

The development of paediatric surgery in Papua New Guinea

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SUMMARY

Until 1993 complex surgery for children in Papua New Guinea (PNG) was usually conducted by general surgeons, or by overseas paediatric surgeons during ad hoc visits. There had been little coordination of these occasional international visits and no involvement in the surgical teaching program in the University Department of Surgery. Over eight years from July 1993 to July 2000, three Australian surgeons spent 33 weeks teaching paediatric surgery and paediatric urology, using lectures, tutorials and operative demonstration sessions. This paper is a report of the teaching and service provided by one surgeon (PAD) over 27 weeks in PNG and describes the development and training of the surgeon who will be the country's first qualified paediatric surgeon (MM). Other support given has been assistance with the publication of scientific papers, reviews of Masters' theses, the development of a proposal for investigation of the prevalence of renal tract anomalies and the development of protocols for the surgical management of anorectal anomalies and Hirschsprung's disease. In addition to this teaching, 311 children have had surgery during the 11 visits that form the basis of this report. The visits have been supported and funded by AusAID and the Royal Australasian College of Surgeons through the Medical Officer, Nursing and Allied Health Professional (MONAHP) and Pacific Islands Project (PIP) programs. An indication of the impact on the care of children with surgical diseases is evident from the improved skills and the changed referral patterns over the eight years.

Introduction

As yet Papua New Guinea (PNG) has no qualified paediatric surgeons. Some children in PNG have been well served by senior surgical staff who have extensive experience in the management of paediatric surgical diseases. However, in order to improve standards of surgery for children, the specialty was included as part of the MONAHP (Medical Officer, Nursing and Allied Health Sciences Training Project or Medical Officer, Nursing and Allied Health Professional) and PIP (Pacific Islands Project) programs, with incorporation of paediatric surgery into both the medical student and Masters programs. Part of the strategy is the identification of apprentices to the program.

Visits initially were aimed at providing a wide service across the country. The program now aims to provide a sustainable structure for future training and service development in paediatric surgery. The teams now primarily visit Port Moresby and Lae, the two centres that are to have a specialist paediatric surgical service in the near future. The visits provide care for complex anomalies and we have developed the resources to teach surgeons, paediatricians, general practitioners and nurses. After some setbacks, there are now two 'apprentices', who work with the visiting team and coordinate the patients in PNG. One of the authors (MM) has now been appointed to an advanced training position in paediatric

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surgery in Australia. To facilitate a further step in the development of an in-country service, the most recent visiting team included this surgeon as the team leader, with an Australian surgeon as his assistant.

As well as putting in place appropriate personnel for the subspecialty of paediatric surgery, there has been a gradual improvement in the knowledge of medical students and changes in the way surgical disease in children has been treated. Wound management, colostomy placement, Hirschsprung's disease protocols, subcuticular suturing, an understanding of urological anomalies and the use of uroradiology have all improved.

With current progress we hope that within five years paediatric surgery will have two senior appointees who will coordinate future developments, provide care for the more complex anomalies, perform outreach surgery and train others to provide a high standard of care for the more common conditions. Of particular relevance will be those conditions requiring urgent care and those requiring temporizing measures, especially colostomy. Education of the community on the favourable outcome for many surgical conditions of childhood is also necessary and should decrease the morbidity associated with preventable late presentation.

Operative paediatric surgery

Because the teaching of paediatric surgery has used an apprenticeship model, it has been important to coordinate the care of children with surgical disease to help teach the operative surgery. The management of this process has been facilitated through the project offices, with the assistance of the Department of Surgery in Port Moresby and would not have been successful without the help of the surgeons in the provinces. Surgical registrars were required to undertake the care of the children in the perioperative period, with the help of paediatricians and anaesthetists. The centres visited were Port Moresby (11 times), Lae (8 times), Rabaul (5 times), Tabubil (4 times), Goroka (2 times) and Mt Hagen (once). Many other staff have provided support with equipment, time and effort.

Tables 1 and 2 detail the 463 operations performed on 311 patients, who had 328 diagnoses. These numbers differ because some patients had more than one problem and a single operation may have had a number of components, or the patient may have had more than one visit to theatre: eg, colostomy formation, definitive surgery for Hirschsprung's disease, then colostomy closure. The age distribution of patients who were operated on is shown in Figure 1.

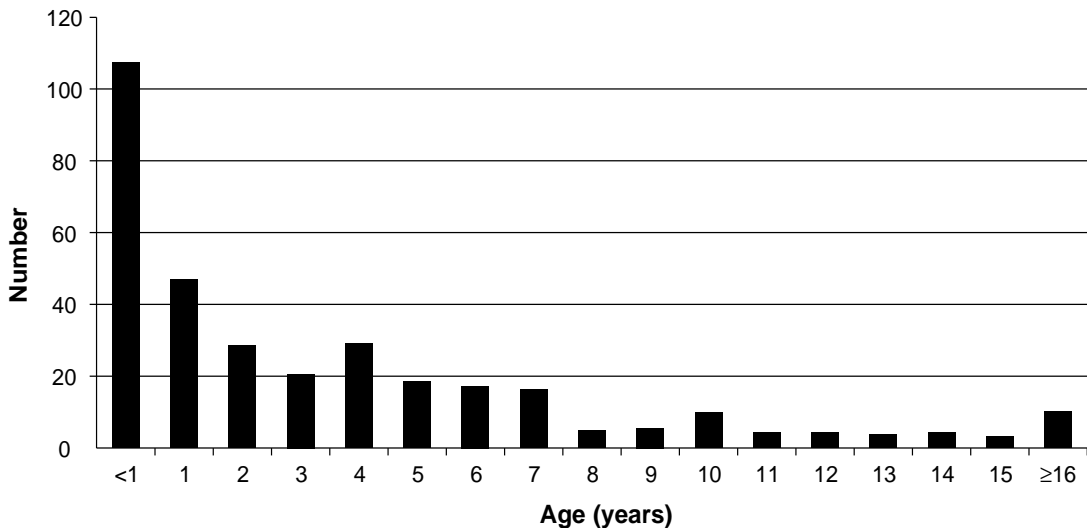


Figure 1. The age distribution of patients receiving operative treatment. The majority of patients were in the first 5 years of life and many were less than 1 year of age.

TABLE 1

PAEDIATRIC SURGICAL OPERATIVE DIAGNOSES OF 311 PATIENTS OPERATED ON DURING 27 OF THE 33 WEEKS OF THE TEACHING PROGRAM*

General	
Anorectal anomalies	90
Hirschsprung's disease	50
Inguinal hernia	18
Laparotomy	17
Bowel atresia	5
Teratoma	9
Other	13
Neurosurgery	6
Thoracic	4
ENT (Ear, Nose and Throat)	14
Urology	
Undescended testis	11
Hypospadias	25
Ambiguous genitalia	3
Exstrophy/Epispadias	7
PUJ/VUJ/VUR	14
Urethral obstruction	8
Stones	7
Tumour	5
Other	22
Total	328

* Some patients had more than one condition that required surgery; colostomies and surgery for their complications were not included

PUJ = Pelviureteric junction obstruction

VUJ = Vesicoureteric junction obstruction

VUR = Vesicoureteric reflux

The teaching of paediatric surgery has been structured around service delivery. This has resulted in complex, often redo surgery being presented for management during the early visits and more recently large numbers of patients seeking care. In total, for the 11 visits and 27 weeks there were 165 operative sessions, of which 66 were longer than 6 hours' duration. These longer cases do, however, provide important teaching examples.

TABLE 2

OPERATIONS PERFORMED DURING 26 OF THE 33 WEEKS OF PAEDIATRIC SURGICAL TEACHING*

General	
Pena	65
Swenson/Soave	36
Minor Anorectal	48
Laparotomy	
Hirschsprung's	17
Congenital	12
Tumour	8
Other	13
Appendicectomy	11
Colostomy	
Formation	12
Revision	20
Closure	22
Inguinal herniotomy	17
Major Other	14
Neurosurgery	6
Thoracic	4
ENT (Ear, Nose and Throat)	14
Other	3
Urology	
Cystoscopy	36
Epispadias/Exstrophy	10
Hypospadias repair	36
Orchidopexy	11
Nephrectomy	5
Pyeloplasty	6
Stones	7
Urethroplasty	5
Ureteric reimplants	3
Major Other	22
Total	463

* Note that the diagnosis and operation may not necessarily correlate - eg, an inguinal hernia may have been treated by laparotomy; also, a patient with hypospadias may have had more than one operation

For Hirschsprung's disease, several needs have been evident. Affected children present late, their colon is hugely dilated making uncomplicated colostomy formation difficult,

and the correct steps in their care were not usually taken previously. The 50 cases highlight the point that the laparotomy should involve having a suspicion for the diagnosis and one biopsy should be taken above the transition zone, a second from the colostomy and a third from the rectum. If the colostomy prolapses it should be treated in the manner detailed in the paper on anorectal anomalies published in this edition of the Journal (1) and definitive surgery (Swenson/Soave – of which 36 operations have been performed) should be left to someone with sufficient experience. With the teaching program now in place the need for a second laparotomy to establish the diagnosis, use of the transverse colostomy for the pull-through operation and having to re-operate for failed surgery have all been less common.

For infant inguinal hernia it has been appropriate to emphasize the use of the skin crease incision, the need for delicate handling of the tissues and the use of fine and subcuticular sutures. Conditions requiring laparotomy have included forms of congenital bowel obstruction and diaphragmatic hernia. With better community and primary health worker understanding of the need for early presentation of congenital bowel anomalies better results should be obtained.

Appendicectomy was not usually an isolated operation, but part of major surgery, as was colostomy closure and revision.

The number of children we have identified with urological disease is smaller than would be expected, but the true population will be much greater. This is evident from the very late stage of many of those seen. Most of the surgical staff had previously only seen pelviureteric junction obstruction operated on by nephrectomy, rather than surgery to preserve a redeemable kidney. Therefore, the operations of pyeloplasty for pelviureteric junction obstruction and ureteric reimplantation for vesicoureteric reflux were of particular value to the trainees. These, and other urological cases, allowed for discussion on the appropriate use of radiology and cystoscopy and for lessons in how to use the cystoscope and interpret the information obtained. Multiple techniques for the

management of hypospadias, the subspecialty skills needed to treat bladder exstrophy and epispadias and the surgery for the undescended testicle were also valuable teaching occasions. The use of the Denis Brown ring retractor, techniques of skin closure, complex procedures such as ureterocystoplasty, ureteroureterostomy, pyeloureterostomy and management of diphallus were other excellent cases to teach with.

In addition to teaching surgical trainees, the paediatric surgical teaching program has been linked to the training in paediatric anaesthesia, providing trainees from both specialties with the opportunity to participate in learning aspects of the anaesthesia and resuscitation of children.

Ward and outpatient teaching

Most of the teaching not directly related to operative surgical technique came during the ward rounds before and after surgery and in the outpatient clinics. The clinics were limited in number because of the screening of patients before the arrival of the visitors, which again limited the less complex material available. Unfortunately, the busy work schedule of the surgical trainees not directly associated with the visits meant that their attendance was limited. This was offset somewhat by the occasional involvement of the paediatric medical registrars and the participation of surgeons from the provinces. In total, 26 outpatient clinics were held and 171 ward rounds were conducted. Evening rounds were an important part of helping the trainees understand the postoperative management and were essential to ensure that nursing staff were familiar with the catheter arrangements in patients who had undergone urological procedures. Training of nursing staff by the visiting paediatric surgeons has been less than ideal, but improved with the inclusion of a paediatric nurse during one of the visits. More practical nurse training will be required, especially on postoperative care of neonates.

Lectures and tutorials

Teaching has been supported by the provision of a set of notes on paediatric surgery, copies of the Australian and New

Zealand Journal of Surgery to Angau Hospital, books for the senior trainee and a paediatric surgical textbook given to the University of Papua New Guinea Medical Library. A total of 44 lectures and 51 tutorials have been given. 7 audit meetings have been attended and grand round presentations have been given on 7 occasions.

The tutorials were wide-ranging and usually directed by the clinical material encountered. The lecture series have been more structured, highlighting anorectal anomalies, Hirschsprung's disease and urology. Lectures have also covered embryology, neonatal bowel obstruction, congenital anomalies in all systems, history and examination, care of the surgical neonate, prevention and management of infection and radiological investigation. The number of participants and the nature of the audience have varied and only recently have medical students been coming to theatre. We feel that the medical students' paediatric surgical knowledge has increased markedly of late, possibly due to their exposure to the surgical trainees.

Research teaching

An important part of the project has been to expose the surgical residents and registrars to people from outside their own institution who could review local research projects and who have assisted with the writing of manuscripts for publication. There have been three papers and one abstract published (2-5).

Journal meetings have been conducted. The use of a database for collation of the material presented here has been part of an ongoing focus on the importance of applied research to monitor and improve standards.

Many hours and many dedicated people in Papua New Guinea have contributed to creating a base with a bright future for the care of children with paediatric surgical conditions.

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