Paediatric Surgery - A General Hospital Experience

Abstract:

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Abstract
Plans to centralise paediatric surgery in Ireland have potentially significant implications for service provision and surgical training. This study assesses the workload of paediatric surgery in a district hospital over a five-year period. Paediatric surgical admissions and procedures at Mayo General Hospital from January 2006 - December 2010 were reviewed. Data was obtained from the Hospital in-patient enquiry (HIPE) systems and theatre logbooks. 4,255 surgical procedures were performed in 3981 paediatric patients, accounting for 7.4% of the total surgical workload. 2,578 (65%) of cases were elective and 1403 (35%) of paediatric surgery was performed in the emergency setting; paediatric appendicectomy was the most commonly performed procedure (n=554) with a complication rate of 2.5%. There were no paediatric surgery related mortalities. Paediatric surgery represents a significant part of the surgical workload. There is a continued need for general paediatric surgical provision in this regional setting, supported by access to specialist centres for complicated paediatric surgery.

Introduction
Specialist paediatric surgery in Ireland is centralised to three paediatric centres in Dublin. Population distribution and availability of services means that much of the general (non-specialist) and emergency paediatric surgical workload is performed outside of these centres. District hospitals throughout the country perform general paediatric surgery on a regular basis. Mayo General Hospital (MGH) has 3 general surgeons and 3 orthopaedic surgeons servicing a paediatric population of approximately 28,930 [1]. There are 5 paediatric physicians at MGH, and a 40-bed paediatric ward. All consultant anaesthetists at MGH have trained in paediatric anaesthesia. Children who require specialist elective surgical procedures are transferred to a specialist centre (Our Ladyâ s Childrenâ s Hospital, Crumlin). Complex paediatric surgical emergencies and burns occasionally require transport to a specialist centre, but a large proportion of general and emergency paediatric surgery is performed peripherally.

Efforts have been made to centralise all paediatric surgery, including the general, non-complex paediatric surgery that is performed in district hospitals such as MGH. Centralisation of these services may impact on the patient population in these areas, particularly their access to paediatric surgical services. The aim of this study is to assess the workload and efficacy of general paediatric surgery in a typical general hospital, and to consider the impact of centralisation of such services on the paediatric catchment population of MGH. Such data may strengthen the argument for maintaining general paediatric surgery in general hospitals such as MGH.

Methods
Data on all paediatric surgical admissions to MGH over a 5-year period (01/01/2006 to 31/12/2010) was accessed from the Hospital In-Patient enquiry (HIPE) System, operating theatre logbooks and a prospectively maintained record of morbidity and mortality for general paediatric surgery cases. Inclusion criteria for the study were: age 16 years or under and admission under the care of any surgical consultant at MGH. The following was noted for each patient: age, gender, length of stay, admission type (elective or emergency) and principal procedure performed. Procedures were classified according to surgical specialty â general surgery, orthopaedics and dental. Data were obtained from Crumlin Childrenâ s hospital (tertiary referral centre for MGH) on all patients transferred for specialist surgical management in the 5-year period.

Note: this figure is less than â total number of paediatric proceduresâ as it does not include a small number of obstetric/gynaecological procedures performed on female patients aged 16 or under.

Results
3,981 paediatric patients underwent surgery during the study period (Figure 1). 2,578 (64.8%) patients were treated electively and 1,403 (35.3%) were managed in the emergency setting. There were 57,544 surgical procedures performed over the 5-year period. A total of 4,255 procedures were performed on patients aged 16 or under (some patients underwent more than one procedure), accounting for 7.4% of the total surgical workload at MGH (table 1). The number of paediatric procedures performed remained consistent throughout the 5 years.

General surgery accounted for the majority of paediatric procedures performed and represented over 50% of the total workload (table 2). Orthopaedic procedures accounted for 25.3% of paediatric surgery. Dental procedures represented 21% of the paediatric surgical workload. There were also a small minority of obstetrics/gynaecology procedures performed on female patients age 16 or under. The most common procedures for each specialty are summarised in table 3. The most common emergency procedure was appendicectomy. Circumcision and upper gastrointestinal (GI) endoscopy accounted for the majority of elective procedures. Closed reduction of a fracture and removal of metal from bone accounted for the majority of orthopaedic procedures performed on children.

There were no surgery-related paediatric mortalities during the study period. For the most commonly performed general surgery procedure (paediatric appendicectomy) there were 14 (2.5%) wound infections requiring treatment. Other documented complications included 2 post-circumcision haematomas and 4 minor infections following ingrowing toenail surgery. Seventy-eight surgical patients age 16 or under were transferred to Crumlin hospital from MGH during 2006-2010. General surgery at Crumlin hospital received 64 paediatric patients from MGH over the 5 years, Orthopaedics received 7 patients, Otolaryngology received 4 patients and 3 patients were transferred to Plastic surgery.

Figure 1 â Number of elective & emergency paediatric surgery procedures over 5 year study period.

Discussion

Paediatric surgical practice has undergone a shift in the last decade. District general hospitals (DGHs) perform less non-complex paediatric surgery (also termed general paediatric surgery [GPS]), with the resulting centralisation of this surgery to tertiary centres. This changing practice has been documented in the UK [2-4]. Similar trends are speculated to have occurred throughout Ireland [5]. The reasons for this changing practice are rooted in an overall trend towards specialisation and centralisation. Centralisation has been largely driven by recognition of the dangers of â occasional practiceâ of paediatric surgery, coupled with the influence of public, as well as medico-legal and governing bodies [6]. It is accepted that complex paediatric surgery is more safely performed at specialist centres [7]. Non-complex GPS, however, may be safely performed at DGHs with the appropriate staff and facilities [8,9].

The effects of the shift in paediatric surgical practice are four-fold. Loss of GPS services in DGHs is difficult for patients who require elective surgery and have to travel long distances to receive care. In the emergency setting it may be dangerous to transfer patients, an issue highlighted in the recent UK NCEPOD document [4]; although 93% of audited hospitals had a policy for the transfer of children, many of these policies were inadequate and did not include staffing arrangements for the transfer. A multi-disciplinary loss of skills in DGHs will occur if more paediatric surgery is referred to Dublin hospitals. Skills to deal with paediatric surgical patients will be gradually lost in DGHs â by surgeons, nurses, anaesthetists, paediatricians, emergency department and theatre staff. Tertiary centres in Dublin may become overwhelmed with GPS and the provision of complex paediatric surgery may suffer as a result.

Furthermore, a loss of paediatric training opportunities for surgeons and anaesthetists may occur in DGHs. This issue is both caused by, and contributing to, the shift of paediatric surgery. The current model of GPS provision in DGHs will not be able to continue if there are not enough general surgeons who can perform GPS. In a Scottish survey of consultant general surgeons, only 13% of responders felt that their successors would be able to perform GPS [10]. We present data, which demonstrate the need to maintain GPS in DGHs. A considerable amount of paediatric surgery is performed at MGH, which at present is well equipped to deal with this elective and emergency workload; the documented complication rate for the most commonly performed general surgery procedures in this series was comparable to studies from similar DGH environments [8,9]. This supports data from previous studies of a similar nature; Zgrai et al recently [11] reported the volume and scope of paediatric surgery performed within the Mid-Western region. If future consultant general surgeons are unable to carry out GPS, Mayo may experience a shift in elective paediatric surgery towards Dublin, as well as an inability to deal with paediatric surgical emergencies. Data from New Zealand indicates that the issue of the future of GPS in DGHs is uncertain on an international level [9].

To solve this problem, two questions need to be addressed: who will provide the service and how will the service be delivered? Initially it was anticipated that general surgeons would continue to provide the GPS service in DGHs. In 2005, attempting to provide DGHs with consultants who could perform GPS, the Senate of Surgery for Great Britain and Ireland recommended a compulsory 6 months experience in GPS for all trainees in general surgery. Subsequently, a committee representing 5 professional bodies in the UK and Ireland issued a joint statement on GPS provision in DGHs [12], recognising that a decline in the number of â general surgeons with an interest in paediatric surgeryâ was inevitable, they envisaged a new approach to the issue of GPS provision, involving a change in the training of paediatric surgeons. Optional specialisation would occur after completion of initial training to consultant level.

Consultants not wishing to specialise would be responsible for the provision of the majority of GPS, and would be referred to as â general paediatric surgeonsâ . DGHs would still be involved in GPS, but to a lesser extent. This introduced the concept of managed clinical networks (MCNs), where DGHs would rely on larger centres for surgeons, staff, resources, out-reach clinics, and effective transfer routes for paediatric surgical patients. These networks would be based around a 3-centre model, which included â The small DGHâ , â The intermediate centre (large DGH or University Hospital)â and â The Specialist/Regional/Tertiary Centreâ . Five-years on, the NCEPOD reported in 2011 [4] that less than half of NHS hospitals performing paediatric surgery are part of a surgical clinical network for children and many of the hospitals that are in surgical clinical networks do not include elements suggestive of effective functioning. If the MCN model is to work existing recommendations for the creation of formal clinical networks for childrenâ s surgical services must be adopted.

It is not clear if MCNs are an effective solution for Ireland. The UK â 3-centre modelâ is based around networks where a tertiary centre may be quite close to a DGH. A UK study comparing appendicectomies performed in a DGH versus a regional centre drew attention to the fact that the hospitals were â separated by only a few milesâ [13]. Irelandâ s population density and distribution cannot afford this luxury in most areas. In Scotland, which reflects the population distribution of Ireland more closely, the majority of GPS is performed by paediatric surgeons at centres in Edinburgh, Glasgow and Aberdeen [11]. This model has been suggested as a possible solution for Ireland [3] â with centres in Dublin, Belfast and the creation of a third centre in the southwest. General paediatric surgeons at these centres would then perform the bulk of GPS in Ireland in the future [5]. Equity of access and safety are the ideals, which drive these propositions. A third centre could provide GPS services for some of the population outside Dublin. However, equity would not be achieved if a child from Donegal had to travel to Limerick or Belfast for a non-complex elective procedure and emergency transfer over these distances may be unsafe.

A solution was proposed by the RCSI in 2009 [14]; GPS services would be provided in seven or eight â secondary paediatric surgical unitsâ throughout Ireland, performed by general surgeons with training in GPS. This seems to be a middle ground between UK style MCNs and the Scottish model. A clinical network involving the proposed National Paediatric Hospital (NPH) would provide outreach clinics and elective surgery at these secondary centres. It was acknowledged that a crucial barrier to this set-up still exists â lack of uptake of training in paediatric surgery among general surgical trainees. The RCSI suggested that paediatric surgery would need to become an obligatory part of specialist registrar (SpR) training in order to overcome this problem. However, two years on SpR training for general surgery remains unchanged.

It is unclear whether adequate resources exist to effectively establish secondary paediatric surgical units. This is critical in the emergency setting - if these units are to be relied on for an emergency service - where understaffing

and/or inadequately trained staff could be catastrophic. Theoretically, several secondary units throughout Ireland could provide the equity of access and safety, which are fundamental to the delivery of GPS. However these plans will not reach fruition unless the issues mentioned above are overcome.

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