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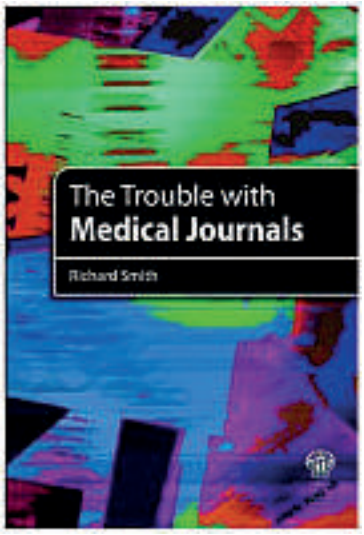
The Trouble with Medical Journals



Author: Richard Smith

Publisher: The Royal Society of Medicine Press Ltd. – 2006

Anyone who has read Richard Smith's writings can expect elegant prose, stimulating and controversial opinions from a self-confessed iconoclast. He strides through the medical minefields poking a stick at anything that looks suspicious. Readers therefore will not be disappointed by this book but will be surprised by the number of suspicious things that he mentions e.g. fraud by researchers and undue influence by pharmaceutical companies, editorial misconduct, conflicts of interest, relations with the mass media and neglect of the developing world etc. etc.

His initial chapter outlines contradictory statements in medical journals and compares them unfavourably with the work of basic scientists. Medicine is not an exact science and correspondingly this is not a fair criticism. He castigates peer review but does admit that it is like democracy – better than other options. He does however concede that training reviewers and examining the raw data of submitted articles are not feasible. He cites many instances of research misconduct yet does not indicate forcibly that this is very much a minor although important issue. He also questions the right of people to be listed as authors and laments the fact that their contribution to a paper is not detailed adequately. He states that putting the individual contributions would be very like modern films where at least 100 people are mentioned in the credits and not plausible. Putting the name of the head of department at the end of an article is a custom and if he or she followed up the study and looked at the finished product this is reasonable. His suggestion that there are too many journals available is well taken and, with PubMed Central and PubMed, paper journals are likely to diminish considerably. I think most doctors when confronted by a drug representative advocating a new compound will ask what advance the drug makes, how it compares with others in the field and how expensive it is and are unlikely to be greatly influenced by any hospitality provided particularly as lavish examples of such are now rare.

He acknowledges that pharmaceutical companies are responsible for great medical advances and that the conflict of science with business is inevitable. I think he over-estimates their influence and that of the mass media on doctors. The suggestion that patients know best is of course absurd - professionals in all occupations are generally superior to their "customers". Anybody using the services of for example carpenters, plumbers, electricians should never assume equal knowledge with them but be guided by their expertise. His suggestion about open access publishing is difficult to understand, is he suggesting that researchers put their material on the world wide web to be judged by everybody? In which case those with adequate aptitude will be few.

In summary therefore the question must be asked is Dr. Smith a Don Quixote tilting at medical windmills or an original thinker who believes that real progress can only be made by challenging the status quo. I adhere firmly to the latter view and recommend this book to doctors, researchers and publishers. Patients who consult it should be issued with a health warning "this book may further impair your faith in the medical profession".

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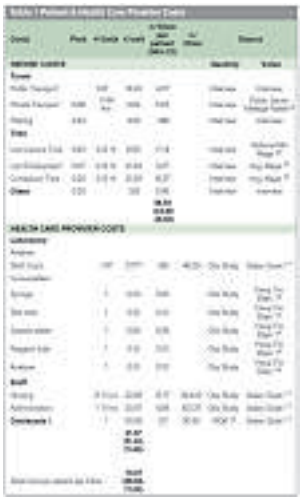
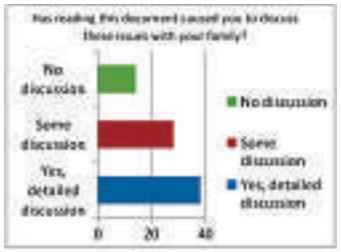
In this Month's IMJ

Retrospective costing of Warfarin: Walsh et al have assessed the use of anticoagulants for stroke prevention in patients with atrial fibrillation. Warfarin, although inexpensive, is the only agent that requires monitoring. The total cost per patient per visit for patients on Warfarin is 70.07.



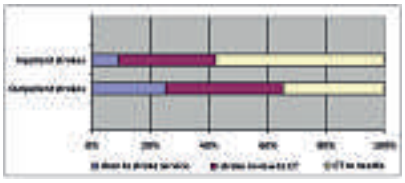
Introduction of oesophageal Doppler-guided fluid management in a laparoscopic colorectal surgery enhanced recovery programme: An audit of effect on patient outcome: McKenny et al report on the efficacy of oesophageal Doppler monitor (ODM) guided fluid therapy management in patients undergoing laparoscopic colorectal surgery. ODM patients had fewer post-operative complications and fewer unplanned critical care admission.

Are we ready to 'think ahead'? Acceptability study using an innovative end of life planning tool: O'Shea et al address the sensitive issue of end of life planning. Five GP practices recruited a total of 100 patients aged 40-70 years. The 'think ahead' data consisted of 6 sections ranging from care preferences, place of death, organ donation, post-mortem, funeral arrangements. The majority 63% found no difficulty in completing the questionnaire. Twenty six per cent were upset by the when I die and 'care preferences' sections. The authors feel that the process is useful and may help reduce distressing end of life outcomes.



Management of parenteral nutrition associated hyperglycaemia: a comparison of subcutaneous and intravenous insulin regimen: Neff et al point out that 88% of patients commenced on parenteral nutrition develop hyperglycaemia. In a retrospective study of 122 patients on parenteral nutrition they compared the efficacy of subcutaneous and intravenous insulin. Intravenous insulin was more effective at keeping the blood glucose within the target range.

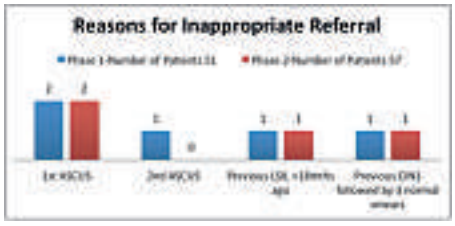
Delays in the stroke thrombolysis pathway – identifying areas for improvement: Brewer et al state that despite the benefits a limited proportion of eligible patients actually receive thrombolysis treatment. In their study of 323 stroke patients, 30 patients were thrombolysed but a further 36 eligible patients were not thrombolysed (in some of these patients the symptoms had resolved). The authors point out the need to reduce the time to CT and needle.



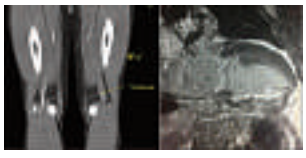
Managing Newborn Ileostomies: Crealey et al describe the post-operative management of a cohort of infants with ileostomies. There were 16 infants in the study. Skilled neonatal nursing care is fundamentally important. The key issues are weight gain, stoma output, and local and systemic complications.

Difficulties associated with diabetes management during the junior certificate examination: Scully et al report on blood sugar control among a cohort of diabetic teenagers during the junior certificate examination. Thirty three per cent had higher blood sugars and 20% experienced hypoglycaemia. Nearly half of the group felt that their diabetes affected their examination performance. The authors urge that the Dept. of Education to issue all schools with clear guidelines for accommodating children with diabetes.

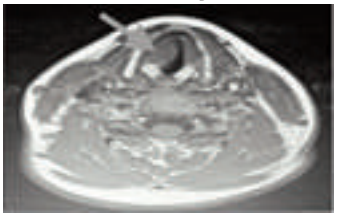
An example of ideal utilization of specialist services by primary care: cervical check: Crowley et al have audited GPs compliance with cervical check guidelines. Among 51 referred patients, there was a 90% adherence to guidelines. The findings are encouraging but the need for sufficient clinical information is again emphasised.



Triad of emboli in acute flare of ulcerative colitis: Kelly et al present a case of arterial emboli in a patient with ulcerative colitis. While venous thrombotic complications are well recognized, arterial thrombosis is much more rare.



Beware: Unilateral Reinke's oedema of the larynx: Kharytaniuk and Walshe describe a patient with hoarseness secondary to a glottis schwannoma. This resulted in unilateral Reinke's oedema which is swelling of the vocal cord.



Practicing Medicine Thirty Years On

Change is not immediately obvious when one is living in the moment. Change only becomes clear when one looks backwards. Change occurs both personally and professionally for doctors. We work in a profession that has changed greatly over the last 30 years. Today's clinical practice is unrecognizable from that of 30 years ago. Much of the change has been good but some aspects are worrying. Learning to live with the new sociological attitudes in society has been just as challenging as the medical and scientific changes. Paul McKeown, Des O'Neill and JFA Murphy presented and discussed on these issues at the IMO AGM on Saturday 26th April 2014.

Paul McKeown who is a specialist in Public Health summarized the big picture in Ireland since 1984. There have been a lot of success stories. Public Health is the science and art of preventing disease. It guides what we should do as a society to preserve health. It is an inclusive activity and works best where there is communal effort. Departments of Public Health were established in 1995. Their vision was a population perspective with a sense of fairness and equity combined with academic rigor. The pillars of good health in society are an adequate living income, maximum employment, strong public services, and minimization of poverty and poor health. All citizens should have good self-esteem. Public Health faces many obstacles. Society only pays lip service to prevention. The emphasis is on dealing with acute problems and specialties like Public Health have a low perceived value. It is a constant struggle to keep prevention at the forefront of everybody's mind.

Vaccination has been immensely beneficial to society over the last 90 years. The uptake of vaccines has never been higher with most programmes at or above the 95% target. Life expectancy has steadily risen with 3 additional years per decade. Children born today can expect to live into their nineties. Cardiovascular related deaths have fallen and cancer 5 year survival rates have improved. RTAs, a previous black spot have decreased from 239 deaths ('09) to 162 deaths ('12). All the mortality statistics for babies and children have decreased dramatically over the last 30 years. The smoking ban introduced in 2004 has significantly reduced morbidity and mortality. Into the future antimicrobial resistance is a potential community threat. We need to carefully preserve the effectiveness of the antibiotics that we have and avoid the emergence of new resistance bacterial strains. Guidelines on antibiotic usage and antibiotic stewardship are an important part of the solution to the problem.

Des O'Neill spoke from his background as a geriatrician and a commentator on medical care and medical practice. He touched on some of the broader issues and dilemmas confronting doctors. Articulating conflict of interest is a problem in Ireland. It is common that doctors presenting papers at Irish scientific or CPD meetings fail to routinely declare potential conflicts of interest. All speakers and presenters should state any association with pharmaceutical and technology companies. Another matter needing consideration is our understanding of professionalism. We all sort of know what it is but have difficulty in defining it: at a cynical level, GB Shaw described professionals as 'a group of people who band together to hide their shortcomings from others'! O'Neill urged the Medical Council to elaborate and expand on what it means to be a professional, particularly in terms of an understanding of the social contract between the medical profession and society[1]. He made some suggestions as to what the definition should include, drawing on the 2002 Physician Charter, a joint US and European initiative[2]. Professionals should seek the just distribution of finite medical resources. A particular area of concern is mounting evidence of differing standards of medical care for public and private patients[3], an issue which the Medical Council needs to address in the forthcoming revision of ethical guidelines. O'Neill pointed out that a more overt articulation of professionalism is a recognition that medical students and doctors are not a 'one size fits all'. There are many differing personality types from the overtly academic to the sensitive soul. Medical professionalism must have a sufficiently broad remit in order to be able accommodate and harness all types. The stereotyped vision of previous doctors has to change. As well as being good at their job the public wants doctors not only to be approachable,and understanding but also to be aware of the parameters of their social contract.

John Murphy spoke from a background of being a Paediatrician and an Editor. There have great scientific advances exemplified by the Nobel prize winners for medicine. The achievements of these special individuals are a permanent gift to society. The greats include Godfrey Housfield for the CT scan, Peter Mansfield for the MRI, Robin Warren for H Pylori, Luc Montagnier and Francoise Barre-Sinoussi for the discovery of the HIV virus, and Steptoe and Edwards for IVF. There have been dramatic reductions in the neonatal mortality rate. The things that save small babies' lives have frequently turned out to be both simple and inexpensive. The administration of antenatal steroids to mothers in preterm labour has reduced respiratory distress and intraventricular haemorrhage, placing the very preterm infant in a plastic bag has eliminated cold injury after birth, and therapeutic cooling is the first effective treatment for birth asphyxia.

There has been a paradigm shift in our thinking on the delivery of care to patients over the 30 years. In 1992 Gordon Guyatt published the seminal paper on evidence based medicine in JAMA. It had far reaching effects on the practice of medicine. Following the publication of To Err is Human in 2000, a new emphasis on safety emerged. Atul Gawande produced the pause moments that are practiced world in operating theatres. He pointed out that there are errors of ignorance because we don't know enough and errors of ineptitude because we don't make proper use of what we know. Doctors use one of two approaches when seeing patients. There is the intuitive approach, which is rapid, reflexive and suitable for high volume low acuity specialties. The other is the analytic approach, which is suitable for low volume high acuity specialties such as specialized neurology. When a patient is not getting better the non-specialist needs to know when to switch from the intuitive to the analytical way of thinking. Don Berwick has pioneered the importance of patient centred care. He portrays the plight of the patient feeling powerless in the system. He takes issue with the doctor using the term we rather than I when speaking to him. Patients want more than a good service, they want a good experience.

The new more strict regulatory directives that doctors now work under have been shaped by a series of medical scandals and mishaps on both sides of the Irish Sea. They include Shipman, The Lourdes Inquiry, The Bristol Infirmary Inquiry, Tribunal of Inquiry into the Blood Transfusion Service, The MMR controversy and the Mid Staffordshire Inquiry. These events have forever undermined the public's trust in the medical profession. Respect is no longer a given, it has to be earned. Doctors can draw a number of lessons from the events of the past 30 years. We can't do everything. We need to concentrate on the job that we were appointed to do. We need basic scientists to do basic science, clinical investigators to do clinical trials and clinicians to implement evidence based improvements for the patients. We need to minimize the lag time before useful therapies are introduced and the time interval before useless therapies are expunged.

JFA Murphy, Editor

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2. ABIM Foundation, ACP-ASIM Foundation, European Federation of Internal Medicine. Medical professionalism in the new millennium: a physician charter. Ann Intern Med 2002;136:243-6.
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Retrospective Costing of Warfarin

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Abstract
In Ireland, there are four anticoagulants available for prescribing to patients with atrial fibrillation for stroke prevention. A key feature of the three most recent anticoagulants is that monitoring is redundant. Despite this, there is continued prescribing of the incumbent anticoagulant, warfarin, which requires monitoring. Lack of information regarding the cost of monitoring, and the extra burden it places on health budgets and patients, motivated this costing study. Using micro costing, the costs of warfarin treatment (including monitoring) was disaggregated and isolated from both the patients' and health care provider's perspectives in a Cork hospital. Costs to the health care provider per patient per clinic visited were €21.57. Patient costs incurred per patient per clinic were €48.50. Thus, the total costs per patient per visit were €70.07. This result reveals that while the pharmaceutical cost of warfarin is low; it is not an inexpensive therapy when monitoring costs are considered.

Introduction

Traditionally in Ireland and the United Kingdom, atrial fibrillation (AF) patients have been anticoagulated with warfarin. Warfarin is well established in the market and has a low pharmaceutical cost base. However, patients prescribed warfarin require monitoring to ensure clinical effectiveness and to minimise bleeding risk, using the international normalisation ratio (INR). Recently however, relatively more expensive novel anticoagulants, with Factor Xa and direct thrombin inhibitors (Rivaroxabon (Xarelto®), Dabigatran etexilate (Pradaxa) and Apixaban (Eliquis®)), have come to market and have been deemed to be cost effective in the Irish health care system for the prevention of stroke in AF. These are given in a fixed dose and do not require monitoring. Despite these advances warfarin prescribing continues. The purpose of this study is to describe the costs incurred with monitoring warfarin so the full cost of warfarin treatment can be incorporated into adoption decisions. Using a micro costing approach this study disaggregates and isolates the costs of warfarin treatment from both the patients' and health care provider's perspectives. To facilitate this study primary data was collected in an outpatient's clinic at a Cork based hospital.

Methods

A bottom up approach, using micro costing, is employed to estimate the costs associated with monitoring warfarin per incidence in a Cork based clinic. This requires identifying, measuring and valuing the resource impact of the treatment in monetary terms[1,2]. The resources identified are consistent with existing literature[3,4]. The quantity and value of the resources consumed are obtained from a combination of sources as recommended by Larg and Moss[1]. These include patient surveys; observational studies of health care professionals and hospital database.

In 2011 ethical approval was granted from the hospital ethics committee to conduct a survey amongst registered warfarin patients at the clinic in the Mercy University Hospital, Cork. The sampling frame included 178 patients over 18 years of age registered with the clinic. Using convenience sampling over a six month period a sample of 158 patients was collected. As the majority of the patients attending the clinic were elderly the data was collected using a semi-structured interview to accommodate different levels of literacy. Although time consuming it led to a more complete dataset than expected with observational or diary studies employed elsewhere[3,5]. To measure health care provider resources consumed an observational study was performed in the clinic in 2011. The resources measured here included consumables, laboratory analysis and labour resources (laboratory, nursing and administrative). Evidence from the hospital's Finance Department databases were employed to estimate the market prices and costs of the resources identified and measured in the observational study.

In addition to the usual parameter and structural uncertainties present[6], external observational studies and convenience samples may yield biased cost estimates[1]. A probabilistic sensitivity analysis (PSA) was performed as a means of addressing these uncertainties in the parameters[6]. This required characterising uncertainty in input parameters; propagating uncertainty through the model using a Monte Carlo simulation and presenting the implications of parameter uncertainty[6].

Results

Patient Costs

The results of the semi-structured interview revealed that there are three categories of patient costs: travel, waiting time and additional costs (including food). The average age of the patients in the sample was 70 years. From examining previous literature this age profile is typical of a population prescribed warfarin[7]. The average distance travelled to the clinic was 11.44km, with an associated standard deviation of 15.16km. The results revealed that 31% used public transport and the remainder used private transport as a means of travelling to the clinic. The average spend on public transport was €14.03 with an associated standard deviation of €5.93. Using public sector mileage rates of €0.64 per km[8], the average travel cost for using private transport was €5.02 (given that 69% of patients utilised private transport). In addition, 44% incurred parking expenses averaging at €4.25, with an associated standard deviation of €1.37.

The average time spent at the clinic (including waiting time) was 2.13 hours. From the patient's perspective there is an opportunity cost associated with this time, irrespective of employment status[2] (7% in employment, 93% not in employment). In valuing this opportunity cost a distinction was made between those in employment and not in employment. For those in employment, the opportunity cost was valued using the national average wage, €21.93[9]. While for those not in employment the national minimum wage, €8.65[10], was applied. In addition, 35% of patients had a companion with them. To value the cost of their time the national average wage, €21.93[9], was again applied. Finally, 25% of patients incurred additional costs (food etc.) averaging at €1.82, with an associated standard deviation of €4.07. Thus total patient costs incurred, per patient, per clinic attended was €47.16, with a standard deviation of €1.15 revealed in the probabilistic sensitivity analysis.

Health Care Provider Costs

The costs to the health care provider were classified as laboratory, staffing and overhead costs. With regard to laboratory costs, the consumables identified were: syringes, test tubes, sample plates, reagent tubes and analysers. The observational study revealed one of each consumable is utilised per patient, per clinic visit. The costs for each consumable were sourced from the Finance Department in the hospital, shown on Table 1, averaging €0.64 per patient, per clinic. There are also wage costs associated with the laboratory analysis. Using the Department of Health salary scales[11] the median point on the scale for a senior laboratory technician was selected, PRSI and pension costs were added (as per HIQA guidelines[12]) and the hourly cost was estimated as

CPD available online at www.imj.ie and questions on page 159.

Table 1 Patient & Health Care Provider Costs

Costs	Prob	# Units	€/unit	€/Clinic per patient (95% CI)	€/ Clinic	Source	
PATIENT COSTS						**Quantity**	**Value**
Travel							
Public Transport		0.31	14.03	4.37		Interview	Interview
Private Transport	0.69	11.44 Km	0.64	5.02		Interview	Public Sector Mileage Rates† [8]
Parking	0.44		4.25	1.88		Interview	Interview
Time							
Lost Leisure Time	0.93	2.13 Hr	8.65	17.14		Interview	National Min Wage [23]
Lost Employment	0.07	2.13 Hr	21.93	3.27		Interview	Avg. Wage [16]
Companion Time	0.35	2.13 Hr	21.93	16.37		Interview	Avg. Wage [16]
Other	0.25		1.82	0.45		Interview	Interview
				48.50 (44.99-49.50)			
HEALTH CARE PROVIDER COSTS							
Laboratory							
Analysis							
Staff Costs		1.67	27.77	1.85	46.29	Obs Study	Salary Scale [11]*
Consumables							
Syringe		1	0.20	0.20		Obs Study	Hosp. Fin Dept. [24]
Test tube		1	0.10	0.10		Obs Study	Hosp. Fin Dept. [24]
Sample plates		1	0.09	0.09		Obs Study	Hosp. Fin Dept. [24]
Reagent tube		1	0.15	0.15		Obs Study	Hosp. Fin Dept. [24]
Analyser		1	0.10	0.10		Obs Study	Hosp. Fin Dept. [24]
Staff							
Nursing		3* 5 hrs	22.95	13.77	344.25	Obs Study	Salary Scale [11]*
Administration		1* 5 hrs	20.47	4.09	102.37	Obs Study	Salary Scale [11]*
Overheads ‡		1	30.35	1.21	30.35	HIQA [12]	Salary Scale [11]*
			21.57 (21.45-21.69)				
Total Cost per patient per Clinic			**70.07 (66.58-71.09)**				

† As per Minister for the Environment, Heritage and Local Government [8]
* See Table 2 for calculations; ‡ See Table 3

Table 2 Estimating Staff Costs

	Basic Pay*	Employers PRSI †	Basic Pay + PRSI	Pension Costs ‡	Total Cost §	€ per Hour ¥
Lab staff technician	43,144	8.5%	43,180.67	13%	43,237.24	27.77
Staff Nurse	39,630	8.5%	39,663.69	13%	39,715.64	22.95
Clinical Officer	35,354	8.5%	35,384.05	13%	35,430.40	20.47

§[12] *[11] †[25] ‡[9] ¥[15]

Table 3 Estimating Overheads

	Basic Pay*	Overheads†	Over Heads per hour ¥
Lab staff technician	43,144	17,257.60	11.09
Staff Nurse	39,630	15,852.00	10.18
Clinical Officer	35,354	14,141.60	9.08
			30.35

*[11] †40% of Basic Pay as per HIQA[9] ¥[15]

€27.77 (see Table 2, as per Government guidelines[13]). The observational study revealed that there are 25 patients per clinic and technicians can analyse 15 tests per hour. Therefore, the average cost of the laboratory analysis per clinic was €46.29 or €1.85 per patient, per clinic visit.

Staff costs were also incurred for nursing and administrative staff. The observational study conducted provided the estimates of staffing resources and time. An administrator is employed for five hours per clinic at an hourly rate of €20.47 per hour (estimated as per HIQA[12] and Government guidelines[13], Table 2). The costs per clinic were €102.37 and given 25 patients were scheduled per clinic; the average cost per patient, per visit was €4.09 (see Table 2). Similarly, at an hourly rate of €22.95 for a nurse (see Table 2) the cost per clinic was €344.25 with three nurses, which equates to €13.77 per patient, per clinic visit. Overheads were estimated at 40% of basic wage costs, as per HIQA guidelines[12]. As shown in

Table 4: Probability Distributions and Parameter Statistics

	Mean (95% CI)	α	β	n	std dev	se	alpha	beta	dist
P_ Public Transport	0.31 (0.21 -0.35)	43	114	157					beta
P Private Transport	0.69 (0.53-0.69)	95	62	157					beta
P_Parking	0.44 (0.32-0.47)	61	96	157					beta
P_Lost Employment	0.07 (0.04-0.11)	11	146	157					beta
P_Companion's Time	0.35 (0.28-0.43)	55	102	157					beta
P_other costs	0.25 (0.18-0.32)	39	118	157					beta
C_ Public Transport	14 (12.13-16.29)			30	5.93	1.08	167.81	0.08	gamma
# kms	11 (8.09-15.09)			80	15.15	1.69	45.59	0.25	gamma
Lost Leisure Time hr	2.13 (2.08-2.18)			157	0.34	0.03	6191.56	0.00	gamma
Lost Employment hr	2.13 (2.08-2.18)			157	0.34	0.03	6191.56	0.00	gamma
Companion's Time hr	2.13 (2.08-2.18)			157	0.34	0.03	6191.56	0.00	gamma
C_Parking	4.25 (3.93-4.61)			61	1.37	0.17	582.30	0.01	gamma
C_other costs	1.82 (0.78-3.35)			39	4.07	0.65	7.83	0.23	gamma
o/head hrs	1 (0.70-1.33)			10	0.50	0.16	40.00	0.03	gamma
C_o/head per hr	30.35 (27.47-33.46)			10	5.00	1.58	368.49	0.08	gamma

se = Standard Error; **std dev** = Standard Deviation; **p**= probability; **c**= cost
Beta Distribution: Beta (**α**, **β**). Where **α** = number of events occurring.
β = **n**- **α** (where **n** is the number of events which could have occurred)[6]
Gamma Distribution: Gamma (alpha, beta). Where **alpha** = (mean/standard error)^2 and **beta** = (standard error^2 / Mean)[6]

Table 3, overheads were €30.35 per clinic (assuming one hour of overhead cost per clinic). This equates to €1.21 per patient per clinic visit. The total health care provider costs incurred, per patient, per clinic attended was €21.57 (the probabilistic sensitivity analysis revealed a standard deviation around this of €0.06).

With respect to assigning distributions to the parameters for the probabilistic sensitivity analysis: Beta distributions were applied to method of transport, parking and waiting time parameters where there was a probability of an event occurring. Gamma distributions were applied to the cost parameters as they were positive and continuous. The input parameters and 95% confidence intervals surrounding the outputs are presented on Table 4.

Discussion

Owing to population growth, aging populations and rising health care costs (including prescription drugs), health budgets worldwide are coming under increasing pressure to deliver value for money health care. Changing demographics like this result in a shift in health care demands. One condition which has received attention in this respect is thromboembolic cerebrovascular disease (stroke). It is estimated that stroke is the second most common causes of death worldwide and responsible for 10% of deaths. While for those who survive there is a significant degree of disability resulting in dependence[14-18]. In Ireland it is estimated that 10,000 individuals with stroke are admitted to hospitals per annum and strokes account for 7% of mortality[19]. Furthermore it is estimated that the total cost of managing stroke patients is Ireland is in excess of €1,044 million[14]. In light of this increased risk, AF patients are treated with anticoagulants like warfarin to reduce the risk of stroke[20]. The monthly pharmaceutical cost of warfarin is €2.13 per patient[21], with additional monitoring warranted to ensure clinical effectiveness. Lack of information regarding monitoring costs, and the extra burden on health budgets and patients, motivated this costing study. Using micro costing the costs of warfarin treatment was disaggregated and isolated from both the patients' and health care provider's perspectives in a Cork hospital.

This study using micro costing estimated the total cost of monitoring (including total patient and health care provider costs) per patient, per visit at €70.07 (the probabilistic sensitivity analysis revealed a standard deviation around this of €1.15). In addition, patients have on average two clinic visits per month and require in the first year of therapy an in-patient stay of 4-5 days at an

estimated cost of €4,747 (given an average cost per bed day of €949, indicated €850 average cost per bed day, this is adjusted for inflation[22]). In contrast, novel anticoagulants do not incur these monitoring costs. Although the pharmaceutical cost of warfarin is low; our study reveals it is not an inexpensive therapy when monitoring costs are considered. This study highlights the significant costs of monitoring warfarin for patients and health care provider, which were not previously measured. With an aging population and an increased risk of the incidence of strokes, health care budgets are under increased pressure. This retrospective, single centre costing study demonstrates how by broadening the perspective of cost analyses the full costs of warfarin can be considered. Given their significance, such monitoring costs should be incorporated into adoption decisions at patient level and when considering the cost effectiveness and budget impact of alternative anticoagulants nationally.

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Introduction of Oesophageal Doppler-Guided Fluid Management in a Laparoscopic Colorectal Surgery Enhanced Recovery Programme: An Audit of Effect on Patient Outcome

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Abstract
Morbidity after colorectal surgery can be reduced with intraoperative oesophageal Doppler monitor (ODM) guided fluid therapy. We audited the effect of introducing ODM-guided fluid therapy in enhanced recovery laparoscopic colorectal surgery. ODM group (n=40) outcomes (toleration of diet, Post Operative Morbidity Survery (POMS) score, complications) were compared to matched patients (n=40) who had the same surgery using a conventional approach to fluid management. Mean (SD) time to tolerate diet was shorter in the ODM group (2.3 (1.6) days vs 3.8 (2.4) days, p = 0.003). The ODM group had a lower mean (SD) POMS score on post-operative day 1 (2 (1.4) vs 4 (1.1), p = 0.001), fewer postoperative complications (14 patients vs 20, p=0.009) and a lower rate of unplanned critical care area admission (1 vs 6, p= 0.001). Introduction of intraoperative ODM-guided stroke volume optimization was associated with improved outcomes in patients undergoing enhanced recovery laparoscopic colorectal surgery.

Introduction

When conventional haemodynamic indices, including blood pressure and heart rate, are used to guide intravenous fluid administration intraoperatively they may not disclose occult hypovolaemia, a volume-depleted state that is associated with worse outcome[1,2]. The use of fixed-volume fluid protocols can lead to hypervolaemia and tissue oedema, which is also associated with increased morbidity[3,4]. Therefore, much interest has focused on methods of monitoring intravascular volume status to guide individualised fluid therapy during major surgery[5]. The oesophageal Doppler Monitor (ODM) is a minimally invasive cardiac output monitor, that, when used with a stroke volume (SV) optimisation algorithm, can guide fluid therapy during surgery to enhance global and regional tissue perfusion and has been shown to improve outcomes in a variety of surgical settings[2,6-11]. In patients undergoing colorectal surgery, ODM-guided fluid administration has been found to enhance recovery of gut function postoperatively, reduce complications and hospital length of stay[7-9]. The National Institute for Clinical Excellence and other organisations recommend that clinicians consider using the ODM in patients undergoing major or high-risk surgery[12,13].

A colorectal surgery enhanced recovery pathway, together with an ongoing audit of patient outcomes, is well established at our institution. This pathway lacked an intraoperative fluid management component, so based on the evidence of improved outcome in colorectal surgery with ODM-guided intraoperative fluid therapy, we introduced this monitoring modality. We report the clinical audit performed as an integral part of this quality improvement change in our enhanced recovery laparoscopic colorectal surgery patient population[14].

Methods

The audit design permitted postoperative outcomes of ASA 1-3 adult patients undergoing elective laparoscopic colorectal surgery with intraoperative ODM fluid management during 2011 (ODM group) to be compared to the outcomes of patients who had the same surgical procedures with conventional fluid management (conventional group). Both groups followed the same enhanced recovery pathway in all other respects. The ODM group had intraoperative ODM-guided fluid management using the Deltex CardioQ-ODM™ (Deltex Medical, Chichester, West Sussex, UK). The conventional group comprised patients from the institution's prospective colorectal surgery audit database who had undergone the same surgical procedure, but had intraoperative fluid therapy guided by conventional haemodynamic indices. Comparison of outcomes between the ODM and conventional groups was based on matching patients for age, procedure type, ASA grade, and Colorectal Physiological and Operative Severity Score for the enUmeration of Mortality and Morbidity (CR-POSSUM). Audit data was collected prospectively for both groups, and the groups ran consecutively. The audit proposal was submitted to the institutional Research Ethics Committee; the chairman reviewed the proposal on behalf of the committee and stated that ethical approval was not necessary.

Both groups received a similar anaesthetic; induction with fentanyl and propofol, tracheal intubation with rocuronium or atracurium, and maintenance with sevoflurane in oxygen and air and a remifentanil infusion. Standard monitoring included ECG, SpO2, capnography and invasive arterial pressure measurement. In the induction room ODM group patients had an ODM probe inserted into their oesophagus in accordance with the manufacturer's instructions. Multimodal post-operative analgesia comprised paracetamol, NSAIDs and morphine patient controlled analgesia. No regional anaesthesia techniques were used. The ODM group fluid management algorithm (Figure 1) was based on RCT algorithms that demonstrated improved outcome in colorectal surgery patients[7-10]. The fluid used in this algorithm was 6% Hydroxyethyl Starch (HES) (Voluven, Fresenius Kabi AG, Bad Homburg, Germany) Stroke volume optimization with the ODM was undertaken prior to initial pneumoperitoneum, and during the 'open' phase of the laparoscopic procedure, but not when pneumoperitoneum was present. The ODM probe was removed at the end of the procedure. Conventional group intraoperative fluid management was at the discretion of the attending anaesthetist using conventional hemodynamic indices.

Outcomes audited were time to tolerate oral diet post-operatively, Post Operative Morbidity Survey (POMS) score, overall organ-specific complication rate, unplanned critical care area (HDU/ICU) admission rate and length of postoperative hospital stay. POMS score is a validated tool that assigns a score for the presence or absence of predefined postoperative organ-specific complications[15,16]. A member of the surgical team who was not present in the operating room undertook postoperative patient data collection. The first post-operative day was assigned day 1 for the purpose of calculating length of hospital stay. Timing and volume of intraoperative crystalloid and colloid administration was recorded. Demographic and baseline characteristics were described using summary statistics for both groups. Our statistical analysis used Student's t test for independent samples. McNemar's Chi Sq test was used for matched data. A p value <0.05 was considered statistically significant.

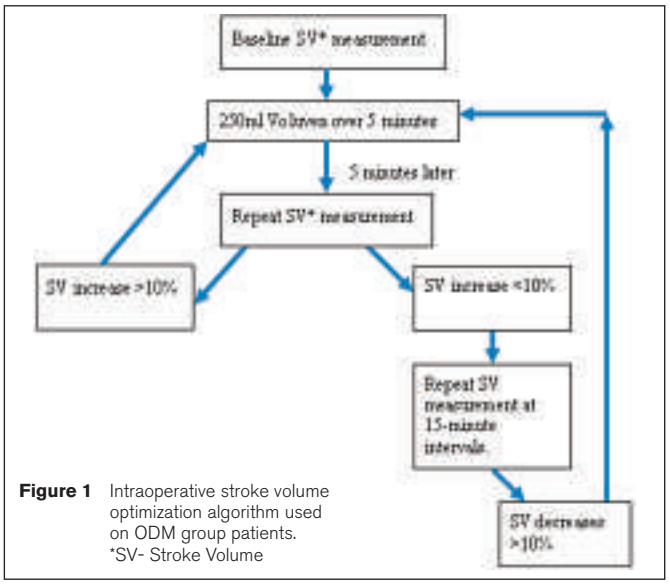

Figure 1 Intraoperative stroke volume optimization algorithm used on ODM group patients. *SV- Stroke Volume

Results

The audit included 80 patients; 40 in the ODM group and 40 in the conventional group. Age, surgical procedure, ASA grade, physiological, operative and total CR-POSSUM score and duration of surgery were similar between the groups (Table 1). ODM group patients tolerated oral diet earlier than conventional group patients (2.3 (1.6) days vs 3.8 (2.4) days, p = 0.003) (Table 2). POMS score was lower on postoperative day 1 in the ODM group (2 (1.4) vs 4 (1.1), p = 0.001) (Table 2).

Table 1 Characteristics of patients undergoing intraoperative ODM-guided or conventional fluid management for laparoscopic colorectal surgery. Values are mean (SD) or number

	ODM (n=40)	Conventional (n=40)	p value
Gender; male	19	27	0.01
Age; years	62.3 (12)	64 (10.2)	ns
ASA	2.2 (0.6)	2 (0.66)	ns
CR-POSSUM Physiological	8.5 (2)	8.8 (7.9)	ns
CR-POSSUM Surgical	7.7 (1.2)	7.9 (1.4)	ns
CR-POSSUM Total	16.2 (2.6)	16.7 (2.9)	ns
Length of surgery; minutes	214 (62)	218 (79)	ns
Anterior resection	22	22	
Right hemicolectomy	12	12	
Abdominoperineal resection	6	6	

*CR-POSSUM; colorectal physiological and operative severity score for the enumeration of mortality and morbidity

Fewer ODM group patients experienced 1 postoperative complication (14 vs 20, p=0.009) (Table 3). In the conventional group, gastrointestinal complications developed in 5 patients. These complications included one anastamotic

Table 2 Postoperative outcomes of patients undergoing intraoperative ODM-guided or conventional fluid management for laparoscopic colorectal surgery. Values are mean (SD) or number.

	ODM	Conventional (n=40)	p value
Tolerate diet; days	2.3 (1.6)	3.8 (2.4)	0.003
POMS 1	2 (1.5)	4 (1.1)	0.001
POMS 3	1 (1.2)	1.5 (1.1)	0.06
POMS 5	0.7 (1.3)	0.8 (1.1)	0.84
Length of postoperative hospital stay; days	8.7 (4.3)	9.6 (5.6)	0.36
Unplanned critical care admission; number of patients	1	6	0.001

Table 3 Postoperative complications of patients undergoing intraoperative ODM-guided or conventional fluid management for laparoscopic colorectal surgery. Values are number. * p = 0.009

	ODM (n=40)	Conventional (n=40)
Number of patients who had ≥1 complications*	14	20
Total number of complications in group	15	24
Gastrointestinal	6	5
Wound infection	2	2
Wound dehiscence	0	1
Genito-urinary	5	8
Cardiovascular	0	4
Respitary	2	3
Other	0	1

haematoma, one small bowel obstruction requiring operative intervention and 2 high output stomas. The fifth patient had a prolonged ileus and required total parenteral nutrition (TPN). All of the gastrointestinal complications in the ODM group were ileus, 2 of which required TPN. Fewer patients in the ODM group required unplanned postoperative critical care admission (1 vs 6, p = 0.001) (Table 2). Reasons for critical care admission included lower respiratory tract infection, hypovolaemic shock, acute kidney injury and prolonged ileus. Length of critical care stay ranged from 1-2 days in the conventional group and was 7 days for the patient in the ODM group. There was no difference between groups in the mean (SD) length of postoperative hospital stay (days) (8.7 (4.3) in the ODM group and 9.6 (5.6) in the conventional group).

Total volume (mean (SD)) of fluid administered was not different between the groups; ODM group 2104 (904) ml vs. conventional group 2447 (958), p = 0.07). Patients in the ODM group received more colloid (964 (525) ml vs 371 (421) ml, p < 0.0001), and less crystalloid (1140 (614) ml vs. 2076 (807) ml, p < 0.0001). Patients in the ODM group received more colloid during the first hour of surgery (636 (355) ml vs 62 (156) ml, p < 0.0001). There were no differences in the volumes of colloid administered over subsequent hours of surgery between the 2 groups. In contrast, the ODM group patients received less crystalloid during every hour of surgery. There were no complications related to ODM probe insertion and no patients in the ODM group developed signs or symptoms of fluid overload or cardiac failure.

Discussion

This audit showed that intraoperative ODM-guided SV optimisation was associated with a reduction in postoperative morbidity in patients undergoing laparoscopic colorectal surgery. Time to tolerate diet was shorter, and complication rate, number of complications and unplanned critical care admission rate was significantly lower in the ODM group. Fewer patients in the ODM group experienced 1 postoperative complication (14 vs. 20, p = 0.009). Patients in the conventional group had more serious gastrointestinal morbidity. Splanchnic hypoperfusion may occur in up to 60% of patients undergoing major surgery, can affect gut mucosal functional integrity, and has been shown to be a strong predictor of postoperative GI morbidity[2,17-19]. Individualised timely optimization of stroke volume in the ODM group may have better maintained splanchnic perfusion and gut mucosal integrity and could explain the observed reduction in complication rate. The total volume of intravenous fluid administered to the 2 groups was not different. Therefore, the type and / or temporal pattern of intravenous fluid administration may explain the observed outcome differences. The ODM group received more colloid and less crystalloid than the conventional group. Colloids may have a benefit by maintaining splanchnic micro-circulation[20,21]. In the ODM group fluid administration was 'front loaded'; they received a greater proportion of their total fluid in the first hour of surgery, prior to initiation of pneumoperitoneum and re-positioning of the patient from supine to Trendelenberg.

The sequence of operating room events in relation to the timing of fluid administration may be important in understanding the observed differences in outcome. Pneumoperitoneum during laparoscopic surgery is uniquely associated with acute cardiovascular changes, including reduced venous return, increased afterload and a reduction in SV and cardiac index[22]. Such haemodynamic responses to pneumoperitoneum may vary according to both the individual patient and the insufflation pressure[23]. These cardiovascular changes may be amplified by the steep Trendelenberg position necessitated by laparoscopic colorectal surgery and the variable degrees of dehydration that exist in this surgical population. It is plausible that this confluence of factors adversely affects tissue perfusion in patients undergoing laparoscopic surgery[23]. Early optimization of stroke volume prior to pneumoperitoneum with 'front loading' of fluid may have a protective effect on the splanchnic circulation and gut mucosal integrity, and this may explain the lower rate of morbidity seen in the ODM compared to the conventional group who did not have this 'front loaded' pattern of fluid administration.

A potentially important effect may be observed from using the ODM to guide fluid administration only when pneumoperitoneum was absent. When pneumoperitoneum is introduced, reduced SV is detected by the ODM. If this reduced SV is inappropriately attributed to hypovolemia, rather than the physiological changes described above, and triggers further intravenous colloid administration, the risk of harmful iatrogenic fluid overload has been created. Thus, the observed improvement in outcome in the ODM group in this audit accords with the benefits that have been observed when an approach is taken to intraoperative fluid management that avoids salt and water excess[3,4]. This audit observed a reduction in postoperative complication rate, but no difference in length of postoperative hospital stay. The sample size may have been inadequate to detect any such difference, and length of stay may be influenced by non-medical factors. Time to fitness for medical discharge might be a more informative measure. Interestingly, the total number of bed days was 348 in the ODM group compared to 383 in the conventional group, which represents significant cost saving at our institution on this metric.

On the basis of evidence of improved outcome and the published recommendations we introduced intraoperative ODM-guided fluid management as a quality improvement measure to an existing enhanced recovery pathway in laparoscopic colorectal surgery. This clinical audit formed an important part of this process, and found that intraoperative ODM-guided stroke volume optimisation was associated with earlier toleration of diet, and a reduction in complication rate, total number of complications and unplanned critical care admission in patients undergoing laparoscopic colorectal surgery. This also illustrates the importance of audit when an evidence-based quality improvement change is implemented. Individualised fluid therapy has been adopted as one of the recommended elements for major elective surgical pathways by the Enhanced Recovery Partnership, and particularly in the area of laparoscopic surgery this has generated recent interest[13,24]. The predicted expansion of enhanced recovery pathways in the future is likely to make this an ongoing focus of interest.

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Are We Ready to "Think Ahead"? Acceptability Study Using an Innovative End of Life Planning Tool

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Abstract

This is a cross sectional study in 5 GP Training Practices, sample size 100 clinically stable patients, attending for routine care. Purpose of the study was explained and informed written consent was sought. Participants were provided with 'Think Ahead,' an innovative end of life planning tool, devised by The Forum on The End of Life, based on best international practice, presented in a questionnaire format, detailing main decision centres relevant in end of life planning. Participants completed telephone surveys at 1 and 3 weeks, ascertaining their experience with 'Think Ahead;' 92/100 completed both surveys. Results indicate high levels of acceptability and positive experience for most participants. A majority (63%) indicated 'no difficulty' in completing 'Think Ahead;' 74% indicated reported they did not find completing the folder to cause upset; 87% indicated they felt the folder should be more widely available, and 68% indicated they felt 'Think Ahead' would be of general interest. The study was effective in encouraging discussion on end of life issues with family(83%) with 49% indicating they had done so in detail, and 34% indicating having 'done so somewhat,' having read 'Think Ahead;'27% indicated aspects of it were upsetting. Results will be used to inform further development of the tool. General Practice consulting is a suitable context in which to systematically present 'Think Ahead.'

Introduction

End of life planning is recognised to be important in the care of healthy adults and individuals with significant medical conditions. Among the earliest references is Kutner (1969) (concept of the advanced directive)[1]. It continues to be of international interest,[2] and more recently (2008), The Department of Health in England and Wales published The End of Life Care Strategy,[3] seeking to identify and improve deficiencies in the planning and provision of medical care to dying patients. There is evidence emerging which indicates this may be effective.[4] In Ireland, The National End of Life Care Programme (NEoLCP) and 'Think Ahead' were established to implement 6 steps in the end of life care pathway.[5,6] Concern in this area of care is evident, in terms of expressed wishes of patients and families, where difficulties are known to exist along familiar care pathways, for example in emergent out of hours care in the community.[7] The National Council of the Forum on End of Life was established in 2009 in Ireland to stimulate discussion on end of life planning, and make recommendations to improve end of life care. The Forum work plan includes 'Think Ahead,' formally launched in 2011.[6] 'Think Ahead' seeks to provide guidance for individuals formulating and recording end of life wishes, preferences, and relevant care details, where possible to do so in consultation with friends and family, and making decisions more effectively available in an emergency, and in care after death. 'Think Ahead' is available through Citizens Information Centres and online (www.thinkahead.ie). This study explores systematic use of 'Think Ahead' in a General Practice setting.

The aim of this project is to evaluate acceptability of the 'Think Ahead' planning tool, on a sample of 100 clinically stable patients, in 5 GP Practices. Feedback was obtained with a view to determining acceptability to patients, areas which were uncertain or a cause of upset, and the extent to which users of the package found it useful, when delivered in General Practice.

Methods

A study was undertaken in 5 Practices on The TCD HSE GP Training Scheme. 'Think Ahead' was presented to 100 patients (aged 40-70 yrs) considered clinically stable, serially attending for routine care to their GP (i.e. GPs were instructed to invite all patients aged 40-70 years meeting the inclusion criteria were invited to participate). Patients adjudged by their GP to be presenting with acute clinical conditions were excluded (i.e. GPs were instructed to exclude patients who were acutely unwell, in pain, or otherwise experiencing distressing symptoms). Patients invited to participate were therefore clinically stable, attending largely for planned routine appointments (e.g. diabetic check), and understood to have been at no clinical risk. Patients with impaired cognitive function were excluded. Patients were recruited through provision of an information sheet, outlining purpose and nature of the study. Informed written consent was obtained. A printed version of 'Think Ahead' was presented, and taken home by the patient. Patients were encouraged to complete 'Think Ahead' with partners or family members.

'Think Ahead' includes an introduction and six sections – Section 1: Key Information (important contacts/insurance details etc.); Section 2: Care Preferences (place of death /life prolonging care, CPR, religious /cultural beliefs); Section 3: Legal (Wills/Enduring Power of Attorney); Section 4: Financial (Bank accounts/pension/life assurance details)

Section 5: "When I Die" (wishes on organ donation, post-mortem, funeral arrangements); Section 6: Sharing of Information (consent for folder contents to be accessible to family, GP). Telephone surveys were carried out at 1-2 weeks and 3-4 weeks. Ethical approval was obtained from the TCD HSE GP Training Scheme Ethics Committee. It was run on a pilot basis, with minimal modification following the pilot, results of which are included.

Results

At week 3 the number of people who had fully responded was 92/100, (52 were female, 51 were medical card holders, most were aged 51-60 yrs). 97% of people read the document, and 76% completed either all (31%), or some (44%) of it.

Acceptability

A majority (63%) reported 'no difficulty' completing the folder; 74% of people indicated they did not find completing the folder to cause upset.

Difficulty in completing Think Ahead

37% indicated some difficulty in completion, the principal area identified as difficult being the section entitled "Care Preferences". A sample response was: "I don't understand the issues around CPR and ventilation" with 4 respondents indicating difficulty with details relating to death and dying, and 3 indicating difficulties around the issue of CPR. Some respondents had difficulty completing the "Legal" and "Key Information" sections, with 6 respondents indicating difficulty understanding references to making a will, and 3 respondents indicating uncertainty regarding financial planning.

Upset in completing Think Ahead

Among 26% reporting upset, two main areas were identified. These were from sections "When I Die" and "Care Preferences". In the former, a sample response was "the idea of organ donation and switching off life support machines was upsetting," with 9 respondents (9.2%) identifying upset at thoughts of dying. "When you are sick, you may feel differently about the choices you have made when you are well".

Recommendations for change by respondents

During telephone interview, participants were asked if they felt information should be removed from the folder. Most (84%) indicated they believed the folder should not be changed. A minority (8.6%) indicated particular information or questions should be removed from the "Financial" section, particularly details regarding recording bank account details (5.4%).

Further items to be included

Most (69%) felt no additional information should be included or removed. Some respondents indicated additional information should be included; a list of people or groups to be contacted at time of death, Church or religious organisations to be notified, and guidance on how often the 'Think Ahead' document should be reviewed. A majority (66%) indicated preference for paper document, 21% had no preference, and 13% indicating preference for a web based format.

Overall impression and recommendation

Overall, 87% felt that the "Think Ahead" document should be made more widely available. A smaller majority (68%) indicated it to be of interest, and 5% of respondents felt it was not likely to be of interest, with the remainder (27%) equivocal. When asked if reading the document had caused them to discuss end-of-life issues with their families, 49% of respondents reported that it had 'done so in detail,' 34% reported 'somewhat,' and 17% indicated it had not done so (Figure 1.).

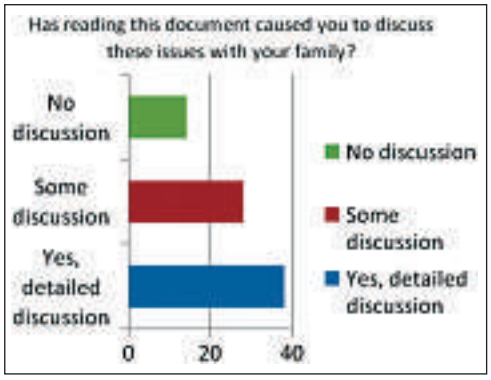

Figure 1

Consideration of Think Ahead is effective in generating discussion among families. Engaging with the Think Ahead Planning Tool caused a majority of patients to initiate discussions with family members, which is an important indicator of effect in this context

Discussion

Research in Ireland indicates that patients, families and healthcare professionals are reluctant to discuss death and dying.[8] It is also understood that failure to discuss end of life care contributes to unsatisfactory and distressing outcomes.[9] In a national survey reported in 2004,[10] a majority of Irish people (67%) indicated they would like to die at home, with a minority preferring to die in a hospital (10%) or a hospice (10%). However, at least half of all deaths occur either in acute hospitals (48%) or hospices (4%). Deaths at home constituted only a quarter of the total (25%), and a further 20% in long-stay facilities. Many patients (51%) indicated they would like more discussion around the issues of death and dying.[8] It is elsewhere reported that when GPs are aware of the expressed wishes of patients regarding place of death, this is positively correlated with patients not being hospitalised in the last 3 months of life.[11] Even where clearly stated patient preferences are documented, recent evidence indicates these are ignored.

A report from The National Confidential Enquiry on Patient Outcome and Death (NCEPOD) describing data from 524 cardiac arrests treated in hospitals (UK & Northern Ireland) reported 52 out of 524 patients actually underwent resuscitation attempts despite explicit decisions against resuscitation, recorded in their hospital medical record.[12] Goodly levels of satisfaction and acceptability evident in this study strongly suggests that where GPs are guided with an appropriate communication tool, they are well placed to engage with patients and families around these issues, and thereby increase the probability of improved outcomes for dying patients and their families.[11] This is important, given recognised and well described concerns of Irish patients in this area of care. Levels of engagement with 'Think Ahead' in this study (76% indicating they completed all (31%) or part (44%) of the 'Think Ahead' folder) compare favourably with those reported elsewhere. Ramasroop,[13] in a systematic review examining completion rates for advanced directives in the primary care setting observed highest completion rates (44%) where interventions incorporated direct patient-healthcare professional interactions, over multiple visits.

Based on results from this study, it is recommended that provision of The Think Ahead Package in the general practice setting is an acceptable and useful intervention. Though it is clear a minority of respondents report some degree of upset and uncertainty regarding their engagement with 'Think Ahead,' a majority did not. It is arguable that long term benefits of engaging with the process electively, in a timely manner, outweigh levels of concern evident in responses here. Moderate concern among a minority who are clinically stable is arguably preferable to acute distress and indeed the anguish known to arise, when there is little or no end of life planning, and where decisions are taken in haste, or in ignorance of patient preferences.

Limitations of this study include possibility of bias, given telephone surveys were carried out by the patient's doctor. The study excluded patients adjudged to be clinically unstable (e.g. those with active medical problems or impaired cognitive function, where end of life planning is understood to be challenging[14]). The current version of 'Think Ahead' already reflects experience captured in this study, particularly in the causes of upset and uncertainty identified. Thought is being given to maintaining a limited dataset from the 'Think Ahead' folder on the GP electronic medical record, should the patient wish, in order to prompt periodic review, and to make it selectively available in the event of onset of complex or acute illness, in the out of hours setting. Given the extent (82%) to which GP medical records are known to be computerised,[15] and strong links between GPs and GP Co Operative Services, it becomes possible to consider how expressed wishes of patients could be reliably communicated and available, to inform out of hours management decisions; the authors recommend this should now be explored, as in other healthcare systems.[16]

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Management of Parenteral Nutrition Associated Hyperglycaemia: A Comparison of Subcutaneous and Intravenous Insulin Regimen

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

Abstract
PN is associated with significant hyperglycaemia, which may be detrimental to clinical outcome. There are few data on the management of this phenomenon outside of intensive care units. In our unit, we studied the efficacy of protocol-based intravenous insulin delivery as compared to subcutaneous insulin prescribed individually outside of the critical care setting. In a retrospective review over a two-year period, we compared patients with PN-associated hyperglycaemia who had received both modes of insulin therapy. A total of 122 who developed PN-associated hyperglycaemia were identified. Those on the intravenous insulin regimen were within glycaemic target for more time than those on the subcutaneous regimen (62% Vs 43%, p=0.008). We therefore conclude that outside of the critical care setting, intravenous insulin delivers better glycaemic control and should therefore be considered optimum therapy for patients with PN-associated hyperglycaemia.

Introduction

Parenteral nutrition (PN) is used in a wide variety of clinical scenarios, and it is widely accepted that adequate nutritional support is an essential part of successful recovery from critical illness[1,2]. However, PN has been associated with hyperglycaemia in patients with and without diabetes[1-3]. Up to 88% of PN recipients develop hyperglycaemia[4-6]. This effect is particularly evident in patients with acute pancreatitis, where the addition of PN almost doubles the rate of hyperglycaemia[7]. Hyperglycaemia is associated with poor outcomes in the context of critical illness and PN use with higher infection rates, higher mortality and renal injury[4,8-10]. PN-associated hyperglycaemia also correlates with increased rates of cardiovascular complications and systemic sepsis[4,6]. Hyperglycaemia therefore results in greater lengths of stay in intensive care units (ICUs), and greater lengths of stay in hospital generally[10].

Outside of the critical care setting, prospective data in humans confirm that there is an increased risk of mortality associated with hyperglycaemia[11]. This risk is five-fold greater in PN recipients who develop hyperglycaemia at a serum glucose level of 10mmol/l or higher, when compared to those with a serum glucose level less than 7.8mmol/l[11]. However, there are few data on the effects of insulin treatment on reducing this risk. In particular there is a dearth of data to inform healthcare providers on which modality of insulin therapy can offer the best outcomes. Studies using rat models of sepsis have shown survival in PN-associated hyperglycaemia is improved when intravenous insulin is used to correct the hyperglycaemia[12]. There have been human studies in specific cohorts, such as patients post-gastrectomy for gastric cancer, which have reported improved outcomes with intensive glycaemic control[13]. However, this has not been well replicated in the non-critically ill patient.

Current guidelines recommend maintaining blood glucose concentrations between 7.8 and 10mmol/l when on PN[14]. Insulin therapy can be most effectively delivered when a specific protocol is utilised to guide health providers[15,16]. However, major guidelines do not offer clear recommendations on how to deliver insulin therapy with PN[17,18]. Intravenous insulin and regular subcutaneous insulin can be used to deliver glycaemic targets in PN-associated hyperglycaemia[19]. Further data are needed to determine best practice, and to indicate whether intravenous or subcutaneous insulin therapy is more effective in the management of PN-associated hyperglycaemia outside of the critical care setting.

Methods

We conducted a retrospective review of patients admitted to our centre who received PN. The data was collected over a two-year period up to January 2010. In April 2009, a protocol was introduced whereby it was recommended that patients who developed PN-associated hyperglycaemia, as defined by a recorded capillary blood glucose levels of greater than 10mmol/l on two or more consecutive occasions, commence intravenous insulin while on PN. An algorithm for dose adjustment according to the blood glucose level was devised (Table 1).

Prior to this, patients were treated with subcutaneous insulin on individually prescribed supplemental scales. In this regimen, the doses of insulin prescribed subcutaneously were not standardised and varied from patient to patient. We compared those who had received the subcutaneous insulin regimens with the intravenous insulin protocol. Patients were identified from a detailed hospital-based clinical register of those receiving PN over the two-year period. This register is maintained by the parenteral nutrition clinical nurse manager and the Department of Nutrition and Dietetics. From these records, medical and surgical patients who were commenced on insulin therapy for hyperglycaemia during PN outside of the critical care setting were identified. The ICU and critical care patients were excluded, as the focus of our study was the efficacy of the two insulin modalities in non-critically ill patients. This study was completed in accordance with Beaumont Hospital ethical guidelines. Those on the intravenous protocol had dose titrations under nurse supervision in accordance with the protocol (Table 1). Those on subcutaneous insulin had a mixture of rapid acting insulin analogues and basal insulin, which was prescribed by the primary medical or surgical team, often in consultation with the diabetes care team.

An anonymised study database was constructed. Clinical parameters including gender, age, body mass index (BMI), admission diagnosis, indication for PN, and steroid use were recorded. The length of time PN was used, patient length of stay and patient outcomes were also recorded in the study database. Patients who had a diagnosis of diabetes before admission to the hospital had additional measurements including HbA1c levels. Duration of diabetes and the individual's pre-admission glycaemic therapy were also recorded. Blood glucose levels were tested using point of care testing four times a day while on PN. All patients had glycaemic profiles recorded with reference to the rate of hypoglycaemia (defined as a blood glucose less than 4.0mmol/l), time spent in glycaemic target (defined as a capillary blood glucose reading between 4.0 and 10.0mmol/l inclusively), time spent in hyperglycaemia (defined as a blood glucose of greater than 10mmol/l), and mean daily capillary blood glucose levels. Descriptive statistics were used and we compared the subcutaneous insulin group with the intravenous insulin group using Student's t-test and Mann-Whitney U tests for parametric and non-parametric data respectively. Regression analysis was used in the cohort as a whole to evaluate for associations between use of each insulin treatment paradigm and glycaemic and clinical outcomes. Statistical significance was assumed at $p<0.05$. All statistics were completed on the R software (Version 2.11.1).

CPD available online at www.imj.ie and questions on page 159.

Table 1 Intravenous insulin infusion protocol for patients on parenteral nutrition

Glucose (mmol/l)	Infusion rate in patients with pre-existing diabetes (units per hour)	Infusion rate in patients without pre-existing diabetes (units per hour)
< 4.0	0.0	0.0
4.0–6.0	1.0	0.5
6.1-8.0	2.0	1.0
8.1-10.0	3.0	1.5
10.1-12.0	4.0	2.0
12.1-16	6.0	3.0
16.1-20.0	8.0	4.0
>20	10.0	6.0

Results

We identified 555 patients who received PN in the study period. Of these 122 received PN outside of the critical care setting and had recorded capillary blood glucose readings of greater than 10mmol/l on two or more readings. Many of those treated with subcutaneous insulin did not have a complete glycaemic record with clear insulin doses given the ad hoc nature of this regimen. Therefore, these data could not be included in our analysis. This resulted in a final group of 53 patients who had complete records. Of this analysed group of 53 patients, 32 (60%) were treated with intravenous insulin as per protocol.

Table 2 Comparative analysis of intravenous insulin (IV group) and subcutaneous group (SC group) by admission demographics

	IV group (N=32)	SC group (N=21)	P value
Age (years)*	69 ± 10	68 ± 11	0.39
Male (percentage of total cohort)	53%	62%	0.27
Body Mass Index (kg/m)	28 ± 5	27 ± 4	0.35
Pre-existing diabetes (percentage of total cohort)	32%	40%	0.29
Pre-existing T1DM (percentage of all diabetes)	3%	5%	0.38
Pre-admission insulin use (percentage of all diabetes)	8%	8%	0.42
Duration of diabetes (years)*	15 ± 8	14 ± 9	0.36

On comparing the intravenous insulin group to the subcutaneous insulin group, there were no statistically significant differences in age or BMI (Table 2). However, there were differences in glycaemic outcomes (Table 3). The group treated with intravenous insulin had a significantly lower daily mean capillary blood glucose level (9.6 ± 2.1mmol/l Vs 11.2 ± 2.6mmol/l, p=0.009), and spent a greater proportion of time in glycaemic target (62% Vs 43%, p=0.008). There was no significant difference in hypoglycaemia rates (1% Vs 2%, p=0.14). On regression analysis, intravenous insulin was associated with a greater time spent in glycaemic target (p=0.02) and a lower mean blood glucose level (p=0.03). There was no association with other glycaemic variables. The use of intravenous insulin was not associated with hypoglycaemia.

Length of hospital stay (61 ± 49 days Vs 43 ± 35 days, p=0.08) and survival to discharge (77% Vs 67%, p=0.2) were comparable between groups. Of the total cohort, 73% survived to discharge. Male gender was positively associated with survival to discharge (p=0.003). Men comprised 73% of survivors, and only 20% of those who died in hospital. Length of stay was significantly associated with duration of PN (p<0.001). Intravenous insulin use was not associated with length of stay. Pre-admission diabetes requiring insulin therapy was significantly associated with a longer length of stay on logistic regression analysis (p=0.04). Pre-existing diabetes was not associated with mortality.

Table 3 Comparative analysis of intravenous insulin (IV group) and subcutaneous group (SC group) by clinical and glycaemic outcomes

Parenteral nutrition duration (days)*	19 ± 18	16 ± 9	0.24
Mean daily CBG (mmol/l)	9.6 ± 2.1	11.2 ± 2.6	0.009
Mean highest CBG (mmol/l)	12.0 ± 3.3	13.4 ± 3.9	0.09
Mean lowest CBG (mmol/l)	7.8 ± 2.0	9.0 ± 2.4	0.03
Percentage of time in target CBG range	62%	43%	0.008
Percentage of time above CBG range	37%	55%	0.01
Percentage of time in hypoglycaemia	1%	2%	0.14
Percentage of cohort with recorded hypoglycaemia	40%	29%	0.19
HbA1c (DCCT %)	6.4 ± 1.0	6.8 ± 2.1	0.33
Length of admission (days)*	61 ± 49	43 ± 35	0.08
Survival to discharge (percentage of total)	77%	67%	0.2

*Non-parametric data tested by Mann Whitney U test
CBG = capillary blood glucose
HbA1c = glycosylated haemoglobin
T1DM = type 1 diabetes mellitus

Discussion

This study demonstrates that use of a standardised intravenous insulin infusion protocol in the treatment of PN-associated hyperglycaemia results in improved glycaemic outcomes outside of the critical care setting. The mean capillary blood glucose levels were lower, and users of intravenous insulin therapy spent more time in glycaemic target as compared to those prescribed subcutaneous insulin on an individual basis without an increased rate of hypoglycaemia. These data are in agreement with previous studies that report improved outcomes with prescribed protocols as compared to an ad hoc insulin prescription strategy[15,19]. Our data shows that an intravenous insulin protocol is superior to subcutaneous insulin delivered on an individual basis, and outside of a prescribed protocol, in PN-associated hyperglycaemia outside of the critical care setting. Our data is retrospective and has limitations, including the lack of randomization. This may have introduced selection bias. The absence of a control group or a parallel design also weakens the conclusion, as it cannot take into account extraneous factors such as infectious outbreaks that could have affected outcomes, including length of stay. However, given the current evidence, testing ad hoc subcutaneous insulin administration and a prescribed intravenous insulin protocol in PN-associated hyperglycaemia in a prospective study may not be ethically acceptable.

Complete prescription records were not always available in the subcutaneous insulin group, resulting in over half of the initial group being excluded from the data. Unfortunately, the ad hoc insulin prescribing in that group, and the absence of formal prescription protocols to facilitate complete prescription recording and insulin delivery, mean that reliable data were not available for comparison. This is a weakness of our study. However, this illustrates another strength of the prescribed intravenous insulin protocol, as it offers a clear record of the insulin prescribed and given, and is likely to reduce drug prescribing and administering error.

Our data in the subcutaneous group are comparable to several clinical scenarios still employing ad hoc subcutaneous insulin prescribing[15,19]. Frequent glycaemic assessment and insulin dose adjustment are vital in any inpatient insulin protocol as patients are often experiencing acute physiological stresses which can lead to rapid fluctuations in glycaemia. Intravenous insulin offers the flexibility to address this problem given the rapid onset of action and clearance. Our findings support the use of intravenous insulin protocols in the management of PN associated-hyperglycaemia. This can deliver significant improvements in glycaemic control in the non-critical inpatient setting.

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Delays in the Stroke Thrombolysis Pathway – Identifying Areas for Improvement

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Abstract
Despite international consensus on the benefits of thrombolysis for ischaemic stroke (IS), it remains underused. Guidelines now recommend a door-to-needle time of 60 minutes. We reviewed the rate and timeliness of thrombolysis for IS at our hospital. 323 stroke patients presented between January 2011 and April 2012.Thirty patients (10.6% of IS) were thrombolysed, mean age was 68.5 years (42 to 88) and 19 patients (63%) were male. Thirty-six patients (12.7% of IS) were not thrombolysed despite arriving within the time-window and symptom resolution was the commonest reason (15 patients; 42%). Despite most thrombolysed patients (42%) presenting to the Emergency Department during daytime working hours, there were delays at each step of the acute care pathway. The mean time for stroke team review was 23 minutes (5-50). The mean door-to-CT and the door-to-needle times were 60 minutes (25-95) and 92 minutes (46-130) respectively. In parallel with national stroke incentives, local audit can highlight barriers to uptake and efficiency within thrombolysis services.

Introduction

It is now almost two decades since the effectiveness of thrombolytic therapy for acute IS was first reported. Results from the NINDS-rtPA trial in 1995,[1] data from large randomized thrombolysis trials[2] along with a Cochrane review,[3] have supported the use of thrombolysis early in the acute IS setting. However, clinical outcomes are time dependent, with those receiving treatment more rapidly having better outcomes in the long and short-term. Pooled analysis of landmark trials reported that although patients benefited from treatment for up to 4.5h, there was a drop in the odds of a favourable outcome by a factor of two with each 90-minute period time delay.[2] Every effort is therefore needed to avoid delays in starting treatment.

Despite benefits, a limited proportion of eligible patients actually receive this treatment, with international reports documenting ongoing suboptimal rates (7%) even in well equipped centres.[4-6] Delays in hospital presentation significantly contribute to this, but even when many IS patients are deemed eligible for thrombolysis, the actual rates of treatment can be relatively low.[7,8] Consequently, there is growing interest in highlighting in-hospital obstacles that contribute to low treatment rates and the fragmentation of what should be a well-organized pathway of care from arrival at the hospital door to administration of therapy. Guidelines recommend a door-to-needle target time of ≤ 60 minutes,[9,10] clearly requiring efficiency, including the rapid completion of clinical and imaging evaluation before initiating treatment in those without contra-indications. Evidence from the Get with the Guidelines-Stroke national US registry[11] shows that less than one-third of acute IS patients who receive thrombolysis are actually treated within such guideline-recommended door-to-needle times. Consequently, the American Heart and Stroke Associations have launched 'Target: Stroke Initiative'[12] which includes multiple key best-practice strategies, and aims to achieve a door-to needle-time of ≤ 60 minutes for at least 50% of IS patients. The effectiveness of implementing similar strategies has also been explored in Europe.[13]

This study aimed to review the thrombolysis service at Beaumont Hospital (BH) from January 2011 to April 2012 inclusive. We reviewed the rate of thrombolysis and analysed the times taken for medical review, radiological investigation and administration of thrombolysis amongst those eligible to receive such therapy. Reasons for withholding treatment in those who presented within the 4.5 hours treatment-window were also reviewed.

Methods

Beaumont is a 820-bed teaching hospital that provides emergency and acute care services to almost 300,000 people. The thrombolysis service is co-ordinated jointly by the Departments of Geriatric and Stroke Medicine and Neurology. A clear pathway of care outlines the steps that should be promptly undertaken from arrival of the patient with suspected stroke at the hospital, to imaging within the radiology department and administration of thrombolysis, where appropriate. In parallel, an education programme updates rotating medical staff within the ED and stroke service about this care pathway. The hospital stroke registry (for January 2011 to April 2012 inclusive) was reviewed. Two paper-based review proformas were designed for data collection: a 'monthly proforma' collected information on overall numbers of stroke patients that presented each month and a 'thrombolysis' proforma collected information on all thrombolysed patients during the study period. Patients' electronic records and charts were reviewed for any relevant data unavailable within the stroke registry and details of relevant radiological investigations were accessed through the McKesson system.

Table 1 Documented risk factors and medications (at baseline) in thrombolysed patients

	N (%)
Risk factors	
Hypertension	18 (60)
Hyperlipidaemia	14 (46)
Atrial fibrillation	8 (26)
Cigarette smoking	7 (23)
Ischaemic heart disease	5 (17)
Previous stroke or TIA	8 (26)
Diabetes	4 (13)
Medications	
Anti-platelet therapy	15 (50)
Dual anti-platelet therapy	4 (13)
Anticoagulation	3 (10)
Antihypertensive therapy	11 (38)
Statin	10 (33)

Results

323 stroke patients presented over a sixteen-month period from January 2011 to April 2012 inclusive (Figure 1). Overall, 10.6% of all IS patients (30 patients) received IV thrombolytic therapy during the study timeframe, although rates of thrombolysis varied greatly from month to month (Figure 2).

Thrombolysed patients

The mean age of this cohort was 68.5 years (range 42 to 88 years) and almost two-thirds (19 patients; 63%) were male. Baseline data are outlined in Table 1. Of the 30 thrombolysed patients, 4 patients had a suboptimal response and were considered for subsequent on-site intra-arterial (IA) thrombolysis and/or thrombectomy. Almost half (10; 42%) of those who presented after their stroke onset arrived between 9am and 5pm, with a further 9 patients (38%) presenting between 5pm and midnight. The remaining patients (20%) presented overnight (midnight to 9 am). Almost all (5/6) of the thrombolysed in-patient strokes received their treatment between 9am and 5pm.

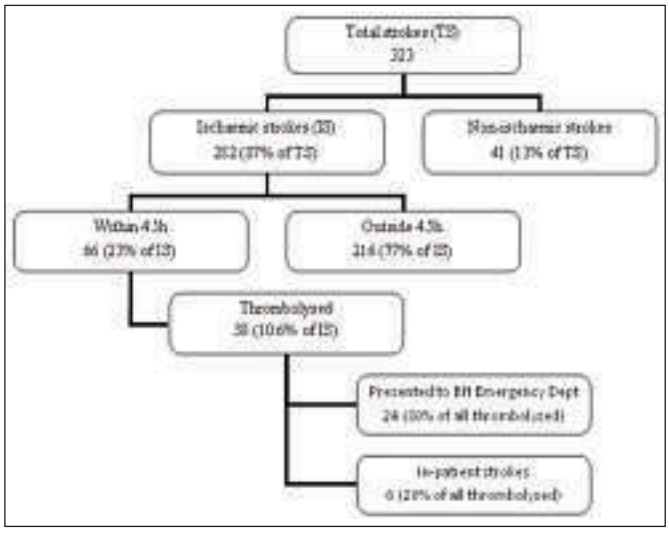

Figure 1 Numbers of patients presenting to Beaumont Hospital (BH) during the 16 month study timeframe (January 2011 to April 2012)

Timelines to administration of thrombolysis

In cases where times were poorly documented within medical notes, nursing notes were reviewed. For patients who presented to the ED after their stroke onset, the mean time (from door) for a review by the stroke service was 23 minutes (5-50). The mean door to CT time was 60 minutes (25-95) and the mean door to needle time was 92 minutes (46-130). For patients who had their stroke onset after admission to hospital, the mean time from symptom onset to review by the stroke service was 9 minutes (5-20). The mean time (from symptom onset) to CT was 42 minutes (15-90) and to needle was 99 minutes (60-150). The proportion of time taken in each step of the treatment pathway is outlined in Figure 3.

Clinical outcomes

Haemorrhagic transformation (defined as any degree of haemorrhage seen radiologically) at 24 hours post thrombolysis was noted in 6/30 patients (20%). However this rate decreased to 6.5% (2/30) when the presence of neurological worsening, as defined by the NINDS study,[2] was incorporated into the definition. For thrombolysed patients, the mean number of days spent in the acute stroke unit was 19 (1-63) and the mean length of hospital stay was 44 days (2-164). Most patients were discharged to their own home (26;88%). The proportion of patients with a mRS of 2 was 3% at 7 days, 23% at 30 days and 37% at 90 days. The 7-day, 30-day and 90-day mortality was 6%, 13% and 16% respectively.

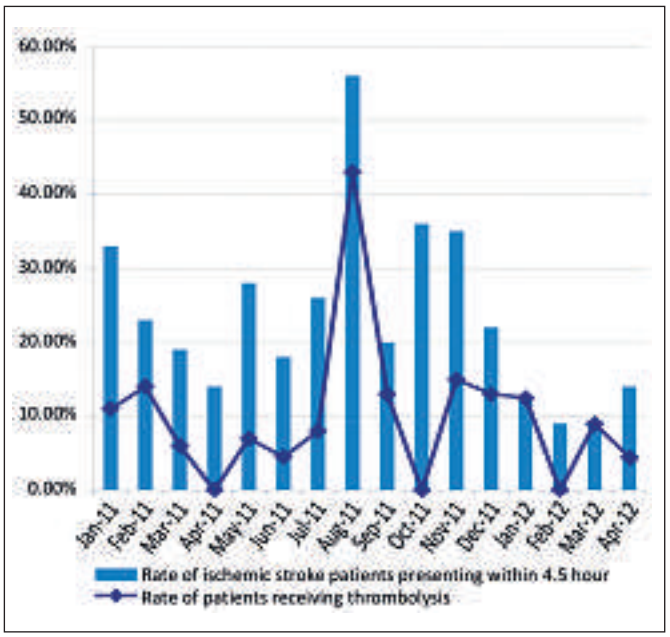

Figure 2 Percentage rates of ischaemic strokes presenting within the 4.5 hours (no. of ischemic strokes within the 4.5 hour window/ total ischemic strokes for that month) and the percentage rate of thrombolysis for each month (no. of patients receiving thrombolysis per month/ total ischemic strokes that month)

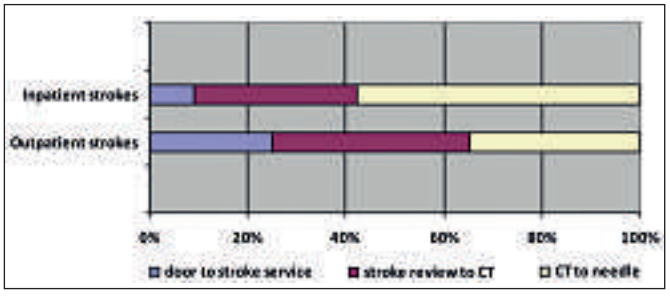

Figure 3 Proportion of time taken from door (or symptom onset) to review by stroke service, CT and needle for patients presenting to ED (outpatient strokes) and patients who have stroke in hospital (inpatient strokes)

Patients who presented within the 4.5h time-window and were not thrombolysed
Of the 66 patients who presented within 4.5 hours, 36 patients (12.7% of all IS) were not thrombolysed due to a variety of reasons. The commonest reason was symptom resolution (15 patients; 42%). Other documented reasons for not administering thrombolysis were low NIHSS <4 (14%), patient on anticoagulation (dabigatran (2) or warfarin with INR 2 (3); 14%) or high NIHSS >24 (8%).

Discussion

Our results show that, although most thrombolysed patients presented during full-service working hours, there was room for improved efficiency at each step in the acute thrombolysis care pathway. Only one-fifth of patients were thrombolysed within the target time-window of one hour and just over one-third were thrombolysed within 90 minutes of arrival at the door (or symptom onset for in-patient strokes). Delivery of thrombolysis took slightly longer amongst in-patients, possibly owing to reduced awareness of the urgency inactivating the stroke care pathway on the wards. In particular we found that there was scope to substantially decrease the proportion of time taken from stroke service review to CT and from CT to needle. During the study timeframe, thrombolysis was not commenced in the radiology department but instead the patient was transferred to another ward for administration of the thrombolysis bolus. Practice has since changed at our centre such that thrombolysis is now commenced in the radiology department.

Although the thrombolysis rate at our hospital compares favourably with international standards, there is room for improvement. One striking finding was that just under one-quarter of patients in our cohort presented within the required time-window for consideration for thrombolytic treatment, similar to that reported in the Get with the Guidelines Stroke Program 2002 to 2009.[14] Heightened public awareness of stroke symptoms, and of the need to present urgently to emergency services can result in more prompt presentation of patients to emergency services.[15,16] However, how campaigns are best delivered and whether they result in sustained improvements in thrombolysis rates remains unclear.[17,18] The upgrading of emergency ambulance services can impact positively on time between symptom-onset to arrival at hospital,[19] although the co-ordination of ambulance services at a national level can be challenging. In Ireland the Health Service Executive National Stroke Program is currently working in partnership with national ambulance services to implement ambulance efficient access protocols for patients with ischaemic stroke.

Studies assessing effective, multi-dimensional implementation strategies (education programmes, identification of treatment barriers and service goal-setting) have demonstrated improvements in administration rates and the efficiency of delivery of thrombolysis in IS. The PRACTISE trial[13] implemented strategies to tackle under-utilisation of thrombolysis for IS. They identified obstacles to treatment as inter-organisational, intra-organisational, medical or psychological, against which they targeted intervention strategies. Patients in the intervention centres were more likely to receive thrombolysis (adjusted OR 1.58; 95%CI 1.11-2.27) and a major component of this effect was the more appropriate local application of clear contraindications to treatment. However the intervention did not improve the timeliness of treatment administration. The INSTINCT study assessed whether a similar multilevel intervention could increase alteplase use in community hospitals in Michigan.[20] Although the proportion of thrombolysed patients increased between the pre-intervention and post-intervention periods in intervention hospitals to a greater extent than the control hospitals, the difference was not significant (RR 1.37; 95%CI 0.96-1.93; p=0.08). Authors identified barriers such as inter-departmental communication, familiarity with treatment guidelines and physician motivation as primary issues.

Of those patients who presented to hospital within the 4.5 hour treatment-window, almost one-half (45%) were thrombolysed. The documented reasons for withholding treatment in the remaining patients were clear and in accordance with local and international guidance. The main reason for withholding treatment was symptom resolution, a contra-indication that is clearly outlined in thrombolysis protocols. However, deterioration following spontaneous improvement can occur in up to 30% of certain subgroups.[21] There is emerging evidence that treatment may be unnecessarily withheld in a substantial number of patients due to the application of strict thrombolytic exclusion criteria, many of which are not evidence-based. Studies now suggest that thrombolysis can be used safely in many excluded groups,[22,23] including those with minor, fluctuating or resolving symptoms, advanced age or seizure at onset. Of patients in our study that had thrombolysis withheld due to symptom resolution, approximately three quarters had an acute infarct on imaging. As further evidence emerges and protocols are revised, perhaps more patients who arrive on time will be eligible for treatment.

In Ireland, significant advances have been made in our stroke services (including thrombolysis rates) since the publication of the National Audit of Stroke Care in 2007. In conjunction with the launch of the National Stroke Program, the Stroke Register was established to collect information on the quality of care administered to stroke patients and this will help to identify areas where prioritised changes are necessary. Multiple guidelines, care bundles and pathways have been disseminated and service development has included the provision of telemedicine to enhance the co-ordination of thrombolysis services over large geographical areas. Stroke governance structures have also been enhanced with the development of local stroke teams and hospital networks and the appointment of clinical leaders. However, in parallel with such collaborative national incentives, local audit and focused initiatives must take place, which can result in significant reductions in time to CT and needle.[24,25] This would result in more favourable outcomes for many more patients with IS presenting to acute services.

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Managing Newborn Ileostomies

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Abstract
The early post-ileostomy medical management of neonates is not clearly defined. A retrospective chart review of all infants who received an ileostomy March 2010- December 2011, identified the post-operative ileostomy progress of each infant. There were 16 cases of neonatal ileostomy during the study period. Over the first 14 postoperative days there was no weight gain. By 21 days the infants were gaining a median 140 g/week. The median stoma output was 5 mls/kg/dy during the first 7 days increasing to 17.5-20 mls/kg/dy. Weight gain or weight loss was closely related to the consistency and volume of the stoma output. Ten infants had a high stoma output >20mls/kg/dy (3 preterm, 7 term). This high stoma output was associated with sub-optimal weight gain. This study provides a template for the expectant management of newborn infants after an ileostomy. The critical issues are weight gain, stoma output and local and systemic complications.

Introduction

Ileostomies are commonly performed on newborn infants with surgical abdominal emergencies. It is a strategy that rests the bowel until physiological recovery takes place. The two large groups of newborns who require an ileostomy are preterm infants with necrotising enterocolitis (NEC)[1] and term infants with a wide spectrum of surgical conditions such a ileal atresia, Hirschsprungs disease and volvolus. The surgical technique involved in the creation of an ileostomy is well defined but the early post-ileostomy management of the infant is less clearly documented. Much of the skill and knowledge about newborn ileostomies lies in the hands of the neonatal surgical nurses rather than the medical staff. This study was undertaken in order to highlight the medical and surgical challenges encountered when managing newborns after an ileostomy. The study is timely in that the number of ileostomies is rising due to NEC complications in surviving very preterm infants.

Methods

The study group was newborn infants who underwent an ileostomy in the first month of life. All the ileostomies were performed at a single neonatal surgical centre (TSH). The operation was a proximal functioning ileostomy fashioned alongside a distal mucous fistula or a loop ileostomy. The infants had been transferred to the centre from neonatal units throughout

the country because of acute abdominal problems. All infants who received an ileostomy March 2010- December 2011 were identified from the neonatal surgical logbook. In the case of each infant the case notes, operation details, fluid balance and nursing observation charts were obtained. The notes and charts were examined by one of us (MC). Each infant's birth weight, gestational age, age at surgery and underlying condition was documented. The post-operative ileostomy progress of each infant was recorded as follows: stoma output, weight gain/loss, parenteral and enteral feeding, types of milks administered, catheter-related infections, surgical stoma, and medications prescribed. Excessive stoma output was defined as greater than 20mls/kg/dy.

Results

There were 16 cases of neonatal ileostomy during the study period with 2 loop ileostomies and the remaining 14 having a proximal functioning ileostomy with distal mucous fistula. There were 8 preterm infants (median gestational age 32 weeks IQR 31-35 weeks) with a median birth weight of 1670g (IQR 1100-3170g). The 8 term infants (median gestational age 40 weeks IQR 38-42 weeks) had a median birth weight of 3320g (IQR 2940g-3900g). Only one infant in the preterm group had periventricular leuckodystrophy on cranial ultrasound.

Table 1 describes the underling surgical condition that necessitated the ileostomy. There was a wide range of surgical disorders among the term infants whereas the preponderance of the preterm infants had NEC. Table 2 shows the median weight gain/loss and stoma output for all the infants during the first 28 days following the ileostomy. Over the first 14 days there was no weight gain. By 21 days the infants were gaining 140g/week. The stoma output was 5 mls/kg/dy during the first 7 days increasing to 17.5-20 mls/kg/dy. Table 3 shows the post-ileostomy surgical and medical complications among the 16 newborn infants. Most of the complications were local stoma problems including stricture, prolapse, skin excoriation and cellulitis.

Table 1 Surgical indication for the Ileostomy in the Term and Preterm Infants

	Number of Cases	
Underlying Surgical Condition	**Term**	**Preterm**
Necrotising Enterocolitis	1	5
Volvulus	3	1
Hirschsprungs	2	0
Ileal Atresia	1	0
Meconium Peritonitis	1	2

Table 2 Weight/Loss and Stoma Output in Infants during the first 28 days Post-Ileostomy

	No of Days Post-Ileostomy			
Parameters (median)	**7**	**14**	**21**	**28**
Wt. gain/loss (g/wk)	0	0	140	130
Stoma output (mls/kg/dy)	5	17.5	18	20

Table 3 Post-Ileostomy Surgical and Medical Complications

Complication	**No. of Cases**
Stoma Stricture	3
Stoma Leak	1
Stoma Prolapse	1
Stoma Skin Excoriation/Cellulitis	8
High Stoma Output >20mls/kg/dy	8
Intestinal Failure	3
Catheter-related Sepsis	3

Ten infants had a high stoma output >20mls/kg/dy (3 preterm, 7term). The high stoma output was associated with poor weight gain. Median weight gain in this group during the first three weeks was 5g/wk (IQR -240g-+230g). Three infants had central venous catheter-related sepsis during their post-operative course.

Feeding

The enteral feeds were as follows- 5 exclusively expressed breast milk (EBM), 2 EBM and donor breast milk, 6 with EMB and a semi-elemental formula. The remaining 3 were fed exclusively with semi-elemental or elemental formula. 13 of the 16 infants reached full enteral feeds at a median of 17 days (IQR 12-25).

The medications prescribed were

Ranitidine 16 infants, Omeprazole 8 infants, Loperamide 2 infants, Metronidazole 1 infant, Erythromycin 2 infants. Alternate weeks of amoxicillin and metronidazole were used in two infants over a 6 week period. Antibiotics were commenced after consultation with the gastroenterology team in infants with persistent high stoma output.

Regarding discharge, 2 preterm infants were transferred back to the referring maternity hospital at 10 days and 14 days post-operatively. 3 infants were transferred to the gastroenterology service in another tertiary children's hospital in Dublin. 3 infants required reversal of their ileostomy due to complications during the same admission. Of the remaining 8 infants who were discharged home with their ileostomy from our centre, the median time to discharge was 42 days (IQR 35-77)

Discussion

This study attempts to set out the expectant progress, management and complications in newborn infants after an ileostomy. Ileostomies are of two types- loop ileostomy and end ileostomy with mucous fistula depending on operative findings and indication. All ileostomies in this study were the later. The critical issues in their management are weight gain, stoma output, local and systemic complications. The approach to these issues is set out in the paper. Weight gain is poor over the first 2 weeks, the median value being zero. Weight gain or weight loss was closely related to the consistency and volume of the stoma output. When the stoma output is thick and difficult to measure, it is considered normal. When the stoma output is greater than 20-30 mls/kg/dy, the infant's weight and fluid and electrolyte balance needs careful monitoring. Losses are usually watery and when stoma output exceeds 30mls/kg/dy the infant will not gain weight. During a high stoma output period the infant will require a reduction in oral feeds and an increase in parenteral feeding. Excess losses from ileostomies can develop an array of acute acid base and electrolyte imbalances in association with volume depletion if not adequately monitored. High output states are caused by a number of factors. These include prematurity, malabsorption due to underlying gut pathology and short gut due to bowel resection[2].

In our institution, in just over half of the infants, the nursing staff re-cycled the proximal stoma output through the distal mucous fistula. The effluent is administered by infusion pump via a silicone urinary catheter in the mucous fistula anchored with minimal balloon inflation under strict aseptic conditions. It is suggested that this procedure may stimulate mucosal growth, prevent bowel atrophy and increase electrolyte and fluid absorption[3,4]. Close attention to fluid balance and avoidance of rapid administration causing abdominal distension and diarrhoea is important.[5] Ranitidine was universally prescribed. It acts by reducing gastric acid secretion which can contribute to high stoma outputs and poor weight gain. The rationale for administering amoxicillin and metronidazole is that they may reduce bacterial overgrowth within the bowel which interferes with absorption and thus increases stoma output[6]. However, the sucrose content of metronidazole may contribute to high stoma output. In our series 3 infants progressed from high stoma output to intestinal failure and required protracted parenteral nutrition under the care of gastroenterology. This is a particularly challenging condition, with a range of issues including nutrition, growth failure, chronic diarrhoea, vascular access and catheter-related sepsis, liver disease as well as many psycho social issues[7]. The aim of treatment is intestinal rehabilitation to enable children to become independent of parenteral nutrition. Successful treatment requires the close collaboration of general paediatricians, gastroenterologists and paediatric surgeons and the benefit of experience at specialized centres.

Local stoma problems are common. They range from skin excoriation and necrosis to stoma stricture and prolapse[8]. Ileostomy losses are usually watery and can be associated with skin excoriation and bowel dehiscence. Excoriation can be precipitated by ill-fitting ostomy appliances[9]. Obtaining an appropriate sized ostomy appliance for a preterm infant is a challenge. Prolapse happens because the bowel peristalsis places continual pressure on the stoma site. Daily vigilance of the stoma site is important in order that problems can be identified and managed at an early stage. Malabsorption is common for a variety

of reasons. Many of the infants, particularly preterm infants have a proximal short bowel due to surgical resection. There may be mucosal atrophy secondary to the inability to initiate oral feeding[10]. The proportion of parenteral nutrition compared with enternal nutrition and weight gain on same can be a good indicator of functional capacity of gut e.g. if proportion of oral feeds exceeds 50%, it is a good indication that the bowel is absorbing. The type and volume of oral feeding that the post-ileostomy infant will tolerate varies widely and the involvement of a dietician, in particular a neonatal dietician is very important. In this series there was an emphasis on using breast milk either maternal or donor bank. The neonatal nurse can provide essential support to the mother while she is expressing and emphasising the positive contribution of the breast milk. The formula milks that were employed were Pepti- Junior (semi-elemental feed) and Neocate (amino-acids feed). These can be useful if malabsorption is suspected and may help to decrease stoma output. There is a fine line in stimulating the gut and overloading it in these infants.

The skill and knowledge of the neonatal surgical nurse and the stoma nurse is pivotal in the management of infants post ileostomy. They have a key role in the precise management of fluid and electrolyte balance and the prevention of complications. Once feeding has commenced close observation of the infant is required, paying particular attention to the appearance of the abdomen, nasogastric aspirates and the stool output. Close attention throughout the nursing shift to the stoma output, with 4-6 hourly calculations of the volume, observation of the consistency and appearance of the fluid is essential. The nurse must be alert to the signs of the bowel's intolerance of enteral feeds manifested by large stool output. Prompt intervention can prevent deterioration to the point of fluid and electrolyte imbalance. The neonatal nurse is best placed to inform the Neonatal/Surgical teams of the progress of the bowel's adaptation to enteral feeds.

In summary this paper provides an account of the progress and complications encountered by a cohort of newborn infants after an ileostomy. The findings provide a template for the care of these infants. It sets out how the attending doctor or nurse should approach the management of these high risk infants in the early post-operative period.

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Congenital-Infantile Fibrosarcoma of the Foot – Avoidance of Amputation

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Abstract
Congenital-infantile fibrosarcoma is a rare entity with a five year survival rate of over 90%. Surgery is still the most common treatment modality with amputation often necessary. There have been reports supporting the use of neoadjuvant chemotherapy to debulk the tumour in an effort to facilitate limb sparing surgery. We report a case of a newborn who presented with a life threatening haemorrhage from a fibrosarcoma of the foot, successfully treated with Vincristine, Actinomycin and Cyclophosphamide (VAC) chemotherapy alone.

Introduction

Congenital infantile fibrosarcoma (CIF) is rare and represents <1% of all childhood cancers[1]. It is however the most common soft tissue tumour under the age of one year[2]. Historically wide surgical excision or even amputation has been required to treat CIF[3].

Case Report

A 12 day old boy presented with a large ulcerated soft tissue tumour on his left foot (Figure 1). A punch biopsy was performed. The deep dermis was essentially effaced by a spindle cell proliferation with a diffuse growth pattern. Prominent ectatic vascular spaces were identified and there was extensive interstitial haemorrhage. The initial histologic features were those of a primitive mesenchymal proliferation with the differential diagnosis, including Kaposiform haemangioendothelioma, congenital infantile fibrosarcoma (CIF) and, less likely, rhabdomyosarcoma. Plain x-rays of the foot demonstrated a large lobulated soft tissue mass with bones of the foot containing normal ossification centres for age. Magnetic Resonance Imaging (MRI) revealed a large 6.9 cm x 7.3cm x 8.2cm mass engulfing the entire left foot, splaying the metatarsals but without any bony infiltration (Figure 2).

The following day at change of dressing, he had a significant bleed from the biopsy site becoming rapidly haemodynamically unstable. He required emergency oversewing of the tumour to stop the bleeding. A single dose of intravenous Vincristine,

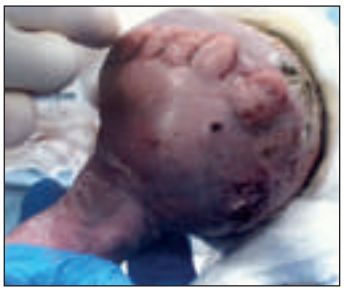

Figure 1 At presentation – large soft tissue mass (above)

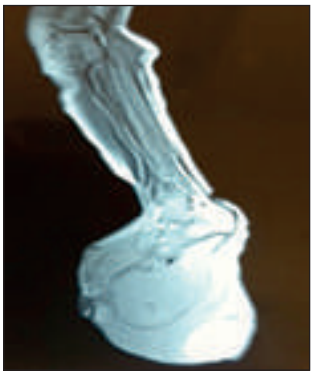

Figure 2 MRI at presentation

Tranexamic acid and Prednisolone was administered. Further analysis of the histological specimens showed that immunohistochemical stains were negative for Desmin and Myogenin. D24-40 was limited to ectatic vascular channels and Glut 1 was negative. CD31 stains obvious vascular channels with unconvincing positivity in the intervening spindle cell population and CD34 was negative. A diagnosis of congenital infantile fibrosarcoma was confirmed histologically by the presence of the pathogonomic translocation t (12:15). He was commenced on a combination of Vincristine, Actinomycin and Cyclophosphamide. Total duration of chemotherapy was over a 28 week period. He is weight bearing in soft shoes and has full range of motion of his foot 24 months later.

Discussion

The differential diagnosis for a large, congenital, enlarging tumor of the foot includes a number of uncommon and rare entities. The most likely clinical scenario will involve differentiating a hemangioma from mimickers such as kaposiform hemangioendothelioma and tufted angioma. Other rare entities include lymphatic malformation, congenital hemangiopericytoma, embryonal rhabdomyosarcoma, infantile fibromatosis or myofibromatosis, malignant fibrous histiocytoma, and malignant peripheral nerve sheath tumor[4]. Surgical excision currently remains the mainstay of treatment but the surgical approach has evolved from mutilating operations to more conservative organ-sparing procedures[5]. In some cases amputation is necessary if the extent of the tumour precludes surgical therapy. Preoperative chemotherapy may be useful for decreasing tumour bulk, enabling a more conservative surgical approach[6]. However there have been some reports of complete response following chemotherapy alone[7]. The complete remission rate is high after chemotherapy, with an overall survival rate of ~80%[8]. Kurkchubasche et al, reported that 43% of CIF treated with chemotherapy alone resulted in complete remission[9].

Our case demonstrates a conservative treatment approach resulting in a favourable response to chemotherapy avoiding amputation as was shown by Demir et al. in 2009[10]. It highlights the chemosensitive nature of these tumours. This case adds to a limited data set supporting chemotherapy alone followed by close observation as a treatment modality for a tumour with low metastatic potential in an effort to avoid limb amputation or at least facilitate limb sparing surgery. CIF is a rare tumour of childhood. The mainstay of treatment has been wide surgical excision, often requiring amputation. It is however a chemosensitive tumour with low metastatic potential. Our case illustrates the potential for avoidance of limb sacrificing surgery with the implementation of early aggressive chemotherapy.

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Gastrointestinal Erdheim-Chester Disease

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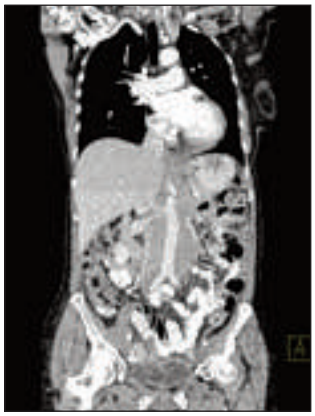
Abstract
We report a rare case of Erdheim-Chester Disease, a non-Langerhans cell histiocytosis. A 60-year old female presented with a seven-month history of vague abdominal symptoms. A large retroperitoneal mass was detected on computed tomography (CT), but multiple CT-guided biopsy samples were inconclusive. Laparoscopy revealed a mass in the distal ileum, which was resected. Histology and immuno-histochemistry supported a diagnosis of Erdheim-Chester Disease.

Case Report

A 60-year-old female was referred by her general practitioner with a seven-month history of dyspepsia and an eight-week history of anorexia, abdominal distension and a stone weight loss. Clinical examination was unremarkable. Routine haematological investigations, oesophago-gastro-duodenoscopy and colonoscopy were normal. A computed tomography (CT) scan of the abdomen and pelvis illustrated a large retroperitoneal mass, 5x1.6cmx8.5cm, extending from above the diaphragm to the bifurcation of the aorta. A CT-guided biopsy was performed and histopathology showed a reactive pattern with histiocytes and an associated fibrous reaction of non-caseating granulomata. In the presence of an essentially negative biopsy, a PET-CT was performed which showed increased FDG uptake at the site of the retroperitoneal

mass. Thus, a second CT-guided biopsy was performed, out of concern that the initial biopsy was not representative, which again showed similar pathologic findings. Overall, the imaging, however, was suggestive of a malignant lymphoma.



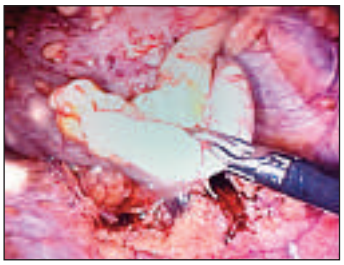


Figure 1 (left) Computed tomograph thorax, abdomen and pelvis. Coronal image illustrating large homogenous mass encasing the aorta

Figure 2 (above) Intra-operative findings suggestive of carcinomatosis peritoneii

A CT abdomen and pelvis, repeated three weeks later, illustrated doubling of size of the right-sided mesenteric nodes. This strongly suggested presence of an aggressive neoplasm, inconsistent with the two prior pathologic interpretations. Laparoscopy revealed peritoneal seedings suggestive of carcinomatosis, which had inconclusive pathology at frozen section. A mass was detected in the distal ileum with minor obstruction, and was resected with side-to-side (GIA 80) anastomosis. Histological analysis of the resected tissue showed a diffuse proliferation composed of large atypical cells with abundant pink cytoplasm, vesicular chromatin and rare mitoses. Scattered Touton-like giant cells were identified. Immunohistochemical studies confirmed a histiocytic neoplasm, (CD68 positive, CD163 positive, Factor XIII positive, CD1a negative). These combined features were most suggestive of Erdheim Chester disease. Our patient is currently undergoing CHOP (cyclophosphamide, doxorubicin, vincristine, prednisolone) chemotherapy.

Discussion

Histiocytic neoplasms are derived from histiocytes or macrophages and are rare tumours. Since many of these tumours were poorly recognized prior to the widespread use of immunohistochemistry, the incidence is uncertain. Histiocytic neoplasms include histiocytic sarcoma, Langerhans cell histiocytosis Langerhans cell sarcoma and disseminated juveline xanthogranuloma/Erdheim Chester disease[1]. Although nearly a century has passed since histiocytoses were recognized, their pathophysiology remains an enigma, and treatment is nonspecific[2]. Erdheim-Chester disease (ECD) is a rare non-Langerhans cell histiocytosis, first described in 1930[2]. It is a systemic, heterogeneous disease mainly involving the bones, lungs, skin, retro-orbital tissues, central nervous system (CNS), pituitary gland, vessels, kidneys, retroperitoneum, and heart[3,4]. It has an unknown incidence, with fewer than 500 cases published in the literature[5].

Gastrointestinal involvement, as occurred in our patient, is extremely rare[4,6]. In a series of thirty-seven patients, the mean age at diagnosis was fifty-two years[5]. Two criteria, of which one should be fulfilled, were proposed as a requirement for diagnosis of ECD: (i) Typical histological findings with foamy histiocytes and polymorphic granuloma and fibrosis or xanthogranulomatosis with CD68-positive and CD1a-negative immunohistochemical staining and (ii) Typical skeletal findings with a) radiographs showing bilateral and symmetric osteosclerosis of the diaphyseal and metaphyseal regions in the bones and/or b) symmetric and abnormally increased labeling of the distal ends of the long bones, and sometimes, the upper limbs, on bone scan[4]. The clinical presentation of ECD is largely dependent on the distribution of disease, which may range from asymptomatic bone lesions to multisystemic, life- threatening forms with poor prognosis, especially with CNS or cardiovascular involvement[7]. The most common presenting symptom of ECD is bone pain, mainly affecting the lower limbs[4].

Typical radiological and pathological features may suggest the diagnosis, but there is a broad clinical spectrum, ranging from asymptomatic tissue infiltration to fulminant multisystem organ failure. Numerous therapies are proposed in the management of ECD including corticosteroids, chemotherapy, radiotherapy, calcineurin inhibitors and alpha-interferon therapy[4]. Prognosis of disease is largely dependent on the extent of extra-skeletal involvement and in particular, involvement of central nervous or cardiac systems[8,9]. Mortality rate is quoted as forty percent in the first forty months[6].

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Infants with FPIES to Solid Food Proteins – Chicken, Rice and Oats

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Abstract
We present two cases of Food Protein Induced Enterocolitis Syndrome (FPIES), a non-IgE mediated food hypersensitivity[1]. FPIES induces severe vomiting 1.5-to-3 hours post ingestion of the offending food, and may be associated with diarrhoea, hypovolemic shock and acidosis. Avoidance of that food will lead to resolution of symptoms and prevents further episodes.

Introduction

FPIES is rare, and more often misdiagnosed[2]. Up to 20% of patients present in hypovolemic shock[3]. Clinicians are likely to initially suspect sepsis, metabolic conditions, acute surgical abdomen or gastroenteritis. Children may require fluid resuscitation, and potentially HDU/ICU admission. Infants with FPIES will re-present with similar symptoms if the protein is reintroduced. In most, tolerance develops by 2-3 years of age[1,4]. The pathophysiology and immune mechanisms underlying FPIES are not fully understood.

Case 1

Eight-month-old male presented twice in 3 weeks with hypovolemic shocked following acute onset of vomiting. He required multiple fluid boluses, and admission to HDU. He was acidotic (pH: 7.30), with thrombophilia (611) and neutrophilia (29.6). Subsequent endocrine, metabolic work-up, ultrasound abdomen and barium study were normal. FPIES was suspected. Food challenges to carrot, sweet potato, followed by chicken ensued. Two hours post ingestion of chicken he had severe vomiting and lethargy, requiring I.V. fluids.

Case 2

Seven-month-old male. Weaned with baby rice at 20 weeks. Three days later was admitted with possible urosepsis. At 22 and 26 weeks of age had profound emesis associated with lethargy and diaphoresis 90 minutes post ingestion of baby rice. Delay in weaning occurred, resulting in anaemia and faltering centiles. At 32 weeks he was admitted for food challenge, and to establish safe foods. He similarly reacted to oats, and required I.V. fluids. Once home he reacted to natural yogurt; subsequent investigation revealed possible contamination with rice flour.

Table 1 Non-IgE Gastrointestinal Disorders8

Food-Protein Induced Enteropathy
Food Protein Induced Proctocolitis
Food Protein-Induced Enterocolitis
Coeliac Disease

Discussion

"Typical FPIES" describes infants under nine months; repeated exposure to the offending agent elicits gastrointestinal symptoms; removal of the protein from the diet results in resolution of symptoms. A standardized food challenge provokes vomiting and/or diarrhoea[3]. FPIES is not exclusive to infants under 9 months; presentation after this period is considered "atypical" FPIES. The most common foods implicated are cow's milk and soy. Infants who present within the first 2 months of life can have chronic diarrhoea, intermittent vomiting, are more likely to have failure to thrive and hypoalbuminemia[2]. Following dietary exclusion, reintroduction of milk or soy will result in an acute FPIES event. Breast milk appears to confer some protection against FPIES to milk or soy[1]. FPIES to solid food proteins occurs later as weaning occurs after 4 months of age. Both our patients reacted to solid food proteins. This often occurs on first exposure. Health professionals and parents consider rice to be relatively hypoallergenic[5]. However rice is emerging as the most common solid food trigger for FPIES, accounting for up to 70% of solid food FPIES[1]. Rice is more likely to induce a more severe reaction than milk or soy[5]. Due to increasing awareness the number of solid food proteins reported to cause FPIES is rising. Cereals (oats, barley, rye), vegetables (squash, sweet potato, peas), and poultry all may cause FPIES[1]. Children with FPIES to milk or soy can later develop FPIES to solid foods.

Clinical features seen in our patients are similar to those already described: vomiting (up to 100%); extreme lethargy (85%, soon after vomiting starts); pallor (67%); diarrhoea (24%, commencing up to 6 hours post ingestion)[4]. Other features include a high neutrophil count[4], thrombocytosis[4], as seen in Case 1, and transient methaemoglobinemia[3,6]. Hypothermia has also been reported[4]. No diagnostic immunological markers have been identified. Specific IgE to food proteins involved are typically negative. IgE testing was performed in Case 2, and was normal. Developing IgE against the offending agent appears to reduce their likelihood of developing tolerance[1]. An upper endoscopy is usually not required[5]. Histology has shown various degrees of villous atrophy that are non-specific and are only present during an acute FPIES event[7].

The diagnosis of FPIES is clinical, based on clinical criteria and standardized oral challenge[8]. As they are considered high risk such challenges are performed under medical supervision. Awareness and early diagnosis reduces recurrence of life threatening episodes through avoidance. A re-challenge should be considered after two years of age to assess for tolerance.

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Acknowledgements

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Triad of Emboli in Acute Flare of Ulcerative Colitis

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Abstract
Arterial thrombosis is rare in ulcerative colitis (UC). Our case report described a triad of arterial emboli in a UC patient who presented with bilateral lower limb claudication associated acute chest pain, confusion, ataxia and diplopia. Investigations confirmed bilateral femoral and popliteal artery occlusion, occipital infarct and a sub-endocardial infarct secondary to embolic disease.

Introduction

Venous thrombotic complications are well known features of acute exacerbation of ulcerative colitis, with many fatal episodes relating to pulmonary embolism [1]. Arterial thrombosis is significantly rarer, including cerebral, retinal, hepatic, aorto-iliac, intra-cardiac and splenic thrombus[2-4]. The relationship between active disease and inflammatory process resulting in a prothrombotic state is the key factor in these complications[5].

Case Report

A 38-year old man with a 15-year UC history, maintained on azathioprine, presented with a 6-month history of bilateral lower limb claudication. Occasional exacerbations of his colitis had been successfully controlled with corticosteroids. The onset of claudication coincided with an acute flare-up 6 months ago. He also had an episode of severe chest pain, followed by an episode of acute confusion with associated ataxia and diplopia lasting less than 24-hours prior to claudication onset. Bilateral popliteal, dorsalis pedis and posterior tibial pulses were absent. Ankle-brachial indices were 0.98 on the right and 0.30 on the left. A computerized tomographic femoral angiogram confirmed bilateral popliteal artery occlusion secondary to emboli at the popliteal bifurcation, with proximal propagation of thrombus (Figure 1).

Subsequently, the patient had a magnetic resonance imaging (MRI) of the brain revealing signal changes in the right medial temporal lobe extending posterior to the occipital lobe consistent with an embolism. Cardiac investigations were carried out in search of a central source for these embolic events. Trans-thoracic echocardiogram showed a hypokinetic left ventricle with no evidence of atrial or valvular thrombus. Follow-up trans-oesophageal echocardiogram did not confirm a patent foramen ovale. Subsequent cardiac MRI confirmed a sub-endocardial infarct involving the mid and apical inferior segment of the left ventricle (Figure 2). Coronary angiogram revealed no evidence of atherosclerotic disease. Thrombophilia screen was also negative. Given the patient's history of UC, a colonoscopy was performed investigating for occult neoplasm. Biopsies of pseudo-polyps in the transverse colon were benign. Computerized tomography of the thorax, abdomen and pelvis did not show an occult neoplasm. The patient was commenced on warfarin, but re-presented several weeks later with a further exacerbation of his colitis. He was re-commenced on high dose steroids combined with infliximab which controlled his condition.

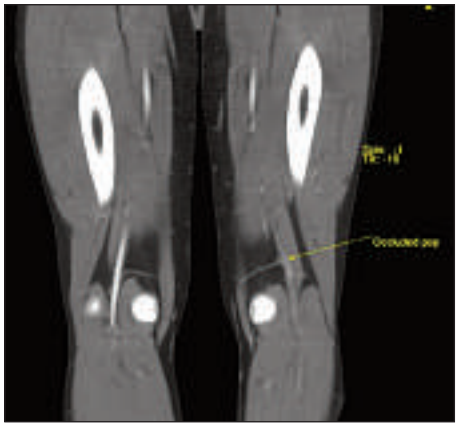

Figure 1
Coronal image of CT Angiogram demonstrates occlusion left distal superficial femoral artery, popliteal junction and artery (Occluded over 25cm in length)

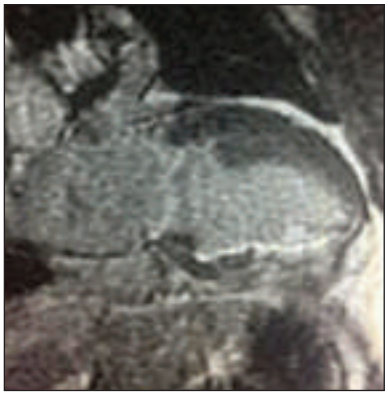

Figure 2
Cardiac MRI 2-chamber late gadolinium enhanced image demonstrates enhancement involving the inferior myocardium consistent with an inferior wall sub-endocardial myocardial infarction

Discussion

There are sparse reports on acute arterial thrombosis in patients with inflammatory bowel disease (IBD). A Mayo Clinic study of 7,199 patients with IBD observed only 7 patients with arterial thrombosis[6]. It is postulated that patients with UC confer a higher risk of arterial thrombosis than those with Crohn's disease[7]. Though colectomy has been advocated for patients with pan-colonic UC to reduce the risk of thrombosis[7], its benefit has not been accurately quantified. The inflammatory response to acute colitis results in a pro-thrombotic state. Up-regulation of coagulation factors V, VII, VIII, thrombin, fibrinogen and thromboplastin combined with increased levels of cytokines, tissue necrosis factor– alpha (TNF a), interleukin-6 and inhibition of fibrinolysis make the "perfect storm" for thrombus formation[5]. Studies have shown that IBD medications including sulfasalazine, methotrexate, azathioprine, cyclosporine and prednisolone also indirectly create a pro-thrombotic state[8]. Hyper-homocystinaemia is also a recognized independent risk factor for thrombosis[9]. The frequency of hyper-homocystinaemia in patients with IBD is estimated to range between 11-52% and is associated with medications such as methotrexate and sulfasalazine[10]. The treatment of thromboembolism in IBD remains debatable. The British Society of Gastroenterology recommends prophylactic subcutaneous low-molecular weight heparin for all patients experiencing an exacerbation of UC[11]. Studies have shown that heparin and members of the glycosaminoglycans have noteworthy anti-inflammatory properties that are beneficial in acute flare-ups[11]. However this treatment is less feasible in the community, as more than 300 patients would need to be treated to prevent one thromboembolic event[11].

The incidence of arterial thrombosis during an exacerbation of UC is rare. We report an unusual case describing a triad of arterial thromboembolism. We alert physicians to the potential serious vascular complications associated with UC. However, the role of pharmacological agents still remains unclear.

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Beware: Unilateral Reinke's Oedema of the Larynx

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Abstract
A thirty year-old man presented with hoarseness of recent onset. The underlying cause was a glottic schwannoma, which led to development of unilateral Reinke's oedema. Schwannomas arising in the paraglottic space are rare.

Introduction

Patients presenting with changes in voice quality are initially investigated in the ENT clinic with flexible nasendoscopy with or without video-stroboscopy, as these allow direct vocal cord visualisation. Reinke's oedema refers to swelling of the vocal cords. We report a case of a young healthy male who presented with hoarseness due to unilateral Reinke's oedema, and was found to have a rare cause to explain this unusual finding.

Case Report

A thirty year-old man was referred to our clinic for evaluation of hoarseness of recent onset. He was a non-smoker, and denied any reflux symptoms. He had no other risk factors, and his past medical history was non-contributory. General physical examination was unremarkable. Flexible nasendoscopy revealed Reinke's oedema, involving the right vocal cord and extending to the anterior third of the left vocal cord, with no evidence of reduced vocal cord movement. Further evaluation with microlaryngoscopy confirmed Reinke's oedema, which was treated with incision of the vocal cord surface and fine suctioning of the oedematous mucosa. On follow-up, the patient reported no improvement in his symptoms. Reinke's oedema persisted. Evaluation with video-stroboscopy showed reduced right vocal cord movement. This led us to suspect the possibility of the swelling extending deep to the right vocal cord, with a soft-tissue lesion producing a mass effect. Magnetic Resonance Imaging (MRI) of the larynx demonstrated a 2-cm mass occupying the right paraglottic space (Figure 1).

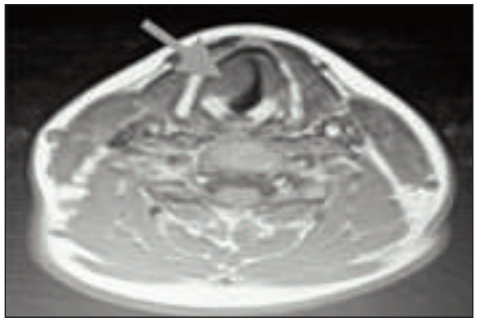

Figure 1

Axial T1-weighted MR image at the level of the thyroid cartilage showing an isointense lesion occupying the right side of the paraglottic space

The patient underwent a complete resection of the lesion via microlaryngoscopic approach. Histopathological findings were consistent with a benign schwannoma (Antoni type-A), and were confirmed on immunohistochemistry with reactivity for S100 protein. Post-operatively, the patient made an excellent recovery, achieving normal vocal cord movement and fully regaining his voice. There was no evidence of recurrence on six-monthly follow-up. His screen for neurofibromatosis was negative. In view of the above findings, we propose this case to be a schwannoma of either recurrent laryngeal nerve or the external branch of the superior laryngeal nerve.

Discussion

Reinke's oedema can occur following voice abuse, smoking or reflux. Usually bilateral, it is characterised by oedematious changes within the superficial layers of lamina propria, producing a balloon-like appearance of the vocal cords on laryngoscopy. The swelling reduces vibrating amplitude and causes low-pitched voice, hoarseness, and difficult phonation. Unilateral vocal cord involvement is suggestive of an underlying lesion, and requires further evaluation. MRI is the radiological modality of choice, as it produces superior image quality of soft tissues.[1] Histopathological examination of the lesion allows for a definitive diagnosis.

Findings of a soft-tissue mass on imaging, in the presence of vocal cord paresis should lead to suspect a possibility of a neurogenic tumour. Two main types exist: schwannomas and neurofibromas. The latter are commonly seen in neurofibromatosis and can be multiple. In contrast, schwannomas are solitary and encapsulated, arising from Schwann cells of the cranial and peripheral nerves. The majority are benign; reports of malignant transformation are rare.[2,3] Up to 45% of schwannomas occur in the head and neck region.[4,5] Of those, less than two percent are found in the larynx, while glottic involvement is even less common.[6] The majority of lesions involve the internal branch of the superior laryngeal nerve. Vocal changes and dysphagia are common, while globus sensation may be due to growing tumour producing a mass effect. Schannomas appear as isointense lesions on T1-weighted MRI; T2- weighted images produce a characteristic hyperintense lesions, differentiating them from sarcomas. Histologically, schwannomas exhibit distinct cellular architecture. Antoni type-A pattern refers to spindle-shaped cells,

nuclei of which are organized in rows, while Antoni type-B is characterized by loose arrangement of spindle cells within the myxoid matrix.[7] Occasionally both types can be seen within the same lesion. Positive immunohistochemical reaction for S100 protein confirms the diagnosis of schwannoma.[8]

Owing to their high resistance to radiation and characteristic encapsulation, surgical excision (endoscopically or by open approach) is the mainstay of treatment.[9] Complete resection is associated with excellent prognosis, allowing normal or near normal restoration of the nerve function.[10]

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Difficulties Associated with Diabetes Management During the Junior Certificate Examination

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

Abstract
The aim of this study was to describe the adherence to recommended diabetes care during the Junior Certificate, and the utilisation of available allowances for children with type 1 diabetes. Questionnaires were sent within 3 months of the examination to all adolescents and their families attending our service completing the Junior Certificate in June of 2012. Fifteen of the 25 (60%) patients/parents completed the questionnaires. Five (33%) had higher than usual glucose readings during the examination period and three (20%) experienced hypoglycaemia during at least one exam. Nine (60%) never checked capillary glucose levels during the exams. No patients left the examination area to perform diabetes related tasks. Thirteen (86%) brought fast acting glucose into the examination centre while only six (40%) brought a glucometer. Just four (27%) patients availed of the rest breaks allowed and six (40%) felt that their diabetes affected their examination performance.

Introduction

The target glycosylated haemoglobin A1c (HbA1c) in adolescence is 7.5%[1,2], and teenagers are less likely than children of all other paediatric ages to have a HbA1c within the target range[3]. Achieving optimal compliance with diabetes care is difficult in adolescence, reflecting the complicating physiological and psychological factors at this time. The transition from childhood to adolescence is associated with less frequent glucose monitoring and deteriorating glycaemic control[4]. Parents often offer their adolescent more autonomy over their diabetes care, which may result in a deterioration in control[5]. Diabetes related psychosocial difficulties are increased in adolescence[6], and exposure to alcohol can also complicate diabetes care[7]. This population is also generally less motivated to improve glycaemic control[8,9]. Even in the well-motivated adolescent, increasing insulin resistance in puberty[10] may transiently affect glycaemic control as doses are increased in response to increasing blood glucose.

The Junior Certificate State Examination in Ireland takes place during this challenging time. This occurs in the eleventh academic year, when the child is approximately 15-16 years of age. This is the first external examination performed by students and most undertake examinations in 9-11 subjects over a two-week period. The months before these examinations can be stressful for the entire family, and optimal diabetes care can assume a lower priority. Type 1 diabetes often assumes a lower priority for the child than study and academic performance. However, children and parents should know that suboptimal glycaemic control impacts negatively on examination preparation and performance. Hypoglycaemia, hyperglycaemia and wide fluctuations in blood glucose affect cognition[11,12], and should be avoided in children preparing for and performing academic examinations. The duration of impaired cognition following episodes of hypoglycaemia is not known, but could impact both on study effectiveness and examination performance.

In order to facilitate children with type 1 diabetes reaching their potential in academic performance, accommodations during examinations are available. All students with chronic conditions, including Type 1 diabetes, which may affect performance, may apply to the State Examinations Commission for "reasonable accommodations" to be made. The purpose of these is to lessen the impact of the condition on their performance, while ensuring that the child is not given an unfair advantage over other candidates. Specifically, a child with type 1 diabetes in Ireland can apply for multiple short "rest breaks" during each examination. The total of these rest periods cannot exceed 20 minutes. This time may be used to perform diabetes related tasks, if necessary. These rest breaks must be applied for in advance, so patients should be informed of these accommodations early in the academic year. The required provision of accommodations for children with type 1 diabetes during examinations is recognised internationally. In Australia, children sitting the Junior Certificate equivalent examination may take rest breaks to a maximum of ten minutes per hour of examination time[13]. Similar to Ireland, they are permitted to eat and take necessary equipment with them into the examination centre. Little is known of the experience of children

CPD available online at www.imj.ie and questions on page 159.

with type 1 diabetes in Ireland during the Junior Certificate examination. In this study, we aimed to gain a better understanding of the compliance of children with type 1 diabetes with diabetes care during this examination, and to ascertain their perceived effect of type 1 diabetes on examination performance. We hoped that gaining a better understanding of this would allow us to better guide our patients who are preparing for this and other examinations.

Methods

Adolescents with Type 1 diabetes attending the paediatric endocrinology service in Children's University Hospital, Temple Street who completed the Junior Certificate examination in 2012 were eligible for inclusion in this study. Questionnaires detailing diabetes self care required during examinations, frequency of hypoglycaemic events, facilities in the examination hall, and students' concerns regarding the impact of type 1 diabetes on their academic performance were sent to parents and students within 3 months of the examination. We also assessed the number of students availing of rest time during the examinations. Questionnaire distribution was followed by two phone call reminders one month apart to facilitate questionnaire return. This study was approved by the Ethics Committee of the Children's University Hospital, Temple Street.

Results

Twenty-five patients from our service completed the Junior Certificate in 2012, and 15 (60%) returned questionnaires (Table 1). The mean patient age at the time of Junior Cert was 15.4 (SD 1.6) years and the patients had diabetes for a mean duration of 5.2 (SD 3.5) years. Three (7%) reported experiencing hypoglycaemia during an examination, and 2 patients (13.3%) did not bring a fast acting glucose source to treat hypoglycaemia with them to the examination centre. Mean HbA1c did not change significantly prior to and after the Junior Certificate (8.5% vs 8.6%). Uptake of the available rest breaks for students with type 1 diabetes was poor, with only 27% availing of this accommodation. Almost half (n=7) of the patients felt that diabetes affected their examination performance. When asked to explain why they felt this happened, the answers included 1) worry that hypoglycaemia was affecting concentration, 2) general concern that blood sugar levels were unstable, and 3) that diabetes added to the stress of the examinations.

Table 1 Results of study

Patient Number	15
Age	15.4 (1.6)* years
Duration of Diabetes	5.2 (3.5)* years
HbA1c prior to Junior Certificate	8.5 (0.98)%
HbA1c after Junior Certificate	8.6 (1.6)%
Insulin therapy	
Insulin Pump	3 (20%)
Basal Bolus	7 (47%)
Premixed Injections	5 (33%)
Number who availed of rest breaks during the examination	4 (27%)
During Examination	
Hypoglycaemia (<4mmol/L)	3 (7%)
Hyperglycaemia (>15mol/L)	7 (47%)
Ketosis (>0.6mmol/L)	0
Number who checked glucose during examination	8 (53.3%)
Equipment brought into exam centre	
Glucometer	8 (53.3%)
Ketonemeter with strips	5 (33%)
High Glycaemic Index Drink	13 (86.7%)
Insulin injection	2 (13.3%)
Glucose Diary	0
Felt diabetes affected performance	7 (46.7%)

*mean (SD)

Discussion

State-regulated examinations represent a stressful event in the life of the adolescent. Impaired cognition is associated with hypo- or hyper-glycaemia[14], and the time taken to return to baseline following such an event is not known. Optimal diabetes control during academic examinations is important to avoid adverse effects on performance. Rest breaks are available for students with type 1 diabetes to complete each examination, but just over a quarter of patients in this study availed of this support. These breaks are intended to facilitate diabetes self care including glucose checks during the examination. On the day of examination, the student should be prepared for the possible stress-related increase in insulin requirement. Hypoglycaemia is also a risk, and the student must be prepared to identify and treat this promptly in the tightly regulated setting of the examination centre. Almost half of the patients did not bring a glucometer into the examination centre. Only 53% checked their capillary glucose levels during the examinations and 13% did not have a hypo remedy with them. Adolescents, their parents and schools need to ensure that this equipment is available during examinations. Three patients experienced hypoglycaemia during one or more examination, but whether or not this affected performance is unknown. In the event of hypoglycaemia during an examination, it is possible that the allowance of extra time may be insufficient to overcome the cognitive effects of the episode of low blood glucose. Glycaemic control in the study participants was suboptimal, with a mean HbA1c over one percentage point above the recommended 7.5%. Possible reasons for this include low priority of diabetes control during the examination year and stress associated with the Junior Certificate, as well as other well-recognised issues affecting diabetes control in adolescence[4,6,8].

Limitations of this study include its small sample size and retrospective study design. However, a number of areas where care of adolescents preparing for this examination could be improved were identified. Almost half of patients in this study felt that their diabetes affected their examination performance. Recommendations to improve this would be to ensure that upcoming academic examinations are discussed at the beginning of the academic year where the importance of optimising control to maximise performance is emphasised. Parents should be informed of the special accommodations available to their children at the exam and should also be encouraged to discuss this with their child's school prior to the examination. A plan should be in place for the day of the exam, where a checklist is provided for the adolescent outlining the equipment that should be brought into the examination centre.

We would also recommend that the Department of Education issue all schools with clear guidelines for accommodating children with diabetes. In addition, invigilators in examination centres where children with diabetes are sitting examinations, should have a basic understanding of the common diabetes related self care procedures that may be required during the examination. We would hope that these interventions may reduce the proportion of patients who feel that type 1 diabetes has a negative impact on examination performance.

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An Example of Ideal Utilisation of Specialist Services by Primary Care: Cervical Check

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Abstract
Cancer of the cervix is the 8th most common cancer for women in Ireland.Cervical Check has organised and combated this clinical presentation nationwide and has shown encouraging figures since its launch in 2007.[1] While working in Kerry General Hospital (KGH), the Southwest Specialist Training Scheme in General Practice carried out an audit of the colposcopy referrals being received from GPs in the southwest. Adherence to Cervical Check referral guidelines was the main focus of the audit. Very positive figures presented in round one of the audit cycle, with 51 (90%) of all GP referrals adhering to the guidelines. This was further improved by a GP information campaign, leading to 57 (93%) of referrals meeting the appropriate referral criteria. Overall, this paper highlights the excellent screening programme that is Cervical Check and the superb working relationship between primary and secondary care facilities.

Introduction

Cervical cancer accounts for 2.8% of all malignant neoplasms, excluding non-melanoma skin cancer, in women.[1] It is a cancer of young women 50% of all cases diagnosed in women aged ≤ 46 years.[2] Free smear tests are provided every three years for women aged 25 to 44 and every five years for women aged 45 to 60 years and is operated in line with best international practice.[2] The annual report of Cervical Check from 2009/2010 showed that 308,130 free smear tests to 279,877 women were done.[2] 7,546 treatments were performed at colposcopy. Pre-cancerous abnormalities were detected in 5,518 women.[2] CervicalCheck uses the Bethesda classification for cytology and the terminology is based on squamous intraepithelial lesions (SIL)[3]. These are divided into 3 groups consisting of Low grade SIL (LSIL) which includes HPV-associated cellular changes and mild dyskaryosis, High grade SIL (HSIL) which includes moderate dyskaryosis, severe dyskaryosis, carcinoma in situ and finally squamous cell carcinoma. Dyskariosis is identified in cells as nuclear changes. Laboratory reports equate mild dyskaryosis with LSIL and moderate and severe dyskaryosis with HSIL[3]. Cytological changes in squamous cells which are not normal and do not fulfil the criteria for SIL are classed as atypical squamous cells (ASC).[3]

As part of the South West GP Training Programme an audit was conducted on the referrals to the colposcopy unit in the south west region from June to August 2011 inclusive. The colposcopy service in Kerry General Hospital is utilised by GPs in the Southwest and has a computerized management system (Compuscope) which was used for this audit. Particular attention was on ASCUS (Atypical Cells of undetermined significance) as it had been noted by the colposcopy unit staff that the number of inappropriate referrals for ASCUS was high and that specific guidelines were not being adhered to. The specific guidelines for ASCUS in 2011 were as follows, 1st ASCUS should be repeated in 6 months. 3 consecutive ASCUS should be referred to colposcopy. Refer 1st ASCUS after having treatment for Cervical Intraepithelial Neoplasm (CIN) to colposcopy. Refer any 3 ASCUS in 10 years to colposcopy or any ASCUS within 3 smears of LSIL (low grade squamous intra-epithelial lesion).[4]

There is a standard referral form to colposcopy on cervicalcheck.ie.[5] Patient details, GP details and clinical details are essential information. Clinical details include reason for referral smear details, clinical findings and past medical history. Appropriate quality referrals were defined as those that adhered to the guidelines as well as completion of cervical check referral form. Inappropriate referrals to colposcopy were defined as those that did not adhere to the above guidelines i.e. one or two ASCUS (with no history of treatment for CIN or no LSIL result within the last three smears). The aims of the audit were to assess the number of inappropriate referrals to the colposcopy unit, to see why the referrals were inappropriate and to implement an intervention to reduce the number of these referrals.

Methods

From discussing GP referrals with the colposcopy unit staff, abnormal smears, post coital bleeding (PCB) and cervical polyps make up the majority of colposcopy referrals, which are entirely appropriate. GP referrals of ASCUS were studied over a 3-month period from 1st June 2011 to 31st August 2011 with a view to determining if they were referred as per the above NCSS guidelines. Having implemented outlined changes subsequent numbers of ASCUS referrals from GPs were examined over a 2 month period to complete the audit cycle. This re-audit cycle took place from 1st February 2012 to 31st March 2012. Ensuring objectivity, two authors performed the initial audit data collection and two separate authors performed the re-audit data collection. Auditing was carried out by the authors. P Hughes and M McCaffrey – Consultant Obstetricians in KGH, supervised the project. The Southwest Specialist Training Scheme in GP granted ethical approval.

A list was compiled using the Compuscope System in the Colposcopy unit of all the ASCUS referrals during the specified audit periods. These patients' case notes were then reviewed with the following exclusion and inclusion criteria. Exclusion Criteria (as per NCSS guidelines) included: 3rd or more ASCUS, 1st ASCUS after having previous treatment for CIN, 1st ASCUS within 3 smears of a LSIL (Low grade Squamous Intraepithelial lesion). Inclusion Criteria was simply two or less ASCUS. An up to date list of all the GPs referring to the Colposcopy Unit was formulated. The intervention was in the form of a letter, which was posted out to GPs individually which included the aim of the audit and the preliminary results. It highlighted the level of appropriate referrals from GPs to the service. This correspondence with the GPs gave us the opportunity to highlight the most common reason for inappropriate referral (1st or 2nd ASCUS,) and how the colposcopy service could be better utilized. A copy of the referral guidelines was also included with each letter.

Results

1st audit cycle Results

The number of patients referred with first ASCUS from 01/06/2011 to 31/08/2011 was 51 patients. 90% of GP referrals adhered to the NCSS guidelines. Of the inappropriate referrals, 2 were on patients who had their first ASCUS, 1 was on a patient that had 2 ASCUS. There was also 1 referral of a patient who had LSIL on a smear greater than eighteen months and 1 referral was on a patient who had a previous CIN I but had 3 subsequently normal smears. It was noted that 24% of all referrals examined had insufficient clinical details documented with regards to information relating to the patients previous smear history.

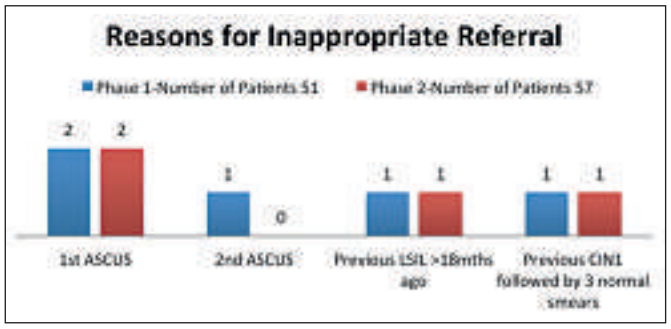

Figure 1

2nd cycle – reauditing

This showed a similar number of referrals with 57 patients referred for colposcopy with first ASCUS. An improvement from 90% to 93% of all referrals meeting guideline criteria was seen on re audit. The reasons for inappropriate referral were similar to cycle one. A subsequent finding of this audit showed that the quality of the information within the referral letter was also improved upon. At stage one of the audit, almost a quarter of the appropriate referrals had insufficient information and lacked full details of previous smear history. In the re audit the content of the appropriate referrals was improved upon, with just 11% of the referrals having insufficient information.

Discussion

The initial results proved impressive with only 10% of GP referrals being inappropriate. After implementation of the audit intervention, further improvement was noted, reducing the number of inappropriate referrals to 7%. Interestingly a second conclusion was drawn from the results. On reviewing all referrals, a high percentage initially appeared to be inappropriate but on further investigation of these patients' charts, the referrals were deemed appropriate. The reason that they first seemed inappropriate was that 24% of referrals had insufficient information. After implementing the intervention this was reduced to 11%. This proved to be a very interesting secondary outcome. It highlighted the fact that although GPs in the Southwest region were referring appropriately at least 90% of the time, sufficient clinical information and history were not always accompanying.

This audit provided positive feedback to GPs regarding their current practice. It was deemed important highlight the need for sufficient clinical information on referral letters to allow for a more efficient service for the patients, as well as enhancing communication between Southwest GPs and the Colposcopy Unit Staff. The Colposcopy staff and GPs are encouraged by the results of this audit. New guidelines and terminology has recently been published by the Quality Assurance (QA) Committee for The National Cervical Screening Programme 1. Re –auditing of ASCUS Referrals under these updated guidelines is warranted. While this audit was limited by time and numbers it did highlight the great work being carried out by GPs in the Southwest with an impressive 93% of all referrals adhering to the Cervical Check guidelines. As well as this, the quality of the referral letters is very high, with 89% containing sufficient information on history. It is hoped this high standard of referrals is continued ensuring the most effective and appropriate use of colposcopy services in KGH, which ultimately results in the best care for our patients.

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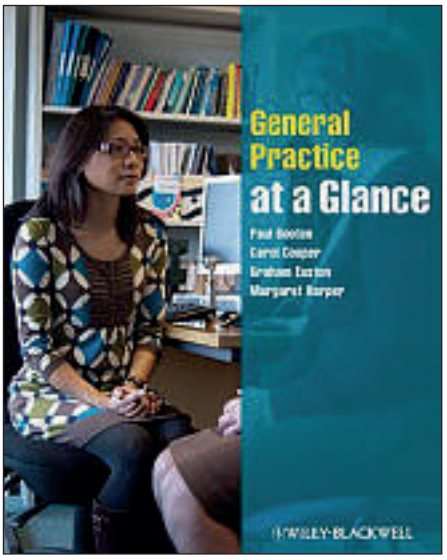
General Practice at a Glance

Authors: Booton, P. Cooper, C. Easton,G. and Harper M.

Publishers: Wiley Blackwell

"General Practice at a glance" provides a good introduction to the world of general practice for medical undergraduates and junior doctors on their first general practice attachment. Well illustrated with diagrams, photos, algorithms and decision trees it succeeds in presenting concise information on the variety of conditions that can present in a general practice setting. The book is divided into two sections. Part one addresses the "essence of general practice" covering areas including the consultation, prevention, significant event analysis, prescribing, law and ethics and child abuse. Part two addresses common presentations in general practice across medicine, paediatrics, obstetrics and gynaecology, mental health, eyes, ENT and dermatology. The general practice context for the book is the NHS and naturally there will be differences (which the authors could not be expected to address) when the contents are applied in a different health care settings.

While the essence of general practice is the same in Ireland there are some significant differences. Some of these are related to systems of health delivery e.g. universal free GP care in the UK unlike Ireland where approximately 60% of primary care patients are private. There are also variances between the two countries in eligibility and timing of screening programmes such as cervical screening and contractual issues such as the Quality and Outcomes Framework which is only applicable to the UK. There is an emphasis on urban general practice in the book particularly in relation to continuity of care where an average of only 30% of patients in the UK setting would remain with a practice for life. There is little mention of rural practice. Many general practices in the UK have multiple partners and continuity of care with the same GP would be increasingly rare. In Ireland the percentage of patients remaining with a practice for life and maintaining a continuing long-term relationship with their GP is far higher. The management of patients through primary care teams delivering structured chronic disease management is far more developed in the UK than in Ireland. The challenge of managing an increasingly elderly population with multiple morbidities is mentioned briefly in the text and is one of the biggest differences between primary and secondary care delivery. However managing multi morbidities would be of more relevance to a postgraduate rather than the intended target audience for this book.



Overall the authors are to be commended on summarising the complexity of general practice in a clear accessible way for the new entrant to a general practice setting.

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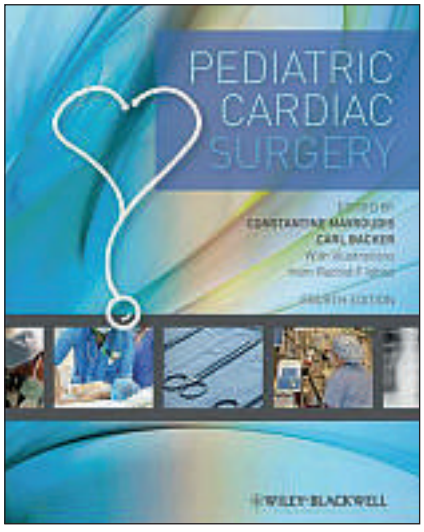
Pediatric Cardiac Surgery, Fourth Edition

Editors: Constantine Mavroudis and Carl L Backer

This comprehensive book gives an excellent overview of modern paediatric cardiac surgery. Since first published in 1985 "Pediatric Cardiac Surgery" has been a gold standard reference for paediatric and adult congenital heart surgeons and the wider multi-disciplinary team of cardiologist, intensivists, anaesthetist and nursing involved in the care of congenital heart surgery patients.



The fourth edition has been extensively rewritten with contributions by over 65 world-renowned experts. Each chapter reviews the embryology, clinical findings, assessment, diagnostic criteria, treatment options and postoperative care for each diagnosis. There are hundreds of illustrations rendered by the same artist to clarify important aspects of procedures. The new chapter layouts guide the reader through new treatment options and key developments since previous editions. For instance the interventional cardiology chapter has been replaced with a chapter on hybrid procedures for congenital heart disease. The new chapters review advances in management of tracheal defects, double out ventricles and hybrid management of paediatric heart disease. Advances in adult congenital heart disease are covered by new reviews on the management of right ventricular to pulmonary artery conduits, arrhythmia surgery and surgical conversion of the intra-cardiac to extra-cardiac Fontan.

This book is a recommend addition to any library on congenital heart surgery, and is a suitable textbook of choice for fellows, nurse practitioners or medics seeking a textbook overview of congenital heart surgery.

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Continuing Professional Development

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

Retrospective Costing of Warfarin

C Walsh, A Murphy, A Kirby, C Vaughan. Ir Med J. 2014; 107: 133-5.

Question 1
The number of anticoagulants available for patients with atrial fibrillation is

a) 2
b) 4
c) 6
d) 8
e) 10

Question 2
The number of the anticoagulants that require monitoring is

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

Question 3
The average age of the patients in the study was

a) 65 years
b) 70 years
c) 75 years
d) 80 years
e) 85 years

Question 4
The average time spent in the clinic including waiting time was

a) 0.13 hours
b) 1.13 hours
c) 2.13 hours
d) 3.13 hours
e) 4.13 hours

Question 5
The total cost per patient per visit (euros) was

a) 55.07
b) 60.07
c) 65.07
d) 70.07
e) 75.07

Management of Parenteral Nutrition Associated Hyperglycaemia: A Comparison of Sub-Cutaneous and Intravenous Insulin Regimen

K Neff, D Donegan, J MacMahon, C O'Hanlon, N Keane, A Agha, C Thompson, D Smith. Ir Med J. 2014; 107: 141-3.

Question 1
The proportion of parenteral nutrition recipients who develop hyperglycaemia is

a) 58%
b) 68%
c) 78%
d) 88%
e) 98%

Question 2
The number of patients with PN associated hyperglycaemia was

a) 92
b) 102
c) 112
d) 122
e) 132

Question 3
The amount of time that those on intravenous insulin were within glycaemic target was

a) 42%
b) 52%
c) 62%
d) 72%
e) 82%

Question 4
The amount of time that those on subcutaneous insulin were within glycaemic target was

a) 23%
b) 33%
c) 43%
d) 53%
e) 63%

Question 5
Among the total cohort the proportion who survived to discharge was

a) 43%
b) 53%
c) 63%
d) 73%
e) 83%

Difficulties Associated with Diabetes Management During the Junior Certificate Examination

D Scully, CP Hawkes, SM McGlacken-Byrne, N Murphy. Ir Med J. 2014; 107: 154-6.

Question 1
The number of children who participated in the study was

a) 9
b) 12
c) 15
d) 18
e) 21

Question 2
The proportion with higher the normal blood sugars was

a) 13%
b) 23%
c) 33%
d) 43%
e) 53%

Question 3
The proportion who never checked their capillary blood sugars during the exam was

a) 30%
b) 40%
c) 50%
d) 60%
e) 70%

Question 4
The HbA1c levels after the Junior Certificate was

a) 8.2
b) 8.4
c) 8.6
d) 8.8
e) 9.0

Question 5
The proportion who experienced at least one episode of hypoglycaemia during the exam was

a) 5%
b) 10%
c) 15%
d) 20%
e) 25%

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