Mauritius

Paediatric Service Training
for
Urology/Surgery, Anaesthesia, Radiology and Theatre Nursing

9th September – 22nd September 2003

Professor Paddy Dewan, Dr Ken Brownhill,
Dr Padma Rao and RN Janine Goodrem

A project of the Mauritius Department of Health and Quality of Life,
the Society for Children Inoperable in Mauritius,
and the Kind Cuts for Kids Foundation

Overview

This is the third visit of an Australian team whose aim was to teach Paediatric Surgery and related skills, to medical and nursing staff in Mauritius. The original proposal came from SACIM, an organisation founded to facilitate surgical care for Mauritian children, and was a mission designed to allow for their surgical treatment in-country. After a small number of patients were treated in Australia by Professor Dewan, motivated by previous experience working with the Kind Cuts for Kids Foundation, it was felt that a number of children could be treated in Mauritius. The additional advantage of going to the island being that skills could be transferred by the visiting team to the local medical and nursing staff. On this occasion the team included an Anaesthetist, a Paediatric Radiologist and an Operating Nurse Educator.

With the efforts of both the Australian and the Mauritius components of SACIM, and funding from the Minister of Health and Quality of Life, once again the treatment of a large number of children with Paediatric Surgery and Urology disease has been achieved.

Thirty three patients having had major surgery for which they would have needed to leave the country, many of whom have had to have repeat surgery, after failed attempts to cure their condition, indicating that the education of Surgeons and Paediatrician needs to continue and be expanded. In order for the standard of care for children with surgical conditions to be furthered, staff who are to be involved in the provision of subspecialty care need to be identified, facilities should be made available, and a process to ensure an ongoing outcomes audit should be established. The ideal service model would incorporate two regional centres, one associated with the cardiac surgical unit and other with the neonatal unit. Those surgeons involved in the care of the more common surgical conditions in children, who are not the nominated subspecialists, should be accredited to do so.

The members of SACIM, the agents of the Minister and the Mauritian medical and nursing staff who assisted with the care or were involved in the teaching activities should feel proud of their magnificent contribution to the care of a significant number of children. The visit was cost effective and very enjoyable.

Ile aux Cerfs is one of the many beautiful locations in Mauritius

History of Mauritius

It is always interesting to reflect on the history of a country in which a training visit in Paediatric Surgery is launched. Mauritian history is, indeed, rich and colourful.

The island for a long time remained unknown and uninhabited. It is probably visited by Arab sailors during the Middle Ages, and on maps of about 1500, it is shown by an Arabic name "Dina Arobi". In 1598, a Dutch squadron, under the orders of Admiral Wybrand Van Warwyck, landed at Grand Port and named the island Mauritius, in honour of Prince Maurice Van Nassau, "Stathouder" of Holland. However, the Dutch had little interest in settling the island. Abandoned by the Dutch, the island became a French possession when, in September 1715, Guillame Dufresne D'Arsel landed and took possession of this precious port of call on the route to India, but it was only in 1721 that the French started their occupation. However, it was only from 1735, that the "isle de France" started developing effectively, when La Bourdonnais established Port Louis as a naval base and a shipbuilding centre.

During the Napoleonic wars, the isle of France had become a base from which French corsairs organised successful raids on British commercial ships. The raids continued until 1810 when a strong British expedition was sent to capture the island. By the Treaty of Paris in 1814, the isle de France that regained its former name "Mauritius" was ceded definitely to Great Britain. In the act of capitulation, the British guaranteed that they would respect the language, the customs, the laws, and the traditions of the inhabitants. One of the most important events under the British was the abolition of slavery in 1835. Thus, the planters turned to India, from where they brought a large number of indentured labourers to work in the sugar cane fields. The Indian immigrants, who were of both Hindu and Muslim faith, were to change rapidly the fabric of the society. They were later joined by a small number of petty Chinese traders.

In 1965 the way was paved for Mauritius to achieve independence. After general elections in 1967, Mauritius adapted a new constitution and independence was proclaimed in 12th March 1968. Mauritius achieved status of Republic 24 years later on 12th March 1992.

The various immigrant populations have made Mauritius a unique blend of different races, cultures, and religions. People of European, African, Indian and Chinese origins have created a multi-racial society where the various cultures and traditions flourish in peace and harmony. During the last ten years the population has grown at average rate of 1.1% annually. At the end of 1996, the population of the Republic of Mauritius was estimated at 1,142,513. With such a considerable population there is obviously a need to not only provide Paediatric Surgical services, but to embark on education, training and service planning for Paediatric Surgery, which is now in its third year.

Mauritius is a beautiful Island

Consultation Clinics

The team commenced with an outpatient clinic on the 10th September in which the visiting Anaesthetist, Surgeon, Radiologist and nurse worked with the local staff, both medical and nursing, to review previously treated patients, evaluate those in need of surgery, and to arrange the operating time accordingly.

During the outpatient sessions, discussion took place about peri-operative planning to cope with the facilities available at the Jeetoo Hospital, including:

- Prioritising surgical timing
- Diagnosis and treatment of concurrent medical illnesses
- Pre-medication
- Estimation of surgical time
- Transfusion requirements
- Post operative pain relief options

The outpatient and ward round consultations included reviewing radiology, and pre-anaesthetic state of the patients and making recommendations regarding treatment on a total of 89 patients (most in two main clinics). Initial and follow-up consultations totalled 97 patient contact episodes. The patients included, 19 anorectal anomaly patients, four with constipation and nine with Hirschsprung's disease, one with bilary atresia, five with spina bifida, a girl with portal hypertension, only three with a hernia or undescended testis, and three haemangiomatous malformations. Some patients had more than one disease, and some were referred for care by other specialists. An unusual case was that of a newborn with a gastric duplication.

The urological cases included 13 with hydronephrosis due to either a pelviureteric junction obstruction, vesicoureteric reflux or other renal anomalies, seven with a history of urethral obstruction, 16 with hypospadias, one bladder exstrophy boy, seven with bladder dysfunction from either Prune Belly syndrome or a neuropathic bladder, and a boy with a large utricular remnant.

The darker shaded portion is the gastric duplication cyst that presented as a neonatal.

The utricular cyst on the right side of the bladder was removed through an operation via the back wall of the bladder.

Operations and Anaesthesia

Dr Brownhill conducted pre-operative anaesthetic assessments during the surgical clinic, noting that the general health of the children was usually excellent. All patient details were recorded on a computer database, which provided invaluable assistance in the operating theatre when preparing for each case, and in preparing the lists.

Forty-two operations were performed on 33 patients; nine girls had eleven operations, including two who had two procedures under a single anaesthetic. Twenty-four boys had 31 operation, with four having had a total of five operations under the same anaesthetic, and a further two had a second anaesthetic, one for a pyeloplasty, and the other for a nephrectomy; both had a nephrostomy tube insertion as an emergency measure early in the visit. The small theatre often contained 20-25 people, who were observing or helping with one of the aspects of the care of the patient.

The 89 patients seen in the outpatient clinics and on the ward ranged in age from 1 month to 49 years (mean 73 months), and 52 patients were 5 years of age or younger. A number of younger patients were deferred for later surgery for hypospadias. Those 33 who went on to have an operation were an average of 70 months of age, and weighed from 2.5 to 54 kg. In 4 operative episodes involved patients who were 2 months or less; 18 were less than five years old. The patients older than 16 were operated on for a Paediatric surgical problem which had not been resolved.

Classification	Number
Anorectal anomaly (including 3 re-do)	6
Swenson	3
Colostomy procedures	4
Rectal imbrication	1
Hypospadias repair	4
Pyeloplasty	3
Cystoscopy	7
Percutaneous nephrostomy	2
Ureterocystoplasty + TUU	1
Utricular remnant excision	1
Nephrectomy	1
Vesicostomy	1
Hernia repair	2
Hygroma/haemangioma excision	2
Gastric duplication resection	1
Other	2

There was a total of more than 80 hours of surgery with an average operating time of over 2 hrs, with a range from a few minutes for a cystoscopy to 5 hours. Several operations took 3 hours or more. Caudal anaesthesia was combined with general anaesthesia in most cases.

Two patients required blood transfusion, both because of a low haemoglobin prior to the surgery. No patient required intensive care post-operatively, and all patients were normothermic at completion of surgery. Only three complications occurred, one was a minor wound dehiscence in the perineum, and the other an infection of a newly formed vesicostomy and a third required a late colostomy formation. Given the conditions in which the work was conducted and the difficulty of the cases, the number of adverse events was minimal.

A boy who had a nephrostomy tube insertion, followed by a second operation after the exudate producing system recollected fluid after the pus had been drained. Despite weighing only 2.5Kg he made a good recovery.

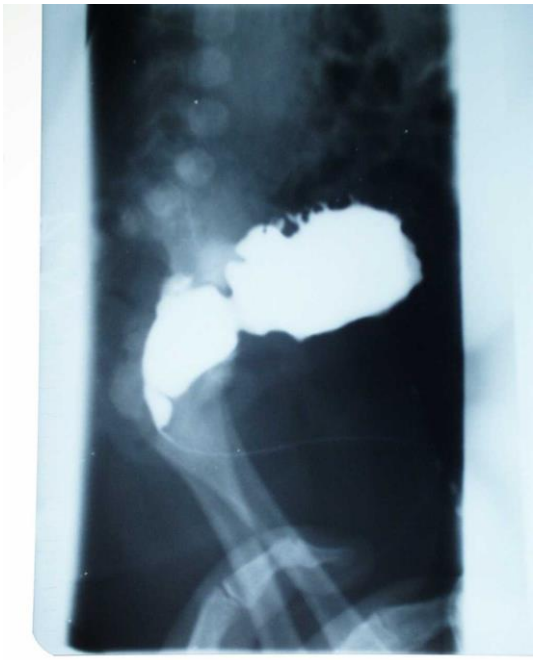
However, there were a number of patients, who presented for rescue surgery, reflect the need for ongoing skill development related to Paediatric Surgery in Mauritius, and the need to develop a process whereby the outcome for the surgical care of children is effectively monitored: the scenarios include:

1. A baby boy who had a laparotomy for an abdominal mass, who had a large bladder.
2. An infant hernia that recurred twice.
3. The formation of a colostomy distal to the transition zone in Hirschsprung's disease.
4. Hypospadias with poor 1st operation outcome.
5. Misdirected bowel in an anorectoplasty.
6. Colostomy formation in a low anorectal anomaly.
7. Perineal procedure for high anorectal anomaly.

The above patients were of particular importance in the skill transfer teaching sessions.

A boy with Hirschsprung's disease had his colostomy resited to the left iliac fossa, to ensure that the bowel above the apparent transition zone did indeed have normal innervation.

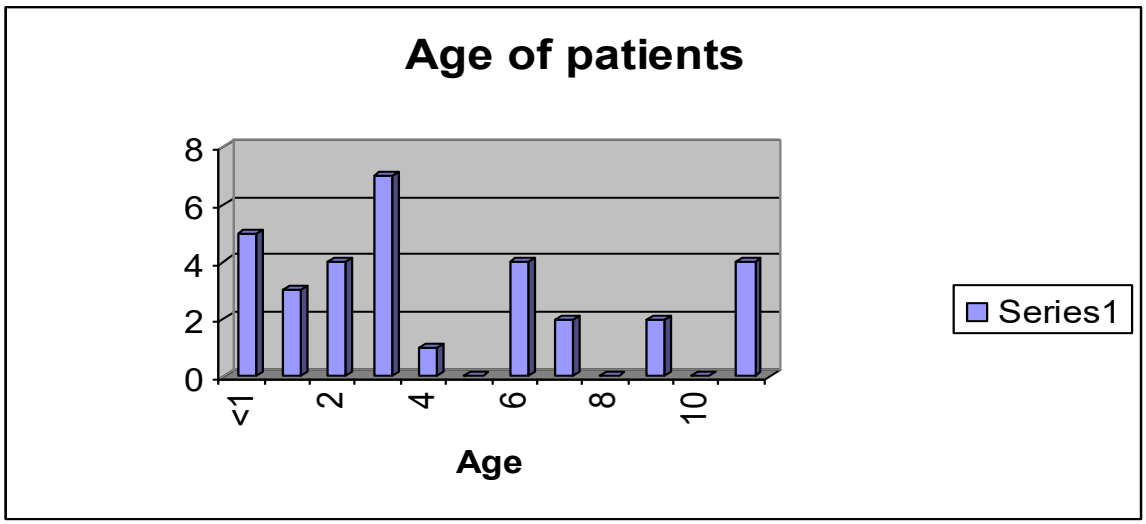
The radiograph shows urethral obstruction in a child who had had a laparotomy for an abdominal mass. Education in Paediatric Radiology will have helped to prevent this error in the future. A vesicostomy, to allow temporary urine drainage through the lower abdomen, was established (below).



This boy (left) who required a redo operation for his hypospadias also had undergone orchidopexy surgery previously. The long, oblique incision, as compared to the marked line that would be used by a Paediatric Surgeon, was one of the many points of information exchange during the surgical sessions.

Anaesthetic Education and Training

Several of the 33 patients had staged operations on different days, with the majority of patients under 3 years of age, the youngest being 12 days old, and one patient was an adult. All patients had general anaesthesia, and 30 procedures were combined with caudal epidurals, and one with a lumbar epidural.



The Anaesthetic Department is well staffed, with two of the three of the senior Anaesthetists being involved in the visit. Three junior specialists participated in the intra-operative care, having finished their one-year of experience in France. Anaesthetic residents also participated.

The situation for specialist anaesthesia in Mauritius has considerably improved with the new specialists returning. Unfortunately, Paediatric Anaesthesia, is spread across a number of major hospitals, limiting the exposure of all anaesthetists to younger patients. As for Paediatric Surgery, there would be considerable benefits to the standard of care in limiting Paediatric cases under the age of five to a small number of hospitals, particularly patients under one year of age. Focussing these cases into a small number of hands will improve the skills in airway management, intravenous access, and regional and local anaesthetic blocks in the younger patients. In particular, as suggested by audits in Australia and the UK, there should be no place for the occasional neonatal Anaesthetist.

If concentration of paediatric cases occurred in Mauritius, it would be useful to provide further training in specialist Paediatric Anaesthesia for selected anaesthetists. These trainees would be able to enhance services for the children of Mauritius, and provide a continuing source of education for those entering the specialty.

Due to the heavy surgical workload all teaching took place within the operating theatres. Informal tutorials were given including:

1. Paediatric and neonatal physiology.
2. Paediatric and neonatal anaesthesia.
3. Local and regional anaesthesia for paediatric surgery.
4. History of Anaesthesia.
5. Obstetric Anaesthesia.
6. Pre eclampsia.
7. The management of Anaesthetic emergencies.

Points of practical teaching encompassed included:

1. General Paediatric Anaesthesia.
2. Neonate airway management.
3. Caudal epidural.

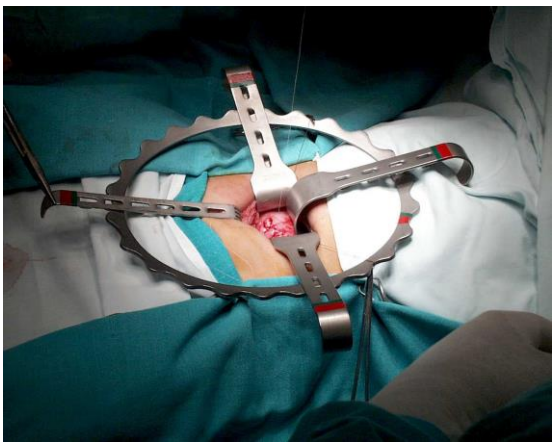
The future of Anaesthesia in Mauritius is very promising, with specialist Anaesthetists already providing a comprehensive service in anaesthesia and intensive care. With continuing support, the care of children can be enhanced, by providing selected Anaesthetists further opportunities for training in Paediatric Anaesthesia. These staff would be best supported in a team that provided most of the care to the very young patients requiring surgery, which would be best achieved by concentrating specialist services within two hospitals.

Dr Ken Brownhill marks the location of the sacral hiatus to show the technique for caudal analgesia.

The small theatre contains "acceptable" equipment

Donated Items

For this, the third visit, a range of material were provided, and it was recognised that the items previously provided had been put to good use and were available for reuse during the recent trip. Two of the most significant items of donated equipment as shown below.



The Dennis Brown Ring delivered during the previous visit was used for several operations

The cystoscope donated by SACIM in 2002 was used on a number of the 2003 operative cases

Nursing Report

The scrub nurses in Mauritius are registered nurses who have learnt by observation, and the staff are notable for the high standard of their work and their dedication. However, no orientation/novice programs seem to exist, nor opportunity for continuing professional development.

The arrangements in theatre including the use of a large trolley (which was difficult to move), and a Mayo stand, draped for each case, but with linen of relatively poor quality. The set up of using the two trolleys is substandard, with the scrub nurse working from the Mayo stand, but accessing the main trolley as necessary, trying to keep those instruments sterile. The latter was covered by a “sterile” drape, which can be removed and replaced many times over the course of the day. The edges of the drape hang below the level of the table occasionally hitting the floor; it may then be lifted up to access the instruments, resulting in potential breaches of sterility, thus a practice that would be better changed.

For each case many sterile tins were opened often to obtain only one article. A suggestion was made to have the sterile containers packed with the basic items per case. For example a sterile container would contain all the required trolley and patient linen, gauze swabs and basic instrumentation required for a cases, perhaps with the likely additional as well. The latter would be limited by the lack of instruments.

There were a number of aspects of the operating theatres that should be attended to, including (some of which are covered above):

1. The building is old and has insect nests in the walls.
2. A pigeon nests in an external vent.
3. The air conditioner has no temperature control/thermostat.
4. Instruments, linen, gowns and disposable items are sterilised via steam in ***elsewhere*** in the hospital.
5. The equipment is presented in multi-case containers, retrieved with Cheadle forceps.
6. Items are often wet, compromising sterility.
7. Few instruments are available, thus are boiled for 20 minutes between cases.
8. Diathermy pencils are soaked in alcohol between cases, and reused multiple times.
9. Heat sensitive instruments (cystoscopes) are soaked in Cidex.
10. Many single use items are reused due to their cost or lack of availability.
11. Needle storage during cases was not ideal.
12. A surgical count was not always conducted, and did not include the sharps.
13. The swabs do not contain an xray detectable strip.
14. Sharp objects, including needles were not handled in the safest possible manner.
15. The scout was often one of the cleaning staff, with no training in sterility concepts.

Changes made:

- Swabs and needles would be counted and recorded on the white board.
- Needles are now being stored on a piece of red-rubber drain.

Recommendations for future Development

There should be further input into the development of the infrastructure and skill development related to the care of surgical problems in children in Mauritius.

Paediatric Surgery

1. Three visits per year of two weeks should focus on the teaching of the range of Paediatric General and Urological skills, in diagnosis, investigation and treatment.
2. Two hospitals and four surgeons should be identified as the centres for the care of the majority of the complex Paediatric Surgical cases.
3. Staff should receive additional training in surgical care and research in Australia.

Paediatric Anaesthesia

1. Three visits per year of two weeks should focus on the teaching of the skills related to the anaesthesia, pain management and intensive care of the young.
2. Two hospitals and four Anaesthetists should be identified as the centres for the care of the majority of the complex cases requiring Paediatric Anaesthesia.
3. Staff should receive additional training in Paediatric Anaesthesia related to children, both during the Paediatric Surgical visits, and by going out of Mauritius.

Nursing

1. Explore sponsorship for the nursing staff, increase their skill and knowledge, which may assist with employment and retention of nurses.
2. Use a well-placed whiteboard to facilitate the counting procedure.
3. More nurses are required to provide an appropriate minimum level of staffing.
4. Shelving is required to get stock off the theatre floor
5. More storage space is required elsewhere in the theatre complex.
6. New staff Orientation should be arranged.
7. Future visits should include more formal teaching sessions.
8. Protocols of minimum requirements should be formulated.

Paediatric Radiology

1. Paediatric Radiology subspecialty training, and review of protocols should be further developed.
2. Techniques for the radiological investigation of children should be developed in harmony with an annual visit of a Paediatric Radiologist.

Conclusion

Paediatric Surgery is becoming established as a specialty in Mauritius, based on the initiative of SACIM, and with strong support from a wide range of people including the Mauritian Minister of Health and Quality of Life, and the Prime Minister. On this occasion we were able to operate on 33 patients, plus we have added teaching in Paediatric Radiology and theatre nursing. The way forward needs to involve a focus on training of Surgeons, Anaesthetists, Radiologists and nurses, facilitated by both visiting teams to Mauritius, and people coming to Australia.

Paediatric Surgery needs to come under the direction of a select group of surgeons, agreed upon by government, Paediatricians and Surgeons, developed by setting up an advisory committee to undergo appointments, and to advise where the services should be established. Identified candidates should then be more closely involved in the visits, which should occur more frequently to develop the full range of Paediatric Surgery.

The visiting team thank the staff of the Ministry, SACIM, the Jeetoo Hospital, and all the Surgical and Anaesthetic staff who helped make the time in Mauritius so productive. Thank you also to Dr Fakim (Surgeon) and Dr Rajkomar (Paediatric Consultant) who provided enormous assistance with the overall coordination of the visit.