CARDIOTHORACIC SURGERY IN **PAPUA NEW GUINEA** - AN UPDATE

FORMER ROWAN NICKS SCHOLAR, DR NOAH TAPAUA, REPORTS ON HIS EFFORTS TO ESTABLISH A CARDIOTHORACIC UNIT IN PAPUA NEW GUINEA BY 2020. ***BY DR NOAH TAPAUA***

Introduction

Papua New Guinea (PNG) had a population of well over 7 million in the 2007 census, and like other developing countries, cardiothoracic pathologies pose a significant problem with high incidence of both congenital and acquired heart diseases and general thoracic pathologies including trauma related problems similar to Western countries. Patients with cardiac or thoracic related surgical problems either receive treatment by general surgeons who can only do what they can, wait for the annual Australian Operation Open Heart (OOH) cardiac team visit, or receive palliative medical treatment. The few who can afford it, pay their own way to seek treatment overseas.

A catchment area of 200,000 people is one of the requirements for a cardiothoracic unit and the two main capital cities of PNG (Port Moresby and Lae) are well qualified with more than 500,000 residents. The caseload at Port Moresby General Hospital (PMGH) is increasing because of the growing population and the influx of people to the capital.

Between 1993 and 2014, 893 patients were successfully treated by the visiting OOH team, with a mortality rate of 1.9%. The team concentrates on paediatric cases where the majority of patients have congenital heart disease (80%). Less than 20% are adults. This therefore does not reflect the true rate of heart disease in PNG, with a high prevalence of rheumatic fever and other acquired heart diseases associated with the changing lifestyle of the local population.

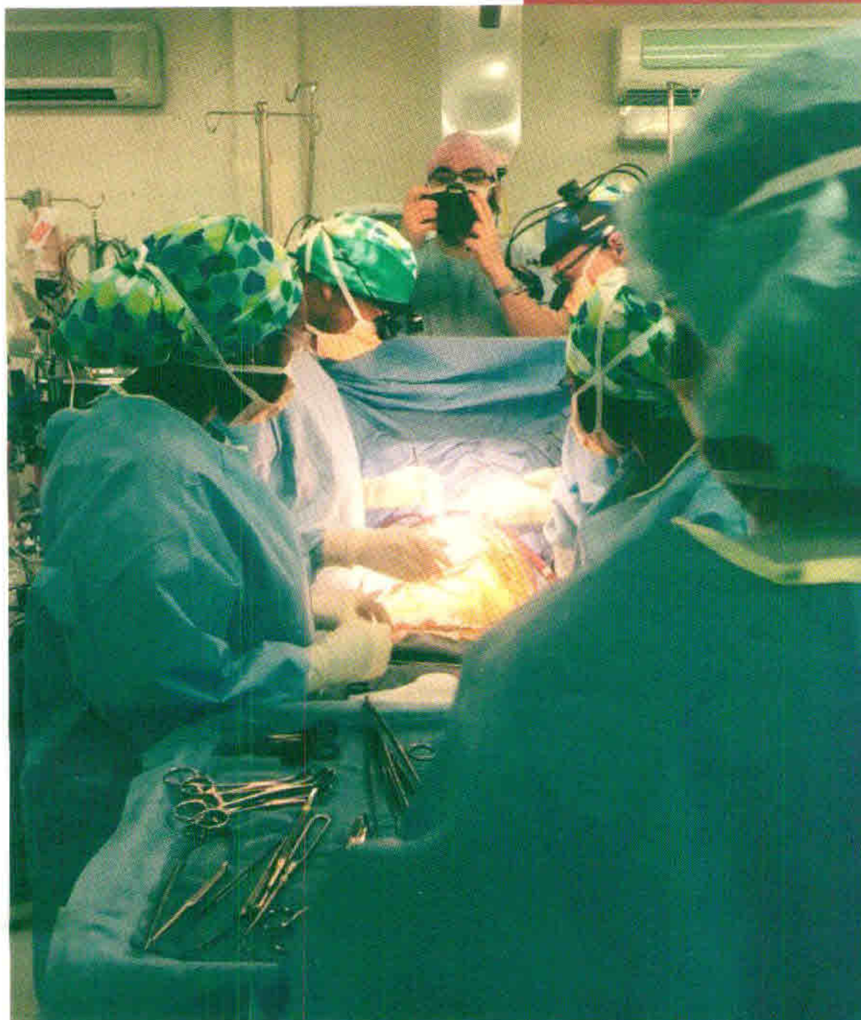
An established cardiothoracic specialist service in the country is well overdue. Considerable planning, equipment and resources are required to set it up, but once established, the economic advantage is irrefutable. The National Government will need to take ownership and include it in every calendar budget as history has shown that ad hoc funding will not sustain the service.

Once established, the unit will provide cardiac surgical procedures including complex valve surgery, congenital and coronary bypass operations including 'beating heart' bypass surgery and comprehensive thoracic surgery services for patients with any surgically treatable lung and chest diseases as well as chest trauma.

Objectives

1. To establish a Cardiothoracic Unit for the country by 2020.
2. To reduce the mortality rate of heart disease by 10% from 2 to 1.8 per 100,000 population by 2020.
3. Venture into research for thoracic and heart related pathologies in PNG.

Below: PMGH Ward Photo: Sr Kila, Dr Elizabeth Alok, Dr Arvin Karu, Dr Mathias Tovilu, Dr Cornelian Kilalang & Noah Tapaua



Left: PNG team doing an ASD repair on a 9 year old

Aims

1. To establish a cardiothoracic service that is accessible and affordable in the country.
2. Develop and upgrade a section at the Port Moresby General Hospital to a cardiothoracic and coronary care unit, with the cardiothoracic wing to be established by 2016.
3. Establish a curriculum adopted by the University of Papua New Guinea for under-graduates and postgraduates training in cardiothoracic surgery.
4. Establish a long-term sister hospital relationship between the visiting Australian cardiac team, Chennai Hospital in India and the SingHealth cardiac team in Singapore.

The indicators will be medical cardiac, surgical cardiac and thoracic mortality.

Progress

Progress has started with the upgrade of ward 7 at PMGH to a four bed coronary care and cardiothoracic ward. In 2012, ward 7 was renovated to a high dependent three bed capacity unit by a private sponsor company, and fitted out with equipment and monitors for cardiac and thoracic patients. The unit is being used for post-operative cardiac patients and is capable of taking in very sick patients and also aiding in offloading our intensive care unit patients as a step-down high dependency unit.

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Training

The partnership with RACS played a vital role in our progress through the sponsorship of a Cardiothoracic Anaesthetist and two Cardiothoracic Surgeons, including myself, to undertake overseas clinical attachments under the Rowan Nicks Pacific Islands Scholarship.

Dr Arvin Karu who is our Cardiothoracic Anaesthetist, was sponsored in 2008 and 2012 as a Fellow at the Cherian Heart Foundation in India and a term at the Westmead Children's Hospital respectively.

The late Dr Lister Lunn completed 18 months of cardiothoracic training at the Cherian Heart Foundation in 2008 to 2009, while I did my one year training as a Fellow in cardiothoracic surgery at the Geelong Hospital, Victoria, Australia in 2007 and another year at the National Heart Centre, Singapore, in 2013, all under the Rowan Nicks Scholarship and the PNG OOH Foundation.

In 2014 two of our Anaesthetist Scientific Officers spent twelve months with the Perfusion unit at the National Heart Centre Singapore. In early 2015 six of our nurses also went for training attachments at the Singapore National Heart Centre. We all have returned to PNG and we are now together as a team at our main referral hospital, the Port Moresby General Hospital.

In 2013 the SingHealth cardiac team from Singapore started their visits to PNG, and together with the Australian team, they have been working with us to provide on-the-job mentoring and training, with the aim of fully establishing cardiothoracic services in

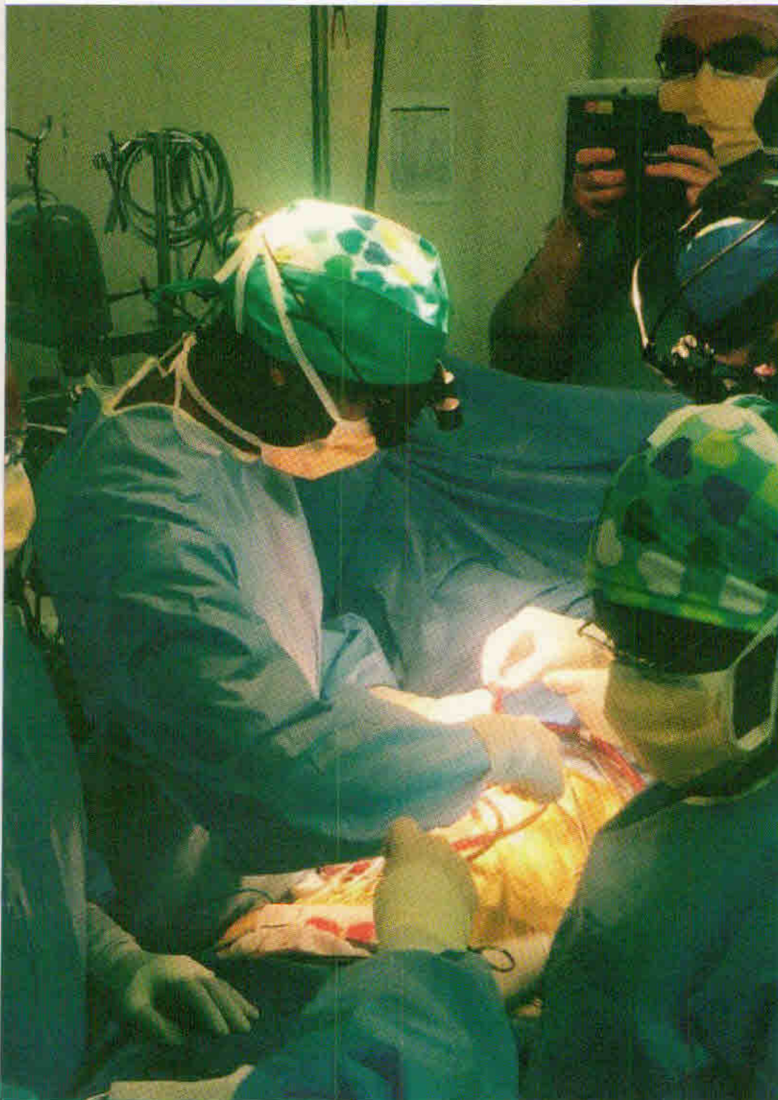
the country.

The continuing education from the OOH and SingHealth teams every year has raised the standard of care for cardiac patients and the general level of care for other patients and the new unit will maintain this.

Challenges

The biggest challenge to our progress has always been financial support, limited trained personal and equipment. The low volume of cases (average 46 cases per year) has made it difficult to report positive results, and resulted in the deskilling of trained staff. Apart from service provision, the external visits have often disrupted the usual flow of patients and the distribution of limited, vital equipment during these visits has been uneven. The total reliance on external support has been our greatest hindrance as while visiting cardiothoracic teams come to help us treat our patients, their departure often leaves us with a void that we are unable to fill. Hands-on experience has always been a challenge when the background is non-cardiac surgery, and the expert cardiac visits are too brief and infrequent to maintain specialist skills.

Below: PNG team doing an ASD repair on a 9 year old



Limited success in moving away from the model of cardiac missions (service delivery) to a sustainable, indigenous cardiac service, has resulted in our program remaining in an infancy state for 22 years. It seems easier to get funding for cardiac missions than to fund surgery performed by the national team.

The unexpected passing of our senior colleague, late Dr Lister Lunn on 9 September 2015 will impact on our progress as it takes years of training to reach the senior level that he was. It is a challenge we will have to take on if we are serious in establishing our own cardiothoracic service in PNG.

Current status

With the national team now at PMGH, we are doing the following procedures throughout the year:

- Patent Ductus Arteriosus (PDA) operations (closed heart operation)
- Insertion of pacemakers
- Pericardiocenthesis
- Pericardial window
- Pericardiectomies
- Lung lobectomies and pneumonectomies for lung pathologies
- Wedge resection of lung lobe lesions
- Decortication
- Repair of diaphragmatic hernias
- Repair of congenital esophageal hernias
- Esophageal cancer resection and gastric pull-up
- Esophageal cancer stenting
- Traumatic artery-venous (A-V) fistulae repair
- False aneurysm repair
- Insertion of central lines for hemodialysis

We took over the closed heart program in 2006. In March 2015, we performed our first three mitral valve replacement surgeries and one complex patent ductus arteriosus surgery under the supervision of the visiting SingHealth team. In July 2015 this year we operated on ten children with ventricular septal defects and atrial septal defects under the supervision of the visiting Australian cardiac team. In addition to assisting with the operations, our nurses were given the task of looking after the post-operative patients while the

visiting cardiac nurses from both teams shadowed them. Prior to the visiting teams' assistance, we were already performing closed heart surgeries, and we have continued to do so after their departure, operating on a total of 28 patients with PDAs. The complications encountered were manageable and there was no mortality.

"*We aim that by 2019, we will have an independent Cardiothoracic surgery unit at the Port Moresby General Hospital that will serve our people and the Pacific as a whole*"

The Way Forward

To fully nationalise cardiothoracic surgical services in PNG, we have re-strategized our approach to achieve our goals as outlined below:

1. Increase the number of cardiothoracic visits to four per annum.
2. Reduce the size of each visiting teams so our local staff play a leading role
3. Halve the budget for annual visiting teams, and use the remaining half of the money to build our capacity.
4. A four year time-line has been developed to phase out the visiting teams so that by 2019, an independent Cardiothoracic unit will be set up at the PMGH.
5. For open heart surgeries, the aim is to concentrate on ASDs, VSDs and Mitral Valve pathologies.
6. Target volume of 10-12 surgeries to perform with the visiting teams and one-two surgeries per week in the intervening periods to give a total of 100 to 150 surgeries per year.
7. Drugs and consumables to be purchased by the PMGH and the PNG National Department of Health
8. Establish a cathlab by 2018.
9. The visiting teams to comprise of: one Cardiac surgeon up to 2019; one Cardiac Anesthetist up to 2019; one OT scrub Nurse; three ICU Nurses; one Perfusionist; 1 Bio-medical Engineer; 1 Intensivist; one Interventional Cardiologist post Cath Lab installation up to 2019; 2 Cath Lab Nurses post Cath Lab installation up to 2019.
10. The local team to comprise of: 1 Cardiothoracic Surgeon; 2 Cardiothoracic Surgical trainees; 1 Cardiothoracic Anesthetist; 2 Cardiothoracic Anesthetist trainees; 2 OT Scrub Nurses; 8 ICU Nurses; 12 Ward Nurses; 2 Perfusionists; 2 Physiotherapists; 1 Social worker; 1 Nutritionist; 1 Intervention Cardiologist (Post Cath Lab set up); 2 Interventional Cardiologist trainees; 3 Cath Lab Nurses (Post Cath Lab set up).
11. To use the existing CT three bed unit, ward 7 and one operating theatre.

By setting the above targets we aim to have an independent Cardiothoracic surgery unit at the Port Moresby General Hospital by 2019 that will serve our people and the Pacific as a whole.

Acknowledgements

On behalf of the local cardiothoracic team, the adult and paediatric cardiology teams, and the people of Papua New Guinea, I would like to extend our gratitude of thanks to the following who have assisted us in training, the time and effort contributed by individuals to help us come this far towards achieving our goal:

1. The Royal Australasian College of Surgeons & Rowan Nicks Scholarship Program
2. The Geelong Cardiothoracic Unit, Geelong Hospital, Barwon Health, Melbourne, Australia
3. The Cherian Heart Foundation, India
4. Westmead Children Hospital
5. National Heart Centre Singapore
6. Dr Lenoard Kaupa, General Surgeon who initiated the cardiac visit program in 1992
7. The PNG Operation Open Heart
8. The Operation Heart International
9. The Port Moresby General Hospital
10. The PNG National Department of Health
11. The PNG Government

Tribute to Late Dr Lister Lunn, (Born 26 February 1961 and died on September 9, 2015)

We missed you during our last Operation Open Heart program in July. You paid us a brief visit in the middle of the program telling us to continue what we were doing, not knowing that you came to say goodbye and that we would miss you forever. Gone in the wind but your story will live on in the hearts and minds of the younger generation of PNG surgeons. Your hands were truly made for surgery, firm but gentle. My mentor in cardiothoracic surgery and friend, we will continue the journey for cardiothoracic surgery as you told us ... may your soul rest in peace till that blessed morning when Jesus comes.