Surgery for Obesity: Adding Years to Healthy Life
University Surgical Cluster

Led by Professor Lee Chuen Neng, Chair for the University Surgical Cluster (USC), the cluster is anchored by two main surgical departments - Department of Surgery and Department of Urology. USC provides a one-stop specialised care for a comprehensive range of surgical conditions, through four specialist outpatient clinics.

“We do our best for every patient, in everything we do. If we do that well, with our hearts, everything else will follow.”
– USC’s motto

Aligned with the motto, USC’s surgical specialists are highly trained and strive to provide the best possible care to all our patients. Our clinical services are benchmarked against some of the best international clinical outcomes.

Complementary to their clinical practice, our surgeons are involved in developing the latest therapies, supported by the use of modern technologies and innovations. The Medical Engineering Research and Commercialization Initiative (MERCI) was established within the Department of Surgery to commercialise medical device technological innovations. MERCI’s operating model employs research grants to develop medical devices that address clinical needs that are of importance to the Department of Surgery and Singapore. In addition to engineering work, MERCI emphasises the importance of meeting quality and regulatory requirements to achieve patient safety and value-creation. MERCI’s management of its projects is geared towards progressive de-risking of the product under development, making it attractive to venture capitalists for further financing, or to corporate partners for licensing or purchase. MERCI comprises a team of doctors, engineers, and business professionals with experience in the medical device industry.

Many of our senior surgeons are also part of the National University of Singapore teaching faculty, committed to training the next generation of surgical specialists.

Upper Gastro-intestinal (GI) Surgery
Traditionally, the upper GI team provides clinical management in upper gastro-intestinal conditions, such as cancer of the stomach, oesophageal cancer, and gastro reflux conditions requiring surgery.

The team has also started offering services in weight/obesity management and surgery, through the Centre for Obesity Management and Surgery (COMS). Obesity, a rising problem in Asia, is a chronic disease that increases the risk of medical conditions such as diabetes, high blood pressure and other co-morbidities. At University Surgical Centre, obesity is managed by our multi-disciplinary team including dieticians, surgeons, physiotherapists, upper gastro-intestinal specialty nurse and psychologists. Using a multi-pronged approach of behaviour modification, diet, physical activity and obesity surgery patients, we enhance our patients’ chances of successful and sustainable weight loss.

Thyroid and Endocrine Surgery
Patients are able to consult our specialists and undertake thyroid function blood tests, and other diagnostic tests (e.g. thyroid ultrasound and needle biopsy) at our one-stop centre. Treatment modalities include minimally invasive thyroid surgeries, thoroscopic thyroidectomy for removal of benign thyroid lumps, and laparoscopic adrenalectomy for removal of adrenal glands. Such minimally invasive surgical options allow patients minimal post-operative pain, faster recovery and a cosmetic benefit of leaving no scars on the neck.

Breast Surgery and Reconstruction
At our Centre, patients are able to consult their preferred specialist and complete the required diagnostic investigations, such as mammogram, ultrasound and biopsy, on the same day. Treatment modalities for breast cancer include breast conservation surgery, lumpectomy, and total mastectomy. A multi-disciplinary team, involving breast oncoplastic and plastic and reconstructive surgeons, manages patients that require mastectomy. This is in addition to our dedicated team of medical professionals from medical oncology, radiation oncology and diagnostic imaging departments.

Hepatobiliary and Pancreatic Surgery
Our centre is also an established regional referral centre for diseases of the liver, pancreas and biliary system. Patients are cared for by a multi-disciplinary team, comprising surgeons, gastroenterologists, interventional radiologists and oncologists, using the latest diagnostic tools and advanced surgical technology. We offer liver transplantation service, and are now involved in spearheading pancreas transplantation for patients with renal failure and diabetes.
Neurosurgery
One of the most demanding surgical specialties, our Centre has consistently achieved excellent clinical outcomes that are of international standards, while continuing to participate actively in clinical research and teaching. Leveraging the latest intra-operative computerised neuronavigation guidance systems, advanced 64-slice CT scanners, MRI with functional imaging, interventional suite and virtual reality imaging, our neurosurgeons are able to handle a comprehensive range of complex brain and spine surgeries, including:

- Functional Neurosurgery and Gamma Knife Radiosurgery
- Head and Spine injury / Trauma neurosurgery
- Paediatric Neurosurgery
- Skull base surgery
- Spine surgery
- Stereotactic Surgery / Radiotherapy
- Surgical Neuro-oncology

Colorectal Clinic
The NUH Colorectal Clinic is a one-stop clinic providing comprehensive care for patients suffering from conditions affecting the colon, rectum and anus. Specialist colorectal surgeons are in attendance daily, with direct access to colonoscopy / gastroscopy services. Bowel problems are sensitive topics and many patients are embarrassed by the symptoms. The clinic provides a comfortable and private environment where patients can discuss their symptoms with our specialists and be assessed thoroughly. The clinic also offers a pelvic floor service, and it is equipped with diagnostic equipments to enable assessment and management of disorders of the pelvic floor muscles, including incontinence and constipation.

One of the common cancers in Singapore for both men and women is colorectal cancer. Our surgeons are committed to delivering the best possible care plan for our patients, which includes:

- Comprehensive evaluation of patients suspected to have colorectal cancer (including 3D endorectal ultrasonography for accurate rectal cancer staging);
- Laparoscopic or minimally invasive surgery (MIS) for suitable patients with colorectal cancer;
- Sphincter-preserving radical excision (operations that preserve the anus) for rectal cancer;
- Transanal excision for early-stage rectal cancer.

As part of an academic medical centre, our specialists are involved in training and educating colorectal surgeons locally and from the region. We run a regular fellowship programme, as well as annual hand-assisted laparascopic and endorectal ultrasound courses. Our team has also embarked on a research study to understand the epidemiology of colorectal cancer in our local population.

Aesthetic Plastic Surgery Centre
The Centre provides comprehensive and customised aesthetics and medical treatments for patients suffering from any medical or surgical conditions affecting the face or the body. Our surgeons help patients solve their cosmetic concerns using surgical or non-invasive surgical methods.
Our specialists also offer reconstructive surgery, including the following:

- Breast Reconstruction / Nipple Reconstruction
- Cranio-maxillo-facial Surgery that includes the treatment of congenital malformations, treatment of facial clefts and related abnormalities and treatment of craniofacial and congenital abnormalities.
- Head and Neck Reconstruction
- Reconstruction of Extremities and Trunk
- Supramicrosurgery for lymphoedema of the upper limb
- Vascular Problems of the Lower Limb that includes treatment of varicose veins, treatment of symptomatic congenital vascular malformations (hemangioma) and telangiectasia

The Centre is designed to provide a comfortable waiting area, where our patients receive personalised service in complete privacy. Patients are provided with detailed information in the form of reading materials, audiovisual aids and clinical photographs to help them in their understanding of suggested treatment plans.

**Urology Centre**

The Urology Centre is equipped with a comprehensive range of investigative and therapeutic facilities, enabling urological evaluation and outpatient day procedures to be performed within the centre.

The Urology Centre is equipped with the following facilities:

- Bedside ultrasound machines in consult rooms for quick screening of the kidneys, bladder and prostate (for men) during consultation
- Blue Light Cystoscopy facility to screen for bladder abnormalities such as bladder stone or tumour
- Shockwave Lithotripsy service to treat urinary calculi
- Urodynamics and video-urodynamics services to assess for bladder dysfunction
- Uroflow services to assess voiding pattern

Our key services include:

- Men’s health that covers male aging, male infertility, acupuncture and health screening
- Prostate diseases, especially the two most common being enlarged prostate and inflammation of the prostate or prostatitis
- Removal of Urinary Stone (renal, ureteric, bladder) by a thin telescope (ureteroscope). It is inserted through the urethra and passed through the bladder and up the ureter to the stone. The stone is usually removed by laser once it is located
- Transurethral Needle Ablation (TUNA) that involves bridging the gap between medical and surgical treatment of benign prostate hypertrophy TURP (Transurethral Resection of Prostate). It is a day surgery procedure using gyrus plasma kinetic bipolar
- Uro-oncology involving renal, ureteric, bladder, prostate, testicular and penile cancer

In addition to the above key services, the Urology Centre will also be providing vasectomy and circumcision under local anaesthesia in the near future.

The Urology Centre is also involved in clinical trials. Currently, we have two clinical trials in our centre, including:

- Therapeutic effectiveness of Vardenafil in ED patients with the metabolic syndrome in daily clinical practice (REVITALISE)
- Validating instruments for the assessment of female lower urinary tract symptoms (FLUTS)
# List of Specialists in the University Surgical Cluster

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<tr>
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Medical Spotlight

List of Specialists in the University Surgical Cluster

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Obesity is a disease with excessive accumulation of fats in the body to the extent that it adversely affects a person's health and well being. It is generally measured by calculating body mass index (BMI). The guidelines by the Ministry of Health classify Asian patients with a BMI of 27.5 kg/m² and above as obese. The prevalence of obesity is set to rise steadily worldwide among all socioeconomic groups. The World Health Organisation estimates 300 million people to be obese globally.

In Singapore, the soaring epidemic of obesity parallels the rest of the world with increasing rates of 5.1%, 6.0%, 6.9% and 10.8% through the years of 1992, 1998, 2004 and in 2010 respectively. As a consequence, the prevalence of associated co-morbidities is set to parallel the growth of obesity. Mortality and morbidity rates for obese individuals are higher than those for normal people.

Prevention is more cost effective than treatment for those who fall prey to this disease. The Centre for Obesity Management and Surgery (COMS) strive to provide holistic & long-term care. Through our integrated multi-disciplinary team comprising surgeons, physicians, dieticians, physiotherapists and psychiatrists, we assist patients to achieve and maintain weight loss. This is achieved through health education, lifestyle modification, medical therapy and surgery.

For the entire family on diet, education with continuous motivation and reinforcement, is pivotal to the success of any weight management programme. The use of supervised adjuncts that either suppress appetite or increase weight loss, e.g. drugs and recommended dietary replacements, help improve compliance and confidence in our patients. The presence of motivation is powerful and this depends on the acceptance and recognition of obesity as a medical disease. Exercising is helpful in weight loss and maintenance. It is essential for limiting the progressive decline in lean mass with age, and helps promote psychological well being.

While many patients will lose weight, and partly sustain weight loss, for others, especially the morbidly obese patients, failure rates are higher and a vicious cycle of weight loss, followed by weight regains sets in.

**Bariatric Surgery**

Surgery for obesity and metabolic syndrome is a recommended option for patients with BMI above 37.5 kg/m² and 32.5 kg/m² with co-morbidities, if attempts at multi-disciplinary comprehensive medical management fail.

Surgery for weight loss is termed “bariatric surgery” and it is a behaviour modification surgery. It is performed because of health risk and health problems rather than for vanity. It reduces healthcare cost, associated co-morbidities and time lost at work. Bariatric surgery achieves not only durable weight loss but also long-term improvement and/or remission of diabetes, hypertension, hyperlipidaemia, coronary artery disease, asthma, obstructive sleep apnoea, gastroesophageal reflux disease, steatosis, depression, polycystic ovarian syndrome, stress incontinence and infertility¹.

We are witnessing an increase in weight loss procedures, not only because of rising prevalence of obesity, but also because of increased public awareness from reliable sources. Today, we have highly effective and durable procedures that are less invasive and safer than before. A high percentage of patients who struggled with weight problems over many years have more options to choose from. These procedures will add healthy years to their lives and eliminate years of suffering. A large number of bariatric procedures have been described with slight variation.

Our understanding of the mechanism governing weight loss after surgery has moved on to the importance of factors like induction of satiety, change of taste, diversion of chyme, neural, hormonal mediation and the effects of aversion after bariatric surgery from the traditional concepts of restrictive procedures limiting the quantity of food consumed and the mal-absorptive limiting of the absorption of nutrients².

Many perceive bariatric surgery to be a morbid surgery. Contrary to this belief, bariatric surgery confers low mortality. There has been a steady decline in mortality and morbidity from bariatric surgery over the years³. In a meta-analysis including 85,048 patients, the overall mortality was 0.28% at 30 days after surgery, and 0.35% up to 2 years after surgery⁴. The advent of minimally invasive laparoscopic surgical technique has made complex bariatric procedures do-able within shorter time and with less scarring, minimal risk of incisional hernia, and reduced discomfort that result in a shorter recovery time.
**Laparoscopic Adjustable Gastric Band (LAGB)**

The simplest of the bariatric surgeries is the laparoscopic adjustable gastric band (LAGB), which allows a surgeon to place a flexible silicon band around the upper part of stomach. The LABG is popular as it is relatively easy to perform, safe with no intestinal tissue or organ being removed, stapled or redirected. Moreover, it is adjustable and completely reversible. Weight loss and improvement in co-morbidities are good but they are tagged to a very close and stringent long-term follow up.

Stroh et al. reported their 14-year follow up for LAGB and concluded that the criteria for patient selection should be carefully evaluated as long-term complications and reoperations after LAGB are high. NUH published our results of gastric banding in Singapore and reported a 41.95% excess weight loss at 26 months follow-up and concluded it to be safe. For good long-term results, a partnership between the bariatric surgery team and patient is needed.

**Laparoscopic Sleeve Gastrectomy**

Laparoscopic sleeve gastrectomy was employed as a 1st stage procedure for the obese patients to help them lose some weight. They had a definitive procedure following weight loss from dieting. Since 1999, it has been employed as a primary weight loss procedure following weight loss from dieting and gained popularity around the world and in Singapore as there is no foreign body unlike LAGB, complication rates are low and short term results are promising.

It involves removing approximately 2/3 of the patient's stomach along with the ghrelin hormone producing area in the fundus. It is suitable for patients who eat in bulk to satisfy their appetite. It leads to early weight loss and is increasingly being popularised as a stand-alone bariatric and metabolic procedure. At six years follow up, Himpens J et al reported a 57.3% early weight loss but cautioning a trend towards weight regain over the years. The remission rates of diabetes in the short-term after sleeve gastrectomy are comparable to Laparoscopic Roux-en-Y gastric bypass. However, long-term weight loss and co-morbidity data are awaited prior to any conclusion for sleeve gastrectomy to become a definitive bariatric / metabolic surgical option.

**Laparoscopic Roux-en-Y Gastric Bypass (LRYGB)**

Laparoscopic Roux-en-Y gastric bypass (LRYGB) has been around for decades and many surgeons favour it as the state-of-the-art procedure because it offers good long-term weight loss and co-morbidity improvement, with fewer nutritional consequences in comparison to other bariatric procedures. However, it is technically more challenging to perform.

For morbidly obese patients, the benefits of LRYGB, such as weight loss and remission of co-morbidities, outweigh the risk posed by the procedure. LRYGB involves the creation of a small, 30cc stomach pouch that empties through a small outlet into the jejunum. With majority of the stomach bypassed and a small pouch, the patient experiences early satiety. After LRYGB, digestive juices come in contact with the food, distally shortening the length of bowel available for digestion and absorption.

Patients who undergo LRYGB may experience dumping syndrome when they eat foods rich in carbohydrates. This works as a behavioural conditioning technique with the unpleasant flushing, palpitation and nausea feeling resulting in a negative reinforcement.

The metabolic advantages of bariatric surgery are increasingly being recognised with high remission rates of type 2 diabetes, hyperlipidemia and hypertension. These procedures are being considered to be employed in low BMI patients to treat the metabolic diseases. After the gastric bypass procedure, amelioration of T2DM is seen within days to weeks after surgery.

In a study of 1160 obese patients who underwent the Roux-en-Y gastric bypass, one third of those with T2DM were discharged home after an average inpatient stay of less than three days with biochemical documentation of normoglycemia without diabetes medications. It is postulated that the resolution of diabetes is likely to result from a combination of factors. Briefly, the proposed hypotheses for resolution of T2DM after bariatric surgery include the following:

1. Increased postprandial secretion of GLP-1 from enhanced distal-intestinal nutrient delivery
2. Exclusion of the proximal small intestine from nutrient flow, possibly down regulating unidentified anti-incretin factor(s)
3. Impaired ghrelin secretion
4. Changes in intestinal nutrient-sensing mechanisms regulating insulin sensitivity, resulting in decreased insulin resistance
5. Alterations in undiscovered gut factors, especially in the duodenum
6. Pancreatic beta cell hypertrophy
7. Weight loss resulting in decreased insulin resistance

Buchwald et al studied 135,246 obese surgical patients in a meta-analysis. In this meta-analysis, T2DM resolution was defined as persistent normoglycemia without antidiabetic medications. They reported an overall 78.1% remission of T2DM after bariatric surgery with 98.9% resolution or improvement among the pure diabetic population. The mean procedure-specific resolution of T2DM was reported to be: 56.7% for LAGB and 80.3% for LRYGB.

The more complex and radical procedures yield better long-term outcomes. However, the best procedure has to be individualised to the patient’s needs and health status.

References

Patient Case Study

“My boss spurred me to come for this operation. How long can my parents take care of me? Eventually, I have to take care of myself. So I had to make this move.”

Mr Eric Lee weighed 195 kg and was wheel-chair bound. He had a 65-inch waist and his BMI was double that of an average adult. He came to the Centre for Obesity Management and Surgery (COMS) at NUH and shed more than 20 kg during his 3-week stay at the NUH. He underwent a Laparoscopic Sleeve Gastrectomy, which involved removing a large portion of his stomach. Within a week after surgery, his weight dropped to 169 kg.

Dr Asim Shabbir
Dr Asim Shabbir is a Consultant Surgeon at the National University Hospital, with an interest in upper gastrointestinal surgery. His clinical and research focus on bariatric and metabolic surgery apart from gastric cancer. He is currently the post graduate education director for the Department of Surgery and a clinical tutor with the National University of Singapore.

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Medical Notes

Official Opening of the National University Heart Centre, Singapore (NUHCS)

The National University Heart Centre, Singapore (NUHCS) held the official opening of its new premises located at the National University Hospital (NUH). Ex-Health Minister, Mr. Khaw Boon Wan, who announced the establishment in 2008, graced the occasion.

Located at levels 1 and 3 of the NUH, the NUHCS is strategically positioned near the upcoming Kent Ridge MRT Station, making it accessible for our patients and visitors. At the new home of the NUHCS, there are now two specialist outpatient clinics, 21 consultation rooms, a diagnostic cardiac laboratory, a diagnostic vascular laboratory, a dedicated pharmacy, and a heart rehabilitation centre.

Along with the opening, the NUHCS launched two new clinical programmes in addition to the four that were announced in 2008. Today, NUHCS boasts of six core clinical programmes. These programmes were chosen due to its strategic importance to meet the needs of the Singapore population. These include the:

- **Heart Failure Programme**
  The Heart Failure Programme prides itself to be holistic, multi-disciplinary and patient centric, as patients are cared not just for their medical problems, but also their daily activities.

- **Structural and Congenital Heart Disease Programme**
  Patients in the Structural and Congenital Heart Disease Programme benefit from a continuum of care that spans all ages utilising the latest in clinical care – TAVI (Transcatheter Aortic Valve Implantation) which reduces mortality by 20%.

- **Acute Coronary Syndrome Programme**
  When dealing with acute coronary syndrome, commonly known as heart attack, time is of the essence. At the NUHCS, the time taken for a patient to receive a balloon delivered to open the artery from the Emergency Room is 67 minutes compared to the international standard of 90 minutes.

- **Vascular Medicine and Therapy Programme**
  Vascular disease is a common cause for disability and mortality due to the lack of awareness, often resulting in lower limb amputation. The NUHCS is dedicated to limb preservation and improving the quality of life of our patients.

- **Women’s Heart Health Programme**
  Women’s Heart Health is dedicated to improving the quality of life of women living with or at risk of heart disease. The team consists of a cardiologist, a dietician, a physiotherapist, an occupational therapist and a life coach to provide a multi-disciplinary and seamless care.

- **Heart Rhythm Programme**
  The Heart Rhythm (or arrhythmia) Programme provides a comprehensive service comprising of high-end diagnostic and therapeutic capabilities. NUHCS is also a training centre for regional cardiologists looking to specialise in heart rhythm.

The NUHCS is unique due to its tripartite mission of clinical care, education and research. Research is the foundation upon which clinical care is further advanced. The Cardiovascular Research Institute (CVRI) was formed with the aim of translating the research efforts of the NUHCS. The NUHCS also fulfils its education mission as we train not just undergraduates, but also cardiologists, cardiovascular surgeons and nurses, and also educate the public in cardiovascular awareness.

The NUHCS aims to be a world-class tertiary cardiovascular centre, providing specialised and dedicated health care to patients, and addressing the healthcare needs of Singaporeans and beyond.

**Heart Clinic @ Level 1**
Tel: 6772 5278 / 9723 6347
Fax: 6772 5279
Email Address: cardiac_clinic@nuhs.edu.sg
The Hand & Reconstructive Microsurgery (HRM) Centre was officially opened on 5 April 2011. With a fast ageing population and more people being active in sports, we expect to see more than 2,000 additional patients a year as an increasing number of elderly end up with hand conditions and enthusiasts sustained injuries from extreme sports activities.

Staffed by 10 hand specialists, the HRM Centre consolidates all hand-related services under one roof to provide treatment for patients with various hand conditions.

Patients can now consult their doctors, go through minor surgical procedures, hand therapy sessions and fluoroscopic assessment of the bones and joints of their hands. These can be done at the Centre and minimal movement is needed for patients as the care team moves from room to room. With this Centre, we will be able to provide more consultation sessions and offer them treatment within a shorter period of time.

For more information and enquiries, please contact:

**HRM Centre**
**Tel:** 6772 5599  
**Fax:** 6779 5190

**Email Address:** hand_enquiries@nuhs.edu.sg
Bladder cancer is the 5th most common cancer in men worldwide. Fortunately, it usually presents at an early stage, formerly called "superficial transitional cell carcinoma" (now re-termed "non-muscle-invasive papillary urothelial neoplasia") and carcinoma-in-situ (CIS). CIS is particularly problematic as it is an aggressive disease, often recurring after initial therapy and having a high likelihood of progressing to life-threatening muscle-invasive bladder cancer. CIS appears as reddish patches, often described as velvety or mossy. Unfortunately, CIS may also be invisible when viewed on standard white light cystoscopy and may co-exist with papillary tumours, significantly worsening the prognosis for the patient.

CIS selectively absorbs hexaminolevulinate (Hexvix), which appears as a bright pink fluorescence when viewed with filtered blue light. Fluorescence cystoscopy allows CIS to be more readily identified, thus improving the accuracy of staging of the cancer and may also improve outcomes of transurethral surgery by allowing the surgeon to ablate otherwise invisible patches of CIS. The guidelines of the European Association of Urology recommend the use of fluorescence cystoscopy.

We introduced Hexvix-blue light cystoscopy in 2010. Our preliminary findings are that fluorescence cystoscopy is helpful in selected cases such as patients with positive urine cytology and negative cystoscopy, early recurrence of high grade papillary tumours or non-response of CIS to intravesical immunotherapy. We also intend to use this technique to confirm the completeness of resection of tumours as it is being pioneered in some European centres.

This procedure, however, is quite costly. A newer technology, "narrow-band imaging" does not require the use of Hexvix and could possibly also be useful in identifying CIS. We intend to compare this new technology to fluorescence cystoscopy in the second half of 2011.

Men's Health Clinic is a new service that will be offered at the Urology Centre in NUH. Men's health refers to health issues specific to the human male anatomy. These often relate to structures such as male genitalia or to conditions caused by hormones specific to, or most notable in, males.

Men are more likely to be diagnosed in a later stage of a serious illness because of their reluctance to go to the doctor. This may also be due to a tendency of men not noticing symptoms as quickly as women do. Some reasons men give for not having annual physical checks and not visiting their physician include fear, denial, embarrassment, and avoidance of an experience in which they are not in control.

The focus of this new service will be exclusively on health screenings for men of different ages, who have various concerns at different stages of their lives. Younger men are concerned about pre-marital issues while those above 50 years old are at higher risk for cancers and other men's health issues such as late onset hypogonadism, prostate health and erectile dysfunction.

Upon review, cases that require more specialised treatments will be referred to and managed by specialists in the Urology Centre in NUH.

Besides Men's health screening, acupuncture will also be offered as an alternative or complementary therapy wherever indicated. The World Health Organisation (WHO) has listed a variety of conditions that may benefit from the use of acupuncture, including various urological disorders.

These new services are expected to begin in the second half of 2011.
NUH Pain Management Clinic

Dr James Tan, Consultant, Department of Anaesthesia

The Pain Management Clinic (PMC) is part of the Pain Management Unit under the care of the Department of Anaesthesia, NUH. The PMC provides care to patients with acute, chronic and cancer pain using a holistic multi-disciplinary multimodal management approach based on the biopsychosocial model of pain.

The biopsychosocial model of pain recognises the multi-dimensional factors involved in the development and perpetuation of the experience of pain. Besides trying to address the pathological/biological causes of pain, it is important to evaluate and manage the psychological and social factors that can precipitate and/or worsen the ongoing suffering of a patient with chronic pain.

To provide holistic care to the patient, the PMC is staffed by a team comprising physicians trained in pain medicine who work closely with dedicated nurses, psychiatrists, psychologists, physiotherapists, occupational therapists, and acupuncturists. In addition, there is a close working relationship with other medical and surgical subspecialties in NUH.

The types of treatments provided include:

1) Pharmacotherapy directed at the underlying type of pain (nociceptive, neuropathic, or mixed) utilising an evidence-based multimodal approach using a range of analgesic and adjuvant drugs,
2) Physical therapy including acupuncture, physiotherapy, occupational therapy, and transcutaneous electrical nerve simulation (TENS),
3) Psychological therapy including distraction, relaxation and cognitive-behavioural therapy,
4) Interventional procedures including trigger/tender point injections, joint injections, facet joint/sacroiliac joint injections, epidural steroids (caudal, interlaminar, transforaminal), nerve root blocks, sympathetic blocks, neurolytic blocks, radiofrequency neurotomiess, intrathecal drug therapies, and peripheral nerve and spinal cord stimulation.

A comprehensive assessment of new patients is performed during the initial visit, lasting 30 to 45 minutes to allow the formulation of a holistic multi-modal management plan individualised to each patient, with the aim of optimising analgesia while minimising adverse effects from therapy. The other goals of management include optimising social and physical functioning to achieve a better quality of life for the patient.

EMMa Care - A New Maternity Care Service For Mothers

At NUH Women’s Centre, we share our patients’ joy of their pregnancies and the arrival of their little ones. We understand that each pregnancy is unique and every mother deserves the best in their journey to motherhood.

As part of our holistic care approach, the Enhanced Midwifery Maternity Care programme, also known as EMMa Care, is our latest maternity care offering to meet the needs of today’s mothers.

The EMMa Care programme is suitable for all mothers who will be given personalised one-to-one care and advice by one of our specialised midwives throughout their pregnancy, right up to their delivery and two months after the arrival of their baby, in collaboration with their obstetrician. Our services also include providing breastfeeding support, early parenting and education support to our patients.

We have three EMMa Care packages to suit all needs:

• Complete Package - all mothers will attend one-to-one antenatal and postnatal consultations with our midwives. During their labour and delivery, they will be accompanied by their chosen midwife who will provide clinical care, emotional and physical support to the mother and her baby.
• Clinic Package – all mothers will attend four sessions of one-to-one antenatal and postnatal consultations with our midwives.
• Single Clinic Visit – all mothers will attend any of our one-to-one antenatal and postnatal consultations with our midwives.

For more information or to request EMMa Care brochures for replacement in your clinic, please contact:

NUH Women’s Clinic
Kent Ridge Wing 2, Level 3
Appointment Line: 6772 2255 / 2277
Fax: 6872 0103 / 6778 8683
Email: Womens_Clinic@nuhs.edu.sg
**Introduction**

Colorectal cancer is the most common cancer in Singapore, accounting for 1,500 new cases per year. In fact, the average population risk for developing colorectal cancer in Singapore is among the highest in the world. The lifetime probability of a person getting colorectal cancer is about 5%. This risk increases with age, rising sharply after 50 years. Most colorectal cancers arise from adenomatous polyps and with early detection and removal of polyps by colonoscopy, the risk of colorectal cancer can be reduced. As the early stages of colorectal cancer are usually asymptomatic, we advocate screening for early detection of cancer, which would result in better survival rates as well as being more amenable to minimally invasive techniques. A Cochrane review showed that a screening programme with repeated annual or biennial FOBT and endoscopic follow-up of positive test results reduces colorectal mortality by 16% after 12 to 18 years.

**Multiple Modalities, Which One to Choose?**

MOH has recently published a set of guidelines for cancer screening in February 2010. Table 1 shows the recommendations for colorectal cancer but with multiple screening tests available, how does one advise a patient on choosing which modality?

The ability of a screening programme to decrease the risk of colorectal cancer is based on screening at regular intervals. The recommended interval period is different for each modality of screening, and different for cancers. Anticoagulants, such as warfarin, aspirin or Plavix, are stopped prior to colonoscopy if adenomas or colon cancer is indicated. Most patients find the process of bowel preparation unpleasant. In fact surveys have shown that it is the single largest deterrent to adherence to colorectal screening. Unfortunately, bowel preparation is still essential for a good colonoscopic examination. If the colon is not clean, small lesions may be missed.

### Table 1. Good Clinical Practice Guidelines for Cancer Screening (Source: MOH)

<table>
<thead>
<tr>
<th>RISK GROUP</th>
<th>SCREENING TOOL</th>
<th>ONSET (AGE)</th>
<th>FREQUENCY</th>
<th>GRADE OF RECOMMENDATION</th>
<th>LEVEL OF EVIDENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Average Risk</td>
<td>Faecal occult blood testing</td>
<td>50 years</td>
<td>Annually</td>
<td>A</td>
<td>1++</td>
</tr>
<tr>
<td></td>
<td>Colonoscopy</td>
<td>50 years</td>
<td>Every 10 years</td>
<td>B</td>
<td>1+</td>
</tr>
<tr>
<td></td>
<td>CT Colonography</td>
<td>50 years</td>
<td>Every 5 years</td>
<td>C</td>
<td>2+</td>
</tr>
<tr>
<td>B. Increased Risk</td>
<td>Colonoscopy</td>
<td>10 years prior to youngest case in the family or age 40 years, whichever is earlier</td>
<td>Every 5 years</td>
<td>B</td>
<td>2++</td>
</tr>
<tr>
<td>1. Colorectal cancer in first degree relative age 60 years or younger or two or more first degree relatives</td>
<td>Colonoscopy</td>
<td>10 years prior to youngest case in the family or age 40 years, whichever is earlier</td>
<td>Every 10 years</td>
<td>B</td>
<td>2+</td>
</tr>
<tr>
<td>2. Colorectal cancer in first degree relative over the age of 60 years</td>
<td>Colonoscopy</td>
<td>3 years after polypectomy in the presence of high-risk features (&gt;1cm, multiple, villous architecture); otherwise, 5 years after polypectomy for low risk people</td>
<td>B</td>
<td>2++</td>
<td></td>
</tr>
<tr>
<td>3. Personal history of colorectal polyps</td>
<td>Colonoscopy</td>
<td>One year after resection</td>
<td>Every 3 years</td>
<td>B</td>
<td>2++</td>
</tr>
<tr>
<td>4. Personal history of colorectal malignancy</td>
<td>Colonoscopy</td>
<td>One year after resection</td>
<td>Every 3 years</td>
<td>B</td>
<td>2++</td>
</tr>
<tr>
<td>5. Personal history of ovarian for endometrial cancer</td>
<td>Colonoscopy</td>
<td>One year after resection</td>
<td>Every 3 years</td>
<td>B</td>
<td>2++</td>
</tr>
<tr>
<td>B. High Risk</td>
<td>Colonoscopy</td>
<td>One year after resection</td>
<td>Every 3 years</td>
<td>B</td>
<td>2++</td>
</tr>
<tr>
<td>1. Family history of familial adenomatous polyposis</td>
<td>Flexible sigmoidoscopy (switch to colonoscopy if adenomas identified); consider genetic counselling and testing</td>
<td>10 to 12 years (from puberty)</td>
<td>Annually</td>
<td>B</td>
<td>2+</td>
</tr>
<tr>
<td>2. Family history of hereditary non-polyposis colorectal cancer</td>
<td>Colonoscopy, consider genetic counselling and testing</td>
<td>20-25 years</td>
<td>Every 1-2 years</td>
<td>B</td>
<td>2+</td>
</tr>
</tbody>
</table>
| 3. Inflammatory bowel disease  
a. left-sided colitis 
b. pan-colitis | Colonoscopy | From 15th year of diagnosis onwards | Every 1-2 years | B | 2+ |
|                                | Colonoscopy | From 8th year of diagnosis onwards | Every 1-2 years | B | 2+ |

Most patients find the process of bowel preparation unpleasant. In fact surveys have shown that it is the single largest deterrent to adherence to colorectal screening. Unfortunately, bowel preparation is still essential for a good colonoscopic examination. If the colon is not clean, small lesions may be missed.
Computed Tomographic Colonography (Virtual Colonoscopy)
This is one of the newest modalities of screening that was introduced in early 2000s. It involves two consecutive runs through the CT scanner, one in supine position and the other in prone. Multiple images of the colon are taken and reconstructed to give a 3D image of the colon. The radiologist will then read the images, look for polyps and masses in the colon, and evaluate the abdominal solid organs as well.

CT colonography is 90% sensitive for the detection of polyps 1 cm or larger in size. It is the best available imaging test if optical colonoscopy is contraindicated or incomplete, and hence in this regard, it is superior to barium enema. For polyps less than 1 cm in size, the sensitivity of CT colonography falls off rapidly. And for polyps 5mm and smaller, CT colonography becomes unreliable.

Bowel preparation is also needed for the CT colonography examination. The risk of perforation is 0.04 - 0.08%.

Many patients, when discussing the pros and cons about a CT colonography examinations, often ask about the effects of radiation. The effective dose for the various examinations are:
- Chest x-ray: 0.1 mSv
- CT abdomen: 5.3 mSv
- CT colonography: 3.8 to 8.8 mSv

Essentially, having a CT colonography is equivalent to several hundred chest x-rays but so far, no study has demonstrated any cancer risk from CT colonography. By calculating the estimated radiation dose and extrapolating to data obtained on cancer incidence in Japanese A-bomb survivors, the researchers from the Center for Radiological Research at Columbia University Medical Center generated risk estimates for CT colonography. They found the estimated lifetime risk of cancer as a result of radiation from CT colonography in a 50-year-old person is about 0.14% and 0.022% for a 70-year-old patient.

Double Contrast Barium Enema
This is a radiological examination where barium and air are instilled into the colon via the anus. The patient is then tilted so as to allow the barium to coat the entire colon. Air is introduced to provide contrast so that the mucosa and lesions may be visualised on fluoroscopy. The advent of CT colonography has seen CT colonography superseding barium enema in its role as an alternative to optical colonoscopy.

Faecal Occult Blood Test (FOBT)
This is a test designed to detect small amounts of blood in the stool. It is a simple test which involves sticking the sampling stick into stool and inserting that into the reagent bottle. This can then be mailed to the laboratory for testing. The UK has adopted this for their NHS Bowel Cancer Screening Programme. Positive FOBTs are referred for colonoscopies. A Cochrane review showed that a screening programme with repeated annual or biennial FOBT and endoscopic follow-up of positive test results reduces colorectal mortality by 16% after 12 to 18 years 1.

There are 2 types of faecal occult blood testing – the guaiac-based faecal occult blood testing (gFOBT) has now been mainly replaced by immunochemical faecal occult blood testing (iFOBT). iFOBT detects human globin and is more specific for human blood, whereas gFOBT detects peroxidase in human blood but can react to peroxidase seen in some vegetables, fruits and meat. Several studies have shown that iFOBT has increased sensitivity for advanced colorectal neoplasia compared to gFOBT, with similar specificity. Positive FOBTs should be followed up with a colonoscopy to examine the entire colon for lesions.

Free FOBT kits from the Singapore Cancer Society are available to patients (Singaporean/PR) aged 50 and above and to anyone with a family history of colorectal cancer. In fact, GPs can also link up with the Singapore Cancer Society to provide free FOBT kits to their patients who fit the criteria.

Carcinoembryonic Antigen (CEA)
Carcinoembryonic Antigen (CEA) is a blood test used to monitor the tumour load in patients being treated for colorectal cancer. Although this test is commonly seen in health screening packages, it is not ideal as a screening tool for colorectal cancer. It has low sensitivity and specificity, i.e. not all colorectal cancers produce CEA and a positive CEA test is not always due to cancer.

Stool DNA test
Cancer cells are abnormal cells which demonstrate genetic mutation. The stool DNA test is targeted at the cells shed by the colon cancer which is found in the stool. It tests for commonly-associated mutations such as those in APC, K-ras, p53, BAT-26 and long DNA. At present, these tests are expensive, and there is no standardisation of laboratory protocols, and hence, are not recommended for population screening.

Conclusion
Colorectal cancer is a common problem in Singapore. We can decrease incidence and mortality from colorectal cancer in Singapore by advocating early screening for colorectal cancer; discussing and advising our patients on suitable screening tests and timing intervals so that they will be compliant to the screening schedule. Hopefully with these, we will be able to mimic the positive effects of colorectal screening on incidence of colorectal cancer as seen in the US and North European countries.

GP have direct access to our endoscopic services at NUH by calling us at:
Tel: 6772 2230/1 or 8181 2311

Dr Aileen Seah
Dr Aileen Seah graduated from the National University of Singapore, obtained her postgraduate qualification from the Royal College of Surgeons of Edinburgh in 2000 and completed her advanced surgical training in 2005.

Dr Seah currently practises as a Consultant in the Division of Colorectal Surgery, National University Hospital, and at the National University Cancer Institute, Singapore. Dr Seah is also the Clinical Teacher at the Yong Loo Lin School of Medicine, National University of Singapore. She did one year of Colorectal Surgical Fellowship in the University of Minnesota, USA under the HMDP program.

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Introduction
Men with mild to moderate prostate enlargement or Benign Prostate Hypertrophy (BPH) can now be treated using a new minimally invasive procedure called the Transurethral Needle Ablation of Prostate Gland (TUNA). This procedure offers faster recovery, enabling patients to return to their normal day-to-day activities within a week.

What is BPH?
Benign Prostate Hypertrophy (BPH), or more commonly known as prostate enlargement, is a non-cancerous enlargement of the prostate gland. This enlargement is due to exposure to male hormones and is one of the most common urological problems affecting men over fifty years old. Globally, it is estimated that BPH affects 40 per cent of men aged 60 and above.

This condition can affect the quality of life of both men and their spouses, with interrupted sleep at night and disruptions to daily routines due to the frequent need to visit the washroom.

What and Where is the Prostate Gland?
The prostate is a walnut size gland presents only in males. It is situated at the outlet of the bladder, encircling the lower urinary outlet like a doughnut. It produces secretion, which nourishes the sperms in the semen.

Problems with urinating and discomfort occur when the enlarged prostate squeezes the bladder outlet and the lower urinary passage like a clamp around a garden hose. In severe cases, this blockage may damage the bladder and kidneys.

How Prostate Problems are Diagnosed
Patients with BPH often present with the following urinary symptoms:

1. A weak urinary stream
2. Difficulty in starting urination (hesitancy)
3. Frequent urination
4. Interruption of the stream (‘stopping’ and ‘starting’ effect)
5. Sensation of incomplete bladder emptying
6. Urgency, in which the person has difficulty in holding the bladder
7. Waking up frequently at night to urinate (Nocturia)

Prolonged blockage of the urine tract over time can cause serious problems. These include:

1. Bladder stone formation
2. Presence of blood in the urine
3. Recurring urinary infections
4. Sudden inability to urinate (acute retention of urine)
5. Urinary leakage/ incontinence (chronic urinary retention)

Some of the tests that may be helpful to pinpoint the cause of the symptoms include a digital rectal examination, ultrasound scan, and/or uroflow test. Specialised tests like cystoscopy and urodynamics study may be needed in selected cases.

Treatment of BPH
The treatment would depend on the severity of the BPH.

In mild BPH, there is no significant blockage of the bladder and the symptoms are not bothersome. Most of these patients can be managed with an adjustment in their fluid intake, regular exercise, and a proper diet.

In moderate BPH, the blockage of the bladder is not severe but the symptoms are bothersome. Medication can be used to treat these cases to either relax the bladder outlet or help shrink the prostate to improve the flow of urine.

In severe BPH, the blockage is severe and patient is unable to empty the bladder completely. Surgery will be considered. The gold standard for surgical treatment for BPH is TURP (Transurethral Resection of the Prostate).
Dr Chua Wei Jin

Dr Chua Wei Jin graduated from University of Bristol, UK in 1997 and obtained his specialist degrees in surgery from the Royal College of Surgeons of Edinburgh and Master of Medicine, Surgery (Singapore) in 2001 and 2003 respectively. He has completed his advanced specialist training in Urology in 2006, and is currently a Consultant with the Department of Urology at the National University Hospital. He is also a clinical lecturer with the National University of Singapore.

Dr Chua was awarded the Ministry of Health Human Manpower Development Plan (HMDP) scholarship in 2008 and spent a year in the United Kingdom for his subspecialty training in Laparoscopy and Endourology. He worked as a fellow at the Bristol Urology Institute. His current practice at the NUH includes all areas of general urology with special interest in Minimally Invasive surgeries, Endo-urology, Laparoscopic and Uro-oncology surgeries.

He started the Day Surgery Transurethral Resection of Prostate (TURP) programme in NUH and is currently the Co-director of the programme. In 2010, he introduced a minimally invasive therapy known as Transurethral Needle Ablation of Prostate (TUNA) for benign enlargement of prostate, which he has been doing in the outpatient clinic under local anaesthesia.

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Treatment Room

In TURP, the obstructing part of the prostate gland is removed using a special instrument called the resectoscope that is inserted via the urinary passage. This procedure is done under General Anaesthesia or Regional Anaesthesia. The amount of prostate tissue removed will depend on the size of the prostate gland. This is an inpatient procedure with an average length of stay of three days.

The latest procedure that is available now is the transurethral needle ablation of prostate or TUNA in short. It is a minimally invasive procedure and can be done under Local Anaesthesia in the outpatient clinic. The prostate gland is ablated using radiofrequency waves. The heat generated causes the prostate gland to shrink. As the prostate is not resected or cut, this procedure is less invasive and has a lower risk of complications like bleeding, retrograde ejaculation and urinary incontinence.

How does TUNA work?

Using radiofrequency waves, two needles are inserted into the prostate. The heat generated causes the prostate gland to shrink. The procedure takes about 30 minutes. Patients will be discharged a few hours later with a urinary catheter (e.g. having a tube inserted into the urinary bladder to drain the urine).

So far in NUH, all of our patients have been discharged on the same day and their urinary catheter were removed within two to five days after the procedure.

Advantages for TUNA as compared to TURP:

1. Can be done under local anaesthetics
2. Less invasive with minimal blood loss
3. Lower risk of complications (e.g. incontinence, retrograde ejaculation)
4. Shorter procedure time

Who can be considered for TUNA?

Patients with mild or moderate bladder obstructive symptoms who:

1. Are not able to tolerate the side effects of medication (which can include giddiness, lethargy and drop in blood pressure)
2. Do not wish to continue with long term medication because of cost considerations

Our Experience with TUNA

TUNA has increasingly been used in the United States and it has shown to be safe and effective in relieving the symptoms of BPH. In NUH, 40 patients have thus far been successfully treated since the procedure became available early last year.

Our initial experience with TUNA has shown it to be a safe clinic-based procedure. Patients treated with TUNA have shown statistically significant symptomatic relief from bothersome symptoms. We know from experience that not all patients on medication experience significant voiding improvements. Some men face undesirable side effects and prefer a different management rather than remaining on long-term medication. TUNA fills a void between medical therapy and TURP by being a compromise between the limited efficacy of drug treatment and the invasiveness of surgery.

While TUNA may not necessarily reach the same efficacy as TURP, it has the advantages of low treatment-related morbidity. It is not for TUNA to compete with medical treatment or TURP, but rather to include it as one of the treatment options for suitable patients with enlarged prostate.

We would propose TUNA as a second line treatment when medical therapy fails to improve a patient’s obstructive and irritative symptoms. In addition, TUNA can also be considered for patients who wish to avoid surgical treatment or who are not fit for surgery. It may also be suitable for patients who wish for a rapid treatment in an outpatient setting, or wish for preserved sexual function.
Breast Reconstruction

Dr Jane Lim, Senior Consultant, Dr Ong Wei Chen, Consultant, Dr Yap Yan Lin, Registrar, Division of Plastic, Reconstructive & Aesthetic Surgery, University Surgical Cluster (USC)

Introduction
Breast reconstruction techniques have evolved and improved tremendously since it was first described in 1895 by Vincent Czerny, when he transplanted a fist-sized lipoma from the patient’s thigh to reconstruct her mastectomy defect. The paradigm shift in the management of breast cancer is an emotional journey for every woman to witness. Choices then were between the harrowing disfiguring disease and its even more harrowing treatment. It was not surprising that many women in those days chose to neglect their breast lump till they succumbed to the disease. Even when the treatment became less radical, the effects of living without a breast filled women with much dread. In the last 20 years, breast cancer management has become much more accepted, and it is partly due to the options available. Now, women may choose between preserving part of their breast or, total mastectomy, and there are currently many options of reconstruction to restore their breast mound.

Breast reconstruction in Singapore
The first TRAM (transverse rectus abdominis myocutaneous) flap performed and described by Hartrampf in 1982 revolutionised the concept of breast reconstruction and remains the standard of care all around the world. It involves transferring a woman’s lower abdominal skin and fat through a subcutaneous tunnel to the breast defect to make the breast mound. Its advantages include ample skin and fat tissues for the creation of natural looking breasts and the resultant rejuvenated abdomen.

The first TRAM flap for breast reconstruction in Singapore was done by Prof Walter Tan in 1984. The result was excellent and long lasting. It is possible to employ microsurgical techniques to transfer free TRAM flaps to the mastectomy defect. In such instances, only a small portion of the rectus muscle is removed with the fat. With improvement in skills and techniques, variations of this flap such as the deep inferior epigastric perforator (DIEP), or, the superficial inferior epigastric artery (SIEA) flaps are gaining popularity.

At NUH, we have been doing DIEP flaps for breast reconstruction since 1999. In cases where the superficial inferior epigastric vessels are of good calibre we would do the SIEA flap, which is even better for preservation of abdominal wall integrity.

Other techniques done at NUH for breast reconstruction include the use of the latissimus dorsi flap. It was very popular in the 1970s, but in many patients, this does not have adequate volume to create a natural looking breast mound. It is mainly used for chest wall reconstruction after surgery for locally advanced breast cancer, reconstruction of small breasts, or used together with an implant to augment the volume.

Partial breast reconstruction usually involve implants or small flaps such as the latissimus dorsi flap and its perforator version, the thoracodorsal artery perforator (TAP) flaps, the intercostal artery perforator flaps, and fat injection. Devices like AlloDerm® have been used in on-going studies to fill the space resulting from partial mastectomy. Long-term results and benefits remain to be determined.

Implants are better accepted now after a long history of controversy, especially after November 2006, when the Food and Drug Administration reversed its ban on silicone-filled breast implants. They are suitable for reconstruction of small breasts with minimal ptosis, partial breast reconstruction or augmentation of the contralateral breast to achieve better symmetry. Silicone implants have a superior feel and appearance and are usually preferred over saline implants in breast reconstruction. Tissue expanders and expandable breast implants are used in cases where the tissues and skin need to be expanded or, in cases where post-operative irradiation is imminent in a patient who desires an implant-based reconstruction.

Nipple-areolar reconstruction can usually be considered three months of the creation of the breast mound. If adjuvant therapy is required, nipple reconstruction is delayed till three months after chemotherapy or one year after irradiation therapy.

Restoration of symmetry of the breasts and improvement of appearance of the contra-lateral breast usually follows after that, or, it can be done concurrently with the main reconstruction procedure. These include insertion of implant to the contralateral breast, reduction or mastopexy of contralateral breast and serial fat injection.

Autologous reconstruction usually results in an insensate flap. TRAM flaps may start to have sensation after eight years. At NUH, we have started to perform neurotised TRAM or DIEP flap in the last one year. During the TRAM/DIEP flap reconstruction, intercostal nerves from the chest wall are coated with the sensory nerves to the skin paddle of the flap. Initial results have been encouraging with improvement in sensation noted after a few months. We are in the process of collecting data from this study.
Breast cancer treatment occasionally results in upper limb lymphedema or breast cancer related lymphedema (BCRL). It can be very inconvenient to the patient and may result in life-threatening infection. Besides conservative measures like compression and lymphatic massage, we now offer shunting procedures such as lymphaticovenous anastomoses (LVA)\(^2\). Our three year results have been encouraging with complete resolution of swelling in a number of cases. For long standing BRCL where fat accumulation result in persistent increased girth, we do liposuction-assisted resection\(^3,4\) in addition to LVA. Again the long term results have been encouraging.

Vascularized lymph node transfer (VLNT) is relatively new in the treatment of lymphedema\(^5\). Lymph nodes with its blood supply can be transferred using microsurgical techniques, as a unit from other unaffected area such as the groin or the neck to the affected site. LVA can be done at the same time in the same area as well. Early results in our first 3 lymph node flaps in Singapore have shown improvement clinically and in post-operative lymphoscintigraphy.

**Conclusion**

It is a long journey for breast cancer patients during their treatment and the restoration of form and self thereafter. Nonetheless, the future is bright for survivors. Many options are available now from the most sophisticated form of reconstruction to the delicate LVA and lymph node transfer for the treatment of the unfortunate few who develop BCRL.

**References**

National University Centre for Organ Transplant (NUCOT): Our Vision for Transplantation

Dr Victor Lee, Consultant, Division of Hepatobiliary & Pancreatic Surgery, University Surgical Cluster (USC)

The National University Hospital (NUH) has been performing living and deceased donor transplantations for both the kidney and liver since 1987 and 1990 respectively. To-date, NUH has performed more than 310 kidney transplants (180 deceased donor and 130 living donor kidney transplants) and 182 liver transplants (113 deceased donor and 69 living donor liver transplants).

In 2008, the National University Centre for Organ Transplant (NUCOT) was formed to respond to an urgent national need for organ transplantation medical expertise. NUCOT was planned to become a single centre under the National University Hospital (NUH), for the provision of clinical services for organ transplantation, and to consolidate and focus on research, training and education efforts in organ transplantation.

Our overall patient survival for liver transplant (both deceased donor and living donor) used to be 76% at 1-year and 68% at 3-years. This has improved to 84% at 1-year and 3-years since 2007 with the new team of liver transplant surgeons.

Overall patient survival for deceased donor and living donor kidney transplant at 1-year, 5-year and 10-year is 97%, 94% and 83%, and, 100%, 99% and 96%, respectively. Graft survival for deceased donor and living donor kidney transplant at 1 year, 5-year and 10-year is 89%, 80%, and 58%, and, 98%, 90% and 72%, respectively. These results compare favourably with major transplant units worldwide.

A significant gap exists between the demand and supply for organs in Singapore and worldwide. The current waiting time for a deceased donor kidney transplant is 9.4 years, and about 10% of patients on the wait list pass away while waiting or, becomes medically unfit for transplant. The current wait list mortality for liver transplant is higher at 25% with a median wait time of fewer than three months, as they do not have an option of dialysis like renal patients.

The annual deceased donor actualised per year in Singapore hovers between 30 to 40 donors for the last five years. This is insufficient to meet our wait list demands, and living donors (usually family members of recipients) have been recruited to meet the urgent needs. The current kidney and liver transplant rate in Singapore is about 20 per million population (pmp) and 5 pmp respectively, although the anticipated need for kidney transplant is 9.4 years, and about 10% of patients on the wait list pass away while waiting or, becomes medically unfit for transplant. The current wait list mortality for liver transplant is higher at 25% with a median wait time of fewer than three months, as they do not have an option of dialysis like renal patients.

The common causes of renal failure are chronic glomerulonephritis, hypertension and diabetic nephropathy. The common indications for liver transplant are hepatocellular carcinoma and chronic liver failure. Interestingly, liver cancer is the only solid organ cancer solved by an organ transplant with good long-term survival data if transplanted within strict tumour criteria. We have been utilising the criteria of single lesion < 6.5 cm, or, 3 lesions not more than 8 cm in total, and no major vascular invasion as our inclusion criteria for liver transplant for hepatocellular carcinoma.

We will be launching a new national pancreas transplant programme soon for insulin-dependent diabetic patients in Singapore. This is usually performed as a simultaneous pancreas kidney (SPK) transplant for Type 1 diabetic patients with end-stage renal failure. We anticipate that the annual demand is about 2 per million population. It can also be performed as a pancreas after kidney (PAK) transplant for patients who have previously received a kidney, or, as a pancreas transplant alone (PTA) for patients with hypoglycemic unawareness or severe hypoglycemic attacks.

The rationale for a simultaneous pancreas kidney transplant (SPK) is that such patients are committed to long-term immuno-suppression for the renal transplant due to their end-stage renal failure and the surgical risk for pancreas transplant allows them to be “cured” of their diabetes. With the same donor source for the pancreas and kidney, the immunosuppressive risk is also minimised.

Recently, NUH performed the first combined liver-kidney transplant in Singapore for a paediatric recipient who has primary hyperoxaluria. A combined liver-kidney transplant and simultaneous pancreas-kidney transplant are the two most common dual organ transplants performed worldwide, and often require a multi-disciplinary team approach for management. The formation of NUCOT, with the close engagement of transplant surgeons and physicians, will enable us to further contribute to the development of transplantation in Singapore.

The Singapore Transplant Games are held bi-annually, by the Society of Transplantation (Singapore), to foster the spirit of sportsmanship and healthy lifestyle among transplanted patients. Those who do well in the Singapore Games go on to represent Singapore in the World Transplant Games.

The 2.4km event in April was won by Mr. Peh Chan Guan, who had a new lease of life in 2004 when he received a liver on New Year’s Eve in NUH. Mr. Peh was suffering from end-stage liver cirrhosis prior to the transplant and used to be easily tired. Six years after the transplant, Mr. Peh, 54, could run a half-marathon (21 km) with an impressive time of 2 hours and 23 minutes. Indeed, Mr. Peh has proven that transplant patients can achieve anything if they put their mind to it.

Dr Victor Lee
Dr Victor Lee is a Consultant with the Division of Hepatobiliary & Pancreatic Surgery, Department of Surgery, National University Hospital, and an Assistant Professor of Surgery at the Yong Loo Lin School of Medicine, National University of Singapore. He was a Clinical Fellow in Transplantation Surgery at the Royal Infirmary of Edinburgh, United Kingdom from 2008 to 2009. Dr Lee’s sub-specialty interests are in liver transplant, simultaneous pancreas and kidney transplants, hepatobiliary surgery and laparoscopic surgery. He is also a gazetted liver and kidney transplant surgeon in Singapore. He has been instrumental in the set up of the Singapore National Pancreas Transplant Programme.

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Pelvic Organ Prolapse (POP)

Dr Roy Ng Kwok Weng, Head & Senior Consultant, Division of Urogynaecology and Pelvic Reconstructive Surgery, Department of Obstetrics & Gynaecology

Definition

Pelvic Organ Prolapse, commonly known as POP, is the medical term used to describe the coming down or sagging of the uterus and vagina. The anterior or posterior vaginal wall may prolapse on its own or in combination with or without uterine prolapse.

Hence, different terminologies are used to describe these prolapses: Urethrocoele (urethra), cystocele (bladder) [anterior vaginal wall compartment prolapse]; rectocele (rectum), enterocele (pouch of Douglas with/without omentum or small intestine) [posterior vaginal wall/compartment prolapse]; cervical (cervix), hysterocoele (uterus), procidentia (complete uterovaginal prolapse); vaginal vault (after previous hysterectomy) [apical prolapse].

Incidence

The incidence of POP in Singapore has not been studied. International prevalence studies of POP are relatively low when compared to female urinary incontinence. This is because such studies were not conducted in the community but on women attending outpatient clinics or admissions for gynaecological surgery. However, surgical management of POP accounts for approximately 15%-18% of hysterectomies in the United States in 2000-2004.

Symptoms of POP

- Something coming down or presence of a lump below
- Vaginal pain, pressure, discomfort or backache
- Difficulty in walking, sitting, having sex or inability to have sexual intercourse
- Vaginal laxity
- Overactive bladder (OAB), urinary and/or faecal incontinence
- Voiding difficulty of urine and/or faeces
- Vaginal discharge, bleeding
- Fear of growth or cancer
- Anxiety, shame, depression

Signs of POP

- Uterine prolapse of varying degrees, from elongated cervix with minimal or no uterine prolapse to complete uterine prolapse (procidentia) with or without cystocele, rectocele/enterocele
- Vaginal vault prolapse
  - Abrasion, ulceration, cervical ectropion, oedema
- Vaginal discharge, bleeding
- Atrophic genitalia
  - Stress urinary incontinence
  - Urinary retention
  - Faecal impaction
  - Vaginal laxity
- Deficient perineum
  - Poor or absent pelvic floor tone
  - Scarred vagina, drain-pipe urethra

Examination

Examination for POP is performed in the supine dorsal position with the knees flexed, hips flexed, abducted and externally rotated, the labia and vagina are parted and the above external signs of POP are looked for. The patient is then asked to strain (Valsalva and/or cough) to inspect for any stress urinary incontinence and POP. A Cusco speculum is then used to visualise the cervix or vaginal vault at rest and straining. As the Cusco speculum is withdrawn...
slowly the patient is again asked to strain, to assess for any uterine/vaginal vault, anterior, posterior vaginal wall prolapse. If the cervix or anterior or posterior vaginal wall is/are not well visualised with the Cusco speculum the patient is re-examined in the left lateral position using a single-bladed Sim speculum to assess for POP more accurately, at rest and straining. Sometimes the degree of POP does not correspond with the patient’s symptoms on conventional supine dorsal or left lateral positions. Examining such a patient in the erect posture with her legs apart and straining usually reproduces the signs of her complaint of POP.

Investigations

- Urine FEME, C&S
- Ultrasound kidneys & ureters to detect hydroureters & hydronephroses
- Ultrasound pelvis to detect uterine and/or ovarian pathology
- Urodynamics to diagnose detrusor overactivity (instability), urodynamics stress incontinence (genuine stress incontinence) – revealed or concealed/occult, especially in the presence of a significant cystocele and/or uterine prolapse kinking the urethra; mixed incontinence, voiding difficulty secondary to urethral kinking
- Routine pre-operative investigations

Management

- Conservative, or Surgical

Conservative Management

Conservative management is indicated in women who do not wish to have an operation, who are either too old or frail or unfit to undergo anaesthesia or surgery.

If vaginal or cervical ulceration is detected on speculum examination, especially in the presence of bleeding and/or infection, the pessary should not be re-inserted and the latter treated with a course of vaginal Flagystatin pessary eon, alternating with Vagifem tablet eon for two weeks. The pessary can be re-inserted after two weeks if the vagina and cervix have healed.

Conservative management also includes the use of vaginal Oestradiol tablets, 0.25 mg (Vagifem) twice per week as well as pelvic floor exercises and the avoidance of heavy lifting and appropriate treatment of constipation.

The mainstay of conservative management consists of the use of latex or silicone vaginal pessaries inserted into the vagina to support POP. Pessaries need to be fitted according to the severity of the prolapse. If it is too small it will fall out and if it is too big, it will cause pain and discomfort, ulceration, infection and bleeding. Ring pessaries are ideal for moderate POP and Gelhorn pessaries (see diagram on right, courtesy of Milex, USA) for severe prolapse that cannot be supported by Ring pessaries. Pessaries need to be changed every 3–4 months: removed, washed and re-inserted after a Cusco and/or Sim speculum examination.
Surgical Management
Surgical treatment for POP consists mainly of Vaginal hysterectomy with routine McCall culdoplasty to prevent vaginal vault prolapse. McCall culdoplasty is a procedure in which the Uterosacral ligament pedicles are used to support the vaginal vault after a vaginal hysterectomy [see diagram (e) below]. If a patient has a significant uterine prolapse or procidentia [see photos. (e) on Page 21 and (a) & (b) on the right], a concomitant Sacrospinous ligament fixation to the vaginal vault is also performed after a McCall culdoplasty to prevent vaginal vault prolapse. Otherwise, the risk of post-operative vaginal vault prolapse can be as high as 25%-50%. Similarly in a patient with vaginal vault prolapse [see photo. (f) on Page 21], after a previous hysterectomy, a therapeutic Sacrospinous ligament fixation to the vaginal vault can also be performed. We usually perform a bilateral salpingo-oophorectomy during the Vaginal hysterectomy [see photo.(c) on the right] if the patient is post-menopausal, as during an abdominal or laparoscopic hysterectomy.

Advantages of vaginal hysterectomy over abdominal and laparoscopic hysterectomy
- Shorter operative time
- Shorter duration of hospital stay
- Faster return to normal activity
  - Decreased postoperative febrile morbidity
- Lower urinary tract (bladder and ureteric) injuries

Complications of vaginal hysterectomy are relatively low as shown in the table below:

<table>
<thead>
<tr>
<th>Complication</th>
<th>Occurrence* (%)</th>
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<tbody>
<tr>
<td>Bladder laceration</td>
<td>0.35</td>
</tr>
<tr>
<td>Rectal laceration</td>
<td>0.07</td>
</tr>
<tr>
<td>Bleeding requiring laparotomy</td>
<td>0.05</td>
</tr>
<tr>
<td>Ureteral injury</td>
<td>0.005</td>
</tr>
<tr>
<td>Other intestinal injury</td>
<td>0.005</td>
</tr>
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*Based on 15 combined series totaling 24,921 patients.
Accompanying cystocele, rectocele or enterocele should be repaired after a vaginal hysterectomy: anterior colporrhaphy/repair, posterior colporo-enteroceleorrhaphy/repair or ligation of enterocele sac respectively. In a patient with significant cystocele, rectocele or recurrent POP after previous failed POP repair, it is prudent to use a Type I (monofilament, macroporous) synthetic polypropylene (Prolene) mesh, usually pre-cut, to improve the success rate, especially of the anterior compartment. The recurrence or failure rate for anterior vaginal wall/compartment prolapse (cystocele) has been reported as 20% - 40%.

For moderate POP (Stage II) a pre-cut mesh kit, e.g., Prosima [(a) below] may be used. Whereas for significant POP, (Stage III or IV) a larger pre-cut mesh like Prolift [(b) below] can be used. The drawback of prolene meshes include mesh extrusion or erosion of 5-10%, which may require outpatient or Day Surgery excision of the mesh extrusion or erosion, if application of topical oestrogen cream (Premarin) or tablets (Vagifem) fails.

Stress urinary incontinence, especially if confirmed by urodynamic investigations, should also be treated surgically when POP surgery is contemplated. We usually perform a mid-urethral tape procedure, either by the retropubic or Obturator approach, e.g., a tension-free vaginal tape (TVT) [(a) below] or TVT-Obturator (TVT-O) [(b) below] respectively.

**Conclusion**

POP affects mainly peri-menopausal and post-menopausal women and as Singapore’s population is ageing rapidly, this condition’s prevalence will increase. It is also more common in women who have had vaginal deliveries. Mild asymptomatic POP should be managed conservatively. Surgical treatment is reserved for more severe symptomatic POP. The mainstay of surgical treatment is through the vaginal route, which has a lower morbidity with good to excellent outcome.

For more information, please contact:

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Email: Womens_Clinic@nuhs.edu.sg

Urogynaecology and Pelvic Reconstructive Surgery is a specialised division of the Department of Obstetrics and Gynaecology that is dedicated to improving the quality of life for women with urinary and faecal, incontinence, bladder and bowel dysfunction, voiding difficulty, pelvic pain, pelvic organ prolapse and pelvic floor disorder; and women who require vaginal, pelvic organ and pelvic floor surgery.

**Dr Roy Ng Kwok Weng**

Dr Roy Ng Kwok Weng obtained his basic medical degree (MBBS) from the University of Mysore, India. He is fully registered with the General Medical Council, United Kingdom, after passing the Scottish Triple Qualification examinations (LRCP Edin, LRCS Edin, LRCPS Glasg.) He did his postgraduate training in Obstetrics and Gynaecology and Urogynaecology in the UK (MRCPG Lond, M Obstet & Gynaec L’pool). He is also fully registered with the Singapore Medical Council and is a Fellow of the College of Obstetricians and Gynaecologists, Academy of Medicine Singapore (FAMS) and is on the MOH Singapore Specialist Register in Obstetrics and Gynaecology. He started and was in charge of the Urogynaecology Clinic at KK Hospital from 1993-98, after which he has been in private practice.

Dr Roy Ng currently heads the Division of Urogynaecology and Pelvic Reconstruction Surgery, and sees patients with urinary incontinence (stress, urge, overflow and true), urinary frequency, nocturia and urgency, difficulty with passing urine, urinary tract infection, bladder pain, painful sex, faecal incontinence and prolapse of the bladder, rectum and uterus.

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Doctor’s Heartbeat

Specialist in Focus:
Clinical Associate Professor Philip Iau

Breast cancer has grown to be the most common cancer among women in Singapore, with 1 in 17 women developing breast cancer in her lifetime. The risk of developing breast cancer increases with age. Breast cancer affects all women; it is the most prevalent in women age 50 years to 59 years in Singapore.

With such alarming incidence, a national preventive medicine initiative, the BreastScreen Singapore, initiated by the Health Promotion Board, was developed. Though its work, and that of other institutions, such as the Breast Cancer Foundation, public education and awareness of this cancer disease has increased tremendously in recent years. And with improvements in both treatment and early detection, many women are surviving breast cancer today.

In this issue, we have a chat with Clinical Associate Professor Philip Iau, a surgeon who specialises in Breast Cancer Surgery.

Could you share with us why you chose to be a surgeon?
I knew I had to do something fairly intensive and challenging, or I would soon lose interest. Much as I like working in a team, my job also had to be something where my contribution had a large part to play in the final outcome. I also had to have something with fairly quick results, not waiting for ages and ages, wondering if I had done the right thing. Surgery provides all this, plus it is a fairly punishing task master, it does not suffer fools kindly, which appears to suit my personality very well. Surgeons are made by their mentors and, in Prof Abu Rauff and Prof Steven Chan, I had two excellent teachers who believed that I had some talent for this profession.

What are your achievements in Breast Cancer Surgery and how did you become interested in it?
I think my main contribution will be in identifying genetic determinants of risk. In other words, what inherent inborn risks we have for developing cancer. My interest came about during my time at the Family History Clinic in the Nottingham Breast Unit. So many families were being closely monitored because of a family history of breast cancer, but in the absence of a genetic marker of risk, we could not tell who was at risk and who wasn’t. To many of them, cancer was not a matter of if but when, and not knowing was as much a burden as the fear of disease itself. Then there was the added issue of wondering if the risk had been passed to their children. Identifying the role of cancer predisposition genes changed all that. It was fascinating how the effect had on these people, and it was extremely satisfying to me.

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2 BreastScreen Singapore is the national breast cancer screening programme which encourages women aged 50 years and older to go for mammograms (breast X-ray) once every 2 years. This Programme aims to detect breast cancer early, allowing for more effective treatment and a reduction in the mortality rate.
Tell us a little bit more about your team and their work?
The breast cancer workgroup consists of a crew of cancer specialists that come together to collectively optimise breast cancer patient treatment, and to collaborate in research. It consists of breast and reconstructive surgeons, pathologists, radiologists, medical and radiation oncologists and, breast care, database and research nurses. We discuss every case of breast cancer at least twice – once at the point of diagnosis and another at the post-operative phase when adjuvant therapy is decided. This significantly increases our workload, but it allows just about every patient to be on either a research or treatment protocol. It’s for the patient’s benefit, ultimately.

Tell us more about your work and responsibilities as the Head of Division. (What you do in the three areas - clinical service, research and academic)
There is the usual clinical load of clinics, ward rounds and operations, as well as trauma calls which can turn the entire day on its head in minutes. The research side of it primarily consists of sustaining a curiosity and criticism of how things work and how to make them better. The actual research projects at some point mean that there is a project to design or execute, collaborators to cajole, research assistants to vet, and reams of paperwork to plough through. The teaching side can be the most challenging, honestly. How do you teach academic curiosity? It seems to require a certain disrespect and cynicism to established norms, something that I find is quite uncommon in Singaporeans.

What are the significant breakthroughs in your field that you think have resulted in better treatment for patients?
There have been quite a few breakthroughs, actually. The wide availability of breast cancer screening means we find longer survivals from earlier detection of disease. The safety of breast conserving surgery and newer oncoplastic methods means we do not need to disfigure to heal. The establishment of sentinel node biopsy means shorter operations with less arm and shoulder morbidity, and finally, the molecular typing of disease is making individualised cancer care more than just a pipe dream.

The exact cause for breast cancer is still unknown. But have there been any significant developments in your research work in breast cancer gene (BRCA) mutations that have shed some light on this issue?
We have found similar prevalence rates of BRCA mutation carriers in our Asian races as has been reported in western populations. We have found that BRCA mutation carriers not only occur in large multi-cancer families, but also in women with early onset cancers without a significant family history. We have also discovered that a disproportionately high number of triple negative breast cancers (which are negative for estrogen and progesterone receptors and HER2 amplification) are BRCA carriers. All these data suggest that breast cancer is a heterogenous disease and a “one size fits all” approach to care for these patients may soon be a thing of the past.
Could you share with us memorable experiences that you have since becoming a surgeon?

I once treated a woman from China who had accompanied her son to Singapore where he was studying in one of the junior colleges. She was not quite used to Singapore traffic and had stepped off a curb when she was hit at high speed by a passing lorry. When she was brought in, she had no measurable blood pressure but there were reactive pupils and we got to work. Both of her legs were broken badly, there was intracranial bleeding, multiple rib fractures and lung contusions, and, we found a liver laceration with a torn inferior vena cava in the abdomen.

All my previous South African training kicked in and we got the abdomen sorted out under an hour. She required multiple laparotomies, neurosurgical decompression and external fixators for her open fractures. We worked closely with the intensivists, orthopaedics and neurosurgeons and got her out of the intensive care unit (ICU) in about a month. Shortly after the orthopods took off the external fixators and gave her definitive internal fixators, she started to ambulate. Her husband had been called in earlier and asked to prepare for the worst.

When he was in the general ward helping her get around, he pressed something in my hand. Thinking it was some sort of token, I turned to return it when I realised it was the traditional cloth shoulder flashes that would have identified him as her widower at her funeral. He had no use for them now, he said.

In 2009, I treated a Dutchman who was blown up in the Jakarta Marriot bombing in 2009. He lost both of his legs and most of his skin, and had multiple shrapnel injuries. He had also lost his hearing in one ear. After spending over a month on the ventilator and after a tracheostomy, we finally got him to speak. The first thing he said was that he would really like a strawberry milkshake. When the ICU nurses got one on their way to work from the McDonalds, he said it was not what he had in mind, and they went out of their way again to get him the one he wanted from some crèmerie. When he was well enough to leave the ICU after nearly two months, he had tears in his eyes. Not for his disability, but for the standard of care and concern he received from total strangers. I am very proud to work with a very good team of ICU nurses.

How can Family Physicians support patients who have undergone breast cancer surgery?

We probably could do a lot more than we have now. I have worked in centres where family physicians are involved in the standard post-operative and surveillance visits for breast cancer patients. But at present, there seems to be too little interaction between the cancer centres and the family physicians. There is definitely a lot of scope for cooperation we could explore. Other breast centres abroad have used primary physicians for the immediate post-operative wound care and some even help run clinics in hospitals. These are options which we have not quite explored here.

Do you have other interests and hobbies?

I have fallen off my mountain bike in four continents. I have a very large motorcycle and have one of those fantasies of taking a long intercontinental trip, preferably when I still have energy and am active. And I walk my dog a lot.

Are all breast cancer patients offered the opportunity for breast reconstruction and if not, how can they find out more?

Our practice has been to offer breast conserving surgery. However, in cases where mastectomy is required, our routine is to offer immediate reconstruction and this is usually done with the plastic surgeons in our common clinic, which is run once a week.

Clin A/Prof Philip Iau

Dr. Philip Iau graduated from the National University of Singapore in 1989, obtained his FRCS in 1994 and his MD-PhD in 2004. He presently heads the Breast Cancer Workgroup at the National University Hospital, a multi-disciplinary treatment team consisting of surgeons, oncologists, radiologists and breast care nursing. His main clinical area of expertise is in breast cancer surgery, with a particular interest in reconstruction following breast conserving surgery and sentinel node biopsy.

His work has been widely published in international journals and meetings, with a research interest mainly in BRCA gene mutations. At the national level he co-chaired to Committee for Breast Cancer Clinical Practice Guidelines in 2002, and is presently the vice president of the Asian Breast Disease Association.

In addition to his contributions to breast cancer care, Dr Iau also heads the trauma service, having trained at the Johannesburg Trauma Unit in South Africa and been deployed as part of a surgical team in Afghanistan in 2010. He sits on several advisory and training committees in both civilian and military settings, and has published widely on the use of systemic hemostatic agents in multiply traumatised patients.
## Upcoming Events

**NUH GP CME Programme 2011**

Please refer to our GPLC website for online registration.

<table>
<thead>
<tr>
<th>Date</th>
<th>Clinical Specialty / Topic</th>
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<tbody>
<tr>
<td>11 Jun</td>
<td><strong>Surgery</strong> Update on Hepatitis, Screening &amp; Treatment for Hepatocellular Carcinoma (HCC)</td>
</tr>
<tr>
<td>18 Jun</td>
<td><strong>Medicine</strong> Contemporary Issues in the Primary Care of Adults with HIV Infection</td>
</tr>
<tr>
<td>02 Jul</td>
<td><strong>Urology</strong> Urology Updates for Primary Care Physicians</td>
</tr>
<tr>
<td>16 Jul</td>
<td><strong>Ophthalmology</strong> Retinal Disease Updates for GPs</td>
</tr>
<tr>
<td>23 Jul</td>
<td><strong>Psychological Medicine</strong> Emotional Wellness of Growing Up Child: Management in Primary Healthcare</td>
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<tr>
<td>06 Aug</td>
<td><strong>Geriatrics</strong> Patient-Centered Primary Care for the Elderly</td>
</tr>
<tr>
<td>20 Aug</td>
<td><strong>Ophthalmology</strong> An Update on Common Ophthalmic Problems in Family Medicine</td>
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</table>

*Event information listed is correct at time of print. While every attempt will be made to ensure that all events will take place as scheduled, the organisers reserve the rights to make appropriate changes should the need arises. Please refer to our events calendar at [www.nuh.com.sg/nuh_gplc/index/index.htm](http://www.nuh.com.sg/nuh_gplc/index/index.htm) for more updates and information.*

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