

ORIGINAL ARTICLE

PAEDIATRIC SURGERY CARRIED OUT BY GENERAL SURGEONS: A RURAL NEW ZEALAND EXPERIENCE

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Background: There are increasing moves towards centralization in paediatric surgery. With only four paediatric tertiary centres in New Zealand, many general surgeons still routinely carry out paediatric surgery. We present an audit of paediatric surgical patients admitted to our general surgical unit.

Methods: Data were prospectively recorded using a standardized pro forma on all children aged 15 years and below, who presented to general surgery between 11 December 2005 and 11 December 2006.

Results: There were 209 admissions (194 children); the median age was 8 years (range 6 weeks to 15 years) with 153 (73%) acutes. Male : female ratio was 3:2 and 37 children (18%) were less than 2 years of age. Procedures ($n = 119$) comprised appendectomy (35), inguinal herniotomy (30), skin procedures (29), endoscopy (10), testicular (10) and others (5). The commonest acute and elective operations were appendectomy and inguinal herniotomy, respectively, with 51% of all operations carried out acutely. There were 10 tertiary hospital transfers (5%) for burns (4), pyloric stenosis (3), intussusception (1), neonatal inguinal hernia (1) and pyoderma gangrenosum (1). Median age of transfers was 11 months (range 6 weeks to 14 years). Complications were wound infection (1), postoperative ileus (2) and infarcted ovary (1).

Conclusion: A large number of children presented to our surgical department. Approximately half required surgery and half of the operations were acute. There is still a significant need for general paediatric surgery in the provinces and hence close collaboration with specialist paediatric surgeons.

Key words: adult, paediatric, rural health services, surgery, surgical specialties.

Abbreviation: NZ, New Zealand.

INTRODUCTION

The population of New Zealand (NZ) currently supports four specialist paediatric surgery centres. The population distribution in NZ and proximity to these centres means that much general paediatric surgery is still carried out in provincial hospitals. The Taranaki Base Hospital has four general surgeons who provide general surgical services for a population of approximately 105 000 people (Fig. 1). The furthest point of the catchment area is approximately 2 h by road. Specialist paediatric surgeons from Auckland (4–5 h by road and 45 min by air) conduct outreach clinics four times per year, weather permitting. Children who require specialist elective paediatric surgery travel to Auckland for their procedures. Paediatric surgical emergencies and burns can be transferred to Hamilton (4 h by road and 30 min by air) if required. There is a team of five paediatricians who have access to 16 ward beds with the ability to increase to 23 in times of need and eight neonatal intensive care cots. The anaesthetic department has a core group of five consultant anaesthetists with an interest in paediatric anaesthesia. Children with significant paediatric surgical conditions are managed at least initially, in

a multidisciplinary team involving the local paediatric and anaesthetic departments.

AIM

The aim of this study was to carry out a prospective audit of paediatric surgical patients admitted to our general surgical unit.

METHODS

Data were collected prospectively for all patients aged 15 years and below, who presented to the general surgical service between 11 December 2005 and 11 November 2006. A standardized pro forma on each patient included data, such as age, sex, diagnosis, days of admission, transfer to another hospital, type of operation, complications and need for follow up. Each month, a list was obtained from the hospital admissions electronic database and cross-checked with the pro formas to ensure that no patients were excluded. Data were stored and analysed using MICROSOFT EXCEL version 2003 (Microsoft Corp., USA).

RESULTS

There were 209 paediatric admissions (194 children) to the general surgical department during the 12-month period. On average, there were 17 admissions, 9.5 procedures and 1 transfer each month (Fig. 2). One hundred and fifty-three (73%) admissions were acute. The median age was 8 years (range 6 weeks–15 years). There were

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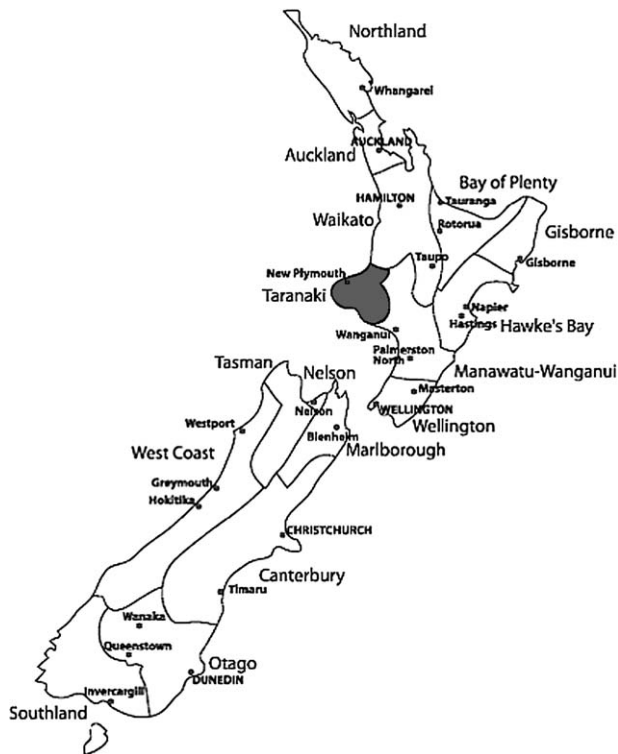


Fig. 1. Map of New Zealand. Taranaki district is highlighted.

37 children (18%) less than 2 years of age and 61 children (30%) aged less than 5 years of age. The male to female ratio was 3:2.

The most common reason for acute admission was abdominal pain with suspected appendicitis (49%). This was followed by trauma (including burns) (19%), skin infections (16%), suspected testicular torsion (7%), suspected strangulated hernia (5%) and others (4%).

Procedures

Procedures (*n* = 119) comprised appendicectomy (35), inguinal herniotomy (30), skin procedures (28), endoscopy (10), testicular (10) and others (6) (Table 1). The commonest acute and elective procedures were appendicectomy and inguinal herniotomy, respectively. Fifty-one per cent of the operations were carried out acutely. The median age of children who had procedures was 9 years (range 11 weeks to 15 years). The median age of children who underwent appendicectomy was 11 years (range 3–15 years). The median age of children who underwent inguinal herniotomy was 2 years (range 2 months to 15 years).

Transfers

There were 10 tertiary hospital transfers (5%) for burns (*n* = 4), pyloric stenosis (*n* = 3), intussusception (*n* = 1), neonatal inguinal hernia (*n* = 1) and pyoderma gangrenosum (*n* = 1). The median age of the children transferred was significantly younger compared with that of the children not transferred (10.8 months (range 6 weeks to 14 years) vs 9 years (range 6 weeks to 15 years) *P* < 0.0001). Two patients (an 11-month-old infant with pyloric stenosis and 15-month-old infant with intussusception) were admitted under general surgeons who could carry out the surgery, but did not have anaesthetic support.

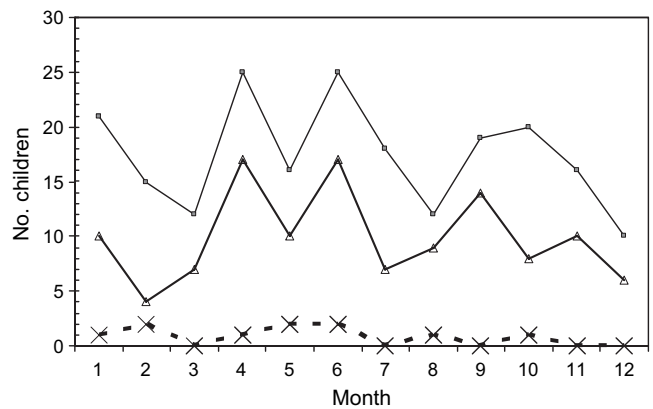


Fig. 2. Number of admissions, procedures and transfers more than 12 months. —□—, no. admissions; —△—, procedures; —×—, transfer.

Follow up and complications

Forty-two (20%) children had outpatient follow up on discharge. Of these, six were referred to other specialties (paediatric medicine (*n* = 3), paediatric surgery (*n* = 1), plastic surgery (*n* = 1) and gynaecology (*n* = 1)). Complications were wound infection (1), postoperative ileus (2) and infarcted ovary (1).

DISCUSSION

Our prospective series of 209 children confirms that provincial hospitals still provide a significant amount of paediatric surgical care with acceptable outcomes. The goal of paediatric surgical care in rural areas should be good patient outcome. The published work suggests children who are treated by specialist paediatric surgeons have better outcome.¹ For example, lower recurrence rates and complications, such as testicular atrophy, have been reported after inguinal hernia repair,^{2,3} but little is reported regarding the ideal length of follow up to detect such complications. Borenstein *et al.* reported that recurrence rates were related to annual surgical volume for general surgeons, but not for paediatric surgeons.³ In our small subgroup of 30 inguinal herniotomies, we had one known complication of infarcted ovary due to delayed diagnosis. Furthermore, our length of follow up is insufficient for detecting other complications.

Several papers have studied the outcome of acute appendicitis treated by specialists and the results vary.^{4,6} Alexander *et al.*

Table 1. Types of operations carried out

Type of operation	<i>n</i>
Appendicectomy†	35
Inguinal herniotomy	30
Skin‡	28
Endoscopy§	10
Testicular¶	10
Other	6
Total	119

†Includes open and laparoscopic appendicectomy. ‡Includes simple excision, abscess drainage and suture of lacerations. §Includes proctoscopy, colonoscopy and oesophagogastroscopy. ¶Includes scrotal exploration ± orchidopexy and circumcision.

reported lower complication rates in children who received specialist care,⁴ but others have shown similar results.^{5,6} Somme *et al.* found that paediatric surgeons carried out significantly fewer number of negative appendicectomies compared with general surgeons.⁵ There was one recorded complication of prolonged ileus post-perforated appendicitis in our subgroup of 35 appendicectomies. Our negative appendicectomy rate was 9%, which is similar to reported rates in the published work.

In the UK, guidelines for the transfer or referral of paediatric surgical patients to tertiary centres have stated that 'the occasional paediatric practice should not be undertaken'.^{7,8} Currently, Australian and New Zealand general surgical trainees have no set formal training in paediatric surgery. A recent survey of Scottish general surgeons found that only 13% of responders felt that their successors would be able to carry out paediatric surgery.⁹ The Royal Australasian College of Surgeons activities report states that nearly 25% of 'non-metropolitan' surgeons will retire in the next 5 years.¹⁰ Consequently, the number of general surgeons sufficiently skilled in paediatric surgery is declining and furthermore supports the fact that medical services, particularly anaesthesia, in provincial hospitals can be lacking. If the figures in this report are representative of other provincial areas in NZ, tertiary paediatric surgery services would need to accommodate a significant increase in workload should further centralization occur.

There is little published data from provincial hospitals on paediatric surgical conditions. Accurate data collection can be difficult because children present to several other specialties, such as urology, ear nose and throat and plastic surgery. Our general surgical department assessed a significant number of children during the period studied and approximately half of the children required surgery. These findings support the need for close cooperation between tertiary and provincial surgeons as well as better general paediatric surgical training for general surgical trainees who may later work in provincial centres. Beasley *et al.* have shown that a successful outreach programme can improve specialist care in the provinces¹¹. There continues to be a need for general surgeons to maintain sufficient skills to carry out some paediatric surgery, especially in the acute setting, in provincial

centres. We propose that further collective data from provincial centres is required to facilitate this.

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