring 6.5cm x 3cm, and a second mid-palmar swelling measuring 3.5cm x 2cm. Both masses moved proximally with finger flexion. No overlying skin changes were noted. There was no associated bruit or thrill. Thenar muscle wasting was absent and intrinsic and extrinsic muscle strength was normal. No sensory abnormalities were elicited and both Tinel's and Phalen's tests were negative.

Haematological and inflammatory markers were within normal limits. Ultrasonography revealed non-specific hypoechogenic regions around the flexor tendons extending from the mid-forearm to the palm, suggestive of tenosynovitis. Subsequent surgical exploration revealed an extensive vascular malformation, with an hour glass configuration, extending from the mid-forearm, deep to the transverse carpal ligament, into and through the carpal tunnel. The mass abutted and invaginated the flexor tenosynovium, the median nerve, palmar cutaneous nerve, digital nerves of the thumb, index, middle and ring fingers and the first and second lumbricals. Connections were also identified to the ulnar neurovascular bundle and the superficial and deep palmar arterial arches. A debulking procedure was performed under tourniquet control, fastidiously dissecting the lesion from the involved structures. The post-operative course was uncomplicated. Histopathological analysis demonstrated a mass composed of variably dilated vascular channels, including arteries, veins and lobules of capillary proliferations. These findings were consistent with an AVM. Clinical and ultrasonic follow-up at eighteen months revealed no evidence of recurrence.

Discussion

Paediatric vascular anomalies can be classified as either haemangiomas or vascular malformations.[2,3] Specific pathological features assist in the differentiation between the two, including vessel type, cellularity, endothelial proliferation and immunohistochemical profile. Flow characteristics have also been proposed as an instrument for subclassification.[4] Malformations with an arterial component are regarded as high-flow lesions, whereas those without are considered low-flow lesions. Although present at birth, AVMs may not become clinically apparent until later in life, as demonstrated by the case reported.[5,6] Symptoms can develop when the body is under the influence of hormonal fluctuations, or as a result of thrombosis, infection or trauma. The clinical manifestations vary according to the extent of the lesion.[5,7] Similar to the findings of Gutowski et al, the AVM described had an hour-glass configuration, narrowed centrally by the transverse carpal ligament. In contrast however, despite the extent of the lesion no sensory or motor disturbances were elicited pre-operatively.

Whilst standard ultrasound findings may be non-specific, colour doppler ultrasonography can determine flow rates, volumes and reversal of flow.[8] MRI can characterise flow patterns, in addition to defining the anatomical extent of lesions and the involvement of adjacent structures.[7] In patients with extensive AVMs, such as the case described, tourniquet control may sufficiently limit intra-operative blood loss to allow for adequate resection, thus avoiding the potentially devastating consequences of embolisation.[6] In such cases, we advocate maximum debulking of the AVM, all the while

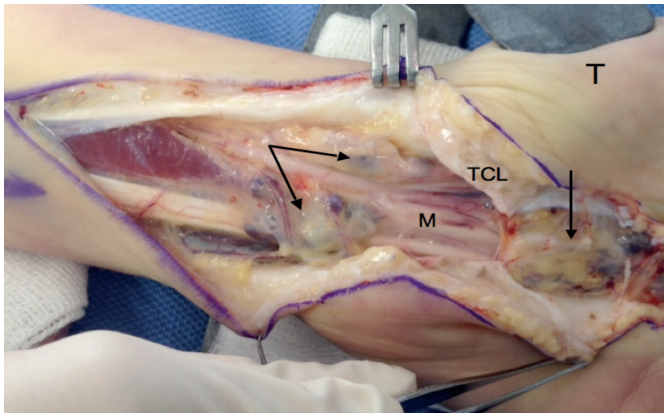

Figure 1 Intraoperative image demonstrating the arteriovenous malformation (arrows) extending from the forearm, deep to the transverse carpal ligament (TCL) into and through the carpal tunnel. The median nerve (M) and thumb (T) are also identified.

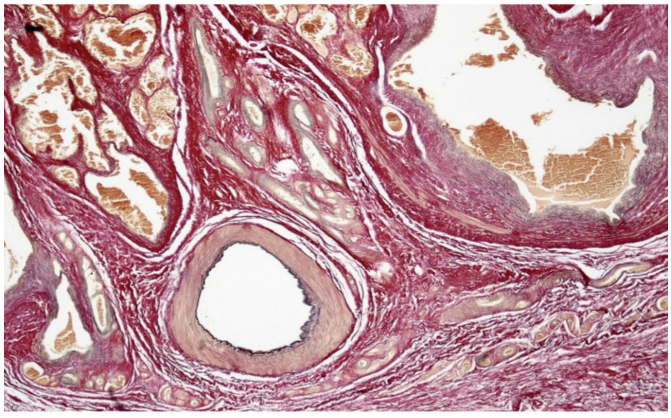

Figure 2 Elastic Van Gieson stained section showing a benign vascular lesion consisting of a mixture of arteries, veins and capillaries consistent with an arteriovenous malformation

meticulously preserving the involved vessels, nerves and tendons. The reported recurrence rates range from 47% to 76%, even in cases of perceived complete surgical excision.[1,9]

Given the variability in extent and presentation, childhood vascular malformations should ideally be managed in a multi-disciplinary setting, with input from plastic surgery, radiology dermatology and pathology. The case reported serves to highlight the importance of considering AVMs in the differential diagnosis of asymptomatic forearm and hand swellings. Clinical follow-up is paramount, due to the inherent risk of recurrence.

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Therapeutic Hypothermia in ICUs

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Abstract
Recent research on Therapeutic Hypothermia (TH) post cardiac arrest has raised questions about its implementation and benefits. TH to 32-34°C is still included in international guidelines for post-cardiac arrest care. We investigated how Irish ICUs are utilising TH as part of their management of patients post cardiac arrest using a telephone survey of all Irish ICUs. All 25 ICUs in Ireland participated. As of quarter 2 2014, TH was part of post-cardiac arrest management in 20 ICUs(80%), which is similar to international figures. 2011 was the median year for units to start using TH in Ireland. Over half 13 (52%) of Irish ICUs have experience with cooling more than 10 patients. Despite lack of evidence for its benefit, 12 ICUs (48%) use TH for OHCA non VF-VT arrests. Lack of resources was cited by 2 ICUs (8%) as well as no local consensus by 1 ICU (4%) prevented a small minority adopting the protocol. Similar methods of inducing and maintaining TH were found in Ireland as with overseas. Interest was expressed in recent research on TH and in 2 ICUs local practice had changed because of it. An updated international resuscitation guideline is awaited.

Introduction

Mortality and morbidity from cardiac arrest is a significant issue in our health service. Mortality from out of hospital cardiac arrest (OHCA) exceeds 90% and the figure is 70% for inpatients who suffer a cardiac arrest.[1–6] In 2002, two seminal, randomised, prospective trials[7,8] with a total of 350 patients confirmed the benefit of 12-24 hours of therapeutic hypothermia (TH) post cardiac arrest in improving survival and neurological outcomes for these patients. It should be noted only patients with VF/VT were included in these studies. Soon after these trials, international guidelines adopted TH into their standard protocols post arrest targeting 32-34° as the optimum temperature for 24 hours[9]. The evidence of any benefit of using (TH) for Non-VF/VT cardiac arrests is primarily based on observational studies and is sparse[10]. Non- VF/VT cardiac arrests unfortunately represent the majority of cardiac arrests and further studies would be required to ascertain what benefit if any that TH may confer to this patient group. The largest study to date[11] on TH has found that there is no significant mortality benefit between cooling to 33° and cooling to 36°. Indeed, cooling to 33° was found to cause more adverse effects such as hypokalemia (19% in the 33° group, 13% in the 36° group). The main objective of this survey is to find out the implementation rate and means of implementation of TH in Irish ICUs and interpret the impact of the latest research on clinical practice.

Methods

A telephone survey of all Irish ICUs was conducted between February and March 2014. There is no centralised database of the contact details of Irish ICUs. The locations of ICUs in Ireland was found in a Health Service Executive (HSE) report entitled 'Review of adult critical care services in the Republic of Ireland'. A previously published questionnaire, similar to that used in a UK survey[1] was used, to collect information from the consultant in charge of each ICU on that day. The Clinical Nurse Manager working in each unit was contacted if the consultant in charge was not available after numerous attempted contacts. Information collected was anonymised and interpreted using IBM SPSS 21[12].

Results

37 hospitals are mentioned in the 2009 HSE 'Review of adult critical care services in the Republic of Ireland' report[13]. 12 of these were ineligible due to downgrading or reconfiguration of the HSE hospital groupings. All 25 of the other units participated in this study. Multiple phone calls were made in an attempt to speak with the consultant in charge of each ICU, which was only possible on 11 occasions (44%). In the event that the consultant was not available on three further occasions the Nursing manager that day was spoken with (14 ICUs or 56%). 5 ICUs in Ireland (20%) do not use TH post cardiac arrest. The most frequent reason cited was 'No resources' (3 units), but one hospital mentioned no local consensus and prompt patient transfer to a neighbouring larger centre, while another had had no recent patients with cardiac arrest. The median year for hospitals to commence TH in Ireland

was 2011 with one hospital commencing cooling patients as early as 2003 and another commencing this year, 2014. This yearly increase in shown in Figure 1.

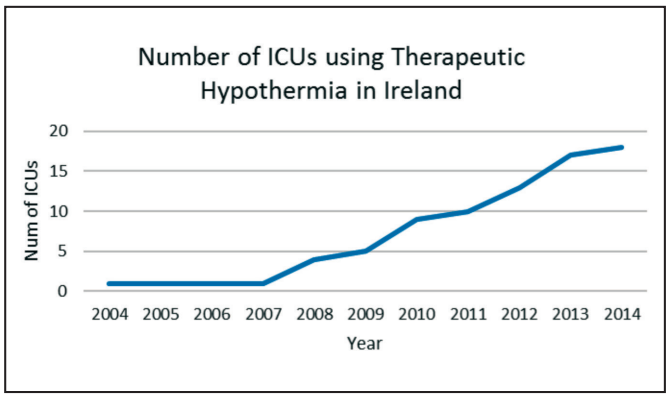

Figure 1

The majority of Irish ICUs have at least some experience of cooling patients with 36% of Irish ICUs having cooled over 30 patients to date. The various types of arrests and their proportions are shown in Table 1. 70% of Irish ICUs usually offer Therapeutic Hypothermia to out of hospital Ventricular Tachycardia or Ventricular Fibrillation (VT/VF) cardiac arrests. Half of Irish ICUs offer TH to inpatient cardiac arrests. In 50% of Irish ICUs, patients who present with out of hospital PEA/Asystole rhythm receive TH. Table 1 shows that the ED is the most common site to commence TH in Ireland with (n=14) 56% of hospitals initiating TH there, while 5 hospitals (20%) initially cooled their patients in the ICU itself. At one site TH has been commenced pre-hospital. The large majority of Irish ICUs cooled patients to a target temperature of 32-34o, with 88% of Irish ICUs using this as their target temperature. Table 1 also demonstrates that there was no consensus on a rewarming protocol with 24% taking 24 hours to rewarm and 20% attempting to rewarm at 0.25 to 0.5 of a degree per hour.

Table 1 Types of arrest cooled in Irish ICUs, details of where therapeutic hypothermia is commenced, how long it is maintained for and what target temperatures are aimed for

	Cool		
Type of arrest	**Usually**	**Sometimes**	**Never**
Out of hospital: VT/VF	14 (70%)	5 (25%)	1 (5%)
Out of hospital: PEA/Asystole	10 (50%)	8 (40%)	2 (10%)
In hospital	10 (50%)	6 (30%)	4 (20%)
Site of initiating TH			
Pre-Hospital			1 (4%)
ED			14 (56%)
ICU5			(20%)
Target Temperature			
28-32			1(4%)
32-34			17(88%)
34-36			1(4%)
Unknown			1(4%)
Duration of rewarming (hrs)			
12-24			1 (4%)
24			17 (88%)
Unknown			2 (8%)
Rewarming Protocol			
0.1 to 0.25 degree per hour			4 (16%)
0.25 to 0.5 degree per hour			5 (20%)
4-6 hours			2 (8%)
24 hours			6 (24%)
Passive			1 (4%)
Unknown			2 (8%)

Discussion

In 2013, the largest randomized control trial to date on TH post out of hospital VF/VT cardiac arrest found there was no benefit in cooling patients to 33°C over 36°C[11]. Evidence is minimal for TH for inpatient cardiac arrest or out of Hospital non-VF/VT cardiac arrest. The majority of Irish ICUs are using TH (80%). This practice began in 2003, however it wasn't until 2008 onwards that a large increase in its implementation was evident. This would be consistent with other studies that have shown a lag time of approximately 5 years prior to widespread adoption of TH[1,14]. Five ICUs in Ireland at the time of data collection, had never used TH. Three units mentioned not having access to resources. This is concerning as the evidence for temperature management and avoiding pyrexia post OHCA is compelling[7,8]. It is the authors' view that every ICU in Ireland should have the capability to control patients' temperature post cardiac arrest. The most common indication for using TH in Irish ICUs has been shown to be an out of hospital OHCA VF/VT. 70% of Irish ICUs use TH on these patients. This is in contrast with 86.5% of UK ICUs using TH for OHCA VF/VT patients[1]. Half of Irish ICUs would "usually" cool OHCA Non-VF/VT despite minimal evidence for its benefit based on mainly observational trials[10]. This is in contrast to 30.3% of UK ICUs "usually" cooling their OHCA Non-VF/VT patients and another 30.3% of UK ICUs "sometimes" cooling these patients. 50% of Irish ICUs would cool inpatients with cardiac arrest (IHCA) compared with 23.6% of UK ICUs, and 43% of cardiac arrest cases from the European Resuscitation Council Hypothermia After Cardiac Arrest-Registry ERC HACA-R database[15]. The evidence for utilising TH on IHCA patients is also lacking with only some retrospective studies available at present[16]. Only one Irish ICU reported an OHCA patient had been cooled pre-hospital, while 4 UK ICUs had done similar[1]. A randomized control trial of 1359 patients with OHCA (VF and non-VF) in 2014 demonstrated that pre-hospital cooling using cold IV fluids did not improve survival or neurologic status[17]. Further research on pre-hospital TH is required.

To date international resuscitation guidelines still recommend cooling patients to for OHCA VF and other rhythms in certain cases. Considerable debate was evident online post the 2013 NEJM publication[11] however the International Liaison Committee on Resuscitation (ILCOR) was quick to respond publishing a letter from its co-chairmen in Dec 2013 confirming their support of TH post OHCA arrest while accepting that certain clinicians may use 36°C as their target instead of previous lower values[18]. TH was not to be abandoned[18]. Two consultants mentioned having locally adopted 36°C as their new target when using TH but have not formally changed their resuscitation protocols. New resuscitation guidelines are awaited (due to be published in 2015) encompassing the latest research. This study is limited by potential reporting bias of telephone survey technique. We attempted to speak with the Consultant in charge of the ICU on that day but this was not always possible despite repeated phone calls. We also did not record outcome variables for each patient who received TH.

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National Institutes of Health Stroke Scale (NIHSS): Are Hospital Doctors Up To Date?

Sir

The National Institutes of Health Stroke Scale (NIHSS) is a validated 15 item neurological assessment that is widely used to evaluate clinical deficit in stroke and their eligibility for thrombolysis[1]. The NIHSS is an essential part of the assessment of patients' stroke severity and also helps to predict outcome and mortality in acute Stroke patients[2]. Our objective was to evaluate junior doctors' current knowledge of the NIHSS and to increase awareness among hospital doctors on its appropriate use. Self-completed questionnaires were administered to all junior hospital doctors in medical rotations. It was designed to determine the level of experience, knowledge, interpretation and application of the NIHSS. Doctors were also assessed on their awareness of the online teaching portal, in date certification and their opinion on the necessity for NIHSS training as part of the core curriculum.

42 non-consultant hospital doctors in medicine were recruited. These included 7 Registrars, 17 Senior House Officers and 18 House Officers. 17 (40%) of those studied had used the NIHSS in clinical practice while 11 (26%) reported experience in acute Stroke thrombolysis delivery. 40 (95%) of the doctors had heard of the NIHSS, however only 8 (19%) were aware of the items tested and 6 (14%) were aware of the total NIHSS score. Only 3 (7%) of the doctors knew of the NIHSS score range indicating thrombolysis as per the ECASS III trial[1] of whom were two Registrars and one Senior House Officer. Despite this, 18 (43%) of the doctors reported being comfortable to use the NIHSS in clinical practice. Only 6 (14%), 2 Registrars and 4 Senior House Officers are certified NIHSS users. Doctors who had previous experience working in Stroke services showed a better knowledge of the NIHSS and had a higher certification rate of 4 out of 17 (23%) compared to 2 out of 25 (8%) in the other group. Unfortunately, only less than half of the candidates are aware of the online training portal[3]. 40 (95%) of the doctors in the study felt that there should be in-house teaching and Stroke training should be part of the core curriculum.

Our study shows that there is insufficient knowledge of the NIHSS among hospital doctors despite Stroke thrombolysis service being available in most acute hospitals. It highlights the need to promote reliability and reproducibility of the NIHSS in acute Stroke management to ensure quality evidence based medicine and safe thrombolysis delivery. It also supports in-house training and stroke rotations as part of the core curriculum. The online certification on the use of NIHSS is crucial in achieving the above goals. Further work should focus on improving awareness and training of medical doctors using available multimedia[4] and the online teaching portal which has been shown to be highly effective.

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Maintaining Good Quality Clinical Data in Interhospital Transfer

Sir,

Well documented clinical data delivers a better patient care. In interhospital patient transfer, it is important to ensure that the transfer medical notes are adequate to provide a good continuation of care. We audited the quality of data provided during the transfer of patients from Tallaght Hospital to Peamount Hospital. Peamount Hospital is a stepdown facility which provide an inpatient respiratory rehabilitation service. Acute respiratory patients when stabilised from Tallaght Hospital are transferred to Peamount Hospital for continuation of care. We initially noted that there was a variation in the content of the transfer medical notes.

In 2012, 20 consecutive referrals were audited and 15 parameters were assessed for every referral. The set standard used was the 'Standards for clinical structure and content of patient records' from the Royal College of Physician of London. The findings were as follows: documented Respiratory consult – 11/20(55%) , presenting complaint -16/20 (80%), duration of presenting complaint -14/20 (70 %), past medical history- 16/20 (80%), medication list- 14/20(70%), allergy- 4/20 (20%), social history- 6/20 (30%), vitals on admission- 10/20(50%), positive examination findings- 11/20(55%), Blood results on admission- 18/20(90%), radiology findings- 18/20(90%), ECG- 11/20(55%), current and previous microbiological reports- 3/20(15%), previous/current echocardiogram report- 6/20(30%), treatment plan- 20/20(100%). Following these findings, a new proforma was implemented and reinforced the importance of documenting these 15 parameters prior to transfer of a patient. In 2014, another 20 consecutive referrals were re audited. An obvious improvement was noted: documented Respiratory consult – 20/20(100%) , presenting complaint -20/20 (100%), duration of presenting complaint -20/20 (100 %), past medical history- 20/20 (100%), medication list- 20/20(100%), allergy- 20/20 (100%), social history- 18/20 (90%), vitals on admission- 20/20(100%), positive examination findings- 18/20(90%), Blood results on admission- 20/20(100%), radiology findings- 20/20(100%), ECG- 20/20(100%), current and previous microbiological reports- 10/20(50%), previous/current echocardiogram report- 12/20(60%), treatment plan- 20/20(100%).

Reflecting on the above audit cycle, we can clearly notice the importance it played in the clinical governance of Peamount Hospital. However the way forward for maintaining good quality data would be the development of an electronic health record. The rising demands on healthcare systems and associated costs require a much more efficient and transparent means of recording, transmitting and accessing reliable clinical information in order to manage and deliver high quality care to patients. Taking NHS England as an example, challenging targets has been set for paperless communications between primary and secondary care by 2015, and a paperless NHS by 2018. For this to be realistically achievable, the standards for structure must reflect the way that patients and clinicians work together to the common goal of best practice and high quality care. This necessity has been recognised by the establishment of an independent Professional Record Standards Body to oversee rigorous development and maintenance of health and social care records.[1]

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Expectations of General Practitioners for Patients Undergoing Elective Total Knee Arthroplasty

M Nugent, O Carmody, PJ Kenny. Ir Med J. 2015; 108: 229-32.

Question 1
The number of GPs who were mailed the questionnaire was

a) 320
b) 330
c) 340
d) 350
e) 360

Question 2
The number of completed questionnaires was

a) 91
b) 101
c) 111
d) 121
e) 131

Question 3
The proportion of GPs expecting pain relief was

a) 91.3%
b) 93.3%
c) 95.3%
d) 97.3%
e) 99.3%

Question 4
The number of items in the questionnaire was

a) 53
b) 55
c) 57
d) 59
e) 61

Question 5
The GPs expectations regarding waiting times for publicly funded patients was

a) 6 months
b) 1 year
c) 1-2 years
d) 2-3 years
e) 4 years

Pattern of Change in Renal Function Following Radical Nephrectomy for Renal Cell Carcinoma

D Coyle, MR Quinlan, FT D'Arcy, BD Kelly, O Corcoran, GC Durkan, S Jaffry, K Walsh, E Rogers. Ir Med J. 2015; 108: 232-5.

Question 1
The study period was

a) 34 months
b) 36 months
c) 38 months
d) 40 months
e) 42 months

Question 2
The number of patients analysed in the study was

a) 131
b) 133
c) 135
d) 137
e) 139

Question 3
The median age at surgery was

a) 60 years
b) 62 years
c) 64 years
d) 66 years
e) 68 years

Question 4
Recent reports state that the average number of renal cell carcinoma cases in Ireland annually are

a) 301
b) 311
c) 321
d) 331
e) 341

Question 5
The 5 year survival for T1 disease is

a) 79%
b) 81%
c) 83%
d) 85%
e) 87%

Evolution of Carotid Surgical Practice in the last Decade

L Hanrahan, C Canning, O Abdulrahim, L Fitzgerald, S O'Neill, P Madhavan, J Harbison, MP Colgan, Z Martin. Ir Med J. 2015; 108:235-7.

Question 1
The number of carotid endarterectomy (CEA) cases in the pre-stroke unit era was

a) 259
b) 261
c) 263
d) 265
e) 267

Question 2
The number of CEAs in the stroke unit era was

a) 199
b) 209
c) 219
d) 229
e) 239

Question 3
The 30 day stroke and death rate was

a) <1%
b) <2%
c) <3%
d) <4%
e) <5%

Question 4
The proportion of male patients in the stroke unit era was

a) 53%
b) 63%
c) 73%
d) 83%
e) 93%

Question 5
The number of patients >80 years in the stroke unit era was

a) 26
b) 28
c) 30
d) 32
e) 34

KEY DATES FOR 2014 TAX RETURNS

Pay + File Deadline: 31st of October 2015
Online Deadline: 12th of November 2015

Those who wish to save for retirement in the most tax-efficient way should consider making a pension contribution prior to the deadline.

IMO Financial Services has the expertise to ensure that you are making contributions into the correct type of pension plan to suit your circumstances and maximise your tax relief.

We cover the full range of pre-retirement pension products:

- **AVCs (Additional Voluntary Contributions) for HSE and GMS schemes**
- **Pensions for private income**
- **Spouse's pensions**
- **Director's pensions**
- **Pension schemes for employees**

Talk to IMO Financial Services to maximise your tax reliefs:

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Email: **imofs@imo.ie**
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