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UNIVERSITY SURGICAL CLUSTER

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THE UNIVERSITY SURGICAL CLUSTER (USC)

The University Surgical Cluster (USC) is a multidisciplinary group in Singapore with three main focuses:

- Clinical Departments & Services
- Research & Innovation
- Education & Training

Our aim is to provide a comprehensive 'one-stop' service to our patients.

The USC clinical departments comprise teams of medical professionals who are able to provide comprehensive specialised care for all surgical conditions. Such specialised care are Breast Surgery, Colorectal Surgery, Hepatobiliary & Pancreatic Surgery, Neurosurgery, Upper Gastrointestinal Surgery, Trauma Services, Plastic, Reconstructive & Aesthetic Surgery, Thyroid & Endocrine Surgery and Urology.

Led by Professor Krishnakumar Madhavan, the USC leverages on advanced technology to provide our patients with quality clinical care. We invest in projects such as the "Initiative for Research & Innovation in Surgery (IRIS)" and the "Medical Engineering Research and Commercialisation Initiative (M.E.R.C.I.)" to design and build medical device technological innovations. Such innovations led to the introduction of 3D computer modeling and printing capabilities to aid in facial reconstruction surgery in 2013 as well as performing Peroral Endoscopic Myotomy (POEM) as a new cure for Achalasia patients for the first time in Singapore in 2015.

We also believe in the importance of educating our undergraduate students and post-graduate surgical trainees in the optimal management of surgical patients. The Khoo Teck Puat Advanced Surgery Training Centre (ASTC) was set up in 2008 as a leading surgical training centre which enables trainee surgeons to get hands-on experience with senior surgeons as mentors.



For more information on USC or to contact us, log on to www.nuh.com.sg/usc

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THE ROLE OF SURGERY IN THE WAR ON DIABETES

Diabetes mellitus is derived from the Greek word diabetes - meaning 'siphon' or 'to pass through' and the Latin word *mellitus* - meaning 'honey' or 'sweet'. This ancient disease has been with us for a long time, with the earliest records dating back to around 1500 BC, written on Egyptian papyrus¹.

Today, diabetes is a pressing global health problem, with an estimated 422 million people having diabetes in 2014 and nearly 3.7 million deaths related to blood glucose levels in 2012². The diabetes epidemic has not spared our shores, with data from the Ministry of Health (Singapore), based on the National Health Survey in 2010, revealing that 1 in 9 (11.3%) Singapore residents aged 18 - 69 years old were affected

by diabetes. Only 2 in 3 diabetics were aware that they had diabetes, of which, 1 in 3 had poor control of their condition.

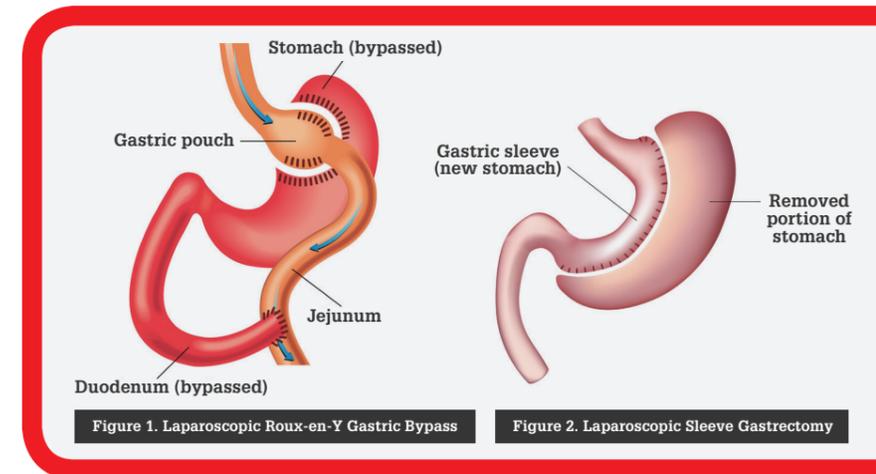
The number of diabetics in Singapore is estimated to be around 440,000 in 2014, with this figure projected to rise to 670,000 by 2030 and to nearly 1 million by 2050³. The long-term complications of diabetes, including cardiovascular events, cerebrovascular events, blindness, kidney failure and amputation add significant morbidity and costs. The cost of diabetes, which was more than S\$1 billion in 2010, is expected to rise to more than S\$2.5 billion by 2050⁴. Last year, this predicament has led the Ministry of Health in declaring 'war against diabetes' with a multi-pronged and comprehensive strategy to tackle the disease³.

The rising problem of diabetes is closely associated with the obesity epidemic, with raised body mass index (BMI), a known major risk factor for diabetes⁵. Together, the escalating problem of type 2 diabetes and obesity has led to them being labelled as the 'twin epidemics', with the increasing use of the term 'diabesity' in recent years being used to describe patients who suffer from both diabetes and obesity. According to WHO estimates, more than 1 in 3 diabetic adults were overweight and more than 1 in 10 were obese in 2014. This proportion increases with country income level, with high and middle-income countries having more than double the overweight and obesity prevalence of low-income countries².

WHERE DOES SURGERY FIT IN THIS WAR?

Bariatric surgery has made quantum leaps in recent decades due to improved safety with the increased use of laparoscopy and advancements in surgical techniques. This has resulted in overall mortality rates of about 0.1% and major morbidity of about 4%. This is coupled with surgery being shown to be the most effective and durable treatment for morbid obesity. Surgery has also been shown to prevent, improve or resolve more than 40 obesity-related diseases or conditions including type 2 diabetes⁶. These improvements have led to the advent of metabolic surgery rather than bariatric surgery, where surgical success was not defined by weight loss outcomes alone, but rather with the improvement of obesity related co-morbidities like diabetes being considered an important goal of surgery. The two most common metabolic surgeries performed are laparoscopic sleeve gastrectomy and laparoscopic gastric bypass⁷.

The laparoscopic sleeve gastrectomy involves removing a large portion of the stomach, resulting in a remnant tubular stomach. This procedure works by several mechanisms. The tubular stomach is considerably smaller and thus results in a caloric restrictive effect. This surgery also results in alterations in the gut hormones, which impacts on hunger, satiety and blood sugar control.



The Roux-en-Y gastric bypass – often called the gastric bypass, involves two components. A small gastric pouch is first created by dividing the proximal stomach. Next, the small intestine is divided proximally, brought up and anastomosed to the small stomach pouch. Another anastomosis is made between the small intestines distally to bypass the distal stomach and a significant portion of small intestine. While the small stomach pouch and small gastro-jejunal anastomosis results in some caloric restrictive effects, there are some malabsorptive mechanisms of weight loss due to the bypassed stomach, duodenum and proximal jejunum. This bypass effect results in major changes in gut hormones that promotes satiety, suppresses hunger and improves glycaemic control.

While there are other procedures like intra-gastric balloons, the mini-bypass and biliopancreatic diversion, sleeve gastrectomy and gastric bypass remain the two workhorses of metabolic surgery, with data from randomised controlled trials showing superiority of these procedures over best medical therapy. A landmark study, the STAMPEDE trial⁸, randomised 150 obese patients with uncontrolled

WHILE THERE ARE OTHER PROCEDURES LIKE INTRA-GASTRIC BALLOONS, THE MINI-BYPASS AND BILIOPANCREATIC DIVERSION, SLEEVE GASTRECTOMY AND GASTRIC BYPASS REMAIN THE TWO WORKHORSES OF METABOLIC SURGERY.



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Dr Kim Guowei's special interests are in upper gastrointestinal surgery (including oesophageal and gastric cancer), metabolic and bariatric surgery, minimally invasive surgery and diagnostic & therapeutic endoscopy. He believes in delivering evidence based and patient-centric care to provide holistic management for his patients.

type 2 diabetes to receive either intensive medical therapy or intensive medical therapy plus gastric bypass or sleeve gastrectomy with the primary end point of glycated haemoglobin level of 6.0% or less. 3 years after surgery, 38% of patients in the surgery arm met the primary endpoint, compared to 5% in the medical therapy only arm. Another study showed encouraging long term results, with 62% of patients who had undergone gastric bypass with severe obesity (BMI ≥ 35) experiencing type 2 diabetes remission compared to 6 - 8% in control groups, 6 years after surgery⁹. These positive results

have led to international guidelines advocating the consideration of metabolic surgery for patients with BMI ≥ 35 with at least one obesity-related comorbidity¹⁰. This recommendation is echoed in our local guidelines¹¹ with grade A recommendation and level 1+ level of evidence. Of interest, the latest guidelines from the American Diabetes Association this year have gone one step further, changing their guidelines (see below) for patients with type 2 diabetes¹².

AMERICAN DIABETES ASSOCIATION (ADA) GUIDELINES ON OBESITY MANAGEMENT FOR THE TREATMENT OF TYPE 2 DIABETES.

Metabolic surgery should be **recommended** to treat type 2 diabetes in appropriate surgical candidates with BMI $\geq 40\text{kg/m}^2$ (BMI $\geq 37.5\text{kg/m}^2$ in Asian Americans), **regardless** of the level of glycemic control or complexity of glucose-lowering regimens, and in adults with BMI $35.0\text{--}39.9\text{kg/m}^2$ ($32.5\text{--}37.4\text{kg/m}^2$ in Asian Americans) when hyperglycemia is inadequately controlled despite lifestyle and optimal medical therapy.

Metabolic surgery should be **considered** for adults with type 2 diabetes and BMI $30.0\text{--}34.9\text{kg/m}^2$ ($27.5\text{--}32.4\text{kg/m}^2$ in Asian Americans) if hyperglycemia is **inadequately controlled** despite optimal medical control by either oral or injectable medications (including insulin).

CONCLUSION

While the role of surgery in the war against diabetes is slowly but surely expanding, it is important to understand and not forget that the pillars of reducing the burden of diabetes still lies in prevention, screening and medical management. Any intervention, be it medical or surgical, would necessarily require a multidisciplinary effort to target this disease on multiple fronts.



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STONE SERVICE AT NUH UROLOGY CENTRE



Kidney stone disease is a common ailment that occurs in 2 – 3% of the population. People with kidney stones often experience sudden pain in the back or the sides of the abdomen. This is caused by a stone in the ureter which is the muscular tube that carries urine from the kidney to the bladder.

Kidney stones form when the components of urine (fluid and various minerals and acids) are out of balance. Problems in the way one's system absorbs and eliminates calcium and other substances create the conditions for kidney stones to form. Less common causes include inherited metabolic disorder, kidney disease, gout, inflammatory bowel disease and some drugs.

It is common for kidney stones to be formed with no definite single cause. A number of factors, often in combination, create the conditions in which susceptible people develop kidney stones.

Some common types of stones are calcium stones, struvite stones, uric acid stones and cystine stones.

The signs and symptoms

- Pain in the side and back, below the ribs

In many instances, the stones are discovered incidentally.

Smaller and non-obstructing stones in the kidney can be treated conservatively but obstructing stones need urgent treatment.

At the NUH Urology Centre, we aim to provide early diagnosis and intervention for all our patients.

THE RANGE OF DIAGNOSIS AND TREATMENT OPTIONS AVAILABLE AT NUH UROLOGY CENTRE:

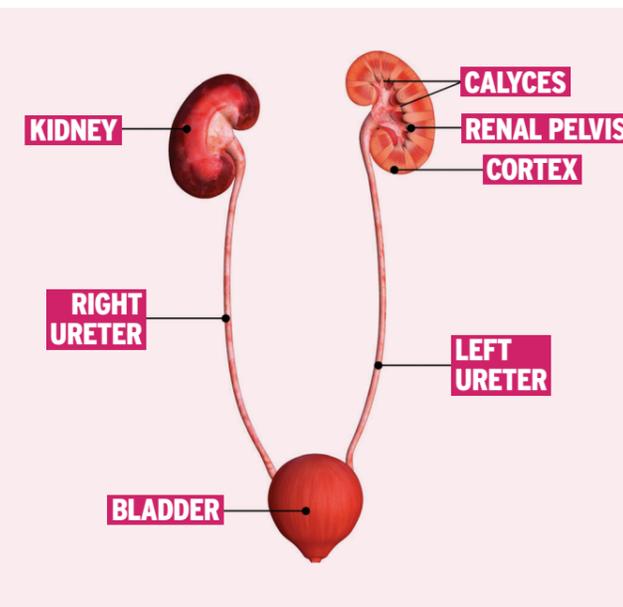
SAME DAY IMAGING

1. X-Ray

A simple and fast test that allows clinicians to visualise hard stones.

- Fluctuations in pain intensity, with periods of pain lasting 20 – 60 minutes
- Pain waves radiating from the side and back to the lower abdomen and groin
- Bloody, cloudy or foul-smelling urine
- Pain during urination
- Nausea and vomiting
- Persistent urge to urinate
- Fever and chills if an infection is present

Many kidney stones go unnoticed until they cause acute symptoms, specifically loin pain as the stone passes through



2. Spiral Computed Tomogram (CT)

The gold standard in diagnosing urinary stones, a CT scan allows accurate localisation and measurement of the stone size. It also gives an estimation of the hardness of the stone.

TREATMENT OPTIONS

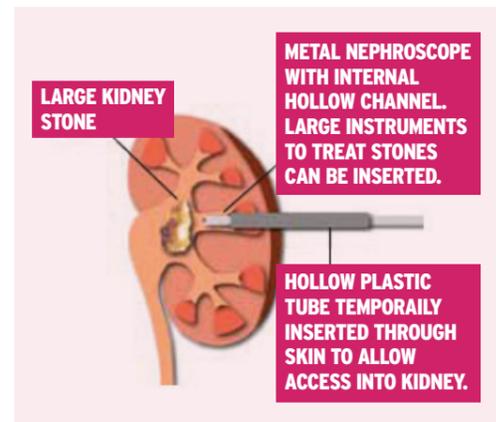
Different treatments are available for kidney stones disease, depending on the type of stone and the root cause. One simple way to remove a stone through your urinary tract is to drink plenty of water to gush it out. Stones that cannot be treated with more conservative procedures, either because they are too large to pass out on their own or they cause bleeding, kidney damage or on-going urinary tract infections, need more invasive procedures.

they can be removed surgically or passed out naturally with the urine.

Patients undergoing this treatment are usually admitted as either a day-case or will spend a single night in the hospital.

3. Percutaneous Nephrolithotomy (PNCL)

This treatment is often used for larger stones or if alternative treatments such as ESWL are not suitable. It is sometimes referred to as keyhole kidney stone surgery. This procedure is performed under general anaesthesia and usually requires a 2 – 3 night stay.



During this procedure, a small incision is made in the back and a telescopic instrument is inserted into the kidney. Once identified, the stone can then be broken down into smaller pieces and removed. An external tube is usually left in the wound and removed after a day.



SAME WEEK INTERVENTIONS

1. Extracorporeal Shock Wave Lithotripsy (ESWL)

ESWL uses high-energy shock waves to break kidney stones down into tiny fragments. These fragments are then flushed out naturally with urine.

This treatment is carried out without any need for anaesthesia and in the clinic setting. Some patients may require multiple treatment sessions.

ESWL is a very effective treatment for stones in the kidney and upper ureter between 5mm – 15mm in diameter.

2. Rigid and Flexible Ureteroscopy

A surgical procedure called Ureteroscopy may be required if you have a stone in your ureter or kidney. This procedure is performed under general anaesthesia and involves passing a thin telescope into the bladder and then up into the ureter. The stone can then be broken up with a laser, into small fragments so that



Asst Prof Chua Wei Jin

Senior Consultant,
Department of Urology

Asst Prof Chua started the Day Surgery Transurethral Resection of Prostate (TURP) programme in NUH in 2005 and is currently the co-director of the programme.

His specialties include laparoscopy, laparoscopic surgery, stone diseases, small renal mass, and Transurethral Needle Ablation of Prostate (TUNA) which he introduced in 2010 for benign enlargement of prostate.

MISSHAPEN OR ENLARGED HEADS IN BABIES: NORMAL, POSITIONAL OR PATHOLOGICAL?

A typical skull shapes occur in as many as 20% of infants¹. Macrocrania is also a common clinical condition affecting up to 5% of the population². A newborn's skull is highly malleable and rapidly expanding. As a result, any restrictive or expansive forces applied to a baby's head can result in dramatic distortions or enlargement. These changes can be mild, reversible deformations or severe, irreversible malformations that can result in brain injury.

At birth, the shape of a newborn's skull is highly variable due to its inherent plasticity and the tortuous journey through the birth canal. Variations from the typical oval shape will generally return to normal in a relatively short period of time. If this does not occur, the possibility of cranial malformation or underlying brain disorder needs to be considered.

NORMAL DEVELOPMENT OF THE HUMAN SKULL

The skull is formed from embryonic mesoderm, which differentiates into the mesenchymal neurocranium and viscerocranium. The calvaria comprises five bones (the paired frontal, parietal and solitary occipital bones, and to a lesser degree the membranous portions of the temporal and sphenoid bones) that develop through intramembranous ossification. Each calvarial bone grows and unites with a non-mineralised mesenchyme to form the suture. The intersection of two or more sutures forms a fontanelle. The most important sutures are the sagittal, coronal, lambdoid and metopic sutures.

Appreciation of normal brain growth guides our understanding and management of many forms of skull anomalies. The rapid growth in neuronal cell number during the 10th through 18th weeks of gestation achieves near adult cell numbers. At 15 months of age, the brain is roughly 65% adult size while the cerebellum has achieved adult proportion.



TIMING OF CLOSURE OF SUTURES AND FONTANELLES

TYPE OF SUTURE/FONTANELLE	TIME TO CLOSURE
METOPIC SUTURE	3 TO 9 MONTHS
CORONAL, SAGITTAL, LAMBDROID SUTURES	22 TO 40 MONTHS
ANTERIOR FONTANELLE	9 TO 18 MONTHS
POSTERIOR FONTANELLE	3 TO 6 MONTHS

The metopic suture fuses at 3 - 9 months of age, while the coronal, sagittal and lambdoid sutures fuse between 22 and 39 months of age. The average occipital-frontal circumference (OFC) is 35cm in newborn, 45cm at 1 year, and 55cm in an adult. These measurements illustrate the extremely rapid growth in the first years of life.

POSITIONAL PLAGIOCEPHALY

Positional plagiocephaly is the most common cause of misshapen head in an infant. In 1992, the American Academy of Pediatrics published guidelines recommending that all healthy infants be placed to sleep in the supine position during the first 6 months of life in an attempt to reduce the incidence of Sudden Infant Death Syndrome (SIDS). This "Back-to-Sleep" campaign resulted in a dramatic 50% reduction in the incidence of SIDS in the United

States. An unanticipated, sequelae of this programme however has been the dramatic increase in the prevalence of deformational plagiocephaly, estimated in 20% of infants during the first 4 months of life³. Occipitoparietal (right or left) and symmetric occipital (brachycephaly) are the most common forms of plagiocephaly.

CRANIOSYNOSTOSIS

Premature fusion of one or more cranial sutures is termed craniosynostosis. This malformation occurs in 1 in 2500 neonates as opposed to the 1 in 3 babies with a deformational anomaly. Craniosynostosis is classified as simple (1 suture) versus compound (2 or more sutures), and isolated versus syndromic. Isolated sagittal synostosis is the most common type of craniosynostosis. Cranial growth restriction will occur in the plane parallel to a prematurely

fused suture and enhanced in the perpendicular planes. Thus, if the sagittal suture were fused early, the skull will be restricted in the transverse dimension and enhanced in the anterior-posterior dimension in response to the growing brain, resulting in dolichocephaly.

Infants with syndromic forms are most likely to appear markedly dysmorphic with abnormalities of their heart, limbs, genitourinary system, and multisutural craniosynostosis. The syndromes include Pfeiffer, Apert and Crouzon Syndromes. Many patients also have a family history of abnormal head shape.

The major complications associated with uncorrected craniosynostosis



Harlequin eye deformity

include increased intracranial pressure, asymmetry of the face, and malocclusion. Asymmetry of the orbits will lead to strabismus.

THE DIAGNOSTIC CHALLENGE

The greatest diagnostic challenge often involves the differentiation of a malformation from a deformation, because it usually determines whether the child will undergo major craniofacial surgery, versus conservative management. Proper diagnosis can often be achieved through a careful history, physical examination and radiological imaging. Plain films of the skull may reveal distinctive uplifting of the orbital roof ("harlequin eye deformity"), which represents a classic finding in uni-coronal craniosynostosis. The best current imaging study would be a CT scan of the head with 3D computer reconstruction.

MACROCRANIA

Macrocrania is defined as a head circumference more than 2 SD above the mean (>95th percentile). Common

causes include familial megalencephaly, idiopathic external hydrocephalus, communicating or obstructive hydrocephalus, subdural collections, brain tumours and cysts. Evaluation of head growth rate (crossing of centiles), assessment of developmental milestones, perinatal history and signs of raised ICP is important in determining the differential diagnosis and urgency of radiological imaging. Clinical predictors of need for neurosurgical interventions include vomiting, developmental delay, accelerated head growth, abnormal fontanel, retinal hemorrhage, focal neurological deficits, and gait abnormalities⁴.

EXAMINATION OF THE INFANT SKULL

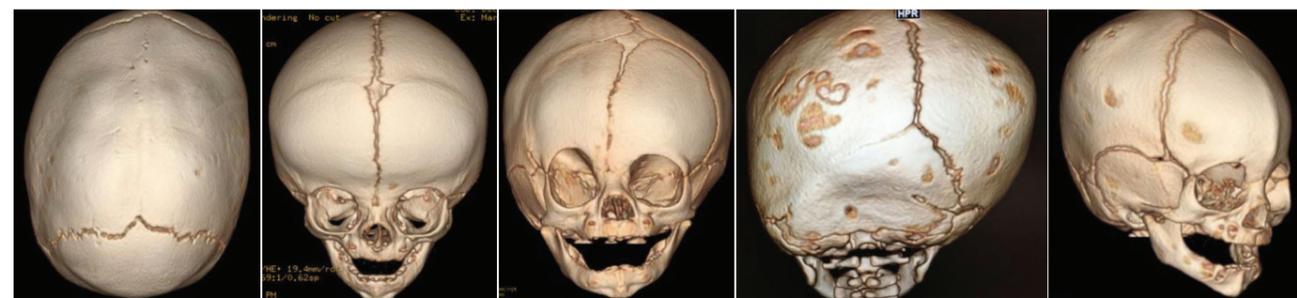
Measurement of the head circumference is vital to detect associated microcephaly or macrocephaly. Overriding of the bones of the calvarial vault is common during the first two to three days of life in an infant born at term and during the first two to three weeks of life in an infant born prematurely. Persistent ridging at the suture lines in an infant with an

abnormally shaped head is suggestive of craniosynostosis.

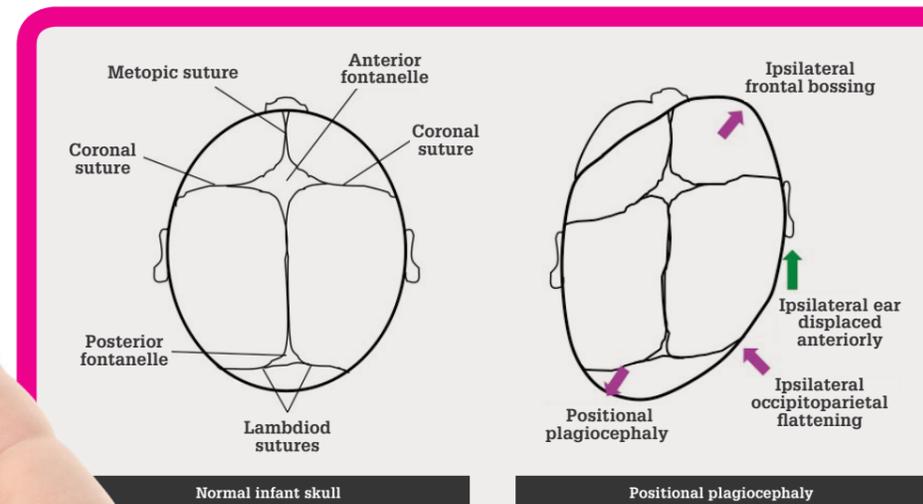
Examining an infant's head from above can help the physician distinguish true lambdoid synostosis from positional plagiocephaly. In infants with lambdoid synostosis, the posterior bossing is in the parietal area contralateral to the flat part of the head. Positional plagiocephaly causes frontal bossing ipsilateral to the flat part of the head. In infants with lambdoid synostosis, the ear is displaced posteriorly toward the fused suture. In infants with positional plagiocephaly, the ear is displaced anteriorly.

MANAGEMENT

Early evaluation, ideally in the first few weeks of life, by an experienced craniofacial team is key to obtaining the best possible outcome for a patient with either misshapen or enlarged head. Positional plagiocephaly can generally be managed conservatively by advising parents to ensure supervised tummy time while awake and varying head position during feedings and when supine.



Sagittal Craniosynostosis, Bicoronal Craniosynostosis, Unicoronal Craniosynostosis, Unilambdoidal Craniosynostosis, Metopic Craniosynostosis



Normal infant skull

Positional plagiocephaly

Reprinted with permission by Renee L. Cannon



CRANIAL GROWTH RESTRICTION WILL OCCUR IN THE PLANE PARALLEL TO A PREMATURELY FUSED SUTURE AND ENHANCED IN THE PERPENDICULAR PLANES. THUS, IF THE SAGITTAL SUTURE WERE FUSED EARLY, THE SKULL WILL BE RESTRICTED IN THE TRANSVERSE DIMENSION AND ENHANCED IN THE ANTERIOR-POSTERIOR DIMENSION IN RESPONSE TO THE GROWING BRAIN, RESULTING IN DOLICHOCEPHALY.

CONCLUSION

Early diagnosis is critical in optimising treatment, or non-treatment, of the infant with a misshapen or enlarged head. In addition, children with craniosynostosis and hydrocephalus are often at risk for learning disabilities and should be provided with early intervention services.

At the National University Hospital, the Division of Neurosurgery offers a comprehensive, intergrated evaluation of paediatric patients with suspected hydrocephalus and/or craniosynostosis. The full range of medical and surgical treatment options are available with a multidisciplinary team approach. An experienced team trained in paediatric neurosurgery, paediatric medicine and plastics surgery is readily available to ensure the optimal outcome for patients with misshapen and/or enlarged heads.

Once the diagnosis of craniosynostosis is confirmed, the treatment includes surgical correction. Surgical intervention involves either strip craniectomy or cranial vault remodelling. Recently, minimally invasive endoscopic strip craniectomy, which involves significantly less blood loss and a shorter hospital stay, has been successful⁵.

Depending on the cause of macrocrania, it can be treated conservatively or surgically. Hydrocephalus, depending on the etiology, can be treated with shunting procedures (most commonly ventriculoperitoneal shunt) or an endoscopic third ventriculostomy +/- choroid plexus cauterization. A mass lesion causing obstructive hydrocephalus would in most instances require surgical management.

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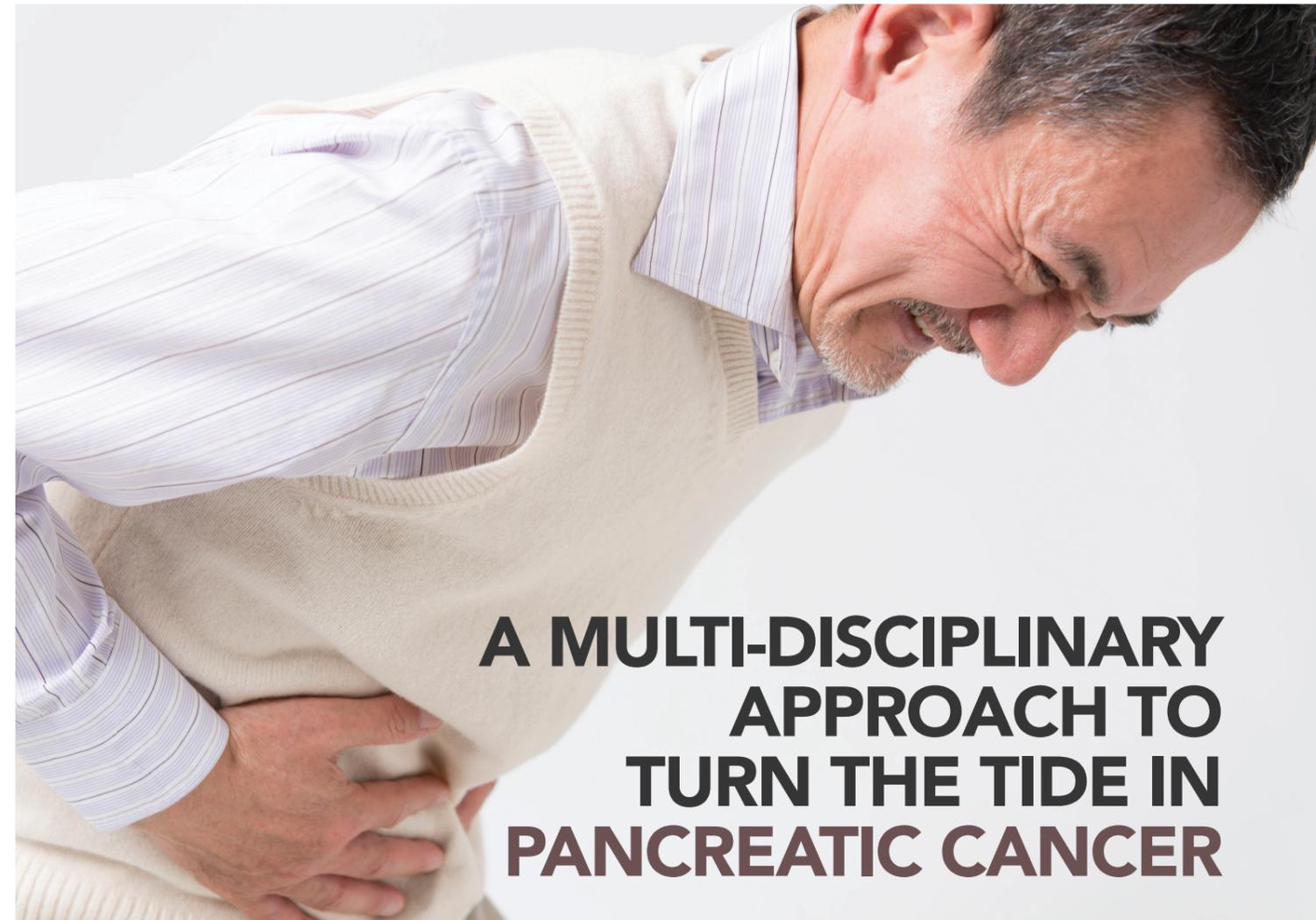


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After receiving his medical degree from the National University of Singapore in 2007, Dr Vincent Nga underwent basic General Surgical training and advanced Neurosurgical training at the National University Hospital.

He was also trained in Neuroendoscopy, Neuro-oncology, Spinal Surgery, Epilepsy Surgery, Neurovascular, Craniofacial and Congenital malformation surgeries during his clinical fellowship in Paediatric Neurosurgery at the Hospital for Sick Children (SickKids) Toronto, Canada.

His clinical and research interests include Paediatric Neurosurgery Neuro-oncology, Neurovascular Surgery and Traumatic Head Injuries, Hydrocephalus and Biodegradable Skull Reconstructive Materials.



A MULTI-DISCIPLINARY APPROACH TO TURN THE TIDE IN PANCREATIC CANCER

In Singapore, pancreatic cancer is the 5th and 6th most common cause of cancer death in men and women respectively¹. This article will briefly describe the key advances in this lethal malignancy.

UNDERSTANDING RISK FACTORS

Risk factors of pancreas cancer have been described previously and are shown in [Table 1]². Perhaps the biggest advance here is the understanding of genetic mutations directly linked to it. In up to 5% of patients with pancreas cancer, a known genetic mutation can be detected that may directly result in its development. In a multi-centre study, asymptomatic patients with a known mutation including CDKN2A, screened with magnetic resonance or endoscopic ultrasound surveillance, were found to have earlier, more treatable disease³.

INCREASED RISK OF PANCREAS CANCER (GOOD EVIDENCE)	MAY INCREASE RISK (LIMITED EVIDENCE)
Tobacco, smokeless Tobacco smoking Body fatness	Alcohol Thorium-232 and its decay products X-radiation Gamma-radiation Abdominal fatness Adult attained height Red meat

Table 1: Risk factors for the development of pancreas cancer

PREDISPOSING CYSTIC LESIONS OF THE PANCREAS

The increasing ubiquitous use of CT and MRI scanning for abdominal symptoms and an ageing population have resulted in an exponential rise in the incidental findings of cystic lesions of the pancreas and is currently a common trigger for referral to specialist hepatobiliary surgery or gastroenterology clinics for review.

In the last decade, the understanding of such lesions has greatly increased, such that there are clearly diagnostic entities that are associated with high and low malignant transformation potential. In 2012, a consensus document was established by an international panel on the management of such cysts⁴. Called the "Sendai criteria", this document forms the basis for



Figure 1: A scan showing cystic IPMN of the main duct with involvement of the portal vein

which diagnosis and screening of pancreatic cysts are made. Of these cysts, intraductal papillary mucinous neoplasms (IPMN) of the main pancreatic duct represents a significant risk factor for malignancy with reported risks being as high as 38 - 68%. When a solid component is seen in a jaundiced patient with main duct IPMN,

there is no doubt that, in a patient deemed fit for surgery, surgical resection is warranted [Figure 1].

OPERABILITY AND PERI-OPERATIVE OUTCOMES FOLLOWING PANCREATIC SURGERY

The definition of resectability has historically been vague, as there is considerable debate and controversy as to what extent of disease is truly deemed resectable. In 2014, the International Study Group of Pancreatic Surgery (ISGPS) clarified definitions of resectability [Figure 2]⁵. While historically, involvement of the SMV/Portal Vein has been concern for its biology and morbidity, more recent studies have shown that when venous reconstruction can be performed safely, the outcome in survival justifies the operation with large series showing no difference in survival with or without venous reconstruction⁶⁻⁸. Venous resection in pancreaticoduodenectomies is currently no longer a contraindication to surgery; and this is clear. Furthermore, surgical techniques in resecting pancreatic cancer with minimally invasive techniques such as laparoscopic and robotic techniques when reviewed, concluded that this can result in good peri- and post-operative and oncological outcomes⁹. Much like in various other surgical specialties, there has been a move toward Enhanced Recovery After Surgery (ERAS) programmes; requiring close teamwork with dietitians, physiotherapists and nurses. Mortality rates after pancreatic resections have reduced from 30% to 2% in high volume centres with the morbidity rate reported to be 30%¹⁰.

INCREASING OPERABILITY WITH NEO-ADJUVANT CHEMOTHERAPY

As detailed above, there is much clarity in diseases that are resectable upfront and that which is borderline. However, arterial resection and reconstruction has not been shown to improve oncological outcomes while increasing mortality and morbidity risk. It is in this area where neo-adjuvant chemotherapy has made significant advances in outcomes.

Historically, Gemcitabine remained the standard of care option for unresectable pancreatic cancer. A recent meta-analysis assessing the role of FOLFIRINOX in borderline resectable pancreas cancer analysed the outcome of thirteen studies enrolling 253 patients with borderline disease, had found that an impressive 43% of patients who were given this therapy went on to undergo resection and 39% achieved a clear margin¹¹.

The advent of neoadjuvant chemotherapy in the treatment of pancreas cancer is the single biggest advancement in the disease for decades. From personal experience, surgically, tumour that has been seen to involve the artery and subsequently given neo-adjuvant chemotherapy appears to dissolve into a pool of oedematous tissue making planes, that were previously not dissectable in such patients, peel away

WHILE HISTORICALLY, INVOLVEMENT OF THE SMV/ PORTAL VEIN HAS BEEN CONCERN FOR ITS BIOLOGY AND MORBIDITY, MORE RECENT STUDIES HAVE SHOWN THAT WHEN VENOUS RECONSTRUCTION CAN BE PERFORMED SAFELY, THE OUTCOME IN SURVIVAL JUSTIFIES THE OPERATION WITH LARGE SERIES SHOWING NO DIFFERENCE IN SURVIVAL WITH OR WITHOUT VENOUS RECONSTRUCTION.

from the affected artery; a testament to this approach for initially borderline or unresectable disease.

SUMMARY

In summary, pancreatic cancer has long been a dismal disease with poor peri-operative and long term survival. In recent years, the recognition of risk factors as well as defining predisposing pancreatic cysts has resulted in detection of early disease and the prevention of malignant transformation. In patients that present with the disease, the criteria for resectable, borderline resectable and unresectable disease has been established. The advent of neo-adjuvant chemotherapy and early results in response rate is promising.

On this background, with close collaborations between surgeons, gastroenterologists, oncologists, family doctors, it is envisaged that the next decade will see dramatic improvements in outcomes, turning the tide for these patients.



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Dr Bonney completed his training in the UK. His 15-year post-graduate experience includes a research degree at Cancer Research UK (MD). After a period as a consultant at the University Hospitals Birmingham, he joined NUH in 2016. He has numerous publications in peer reviewed journals and international presentations; with a recent Presidential Award of the International Hepatobiliary Association.

LOCALIZED AND RESECTABLE	BORDERLINE RESECTABLE	UNRESECTABLE
No distant metastasis	No distant metastasis	Distant metastasis
No radiographic evidence of SMV or PV distortion	Venous involvement of the SMV or PV with distortion or narrowing of the vein or occlusion of the vein with suitable vessel proximal and distal, allowing for safe resection and replacement.	Greater than 180° SMA encasement, any celiac abutment, IVC
Clear fat planes around CA, HA and SMA	GA encasement up to the hepatic artery with either short segment encasement or direct abutment of the HA without extension to the CA.	Unreconstructible SMV/portal occlusion
	Tumor abutment of the SMA not to exceed 180° of the circumference of the vessel wall.	Aortic invasion or encasement

Figure 2: NCCN guidelines reflecting resectability status

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APPROACHING PATIENTS WITH PRIMARY HYPERPARATHYROIDISM IN THE COMMUNITY



the patient be referred to the endocrine surgery clinic for further investigations and treatment.

WHAT ARE THE MISCONCEPTIONS ASSOCIATED WITH THE CONDITION?

It is common to see patients not being referred for further investigations or treatment. This is due to some misconceptions:

- The blood calcium is not high enough to warrant treatment
- The parathyroid hormone level is normal and therefore not diagnosed as parathyroid disease
- In the absence of symptoms, one does not require treatment
- Wait until the results become positive
- One should not treat elderly patients due to the risks of surgery

WHAT PROBLEMS ARE ASSOCIATED WITH DELAY IN TREATMENT?

Patients with hyperparathyroidism have a higher incidence of stroke, heart failure, heart attack, atrial fibrillation, cardiomyopathy, renal failure, serious bone fractures, high blood pressure, memory loss and early death. Therefore, it is best to treat the condition when the diagnosis of hyperparathyroidism is made, rather than wait until one or more of these complications arise.

HOW IS THE CONDITION TREATED?

Surgery is the only way to treat primary hyperparathyroidism, with an extremely low risk of complications, even in very elderly patients. Cure is often associated with a significant improvement in the quality of life.

Diagnosis of primary hyperparathyroidism is frequently delayed due to non-recognition of the condition. Early diagnosis and treatment saves lives, prevents life-threatening complications such as stroke, fractures and poor quality of life.



Assistant Professor Rajeev Parameswaran

Head & Consultant,
Division of General Surgery
(Thyroid & Endocrine Surgery)

Asst Prof Rajeev Parameswaran is actively involved in the basic and clinical research of endocrine cancers and serum based glycan markers in endocrine disease.

He is an advocate for intra-operative neuromonitoring in thyroid and parathyroid surgery, to minimise nerve injuries and improve voice outcomes following surgery. He has extensive experience in day case endocrine surgery and is one of the very few surgeons in the world who has performed parathyroid surgery under local anaesthesia and sedation.

Primary hyperparathyroidism is the third most common endocrine problem affecting about 1% of postmenopausal women over 50 years old. It is the most common cause of hypercalcaemia in the community. Even though diagnosis should be possible to make in about 95% of cases, many doctors fail to recognise the condition. The most important tool to diagnosis is to take a good history, having an index of suspicion and organising relevant blood tests.

WHAT ARE THE SYMPTOMS COMMONLY SEEN IN PATIENTS WITH PARATHYROID DISEASE?

In the past, patients presented with kidney stones, fractures and recurrent abdominal pains. Nowadays, we regularly see patients who present with lethargy, tiredness, aches and pains, headaches and poor memory. All these symptoms could be attributed to old age and post-menopausal state.

Patients may have a family history of parathyroid disease (multiple members in the family with stone disease, pancreatic or pituitary disorders).

Another common way it is discovered is when patients present with raised serum calcium during health screening. It is important to remember that it is never normal to have a high blood calcium level. Once a patient is seen with hypercalcaemia, it is important that



PROSTATE CANCER – “HUNTING TIGERS, NOT PUSSY CATS”

SOPHISTICATED NEW PROSTATE CANCER TESTS ARE EMERGING IN THE MARKET. THESE MIGHT SUPPLEMENT THE UNRELIABLE PSA TEST, POTENTIALLY SAVING TENS OF THOUSANDS OF MEN EACH YEAR FROM UNNECESSARY BIOPSIES, OPERATIONS AND RADIATION TREATMENTS.

Prostate cancer is the third most common cancer of local men and shows the second highest upward increase in incidence of all cancers in Singapore.

Natural history of prostate cancer – Tigers vs Pussy cats

The natural history of prostate cancer varies depending on the risk classification of the disease – based on the stage, grade and PSA level at diagnosis.

The risk of developing metastases and dying of prostate cancer is largely driven by the Gleason scoring of the cancer. Gleason score 6 is low risk, 7 is intermediate risk and 8 - 10 is high risk. There has been a recent change of terminology, where the Gleason scores are reported as Gleason grade groups* found below:

Grade Group 1 corresponds to Gleason score ≤ 6
Grade Group 2 corresponds to Gleason score 3+4
Grade Group 3 corresponds to Gleason score 4+3
Grade Group 4 corresponds to Gleason score 8
Grade Group 5 corresponds to Gleason scores 9-10

*Often when patients learn that they have a Gleason score of 6, they tend to believe their cancer is more aggressive than it is in reality, which leads to pressure to undergo radical treatment that they may not need. Thus, this new nomenclature where the lowest grade is 1 as opposed to current practice of Gleason score 6, may help reduce overtreatment.

Prostate cancer is a complex disease, which can vary from very slow growing cancers (Gleason grade group 1) that, untreated, may never harm a person within his life time – what I call docile pussy cats; to fast growing aggressive cancers (Gleason grade group 4 and 5) that act like roaring tigers – spreading locally and metastasizing – causing symptoms like bony pain, pathological fractures and obstructive uropathy, with a high risk of death from prostate cancer if left untreated.

In an ideal world, we would only hunt and kill the tigers and leave the pussy cats alone. Unfortunately, the current standard diagnostic pathway of prostate specific antigen (PSA) followed by transrectal ultrasound (TRUS) biopsy currently in widespread use is fraught with uncertainty, leading to overdiagnosis and overtreatment of indolent low risk cancers and putting them at risk of complications from potentially unnecessary treatments, yet still often missing potentially fatal high risk cancers.

The prostate specific antigen (PSA) test revolutionise prostate cancer management when it was discovered. It led to a rapid increase in prostate cancer diagnosis and drop in prostate cancer morbidity. However, PSA is prostate specific, rather than prostate cancer specific. It has a poor specificity for detecting prostate cancer of about 25% in the diagnostic grey zone

of 4 - 10ng/ml. This poor specificity may lead to unnecessary biopsies in up to 75% of men with an elevated PSA, resulting in unnecessary cost, as well as potential anxiety and morbidity such as urosepsis.

The problem with standard TRUS biopsy is that we cannot visualise the prostate tumour. Thus, this is essentially a “blind” systematic sampling of the prostate and is not surprising that significant tumours can be missed. On the other hand, even a positive biopsy can be misleading, either undersampling significant high risk disease or misrepresenting small lesions as significant cancers. (Figure 1)

This leads to the problems of overdiagnosis and consequently overtreatment, yet frustratingly, on the other hand, we still run the risk of underdiagnosis and undertreatment of important cancers.

These issues of overdiagnosis and overtreatment have led to the United States Preventive Services Task Force (USPTF) to recommend against PSA screening of prostate cancer. This is despite high level evidence that prostate cancer screening does save lives and reduces the burden of metastatic prostate cancer. Abandoning prostate cancer early detection clearly is not the solution. The answer lies in smarter detection of prostate cancer, minimising overdiagnosis and treatment of incidental cancers.

Advances in prostate cancer diagnostics

Sophisticated new prostate cancer tests are emerging in the market. These might supplement the unreliable PSA test, potentially saving tens of thousands of men each year from unnecessary biopsies, operations and radiation treatments.

While a number of these tests are available in the US, this article will focus on the two that are currently available locally.

P2PSA/PHI TEST

The Prostate Health Index (PHI) is a mathematical formula of three

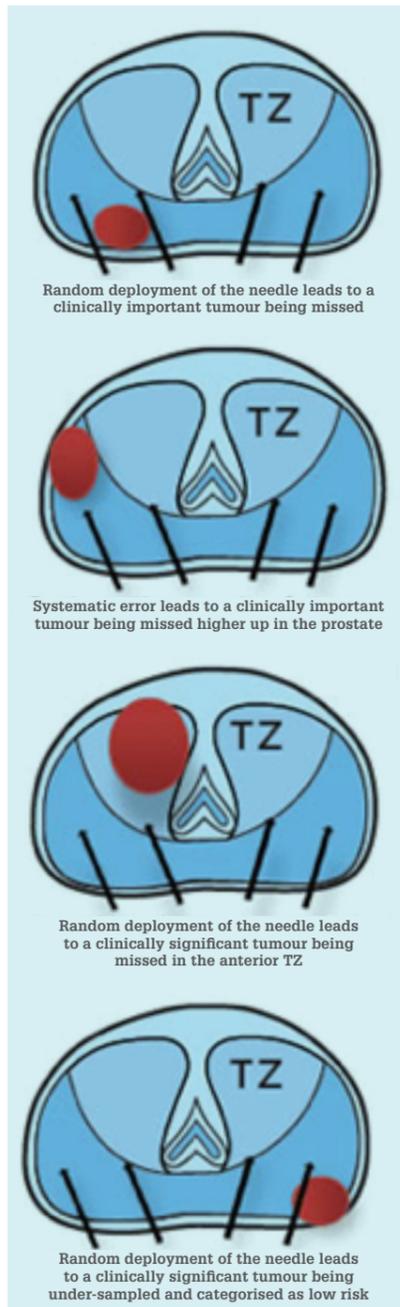


Figure 1 – Sampling errors from standard trans-rectal ultrasound guided prostate biopsies

Reprinted with permission by Nuada Medical Group

biomarkers – PSA, fPSA and p2PSA. The [-2]proPSA (p2PSA) is the most cancer-specific form of all, being preferentially concentrated in cancerous tissue on histochemical staining and significantly increased in serum of men with prostate cancer.

The PHI test was approved by the US Food and Drug Administration (FDA) in 2012. The intended use of PHI is to distinguish PCa from benign prostatic conditions in men aged 50 years and older with a total serum PSA in the diagnostic grey zone of between 2 and 10ng/ml, and in whom the digital rectal examination was not suspicious for cancer.

A systematic review of studies and meta-analysis have shown that %p2PSA and PHI were consistently more accurate than standard reference tests in predicting prostate biopsy outcome and could guide prostate biopsy decision making³.

This test has been validated locally by a multicentre prospective trial from NUH and TTSH studying the use of PHI in men undergoing their first biopsies for PSA between 4 - 10ng/ml⁴.

At a sensitivity of 90%, the specificity of PHI was 58.3%, more than triple the specificity of total PSA at 15.8%, potentially avoiding 78 (49.7%) unnecessary biopsies.

Advances in prostate cancer imaging

Previously with 1.5T MRI and T2 weighted imaging, only extracapsular extension of prostate cancer could be detected. Multiparametric MRI (mpMRI) combines multiple functional MRI parameters to the anatomical T2 weighted sequences. Each individual MRI technique has its own shortcomings, mpMRI combines the benefits of each individual MRI sequence and provides the greatest sensitivity and specificity for cancer foci. Together with increase in MRI field strength (3T), we are increasingly able to detect large anterior and deep central prostate tumours that were previously missed on random TRUS biopsies.

Data is accumulating to show that while the MRI cannot detect all prostate cancers, those that it misses, are the ones that are unlikely to have an impact on a patient’s lifespan. A recent systemic review found that the negative predictive value of mpMRI for exclusion of significant disease

ranged from 63% to 98%.⁶ A high negative predictive value may mean that mpMRI could potentially be used to rule out significant disease. This may result in fewer or no biopsies in patients with PSA suspicious for prostate cancer.

However, this promising data needs to be confirmed with more studies. **It is important to note that these results may not apply to every centre, as the type of MRI protocols and machine, and experience of the radiologists reading the MRI will vary in different institutions. Thus, this emerging data cannot be extrapolated to every institution.**

If a MRI scan detects a tumour in the prostate, a biopsy of this tumour still needs to be done to obtain pathological proof that it is cancerous, before any treatment can be planned.

Thus, at this time, mpMRI cannot replace prostate biopsies as the standard in proving or disproving the presence of clinically significant prostate cancer.

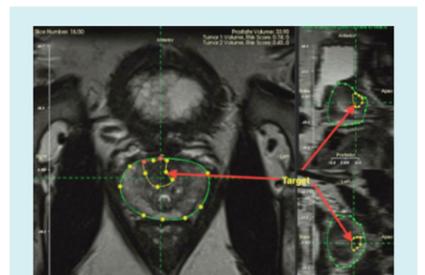
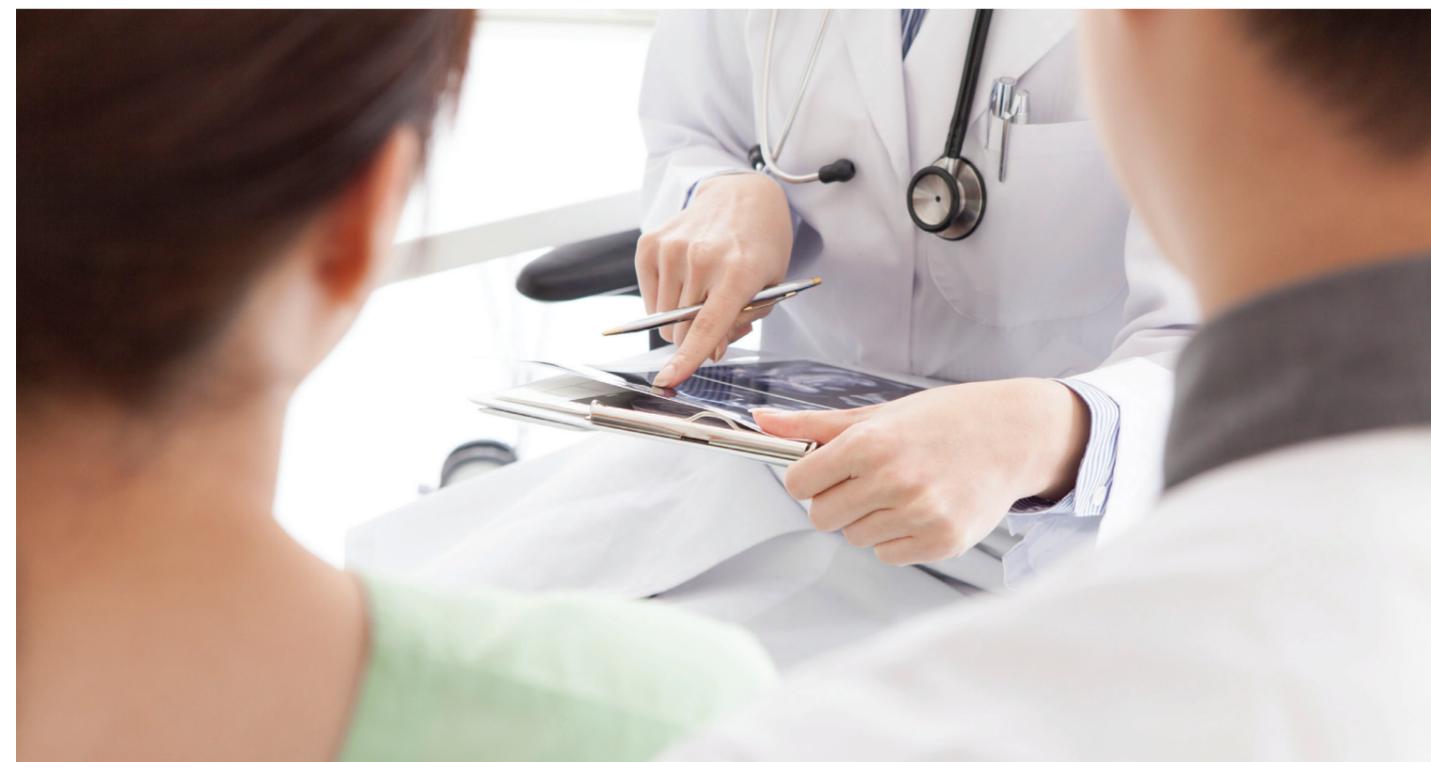
Advances in prostate biopsies

MRI FUSION ULTRASOUND GUIDED BIOPSY

With progress in detecting tumour foci within the prostate, progress has been made to use this information in improving biopsy technique, allowing urologists to progress from blind, systematic biopsies to biopsies, which are mapped, targeted and tracked.

MRI-guided robotic-assisted transperineal prostate biopsies have been available in NUH since September 2015.

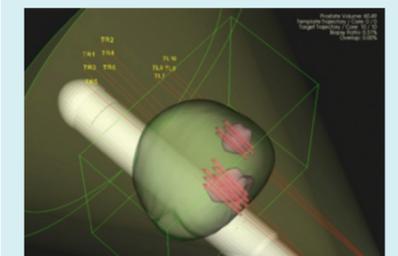
The MRI of the prostate performed beforehand is stored in the device, and fused with real-time ultrasound



MRI Fusion 1: T2 MRI with suspicious lesion marked as target



MRI Fusion 2: MRI and targets for biopsy fused onto real time trans-rectal ultrasound image



MRI Fusion 3: 3D model of MRI-ultrasound fusion, showing targets and biopsy trajectories

(Images courtesy of Biobot Surgical Pte Ltd)

using a digital overlay, allowing the suspicious target lesion(s), previously delineated by a radiologist, to be brought into the aiming mechanism of the ultrasound machine. The fusion results in the creation of a three-dimensional reconstruction of the prostate; and on the reconstructed model, the aiming and tracking of the biopsy sites occurs. This is akin to using a GPS to reach your destination rather than driving without directions. The results using a fusion device have been very promising.

MRI fusion ultrasound guided biopsy allows us to sample only suspicious target lesions seen on MRI, using fewer biopsy cores than current standard biopsy schemes.

In theory, this will reduce overdiagnosis of insignificant lesions which do not need to be treated. For men already diagnosed with low risk prostate cancer and on active surveillance, better sampling with this technology can allow urologists to more confidently risk stratify them into those who can avoid treatment, or those who need immediate treatment.

An additional benefit is that the biopsies are performed via the transperineal route. This avoids going through the rectum, resulting in a near zero rate of infection as opposed to the approximately 3% rate of infection associated with TRUS biopsy⁸. With the increasing prevalence of bacteria that are resistant to multiple antibiotics, these post biopsy infections can sometimes be severe, and rarely, can even be life threatening.

As earlier stated, while this new technology is promising, it is highly dependent on the MRI imaging quality in each institution, and expertise of the radiologist to correctly identify suspicious target lesions.

WHAT DO WE DO WHEN WE FIND LOW RISK PROSTATE CANCER?

Active surveillance is monitoring of low risk localized prostate cancer rather than treating it straight away.

This approach helps men avoid unnecessary treatment for cancers that do not need treating, or delaying treatment until tests show that the cancer has progressed, delaying potential complications from treatment such as urinary incontinence, impotence or radiation induced cystitis/proctitis.

Modern series of men undergoing active surveillance for low risk prostate cancer show 10-year cancer survival rate of 99.7% – highlighting that with proper selection, most men can be watched safely. However, in these series, up to one third of men drop out and request to undergo radical treatment because of anxiety.

The source of this anxiety is that standard biopsies can both underestimate or overestimate the volume and grade of cancer in the prostate as described earlier.

The inclusion of mpMRI MRI-guided biopsies in the surveillance protocols can give us greater confidence in the classification of patients with cancers that are kittens while allowing us to catch the hidden tigers.

CONCLUSION

Advancements in our diagnostic tools help us overcome the deficiencies in the current diagnostic pathway, and with greater confidence in active surveillance, help us become better at avoiding cancers that are kittens and to concentrate on hunting tigers instead.

DATA IS ACCUMULATING TO SHOW THAT WHILE THE MRI CANNOT DETECT ALL PROSTATE CANCERS, THOSE THAT IT MISSES, ARE THE ONES THAT HAVE AN IMPACT ON A PATIENT'S LIFESPAN.



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Dr Lincoln Tan graduated from NUS in 2001. He is a fellow of the Royal College of Physicians and Surgeons of Glasgow and fellow of the Academy of Medicine of Singapore. In 2011, he was awarded the College of Surgeons Gold Medal from the Academy of Medicine Singapore for being the best performing Advanced Surgical Trainee in Urology. Dr Tan's interests lie in prostate cancer, and the minimally invasive treatment of urologic cancers.

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"WITH A FAST PACED LIFESTYLE IN SINGAPORE, MOST OF US PREFER CONVENIENT, RELIABLE AND FUSS-FREE SERVICES. HENCE, WITH THIS IN MIND, THE NUH COLORECTAL CENTRE IS PLANNING TO PROVIDE PATIENT CENTRIC CARE WITH MINIMAL REPEATED HOSPITAL VISITS."

NUH COLORECTAL CENTRE – THE COMPREHENSIVE ONE STOP SERVICE FOR COLORECTAL-RELATED CONDITIONS

In total, the patient may need to visit the hospital up to 6 times before he undergoes the surgery!

At the NUH Colorectal Centre, we aim to cut down these visits and provide an improved quality service and care within a shorter timeframe. This is the *new journey of the same patient as above in NUH Colorectal Centre:

Being diagnosed with a life threatening condition such as colorectal cancer is both mentally and physically draining. However, how many of us have experienced a typical journey of a patient who has just been diagnosed with cancer? Here is an example of a patient's journey.

A hypothetical experience of a rectal cancer patient who will be undergoing the treatment:

1. Seen at external clinic due to a change in bowel habit and referred to a NUH colorectal surgeon for suspicion of rectal cancer (1 - 2 weeks waiting time).
2. Seen by a colorectal surgeon and listed for colonoscopy the following week.
3. Undergoes colonoscopy with biopsy taken and is arranged for staging scans.
4. Undergoes scans i.e. CT scan.
5. Seen back in NUH Colorectal Centre, listed for surgery but need anaesthesia review.
6. Seen an anaesthetist and deemed fit for surgery.
7. Listed for elective surgery.

1. Seen at external clinic due to a change in bowel habit and referred to a NUH colorectal surgeon for suspicion of rectal cancer (1 - 2 weeks waiting time).
2. Seen within the next 1 - 2 working days (slots reserved for urgent cases) and listed for colonoscopy the same day. Endo Rectal Ultra Sound (ERUS) can be done at the same setting too to determine the local disease stage.
3. Undergoes staging scans i.e. CT scan.
4. Seen back in NUH Colorectal Centre and planned for surgery. Referred to anaesthetist the same day (next room). Once deemed fit for surgery, patient will return to Colorectal Centre for peri-operative surgical preparation such as Enhanced Recovery After Surgery (ERAS) counselling and stoma care teaching on the same day.
5. Listed for elective surgery.

* The new journey is not applicable for all cases, only when deemed appropriate by the doctors

In the new journey, the patient only needs to visit the hospital 3 times before he/she undergoes the surgery. Besides the fewer hospital visits, the workup time frame is shorter and better prepared for the surgery.

With a fast paced lifestyle in Singapore, most of us prefer convenient, reliable and fuss-free services. Hence, with this in mind, the NUH Colorectal Centre is planning to provide patient centric care with minimal repeated hospital visits. The Centre's layout is designed specifically to allow colorectal patients to be diagnosed, counselled and treated for common colorectal conditions in the same location within the shortest possible time frame. The Department of Anesthesia is also located on the same floor to aid us in pre-operative assessment in the form of Anesthesia Outpatient Consultation Clinic (AOCC) service.

CONDITIONS DIAGNOSED AT NUH COLORECTAL CENTRE:

1. Cancer and polyps in the colon, rectum and anus
2. Cancer and benign tumours of the appendix
3. Peritoneal cancer (mesothelioma, pseudomyxoma peritonei, primary peritoneal carcinoma, peritoneal metastases from colorectal and ovarian cancer)
4. Benign colorectal conditions (diverticular disease, gastrointestinal bleeding, ischemic colon, infection, volvulus, stricture, radiation-related complications and intestinal fistula)
5. Anorectal conditions (anorectal infection and fistula, piles and anal fissures)
6. Hereditary colorectal cancer (Lynch syndrome/Hereditary non-polyposis colorectal cancer syndrome, familial adenomatous polyposis and family cancer syndrome)
7. Functional pelvic floor dysfunctions (fecal incontinence, constipation, anal pain and rectal prolapse)
8. Stoma and wound-related complications

FACILITIES AVAILABLE AT NUH COLORECTAL CENTRE:

1. **Outpatient Clinic** – The clinic is open five days a week to both new and follow up patients. The clinic also accepts walk-ins and early/urgent referral from the Emergency Department.
2. **Endoscopy service** – There are two dedicated endoscopy suites at the NUH Colorectal Centre to enable the surgeons to perform both emergency and elective gastroscopy and colonoscopy. Urgent cases can be done either on the same day or the day after a clinic consultation.
3. **Pelvic floor lab** – 3D-ultrasound machine is available for surgeons to perform both endoanal ultrasound (EAUS) and endorectal ultrasound (ERUS). This helps to guide surgeons in diagnosis and pre-operative preparation for both benign and malignant anorectal conditions. Anal manometry for functional disorder is available in the lab too.
4. **Treatment room** – Simple procedures such as drainage of perianal abscess or hematoma can be performed in this room under local anaesthesia on the same day as clinic consultation. Nurses also provide wound care service here.
5. **Counselling room** – Pre-operative counselling is essential to get patients prepared for surgery. This room enables counselling to be done in a quiet environment away from the hustle and bustle of the busy clinic. Our dedicated ERAS nurse will also advise patients on surgical preparation.
6. **Stoma care room** – There is a specialised stoma nurse who will educate the patient on stoma care. Pre-operative education and stoma marking is also done here so that patient will understand the need and care of a stoma.

At the NUH Colorectal Centre, our aim is to provide easy and early access to patients, and ensuring quality treatment at a one stop centre. We provide patient centric care with our team of doctors, nurses and clinical staff.



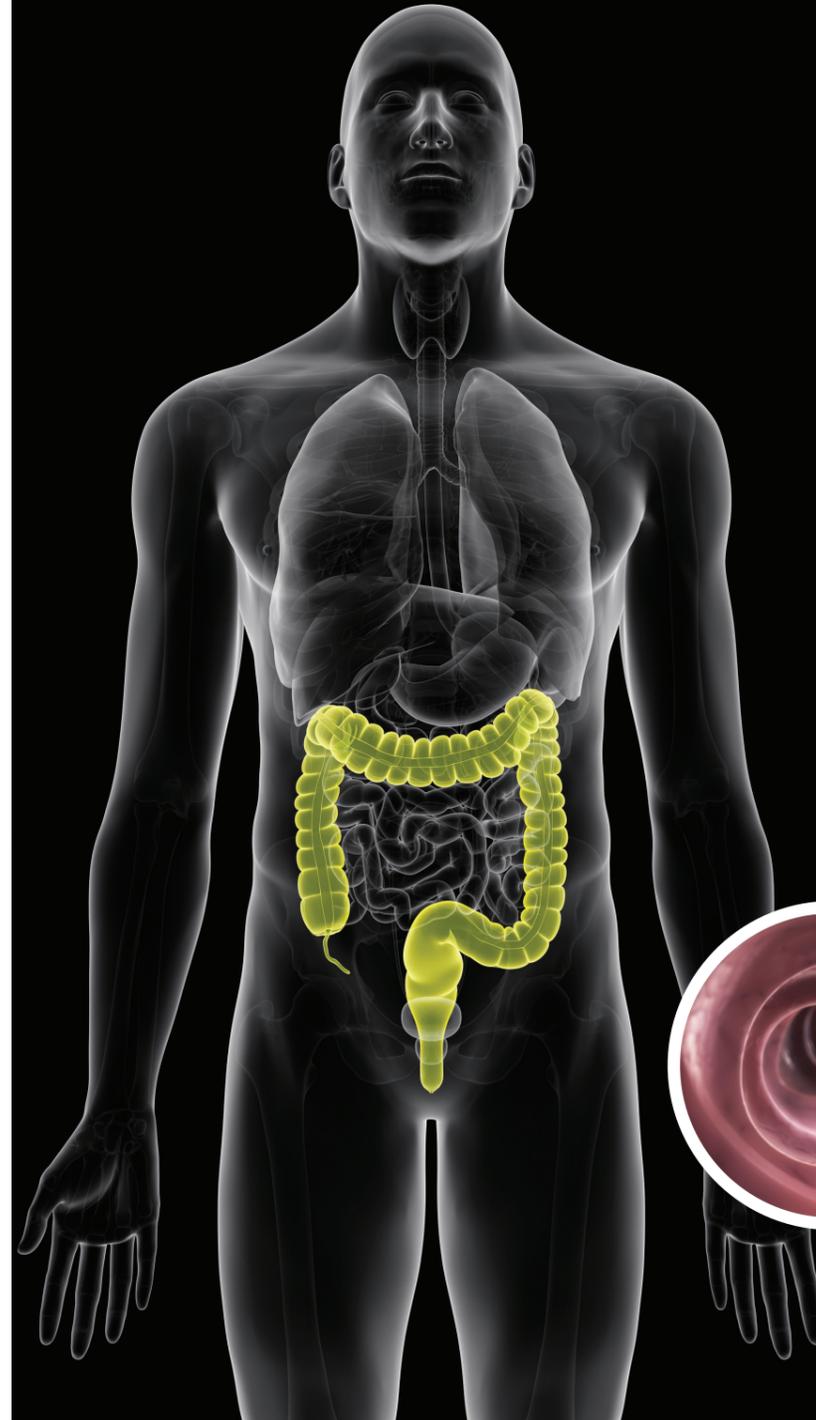
Dr Lee Kuok Chung

Consultant, Division of Colorectal Surgery

Dr Lee Kuok Chung obtained his basic medical degree (MBBS) from the National University of Singapore. He subsequently completed his postgraduate training in surgery and obtained his fellowship of Royal College of Surgeons (FRCS) from Edinburgh.

Dr Lee is currently involved in the management of both malignant and benign colorectal diseases. His main interest is in advanced minimally invasive colorectal surgery such as laparoscopic surgery, single site surgery and robotic-assisted surgery.

“THROUGH THE TUNNEL ... WHAT HAPPENS BEFORE, DURING AND AFTER A COLONOSCOPY AT NUH.”



Colonoscopy can be performed for screening, diagnostic, surveillance and therapeutic purposes. It plays a part in health screening for those more than 50 years of age; diagnostic for those who present with symptoms such as per rectal bleeding, change in bowel habits, positive FIT tests; just to name a few common indicators.

This flexible channel that allows visualisation of the inner lining of the colon can facilitate removal of polyps and even resection of early cancers! Internal haemorrhoids can be rubber banded; surveillance post resection of colorectal polyps and/or cancers or those with inflammatory bowel disease (IBD) are also achieved.

Let us take a walk through this tunnel...

PRE-COLONOSCOPY:

Patients are first reviewed at the NUH Colorectal Centre to ascertain appropriate indications before commencing their journey. Time and adequate counselling is key to ensure a smooth trip ahead!

Before the colonoscopy can be performed, patients require at least **1 to 3 days** for a good bowel preparation. Avoidance of high fibre foods and timely consumption of the medication (variable volumes available) is key. They must be prepared to consume adequate volumes of liquid and are educated on what their stool output will look like prior to the colonoscopy. Those who are on antiplatelets or anticoagulation medications and/or those who have fluid restrictions (ESRF patient) belong to a subset of patients who will require modification of their itinerary.

IN THE ENDOSCOPY ROOM

2 hours prior to commencing their journey, nurses will run through a checklist to ensure that the patient has fulfilled all the necessary tasks. For example, an antiplatelet medication such as aspirin should be stopped 5 days prior to the

procedure; extra fleet enema or PEG may be administered for those with inadequate bowel preparation if bowel preparation was assessed to be inadequate.

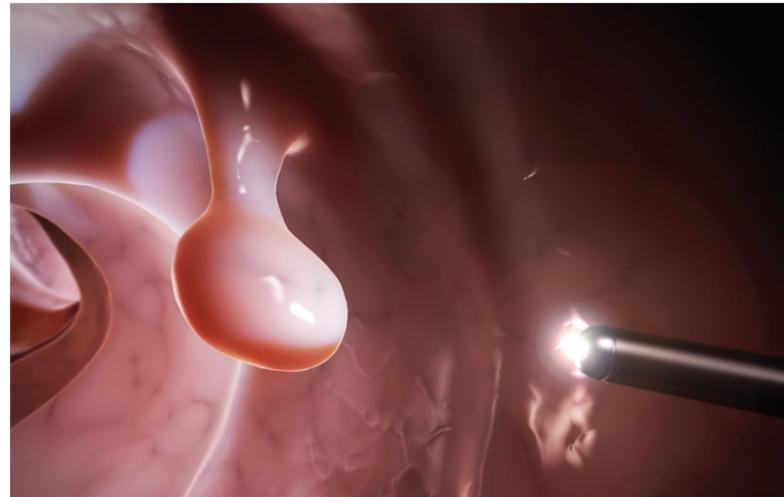
Conscious sedation with intravenous Midazolam and Fentanyl is routinely administered. Occasionally, IV Propofol is used for deeper sedation (with Anesthesia support) in selected cases. These include patients with complex polyps and/or prolonged procedures to ensure optimal patient comfort and safety.

The most common procedure done is screening or diagnostic colonoscopy. Small polyps (<2cm) are removed during the procedure with or without electrocautery. Polyps are characterised with special imaging processors (narrow band imaging NBI) which enable endoscopists to determine the nature of the polyps and subsequent management. Certain type of stains (e.g. Indigocarmine) are used, such as chromoendoscopy. Internal hemorrhoids are rubber banded at the end of the procedure if deemed appropriate.

Complex procedures are also performed for larger polyps (>2cm) – EMR (endoscopic mucosal resection) /ESD (endoscopic submucosal dissection) are the newer techniques which require greater expertise, special equipment and longer procedure time. These are performed for resection of complex polyps (e.g. lateral spreading tumour LST; or those which require “en bloc” histologic assessment). Double balloon endoscopy (DBE) enables endoscopist to maneuver past colons which have “tight kinks” or “excessive looping” and/or those who were not able to have their colonoscopy completed due to the above reasons.

Other special techniques such as argon plasma coagulation (APC) is performed for hemostasis from radiation proctitis; endoclip application to close large mucosal defects post polypectomy; endoscopic balloon dilatation for benign stricture; and/or stenting for malignant obstructive colonic strictures as a bridge to elective surgical resection.

Hence, this journey on average takes 15 minutes but may take up to 2 hours. At the end, patients are provided with their report and photographs



of their journey. A coloured copy is provided to the patients; additional images are stored in our database. Withdrawal time of the colonoscope, quality of the bowel preparation and polyp detection rate are all audited.

POST-COLONOSCOPY

After the journey, patients are given time to wake up from sedation in the post procedure recovery room. Findings are explained by the nurses and in special circumstances, the endoscopist will examine and advise the patients accordingly. They are given hot drinks and biscuits to relieve them from the prior 6 hours of fasting. Appointments for return visits are arranged to review any histology of biopsies that were taken during the colonoscopy. Also, in certain cases – other imaging appointments may be arranged to facilitate further management. If the colonoscopy is normal – certain patients may be given discharge advice and to continue with follow up at their GP clinic.

Sometimes, there may be an extension of the patient’s journey – admission may be required to monitor for any adverse events. This is especially so if patients had several polyps removed, complex procedures such EMR or ESD performed. Post polypectomy syndromes occur as early as 12 hours after the procedure; post polypectomy bleeding is also monitored in these circumstances.

This journey, as you can see, may be very straightforward or unexpectedly convoluted – like the colon which is difficult to predict. Our intent is to make the journey as predictable as possible and to achieve the highest quality in patient’s outcome and satisfaction.



Dr Sharon Koh Zhiling

Consultant,
Division of Colorectal
Surgery

Dr Sharon Koh graduated from the Yong Loo Lin School of Medicine at the National University of Singapore (MBBS) where she also obtained her Masters of Medicine (Surgery).

She obtained her fellowship diploma from the Royal College of Surgeons of Edinburgh and had completed her fellowship training programme in Colorectal Surgery at the Cedars-Sinai Medical Center in Los Angeles, USA. Dr Koh’s other interests include advanced endoscopic management of both benign and malignant lesions in the gastrointestinal tract for which she has published papers and a book chapter on.

SPECIALIST IN FOCUS

ASSOCIATE PROFESSOR TIONG HO YEE
Senior Consultant, Department of Urology



YOUR CLINICAL SPECIALTY INTERESTS ARE IN KIDNEY CANCER SURGERY AND KIDNEY AND PANCREAS TRANSPLANTATION. HOW DID YOU GET STARTED IN THEM OR WHAT INSPIRED YOU TO SPECIALISE IN THESE AREA?

It has been a dream come true for me to be able to commit to a lifelong cause of optimising surgical management of kidney cancers and kidney failure. Being the surgical director of Kidney Surgery and Transplantation for the Department of Urology and National University Center for Organ Transplantation at National University Hospital (NUH), it has enabled me to achieve it in the most dynamic manner. My subspecialty interests in these areas did not occur by chance, they were developed as I was training in Urology. I felt challenged by both of these difficult conditions and was excited by the prospects of being able to understand and treat them effectively. Kidney cancer is one of the deadliest cancer of the urinary system and kidney failure is a rising epidemic that dramatically shortens patients’ lifespan despite the availability of dialysis. With advances in minimally invasive surgery and transplantation techniques, I realised I am able to make a difference to my patients’ lives as a surgeon. My fellowship in these subspecialty areas at the Cleveland Clinic for 2 years were seemingly endless hard work but the fruit of the labour has been great since I started as a consultant at NUH post fellowship in 2009. To have successfully treated kidney cancers from patients with a robotic or laparoscopic technique and ensuring minimal morbidity made me feel like I have helped someone escape from a dreaded end. When I see our patients who previously relied on dialysis machines, return to their working lives and loved ones I thank God for this gift every day!



A/Prof Tiong coaching with training models on transurethral surgery.

KIDNEY AND PANCREAS TRANSPLANTATION IS A COMPLEX SURGERY, WHAT ARE SOME CHALLENGES THAT YOU FACE BEFORE/DURING THE SURGERY?

Kidney and pancreas transplantation is indeed a complex surgery with tremendous benefits to patients with renal failure as a result of Type 1 diabetes mellitus. Not all patients with diabetes are suitable but for those who are, a single surgery can take them off both dialysis and insulin injections with a prevention of the systemic damage to other organs due to poorly controlled diabetes. Such surgery involves transplanting 2 organs with a total of 8 suturing joints and the operation from the procurement to final implant could last 8 to 10 hours. Post-surgical care includes close monitoring for operative complications that may require urgent surgery. The key in doing these and other complex surgery is teamwork and only when team members work to support each other through the surgery, we can achieve good surgical outcomes. At NUH, I have had the privilege of working with other great transplant surgeons and physicians to ensure our complex transplant surgeries are of high



A/Prof Tiong with NUH Operating Theatre nurses.

standards. At an Academic Medical Center such as ours, we work together to push the medical boundaries to achieve more remarkable outcomes such as dual kidney transplantation, minimally invasive donor surgeries and paired kidney exchanges. Hence, I have applied the same approach to my work in kidney cancer treatment – adopting a team approach to optimise the Da Vinci robotic surgical treatment of kidney tumours with a holistic view of rapid patient recovery from surgery, their cancer and kidney function.



A/Prof Tiong lecturing at the Asian Urological Surgery Training Educational Group in Bangkok.

DO YOU THINK THE PRIMARY HEALTHCARE/GENERAL PRACTITIONERS (GPS) CAN PLAY A ROLE IN THE POST KIDNEY & PANCREAS TRANSPLANTATION CARE?

I believe that for tertiary healthcare in Singapore to progress and manage the increasingly challenging conditions against the background of a silver tsunami, a close relationship with our primary healthcare including general practitioners is crucial. As the post-

graduate education director at NUH Urology Department, I have made a conscious effort to integrate family medicine residents and geriatric residents into our team. During their rotations to our specialty, we have engaged them during our daily team rounds to discuss solutions to reduce our specialty's re-admission rate, especially for the post-cancer or transplant surgeries. Hopefully, with better integration and communication between primary and tertiary systems, our patients can recuperate faster from

surgeries in their community and at home. One of the possibilities where this can occur will be in the future community step down care facilities whereby patients who have undergone complex surgery for kidney cancer or post-organ transplant can be co-managed by both tertiary and primary care physicians in an integrated manner. Not only would this be better for patients, it will likely free up the acute beds.

HOW DOES YOUR RESEARCH WORK ENRICHED YOUR LIFE AS A SURGEON? TECHNOLOGY HAS BECOME A MAJOR DRIVER OF THE FUTURE DIRECTION OF HEALTHCARE AND SURGERY. HOW WOULD TECHNOLOGY IMPACT YOU AS A SURGEON IN THE NEXT 10 YEARS?

Research is the main reason I have elected to pursue a career as an academic surgeon at NUH. As an early adopter of medical technology, NUH has given me the platform to evaluate new medical technologies in an objective manner, with the goal of improving surgical outcomes for our patients. These include 3D imaging, robotic surgery on Da Vinci and other platforms like the advanced energy devices and new urinary prosthesis and even the Google Glass. Not all new technologies are useful but with a standardised research process, we are able to evaluate and choose the most relevant ones, optimising their use safely in surgery. Another area where technology will have a major impact is in surgical skills training. I am part of the Asian Urological Surgical Training and Educational Group – a group

of surgeons in Asia which organises workshops advocating local surgeons to train their regional trainees. Increasingly, we will be utilising emerging technologies including web-based learning, virtual reality, 3D - printed silicon organ models, and simulation training models to train our regional surgeons in several aspects of surgery. Through this platform, trainee surgeons including residents in Singapore and the region will be trained before operating on patients therefore risks to patients will be significantly reduced. Research in surgical education is of great interest to me as I believe it has a major impact on patient outcomes beyond the boundaries where I operate. By training the next generation of young surgeons in an academically proven and methodical way, I can be assured of the quality and future of our healthcare system.

WHAT DO YOU ENJOY MOST ABOUT YOUR WORK?

Like all doctors, I derive great satisfaction from my work when patients recover from their illness and the surgery had been curative without any complications. There are ups and downs but through the downs, we are constantly striving for patient satisfaction and better outcomes. This is addictive and I cannot imagine doing anything else. The university environment is the best place to achieve this and I enjoy my day-to-day interactions with other like-minded health professionals, scientists and biomedical engineers to discuss on how to improve patient care in innovative ways. As the residency director, I enjoy developing our residents into thinking surgeons through research, presentations at international meetings and seeing their careers develop into confident surgeons who can network with other regional colleagues and expand their circle of influence. I believe with time, our team at NUH will develop into the institution of choice for our patients in Singapore.



The medical and surgical team together with Mr Seow Hock Lin, who had undergone a rare combined kidney and pancreas transplant.

POST EVENT HIGHLIGHTS

2ND NUH SINGAPORE COLORECTAL CANCER SYMPOSIUM ON MANAGEMENT OF METASTATIC COLORECTAL CANCERS



to simulate the thinking process behind joint decision-making in managing metastatic colorectal cancer patients.

There was a pre-symposium cadaveric workshop on advanced laparoscopic oncological-colorectal surgery held at Advanced Surgery Training Centre on 25th May 2017. The workshop was well attended by regional surgeons from Vietnam, Indonesia, Philippines, Malaysia as well as local surgeons. At the workshop, participants were taught technical know-how skills on complete mesocolic excision for right hemicolectomy, total mesorectal excision for low anterior resection and transanal total mesorectal excision. Both participants and mentors had a tiring but fruitful day at the workshop!

In anticipation of the 3rd NUH Singapore Colorectal Cancer Symposium in 2018, we will be focusing on "Adenoma to Colon Cancer: Current Management Strategies and Innovations". This will be jointly held with our Colorectal Nurses' Symposium on "Adenoma to Colon Cancer: Nurses Leading the Way!" The event will be held in early June 2018.

The NUH Division of Colorectal Surgery in collaboration with National Cancer Institute Singapore (NCIS), organised the 2nd Colorectal Cancer Symposium on 26th - 27th May 2017 focusing on management of metastatic colorectal cancers. The topic was chosen this year in view of increasingly better survival outcome

in stage IV (metastatic) colorectal cancers over the past few years with modern treatment. However, treatment of metastatic colorectal cancers are often complex and involve many different sub-specialties. Thus, it was a timely update of the latest modalities in treatment as a multidisciplinary approach.

The symposium broadly covered main colorectal metastasis such as liver, lungs and peritoneal. There were both eminent foreign and local speakers involved in the symposium. The symposium was lead in a multidisciplinary tumour board discussion-style involving disciplines such as medical oncologist, radiologist, radiation oncologist, pathologist, hepatobiliary surgeons, thoracic surgeons and colorectal surgeons. Complex cases were discussed in lively sessions



UPCOMING EVENTS

6TH WONG HOCK BOON (WHB) PAEDIATRIC MASTERCLASS

DATE: 26TH & 27TH AUGUST 2017

VENUE: NUHS TOWER BLOCK

The Department of Paediatrics, National University Hospital in Singapore, is organising the 6th Wong Hock Boon (WHB) Paediatric Masterclass on 26 & 27 August 2017.

There will be a Pre-Masterclass course – Practical Pulmonology For The Community Practitioner – on 25 August 2017, Friday.

This annual event attracts doctors, private paediatricians, General Practitioners, nursing and allied health professionals from local and regional sector. It is a great educational platform and an opportunity to network and share updates on various areas relating to paediatrics.

This year, our 3 WHB Professors focusing on Haematology, Gastroenterology & Endocrinology respectively are:

- 1) **Prof Mammen Chandy**
Director of Tata Medical Centre
- 2) **Prof Anil Dhawan**
Director of Paediatric Liver GI and Nutrition Center, King's College Hospital
- 3) **Prof Stephen Rosenthal**
Director of Paediatric Endocrinology Clinics & Director of the Child and Adolescent Gender Center, UCSF Benioff's Children's Hospital



OTHER KEY HIGHLIGHTS:

1. Our teachers from the departments of Paediatric Surgery & Neonatology will be sharing key insights.
2. Pre-Masterclass Course – 'Practical Pulmonology For The Community Practitioner'. This is an interactive course that will provide the latest information on relevant topics in Paediatric Pulmonology including Sleep and Obstructive Sleep Apnoea and control of common ailments like Asthma and Allergic Rhinitis.
3. Nursing Symposium - a new platform to discuss the current roles and challenges of Advanced Nursing Practitioner care in the discipline.
4. Debate installation by A/Prof Ong Hian Tat & Dr Jennifer Kiing on "Screen Time Exposure Must Be Reduced At All Cost For The Future Health And Safety Of Our Children"

REGISTRATION:

Visit www.nuhkids.com.sg for detailed programme and registration details. For queries regarding the event, please email to Ms Bernadette Png, email: nuhkids@nuhs.edu.sg

6th Wong Hock Boon PAEDIATRIC MASTERCLASS
Endocrinology | Gastroenterology | Haematology
26 – 27 Aug 2017
NUHS Tower Block, Singapore

PRE-MASTERCLASS COURSE
Practical Pulmonology for the Community Practitioner
25 Aug 2017 (afternoon)

PROGRAMME INFORMATION
• Visit www.nuhkids.com.sg for registration and programme details
• Email nuhkids@nuhs.edu.sg for more information

ORGANISED BY: **NUH kids** | **NUS** | **LEE FOUNDATION**

CELEBRATING EXCELLENCE IN PAEDIATRIC HEALTHCARE

UPCOMING EVENTS

PAEDIATRIC NEUROSURGERY SYMPOSIUM 2017

DATE: 2ND AND 3RD OCTOBER 2017
 VENUE: ADVANCED SURGERY TRAINING CENTRE (ASTC),
 KENT RIDGE WING LEVEL 2, NUH



The Division of Neurosurgery, National University Hospital, Singapore presents a two-day symposium for dedicated updates in the management of paediatric neuro-oncology, hydrocephalus, spinal dysraphism, epilepsy and craniofacial abnormalities. We are proud to present the following visiting experts to discuss the latest developments in the management of various paediatric neurosurgical conditions:

- **Dr. James Drake**
Head of Neurosurgery, SickKids, Toronto, Canada
- **Dr. Eric Bouffet**
Paediatric Neuro-oncologist, SickKids, Toronto, Canada
- **Dr. A. Leland Albright**
Former head of Paediatric Neurosurgery at University of Wisconsin Health Centre

Our own local experts from neurosurgery and paediatrics will also provide their expert opinions and clinical experiences in managing a wide spectrum of paediatric neurological conditions.

For registration or more info, kindly contact hui_ting_yeo@nuhs.edu.sg

UPCOMING EVENTS



GP Symposium
PRACTICAL TIPS IN SPORTS MEDICINE
 8 July 2017
 NUHS Tower Block Auditorium



GP Symposium
NUH ENT GP SYMPOSIUM
 29 July 2017
 NUHS Tower Block Auditorium



GP Symposium
THE ROAD HEAD – UPPER GASTROINTESTINAL
 5 August 2017
 NUHS Tower Block Auditorium



GP Symposium
THYROID & ENDOCRINE SURGERY GP SYMPOSIUM
 9 September 2017
 To be advised



GP Symposium
MINIMALLY INVASIVE SURGERY GP SYMPOSIUM
 16 September 2017
 To be advised



GP Symposium
UROLOGY GP SYMPOSIUM
 23 September 2017
 To be advised

The above events are subjected to further changes, please refer to GPLC website for updates and more information.

GPLC

NUH GP Liaison Centre

At the NUH, we recognise the pivotal role general practitioners (GPs) and family physicians play in providing and ensuring that the general public healthcare is of the highest quality and standard. As such, we believe that through closer partnerships, we can deliver more personalised, comprehensive, and efficient medical care for our mutual patients.

The GPLC aims to build rapport and facilitate collaboration among GPs, family physicians and our specialists. As a central coordinating point, we provide assistance in areas such as patient referrals, continuing medical education (CME) training, and general enquiries about our hospital's services. Through building these important platforms of shared care and communication, we hope that our patients will be the greatest beneficiaries.

If we could be of any assistance to you, please feel free to contact our office from

**Mon - Fri: 0900-1200hrs,
1400-1800hrs**

GP Appointment Hotline

Tel: +65 6772 2000

Fax: +65 6777 8065

GP Liaison Centre

Tel: +65 6772 2535 / 5079

NUH CME EVENTS

At the NUH, we strive to advance health by integrating excellent clinical care, research and education. As part of our mission, we are committed to provide regular CME events for GPs and family physicians. These events aim to provide the latest and relevant clinical updates practical for your patient care.

Organised jointly by the GPLC and the various clinical departments within NUH, our specialists will present different topics in their own areas of specialties in these monthly symposiums.

For more information on our CME events, you can go to www.nuh.com.sg.