



MEDICAL NEWS

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FOCUS : PAEDIATRICS

| **Eating Disorders in
Children and Adolescents**

| **Advancing Care For
Paediatric Brain Tumours**

| **Vascular Anomalies**



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Eating Disorders in Children and Adolescents

- Early Detection and Diagnosis in Primary Care

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INTRODUCTION

Eating disorders are complex illnesses that have a significant impact on the bio-psychosocial health of the patient. Despite the medical complications and relatively high prevalence, eating disorders are not referred early for effective treatment due to the lack of specificity of the initial presentation and the range of clinical presentation.

As eating disorders commonly develop in adolescence, the impact on health is more significant, and early recognition and treatment is needed. Anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorders (BED) have a median age of onset from 12 to 13 years old; and a median age of onset of 11 years old for avoidant-restrictive food intake disorder (ARFID).

Eating disorders can have both serious short- and long-term consequences on health. **Serious short-term consequences** may include cardiac complications such as bradycardia and arrhythmia, significant electrolyte abnormalities including those due to re-feeding syndrome, as well as syncope and dehydration. **Long-term complications** include compromised bone health, infertility, as well as mental health sequelae. The mortality rate for anorexia nervosa is five to six per cent, which is the highest mortality rate of any psychiatric illness.



There are diagnostic criteria (DSM V)³ for eating disorders and the various subtypes, however these conditions can present with a range of symptoms and signs, especially in children and adolescents.

Prevalence of eating disorders among children and adolescents in Singapore

Worldwide studies have placed the lifetime prevalence of anorexia nervosa between 0.5 to two per cent and bulimia nervosa between 0.9 to three per cent. While females are more commonly affected by eating disorders, males can represent up to 10 per cent of all cases. A Singapore-based study⁴ revealed that 7.4 per cent of females (aged 12 to 26) are at risk for developing an eating disorder. In Singapore, the number of young people seeking help for eating disorders is steadily rising.

CASE STUDY

Patient Profile

S was in her early teens when she was brought to her general practitioner (GP) for an evaluation of her weight loss. She had lost six kilogrammes in three months and her parents had noted fatigue, hair fall and a loss of menses. S claimed she was still eating regularly – although her parents noted that she had not been eating at home as she had been eating with her friends before returning home. S denied any dieting, mood or body image issues.

Evaluation by GP

On examination, S had a body mass index (BMI) of 14.0 kg/m², indicating that she was below the healthy weight range. On physical examination, her heart rate was normal but low and her blood pressure was normal. Physical examination revealed that S had cold peripheral extremities and lanugo hair, and further history indicated that S had two months of amenorrhoea.

Although S denied experiencing issues with her body image, the general practitioner had suspected that S may have an eating disorder, and advised her parents on the need for referral to a specialist eating disorder service for further evaluation.

Referral for Specialist Care

Upon referral for specialist evaluation, extensive medical evaluation revealed no other causes for S' weight loss. Laboratory tests revealed mildly elevated levels of urea and creatinine, mild transaminitis, as well as suppressed levels of oestradiol. On further evaluation, the physician learned that S had been skipping meals, weighing herself frequently, and significantly increased amounts of exercise. She denied any shape concerns.

S was referred to a nutritionist who provided her parents with dietary advice regarding the necessary nutrition needed for S' nutritional rehabilitation, as well as a psychologist trained in Family-Based Treatment (FBT), a specialised treatment model for paediatric eating disorders. The psychologist worked intensively with S' family to enable them to restore their child to a healthy weight. The psychologist continued to work with the family to help S regain independent eating habits and addressed any underlying psychological issues. S achieved remission for her eating disorder and after a period of periodic monitoring, she was discharged from the eating disorder service.

TYPICAL CLINICAL PRESENTATION

While some children and adolescents may seek help for an eating disorder, most will not acknowledge these concerns and may deny any body dissatisfaction, fear of calorie dense foods and difficulty maintaining their weight. Due to the secretive nature of the condition, many parents may also not be aware of these issues. Often, the symptoms that may present to the doctor can include:

- a. **Growth and developmental abnormalities**, including precipitous weight loss or gain; frequent weight fluctuations; failure to gain expected weight or height; and delayed or interrupted pubertal development.
- b. **Other medical complaints related to the physical consequences of the eating disorder**, including secondary amenorrhoea; gastrointestinal complaints such as poor appetite, constipation and bloating; hair loss; fatigue; mood changes; giddiness or syncope and nutritional deficiencies.
- c. **Certain physical signs that may be present on examination**, including hypothermia; bradycardia; orthostatic pulse and blood pressure changes; dull or thinning scalp hair; lanugo hair; looking emaciated; flat affect; cold extremities; acrocyanosis and primary or secondary amenorrhoea.

- d. **Characteristic cognitive and behavioural signs**, which may not be easily elicited from adolescent patients, including intentional caloric restriction; pre-occupation with weight, food, calories, fat and dieting; thoughts of "feeling fat" when the child's weight is normal or low; fear of gaining weight; feelings of guilt and shame about eating; frequent weighing; perception that weight determines one's self-esteem; binge-eating and inappropriate compensator behaviours (purging) including self-induced vomiting, use of laxatives, diet pills and excessive exercise.





WHAT TO DO IF A GP SUSPECTS AN EATING DISORDER:

A. The first priority is to determine the patient's medical stability and evaluate for complications of the disordered eating pattern. Patients who are suspected to have an eating disorder do not have to be at a significantly low BMI.

For patients who are medically unstable, they should be referred to the emergency department for immediate evaluation and admission. The most common medical complication requiring admission is bradycardia.

Criteria for medical instability and acute admission include:

1. Resting heart rate < 50 beats per minute
2. Electrocardiogram (ECG) abnormalities, such as prolonged corrected QT interval (QTc)
3. Significant postural and/or haemodynamic changes, including:
 - a. Hypotension
 - b. Systolic BP drop > 20 mmHg from lying to standing position
 - c. Diastolic BP drop > 10 mmHg from lying to standing position
 - d. Heart rate increase of > 30 bpm from lying to standing position
4. Dehydration
5. Body temperature < 35.5 degrees Celsius

B. Adolescents with eating disorders require early referral to a specialist eating disorder programme. Young people with eating disorders have the best chance of full recovery, both physically and psychologically, when initiating specialised treatment early in their illness.

C. While waiting for specialist evaluation, if the patient's weight is dropping rapidly, medical instability may have occurred by the next visit. Hence, close follow-up appointments, such as every two weeks until the involvement of a specialist treatment team, are recommended.

D. Important early messages for families from their GP:

- a. Start providing the adolescent with three meals and three snacks everyday
- b. Excuse the child from Physical Education lessons, co-curricular activities, and other physical activity
- c. The development of an eating disorder is not the fault of the child or the parent

EXCLUDING MEDICAL MIMICS OF EATING DISORDERS IN CHILDREN AND ADOLESCENTS

As many young people with eating disorders may present with nonspecific symptoms including growth and weight disturbances but not endorse dieting or body image concerns, thorough history and physical examination is required to exclude other medical causes.

Some medical conditions that may need to be excluded include gastrointestinal conditions such as inflammatory bowel disease and gastritis, hyperthyroidism, autoimmune conditions, and in rare cases, malignancy.

TREATMENT

Likely treatment options by a specialist

Upon referral to the service, initial specialist medical evaluation focuses on evaluating for any possible alternative causes of weight loss, as clinically indicated, as well as evaluating for medical complication and physical compromise due to the weight loss and malnutrition.

This may involve a complete physical examination including the patient's orthostatic vital signs, an ECG, full blood count (FBC), renal panel, as well as tests for the patient's calcium, magnesium, and phosphate levels, and liver function. The care team may also obtain the patient's erythrocyte sedimentation rate (ESR), and conduct hormonal evaluation including tests on the thyroid function, luteinising hormone (LH), follicle-stimulating hormone (FSH) and oestradiol levels. Bone mineral density scan may also be obtained.

First-line treatment

Based on evidence-based guidelines, Family-Based Treatment (FBT) or the Maudsley approach is considered the first-line treatment model for children and adolescents with eating disorders, and is the treatment model used by the care team from the Adolescent Medicine Service at KK Women's and Children's Hospital (KKH).

This evidence-based model of care provides the best treatment outcomes and is protective against relapse. In the FBT model, parental (family) involvement is vital and strategies are used to empower caregivers to re-feed their adolescent. FBT emphasises early weight and growth restoration, adopting a non-blaming approach that focuses on moving forward from the disease. It also focuses on the cessation of disordered eating patterns and body image distortion, with resumption of normal meal patterns that promote health and social norms.

Team approach

Optimal care involves a team approach involving paediatricians, psychologists, psychiatrists, dietitians, social workers, nurses and other health professionals. At KKH, the Adolescent Medicine Service works as part of a multidisciplinary team to treat children and adolescents with a variety of medical conditions including eating disorders, obesity, somatisation, and risk-taking behaviours. For young people with an eating disorder, the best prognosis is if the condition is treated early.

LIKELY TREATMENT OPTIONS BY GPs

A child or adolescent with an eating disorder may present with common complaints such as constipation or abdominal bloating. These complications are common and often related to malnutrition leading to reduced intestinal motility.

Treatment with laxatives can be prescribed – however, GPs are advised to be cautious with overuse, which can enable purging behaviour. GPs should also encourage nutritional rehabilitation to persist, and for the patient and the family to continue treatment with the eating disorder specialist team.

At times, a patient with an eating disorder may present with common acute problems such as an upper respiratory tract infection (URTI) or gastroenteritis. The child should be assessed routinely and appropriate treatment provided. If there is no contra-indication to oral intake, nutritional intake should be maintained.

In children and adolescents with a past history of eating disorders, primary care physicians should be cognisant of the possibility of a relapse of the condition – a comprehensive re-assessment of the clinical presentation may be required.

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Advancing Care For Paediatric Brain Tumours

- Recognising the Signs in the Primary Care Setting

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Brain tumours are the commonest solid tumours in children and are the leading cause of cancer death in childhood. According to data from the Singapore Cancer Registry, from 2008 to 2012, central nervous systems (CNS) tumours were the second most frequently occurring cancer in children (18.3%) after leukaemias (35.3%).¹

While advances in neurosurgery, radiotherapy and chemotherapy have raised survival rates of children with brain tumours, mortality and morbidity nonetheless remain significant. There is still much work to be done to improve cure rates and minimise treatment-related side effects wherever possible.

FACILITATING EARLY RECOGNITION BY PRIMARY HEALTHCARE PROVIDERS

The first step in advancing care for paediatric brain tumours is to facilitate early recognition by primary healthcare providers. Studies have shown that brain tumours in childhood have the greatest delay in diagnosis^{2,3}, likely due to the myriad of symptoms they could present with^{3,4}, including more subtle symptoms of gradually increasing intracranial pressure or developmental regression, or more glaring symptoms of cranial nerve palsies or seizures.

Globally, countries are recognising the value of facilitating early recognition. The "HeadSmart: Be Brain Tumour Aware" campaign was launched in June 2011 across the United Kingdom as a quality improvement strategy, to raise awareness among the public and healthcare professionals to recognise the signs and symptoms which should trigger an early referral for evaluation and neuroimaging.

In combination with revised National Health Service referral guidelines published in 2008, the campaign was successful in reducing the total diagnostic interval from a pre-campaign median of 14 weeks to 6.7 weeks⁵. Centres in the United States of America are also intending to adapt the same programme to reduce the time interval between symptom onset and diagnosis for their patients².

CASE STUDY

Raj* (not his real name) was a primary school-aged boy who had presented with two months of vomiting, and was undergoing evaluations for gut dysmotility disorder. A new development of headache and an unsteady gait prompted neuroimaging, which showed obstructive hydrocephalus secondary to a large posterior fossa mass. This is not an uncommon presentation for paediatric brain tumours, where symptoms may have been initially non-specific and gradual.

Raj's parents were rightly informed of the "red-flag" symptoms to watch out for and re-attend for further evaluation. This facilitated an early referral to a tertiary centre and enabled prompt neuroimaging.



Figure 1 Pocket-sized symptoms card which lists the most common signs and symptoms associated with a brain tumour across three age categories: babies, children and teenagers. Source images from www.headsmart.org.uk.

NEW APPROACHES TO CLASSIFICATION AND TREATMENT OF PAEDIATRIC BRAIN TUMOURS

Paediatric brain tumours make up a heterogeneous basket of tumours – from slow-growing, low-grade gliomas to malignant medulloblastomas. The more common brain tumours in childhood include:

- Medulloblastoma
- Low-grade gliomas
- High-grade gliomas and diffuse midline gliomas
- Germ cell tumours
- Ependymoma
- Craniopharyngioma
- Less commonly, other embryonal tumours such as atypical teratoid rhabdoid tumours (ATRT) and embryonal tumours with multi-layered rosettes (ETMR)

Refining the classification of brain tumours

Traditionally, it was thought that the aggressiveness of the disease is dictated by tumour histology and grade, and the extent of the tumour or the presence of metastasis.

However, it is now recognised that tumour molecular information predicts tumour behaviour more accurately. This is made possible due to advances in the last decade in **molecular diagnostics** (genomic, epigenetic and transcriptomic profiling) and increased global collaborations and knowledge sharing.

These advances have revolutionised the genomic landscape for paediatric brain tumours^{6,7} and driven important revisions in the World Health Organization (WHO) 2016 classification of CNS tumours⁸. The revisions introduced integrated diagnoses incorporating both conventional histology and newer genomic features, and examples of the classifications include “medulloblastoma, WNT-activated”, “ependymoma, RELA fusion-positive” and “diffuse midline glioma, H3K27M mutant”.

APPLICATION OF MOLECULAR DIAGNOSTICS

Molecular Subgrouping

Clinical application of molecular data can be seen in the molecular subgrouping of paediatric brain tumours. A 2012 landmark paper⁹ for molecular subgrouping in medulloblastoma, the commonest malignant brain tumour of childhood, established that **tumour behaviour was better predicted through molecular subgroups** instead of conventional histological subgroups.

Among the four molecular subgroups, the WNT subgroup had the best prognosis, whereas outcomes for Group 3 medulloblastoma were the worst.

This molecular classification is now widely accepted and assimilated into current literature and clinical trials. Since then, molecular subgrouping has also been used for other brain tumour groups such as ependymoma¹⁰, ATRT¹¹ and diffuse intrinsic pontine glioma (which is now incorporated into the entity of diffuse midline gliomas)¹².

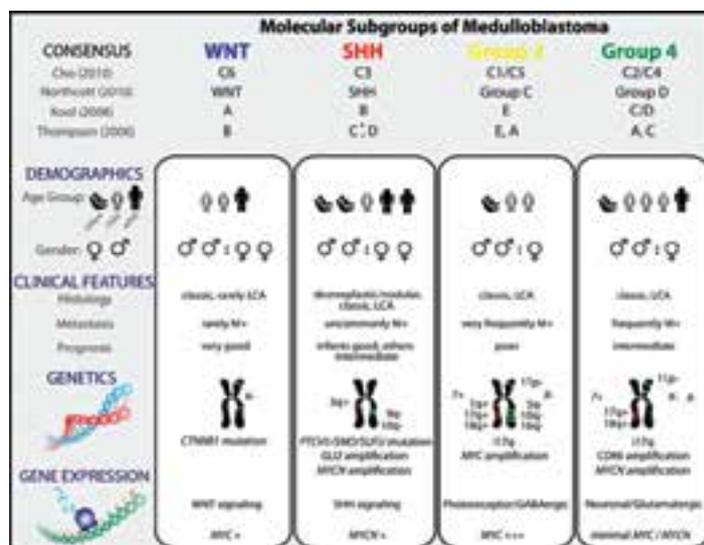


Figure 2 Comparison of the various subgroups of medulloblastoma including their affiliations with previously published papers on medulloblastoma molecular subgrouping (from MD Taylor et al.⁹).

Improved prognostication allows more accurate risk-stratification and, consequently, better treatment stratification. In favourable-risk subgroups, the goal is to reduce treatment morbidity in patients whom we foresee to be long-term survivors by introducing treatment reduction; conversely, in poor-risk subgroups, the goal is to improve cure rates by exploring novel treatment regimens.

Novel Therapeutics

Identification of signature tumour mutations has enabled targeted therapy to be employed for patients who previously had little or no further treatment options⁶. For example, *BRAF* gene alterations in paediatric gliomas, such as *BRAF* V600E mutations or *KIAA-1549* *BRAF* fusion, provide a target for *BRAF* inhibitors and/or MEK inhibitors.

Early phase trials in paediatric gliomas have shown optimistic tumour responses and manageable drug toxicity^{13,14}. These drugs are now a promising treatment option for patients whose gliomas bear these *BRAF* alterations and who have failed conventional therapy^{7,15}.



VIVA-KKH PAEDIATRIC BRAIN AND SOLID TUMOUR PROGRAMME

Increased attention has been given to paediatric brain tumours as part of the VIVA-KKH Paediatric Brain and Solid Tumour Programme. This is a collaborative clinical and research partnership between VIVA Foundation for Children with Cancer, KK Women's and Children's Hospital (KKH) and St. Jude Children's Research Hospital for childhood brain and solid tumours. Its main aims are to improve clinical care through multidisciplinary coordination and to support molecular profiling for research initiatives.

In KKH, the care team is equipped with the ability to perform in-house medulloblastoma molecular subgrouping through the Nanostring™ Counter assay and ancillary molecular workup for selected brain tumours through specialised immunohistochemistry, fluorescence in-situ hybridisation (FISH) or target sequencing. Advancements in neurosurgical adjuncts at KKH have also enabled tumour specimens to be obtained safely from challenging anatomical locations, such as stereotactic biopsies from pontine tumours, allowing histological confirmation and molecular workup^{16,17}.

In addition, new treatment techniques are in the pipeline. For example, the new proton beam therapy centre slated to open in 2021 at National Cancer Center Singapore (NCCS) would be able to provide radiation therapy with less side effects to our paediatric patients in whom long-term side effects of scatter irradiation in normal tissues would make a big difference.

ADOPTING A MULTIDISCIPLINARY APPROACH TO PAEDIATRIC BRAIN TUMOUR CARE

Beyond advances in tumour diagnostics and treatment, adopting a multidisciplinary approach towards paediatric brain tumour care is important. From diagnosis to treatment and supportive care, and to post-treatment surveillance, KKH has a comprehensive team coordinating and delivering care for paediatric patients with brain tumours.

Tumour board meeting

A multidisciplinary tumour board meeting serves as a platform for the team of radiologists, pathologists, oncologists, neurosurgeons and radiation oncologists to jointly review neuroimaging, pathology slides, and discuss the appropriate treatment – surgery, radiotherapy, and/or chemotherapy – as the optimal treatment may differ from case to case, depending on tumour histology, tumour location, disease extent and the age of the child.

The ancillary team

For a child who is embarking on chemotherapy, an ancillary healthcare team comprising oncology pharmacists, dietitians and oncology nurses provides counselling and care during the child's treatment. In addition, a paediatric brain tumour resource nurse coordinates complex care with multiple treatment visits and investigations, and offers frontline advice and emotional support to patients and their families.

Psychosocial support and neurorehabilitation

The psychosocial needs of a child and his/her family who have received the life-changing news of a brain tumour diagnosis cannot be over-emphasised. At KKH, medical social workers and case workers from the Children's Cancer Foundation (CCF) jointly support the child, parents and siblings throughout their journey from diagnosis. The CCF

Resource Centre and teens' room are also available to patients who are receiving treatment in the oncology wards and Day Therapy Centre, and often become the highlight of their treatment visits.



Figure 3 Art Therapy open studio session with Mrs Karen Pence and KKH paediatric cancer patients in the CCF Resource Centre.

In 2017, the CCF Psychosocial and Supportive Care Programme was also established at KKH, where the Nutrition and Dietetics Department, Rehabilitation Department, and Psychology Service have been providing holistic and supportive care for paediatric oncology patients. This programme is especially relevant to brain tumour patients, who may experience neurological deficits and cognitive difficulties due to the tumour or raised intracranial pressure, from a tumour surgery or as a long-term side effect from radiotherapy and/or chemotherapy. Knowing the plasticity of the paediatric brain, well-organised neurorehabilitation can greatly improve the functional status of a child with neurological deficits or help to prevent further deterioration of functional disabilities.

In KKH, neurorehabilitation is carried out by paediatric therapists through physiotherapy, occupational therapy, and speech therapy, in tandem with assessments

by a neurorehabilitation physician, and may continue even after the child has completed the cancer treatment and is preparing to re-assimilate into school. Neuropsychology assessments are also made at regular intervals to monitor for neurocognitive deficits such that early interventions for learning difficulties can be recommended at appropriate timings.

Post-treatment surveillance

As cure rates for paediatric neuro-oncology improve, the burden ripple effects of cure become more apparent when long-term side effects develop from treatment. These may include neurocognitive deficits, endocrinopathies from cranial irradiation, hearing loss, subfertility from chemotherapy and more. The KKH Survivorship Clinic and Late Effects Clinic incorporate comprehensive post-treatment surveillance for an early detection of these long-term complications, as well as provide patient education and relevant referrals to subspecialties to manage these complications.

CONCLUSION

Advancement of paediatric brain tumour care requires a team effort from different aspects of the healthcare system. This starts with early detection by primary care professionals, implementation of new tumour molecular diagnostics and therapies, application of multidisciplinary approaches towards management of the condition in tertiary centres, and post-treatment surveillance in survivorship clinics.

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Vascular Anomalies

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Vascular anomalies are a heterogeneous group of conditions that can be classified into two broad categories, namely vascular tumours and vascular malformations. The International Society of the Study of Vascular Anomalies (ISSVA) classification¹ has led to standardisation of the nomenclature of vascular anomalies, especially among physicians managing these conditions. This is important as there now exists a variety of different treatment options targeted at the various vascular tumours and malformations. Inaccurate diagnoses may lead to inappropriate treatments with suboptimal outcomes. Vascular anomalies that are more complex, such as Klippel-Trenaunay Syndrome (KTS), should be managed under the care of a multidisciplinary team, as a combination of various treatments may be required for optimal results.

Vascular tumours can be sub-classified into benign, locally aggressive/borderline or malignant. The commonest benign vascular tumours in infants and children are infantile haemangiomas (IHs). Locally aggressive vascular tumours, such as kaposiform haemangioendothelioma (KHE) or tufted angioma (TA), are rare in children but can be associated with severe complications which include Kasabach-Merritt syndrome (KMS). Malignant vascular tumours are extremely rare in children, but can occur in older patients, such as angiosarcoma.

Vascular malformations can be sub-classified into simple, combined or syndromic.

Simple malformations can be slow-flow (capillary, venous or lymphatic malformations) or high-flow (arteriovenous malformations). **Combined malformations** can be a combination of the various simple malformations, such as veno-lymphatic. **Syndromic malformations** (malformations that are part of a syndrome) are rare. More common examples include KTS and Parkes Weber syndrome. Somatic mosaic mutations, such as the mutation of the *PIK3CA* gene, have been detected in many of these malformations and malformation syndromes.

VASCULAR TUMOURS

Infantile Haemangiomas

Infantile haemangiomas (IHs), the most common vascular tumour in children, affect two to four per cent of infants. It is more common in females, premature infants and twins.

IHs most commonly present in the first three to four weeks of life as enlarging red or bluish papules or nodules. IHs grow in breadth and depth over four to five months, thereafter slowing in the rate of growth until the child is about one year of age, before it begins to involute (decrease in size).

The rate of involution is estimated at about 10 per cent per year, with smaller lesions resolving faster than larger ones. Although small IHs can involute to near-normal skin, large IHs, if left untreated, may involute with residual fibrofatty change and telangiectasias.

Most IHs are uncomplicated with minimal cosmetic concern, and can be observed for spontaneous resolution. A handful of IHs may lead to life-threatening or function-threatening complications, or have a potential to cause severe cosmetic disfigurement. Early identification of these IHs is important, as early treatment within the first six months of life can reduce these complications.



Figure 1 Haemangioma



Figure 2 Deep Haemangioma

More common on the head and neck region, IHs can occur on almost any part of the skin. Superficial IHs (*Figure 1*) usually appear as bright or deep red papules, nodules or plaques. Deeper lesions (*Figure 2*) can be skin-coloured or have a bluish hue. Many IHs can have a mixed appearance, with both superficial and deep components. All forms of IHs have a soft consistency on palpation.

Diagnosis

A doppler ultrasound placed over an IH will reveal fast-flow components. Large IHs on the head and neck region may be associated with eye, brain and heart abnormalities (PHACES syndrome); while those in the groin, perineal or sacral region may be associated with spinal and genitourinary abnormalities (PELVIS syndrome).

IHs at certain sites, such as the lip, groin, neck and ear, may ulcerate and lead to pain, infection and scarring. Multiple IHs (> 5) may be associated with visceral involvement, such as that of the liver or spleen. Complicated IHs require prompt referral to a paediatric dermatology unit for urgent investigations and treatment.

Treatment

The treatment of IHs has revolutionised over the past decade with the use of beta blockers. Systemic beta-blockers such as propranolol have been shown to be very effective in the treatment of complicated IHs if started within the first year. Topical beta-blockers such as timolol have also been found to be efficacious in the treatment of more superficial IHs. Lasers, such as the pulsed dye laser (PDL), can also be used to treat IHs.

Kasabach-Merritt Syndrome, Kaposiform Haemangioendothelioma and Tufted Angioma

Kasabach-Merritt syndrome (KMS) is characterised by thrombocytopenia, coagulopathy and microangiopathic haemolytic anaemia, associated with an underlying rapidly expanding vascular tumour, most commonly kaposiform haemangioendothelioma (KHE) (*Figure 3*) and tufted angioma (TA).

The vascular lesion commonly becomes enlarged and indurated, and infants can present with bleeding manifestations such as ecchymoses, epistaxis, haematochezia and haematuria. Although both KHE and TA can be locally aggressive, they may also undergo spontaneous involution.

Diagnosis

Diagnosis is usually clinical and confirmed with radiology through a doppler ultrasound, magnetic resonance imaging (MRI) or histology.

Treatment

Treatment of KMS, KHE and TA may require different regimens and a multidisciplinary approach. Options include systemic high-dose corticosteroids, anti-fibrinolytics, interferon, vincristine and anti-thrombotics. More recently, the use of sirolimus has proven to be very effective in reducing both the KMS, as well as the size of the underlying tumour. Surgery, embolisation and radiation are used less often in recent years.

Sirolimus, also known as rapamycin, was first isolated from the bacterium, *Streptomyces hygroscopicus*, and its anti-proliferative properties is due to inhibition of mTOR. It has been used for the treatment of various vascular anomalies, including vascular tumours, such as KHE, and vascular malformations, such as lymphatic malformations and venous malformations. It also has immunosuppressive properties and has been used extensively in the prevention of transplant rejection. Common side effects include stomatitis, peripheral oedema, abdominal pain and headache.

VASCULAR MALFORMATIONS

Capillary Malformations

The commonest vascular malformations are capillary malformations or port-wine stains (PWS). These are usually present at birth and grow in proportion to the child. Although initially flat, they may thicken during puberty and adulthood. Although asymptomatic, they may cause significant cosmetic and psychological distress in patients and their caregivers. Large PWS affecting the forehead or eyelids (*Figure 4*) may be associated with Sturge-Weber syndrome (SWS), with cranial and ophthalmological associations.



Figure 3 Kaposiform Haemangioendothelioma



Figure 4 Port-wine stain



These patients require brain imaging and thorough eye examinations. Seizures and developmental delay are common neurological manifestations of SWS. PWS that are not of cosmetic concern may be left alone.

Treatment

Those that have the potential to lead to cosmetic or psychological impairment may be treated with lasers. The pulsed dye laser (PDL) is the commonest laser used in the treatment of PWS. Treatment can begin within the first few months of life, and the child will require multiple treatments, usually one to two months apart.

Venous and Lymphatic Malformations

Venous and lymphatic malformations are the next most common forms of vascular malformations. They usually present within the first few years of life, with soft, bluish-to-purple swellings (*Figure 5*). Most common on the head and neck, they may occur anywhere on the body. Although mostly asymptomatic, they can present with pain, bleeding and secondary infection.

Diagnosis

Radiological investigations, such as a doppler ultrasound or MRI, can aid in diagnosis and should be performed in all lesions undergoing treatment.

Vascular Malformations Syndromes

Some vascular malformations may be associated with other anomalies, such as tissue overgrowth. These “vascular malformations syndromes” are rare but have the potential to lead to severe physical and psychosocial impairment. Somatic mosaic mutations in the *PIK3CA* gene have been found in the *PIK3CA*-related overgrowth syndromes (PROS). These include KTS and CLOVES (congenital lipomatous overgrowth, vascular malformations, epidermal nevi, scoliosis /spinal) syndrome.

Patients with PROS present with asymmetric limb overgrowth associated with various slow-flow vascular malformations (*Figure 6*). Multidisciplinary and multi-modality treatment is required for these patients, including sclerotherapy, embolisation, systemic medications such as sirolimus, lasers and surgery.

Other genetic mutations that have been discovered to underlie other vascular malformation syndromes include that of the *GNAQ* gene (SWS), *AKT1* gene (Proteus syndrome), *RASA1* gene (Parkes Weber syndrome) and *PTEN* gene (Bannayan-Riley Ruvalcaba syndrome). More specific treatments targeting these mutations may be available in the near future.



Figure 5 Venous malformation lip and tongue



Figure 6 Klippel-Trenaunay syndrome

Treatment

Small, asymptomatic lesions may be left alone, while treatment is recommended for larger lesions, especially if symptomatic. Various treatment modalities may be employed, and thorough discussion of the benefits and side effects of each treatment is essential for patients and caregivers to make an informed choice. Treatment options include sclerotherapy, lasers, surgery, and systemic medications such as sirolimus. Some lesions may require more than one modality for optimal results.

Recently, an increasing number of somatic genetic mutations have been discovered in vascular anomalies, such as in the *PIK3CA* gene. Genetic testing may be offered in some cases, which may guide management decisions.

CONCLUSION

Vascular tumours and malformations range from mild to severe conditions that can lead to significant physical, psychological and emotional impairment. Many of these conditions have been well classified under the latest ISSVA classification. Specific treatments are now available for the management of many of these conditions. However, complex and more severe cases will require multidisciplinary treatment in centres specialising in the management of complex vascular anomalies.

VASCULAR ANOMALIES CLINICS AT KKH & SGH

At KK Women's and Children's Hospital (KKH) and Singapore General Hospital (SGH), the multidisciplinary Vascular Anomalies Clinics comprise various sub-specialties including interventional radiology, haematology/oncology, surgery and dermatology, and were developed to diagnose and manage a wide range of vascular anomalies. Conditions in children and adolescents are managed at KKH, while conditions in adults are managed at SGH.

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Stereotactic Body Radiotherapy for Prostate Cancer

- A Better and Faster Treatment with Less Side Effects

Dr Jeffrey Tuan, Senior Consultant,
Division of Radiation Oncology, National Cancer Centre Singapore

Radiotherapy is a type of cancer treatment using high-energy ionising radiation to kill cancer cells. For prostate cancer, radiotherapy has long been established as one of the standard treatments. Radiotherapy works as well as surgery in curing early stage prostate cancer, yet is associated with less erectile dysfunction and urinary incontinence.

Traditional radiotherapy requires daily treatments for a total of 37-39 sessions and the entire treatment course often lasts up to two months. Over the past decades, advances in radiotherapy technology and incorporation of X-ray and computer tomography (CT) imaging during treatment (image-guided radiation therapy [IGRT]) have allowed radiotherapy to be given at the level of precision within millimeters.

Stereotactic Body Radiation Therapy (SBRT) was first developed to treat small brain lesions not amenable for surgery, and quickly expanded to treat other types of cancer. SBRT can deliver much larger radiation doses for each treatment and complete the entire radiotherapy course in as short as five sessions.

Prostate SBRT was first studied by a group of radiation oncologists from the University of California, Los Angeles (UCLA) in 2000. In a recently updated publication of more than 2,000 patients treated across several centers in US, after a median follow-up of seven years, no patients died from prostate cancer while only 6% had recurrence and 0.6% had developed distant metastases.

Two large randomised studies from Scandinavia and Canada also confirmed that long-term side effects of SBRT were similar to conventional fractionated radiotherapy.

The National Cancer Centre Singapore (NCCS) is the first centre in Singapore to offer SBRT for early stage localised prostate cancer. First launched as part of a prospective Phase 2 Study in 2014, 80 patients are participating in this study and accrual closed on March 2019.

The patients treated with this technique have achieved excellent clinical outcomes and a favourable toxicity profile. In 2019, prostate SBRT became a routine clinical practice in NCCS for early stage localised prostate cancer, after analysis and confirmation of efficacy and safety in local data and international long-term data.

The SBRT Process

Although SBRT significantly reduces total duration of radiotherapy from two months to less than two weeks, it requires a more complex and longer preparation for the treatment. An additional magnetic resonance imaging (MRI) scan has to be performed in the treatment position to accurately identify the prostate and other normal structures.

Prior to treatment delivery, a cone beam computed tomogram (CBCT) is acquired by the linear accelerator machine. The attending radiation oncologist will verify the treatment position prior to actual radiation delivery. The entire process can last up to 20 minutes but the actual radiation beam-on time only takes less than two minutes to complete.

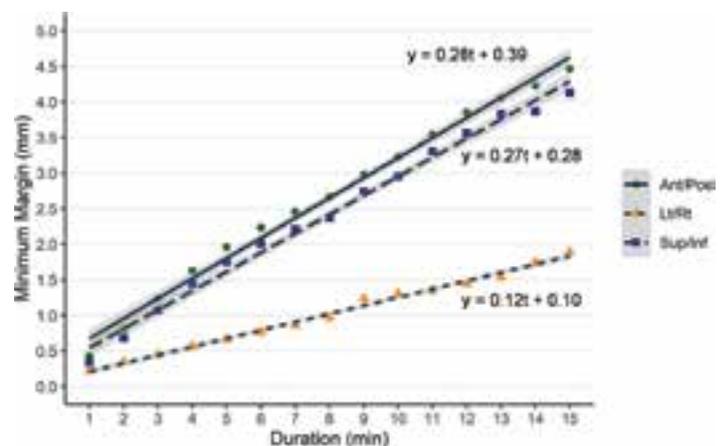
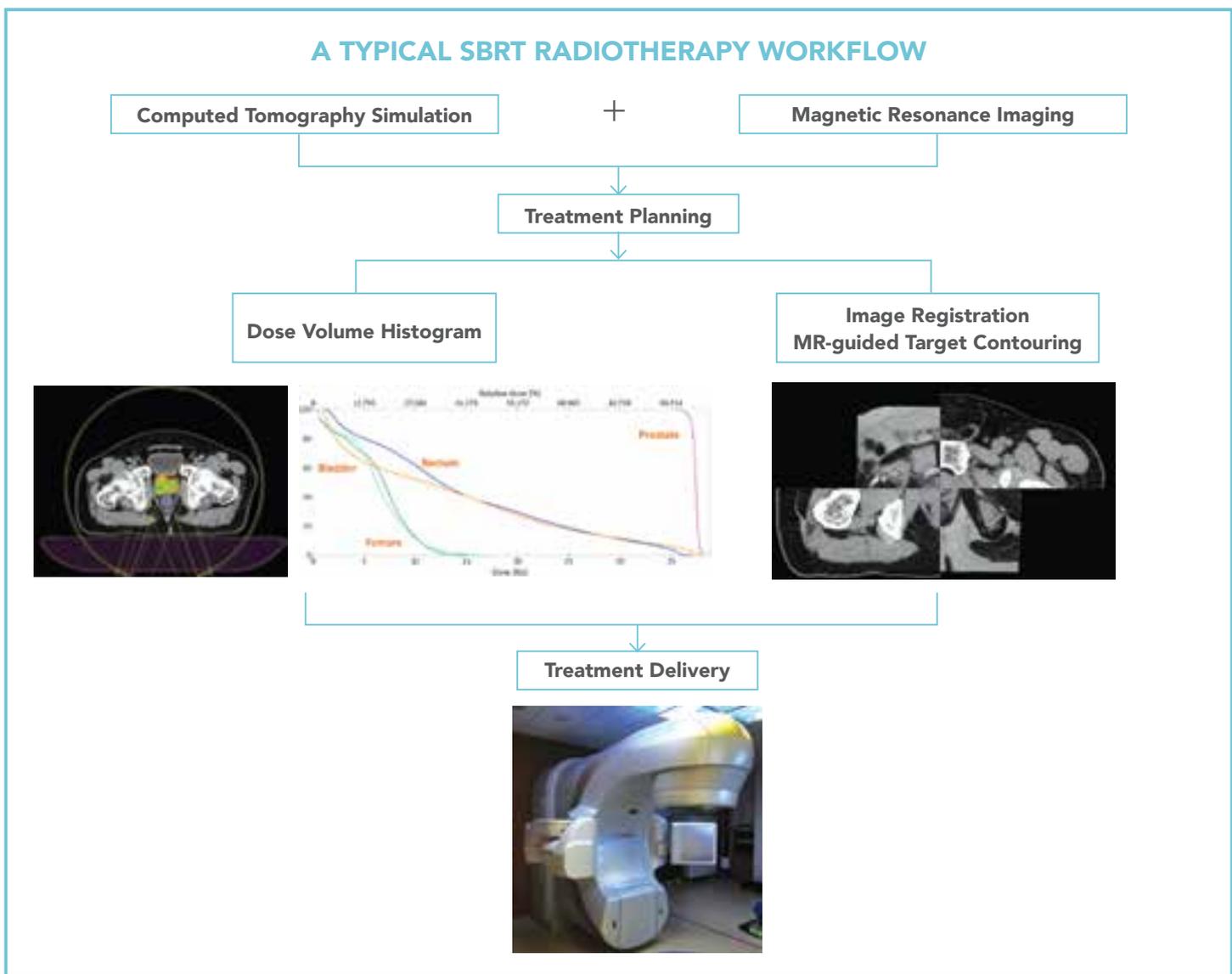


Figure 1 Illustration of the linear trend of the required margin to account for uncertainty of prostate displacement during treatment up to a 15-minute duration (from Eric Pei Ping Pang et al.). Linear lines refers to the best fit regression model; shaded areas refer to the 95% confidence.

This short delivery time is made possible by the use of a novel technology called flattening-filter-free (FFF) delivery, which increases the speed of delivery up to four times as compared to the standard treatment; which greatly reduces the uncertainty of patient motion during treatment. An example of the trend and magnitude of the required treatment planning margins to account for such prostate motion during treatment is illustrated in *Figure 1*.

A TYPICAL SBRT RADIOTHERAPY WORKFLOW



Common side effects

During SBRT, common side effects encountered by patients are: mild tiredness, urinary frequency and a burning sensation on passing urine. These side effects sometimes can continue after treatment but eventually will improve after a few weeks. After SBRT, radiation oncologists will follow-up with patients in the clinic every three to six months with a PSA blood test.

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Helping Children with Developmental Needs Have a Brighter Tomorrow

The Department Of Child Development In KK Women's And Children's Hospital

“Our nation's children are our pride and joy. They hold the future of Singapore in their hands and become the parents of the next generation. The Department of Child Development is proud to be part of their journey to adulthood.”

Adjunct Associate Professor Lourdes Mary Daniel, Head and Senior Consultant,
Department of Child Development, KK Women's and Children's Hospital (KKH)

THE TEAM AT THE DEPARTMENT OF CHILD DEVELOPMENT

The Department of Child Development (DCD) in KK Women's and Children's Hospital (KKH) has a team of 140 staff members, including paediatricians who focus on child development; psychologists; nurses; speech and language, occupational and educational therapists; medical social workers; and clinical research coordinators, supported by administrative and ancillary staff.

THE FOCUS

The focus is the preschool child with developmental, learning and behavioural problems. Much emphasis is also given to family-centred care through support for parents and caregivers, who are critical partners for intervention. The range of skilled staff within the same department is one of its strengths, as it can provide both integrated care and trans-disciplinary care in a team-based and collaborative manner, with increased efficiency and reduced cost.

RANGE OF PROGRAMMES

CHILD DEVELOPMENT PROGRAMME

DCD runs the Child Development Programme of the Ministry of Health (MOH), together with the National University Hospital.

In 2018, DCD saw more than 4,000 preschool children with a wide range of diagnoses, the most common being language delay (35%), autism spectrum disorder (ASD) (23%) and global developmental delay (11%).

These children are assessed in KKH and receive their intervention in two community satellite therapy centres in the Health Promotion Board and in Riverdale. Over 20,000 therapy sessions were delivered by DCD in 2018.

Whenever appropriate, children are transferred to Early Intervention Programmes for Infants and Children (EIPIC) run by social service agencies, where group-based intervention can be provided in their naturalistic environment till school entry, if needed.

In addition to assessment and family-centred, right-sited intervention, DCD supports children's behaviour; ensures that they are enrolled in programmes and schools where they can thrive best; facilitates seamless transition into their school years and continues to support the families as needed.

SPECIALISED ASD TRACK

DCD has a strong focus on ASD. In 2018, 932 preschool children seen by DCD were diagnosed with ASD. Through a specialised ASD track, the clinical diagnosis is made by paediatricians before formal psychological testing is performed.

An ASD nurse supports the parents as they start their challenging journey into intervention. In partnership with Temasek Foundation, in the BabySibs - Autism Screening Service in Singapore Toddlers (B-ASSIST), siblings of children with ASD (whose risk of ASD is 10 to 20 times higher than the general population) are screened for early identification of ASD.

LEARNING AND BEHAVIOUR TRACK

The Learning and Behaviour Track focuses on kindergarten-aged children with learning, development and behavioural problems that are likely to affect their academic journey.

School readiness is the focus of this track, with screening of learning skills and behaviour, and timely intervention to maximise the narrow window of intervention before school entry. Very high-risk children are supported during their transition into primary school through DCD's collaboration with the Ministry of Education (MOE).

BEHAVIOUR MANAGEMENT

Behaviour management is another strong focus of the department, which adopted the programme "Signposts for better parenting" from the Parenting Resource Centre (PRC) in Melbourne.

Four DCD staff are trained by PRC, and are the only trainers endorsed outside of Australia. They have trained several hundred Signposts facilitators in numerous community organisations in Singapore, who have gone on to train over 5,000 parents in KKH and in the community to manage their children's challenging behaviour.

DCD adopted the Supportive Parenting for Anxious Childhood Emotions (SPACE) Programme from Yale University and adapted it for local preschool children, in partnership with Temasek Foundation. The developer of the programme, Dr Eli R. Lebowitz, trained a team of DCD psychologists to administer this programme to parents, so that anxious children can be supported in the preschool years before they enter primary school (a key but highly stressful transition point), and the risk of developing the mental health disorder of anxiety may be reduced.

The department's psychologists also train early childhood educators to manage behaviour problems in the preschool classroom, in collaboration with the PAP Children's Foundation (PCF).

BUILDING CAPACITY IN THE COMMUNITY

DCD also has an active presence in the community, focusing on capacity and capability building with right-siting and appropriateness of intervention and assessment, through programmes at home, preschools and EIPIC centres.

The process often begins with a small pilot project to determine the suitability of intervention before collaborating with a larger organisation to test the model of care.

- i. A small pilot programme of preschool-based intervention with supportive funding from MOH was the basis of a larger community-based programme,

Mission I'm Possible, which was funded by the Lien Foundation. This programme was adopted by the Ministry of Social and Family Development (MSF) and is now run as the preschool-based Developmental Support-Learning Support Programme (DS-LS), which has since reached more than 500 preschools across the island.

- ii. The Early Childhood Holistic Outcome (ECHO Programme, adapted by DCD from an existing American model), has also been adopted by MSF for the EIPIC centres so that children can be assessed in a holistic and meaningful manner that accurately reflects their abilities in their natural environment and their daily lives. DCD staff currently forms the implementation team for the ECHO project, and the consultancy team for the DS-LS programme.

COMMUNITY COLLABORATION

Collaboration is a key DCD strength. To date, it has collaborated with 38 community agencies to develop and lead programmes, provide training, consultancy and supervision, and identify ways to enhance services for the community.

These include:

- Preschool anchor operators such as PCF and NTUC My First Campus
- EIPIC centres
- Seven tertiary institutions including universities and polytechnics
- MOE, MSF, the Early Childhood Developmental Agency (ECDA)
- Philanthropic organisations including Temasek Foundation, Lien Foundation and the TOTE Board
- Two overseas organisations, namely the Frank Porter Graham (FPG) Institute in the University of North Carolina, and the Parenting Research Centre (PRC) in Melbourne

These collaborations have allowed DCD to be involved in numerous ongoing community and intervention projects. With the support of Lien Foundation, its staff is leading the Circle of Care, a project with Canossaville Children and Community Services, as well as a new programme, Relational Invitational Approach (RIA), which aims to improve the collaboration between clinicians and parents (whose actions, priorities and perspectives are critical for effective intervention for the child).





Services

With Nanyang Polytechnic, the department has developed early versions of literacy apps for children with literacy difficulties.

With FPG in USA, it has also co-developed the CONNECT module, a web-based learning framework for educators on early literacy.

The journey towards the creation of a more inclusive community landscape in Singapore is continuously evolving. With multiple stakeholders and service providers, it is important for DCD to be always alert to movements that will affect the children under its care and to respond quickly to changing needs. The department's large collaborative network is very important in this aspect of its work.

SETTING STANDARDS THROUGH EDUCATION

As a department that has strongly supported the education of its staff, DCD is very fortunate to have nine Allied Health Professionals with PhDs. This strong professional team has allowed the department to have an impact on the standards and service delivery in both the department and the community, as they lead in research, needs analyses for external organisations, programme development and consultancy and technical assistance teams for community projects. They mentor the junior staff and critically review the departmental work.

Paediatric residents spend a total of two months in DCD. A fellowship programme for non-Singaporean paediatricians has also been developed, as the department sees the need to support its developmental colleagues in other countries as they develop their own childhood development programmes. In addition, psychiatry residents, medical students, student psychologists and therapists rotate through the department, so that they can benefit from the large preschool population seen in DCD.

LEADING THE WAY WITH RESEARCH

Research is a small but growing part of DCD's work. The Timely Identification of Developmental and Behaviour Problems in Toddlers (TIDBIT) study, supported by a grant from the National Medical Research Council (NMRC), aims to screen up to 1,050 children over a period of three years. It aims firstly to compare the effectiveness of established tools for developmental screening in young children, and secondly, to determine the screening tool that is preferred by local parents to monitor their child's development.

This study will help DCD make recommendations for nationwide timely identification of developmental delay to facilitate early intervention while the child's brain has the greatest neuroplasticity.

The first autologous cord blood study in children with ASD in Singapore is in progress and will provide useful information

on how research in this area can progress. There are only three published studies on this mode of treatment in the world.

“Our work in DCD is wide-ranging in its scope and impact. There is much more to be achieved, many more journeys to take, many service gaps to bridge, many more children to reach and many mountains to climb. But, we are privileged to be in this field, to do this work and experience the joy of working with children and families every day of our working lives.”

Adjunct Associate Professor Lourdes Mary Daniel,
Head and Senior Consultant,
Department of Child Development, KKH

DOCTORS WITH THE DEPARTMENT OF CHILD DEVELOPMENT, KKH

Head and Senior Consultant

Adj Assoc Prof Lourdes Mary Daniel

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Adj Asst Prof Sylvia Choo Henn Tean

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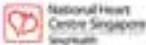
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WHY IS A NEW ECG TEACHING TOOL NEEDED?

As the electrocardiogram (ECG) is an important basic investigation for evaluating cardiac conditions, it is essential to equip medical students, trainees and physicians with the ability to effectively interpret it.

Currently, a myriad of ECG books and applications exist to teach basic ECG reading skills. However, it remains difficult to find material that teaches intermediate-advanced concepts in a simple-to-understand fashion.

A team of Cardiologists (including Senior Residents and Consultants) at the National Heart Centre Singapore (NHCS) first identified this gap in learning when they witnessed fellow clinicians having difficulties interpreting ECG readings.

As such, they set out to develop a learning tool to teach these higher level ECG interpretation skills in a simple and practical way – one that would be useful for medical students and doctors in their daily clinical practice.

Over a few years of refinement and reviews, this culminated in the creation of a new electronic application.

INTRODUCING DR ECG

The interactive App – Dr ECG was launched end 2018. Since then, Dr ECG has been endorsed by several major cardiology societies, including the Chapter of Cardiologists, Singapore Cardiac Society and Asia Pacific Society of Cardiology.

INTERMEDIATE TO ADVANCED CONCEPTS MADE SIMPLE

Dr ECG does not intend to replicate what is already available in other ECG teaching tools, but instead, it focuses on teaching intermediate to advanced practical interpretation skills of common day-to-day clinical cases. The App also aims to share best practices to improve clinical care.

The App further incorporates case-based teaching using real-life case vignettes to aid learning. There are simple illustrations, curated content, practical tips and tricks, and useful algorithms for ECG interpretation.



Services



Content Page



Sample Quizzes



Illustrations

PRACTICAL LEARNING WITH OVER 100 CASE SAMPLES

One of the significant features of Dr ECG is its accessible library of more than 100 ECG examples, categorised by diagnosis. There are also summarised practical clinical learning pearls on related electrophysiology information, put together by the team of doctors in NHCS.

To test and refresh knowledge, there is a series of interactive quizzes, where clinicians can learn from detailed explanations of the answers.

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Counting on Babies Cord Blood to Save Lives

At 28 and newly married, life was rosy for Shou Zhu when the diagnosis of Acute Leukaemia took her on a detour with hospitalisations, blood tests, and two rounds of bone marrow stem cell transplants which did not graft well. As a last resort to save her life, her doctor suggested a cord blood stem cell transplant.

Fortunately for her, a match was found in the Singapore Cord Blood Bank's (SCBB) public cord blood inventory, and the unrelated cord blood stem cell transplantation was performed successfully.

Today, Shou Zhu is doing well, and able to return to work and look after her family. She also makes time to volunteer with SCBB as an outreach advocate.

CORD BLOOD BANKING: A LIFE-SAVING PROCESS

The use of unrelated Cord Blood Stem Cells has grown over the past 25 years. It has become recognised as a trusted alternative source of haematopoietic stem cells in haematopoietic stem cell transplantation (HSCT), and increasingly in research in regenerative medicine.

"The biggest use of unrelated cord blood stem cells today is in the area of allogeneic bone marrow transplantation, where an unrelated recipient is transplanted using cord blood for a variety of blood disorders. Active research may see more cord blood being used to treat other conditions and diseases," shared A/Prof Aloysius Ho, Head, SingHealth Duke-NUS Blood Cancer Centre and Medical Director of SCBB.

In Singapore, 40% to 60% of patients needing HSCT are unable to find a matching donor in their own family. Since genetic types are inherited, they are most likely to find an adult donor match within their own racial group. But cord blood does not have to be perfectly matched: a 4 out of 6 (67%) match with cord blood may be just as good as a 100% match with an adult donor, enabling greater versatility.

THE CONTRIBUTING ROLE OF OBSTETRICIANS IN THE GROWTH OF BANKABLE CORD BLOOD UNITS

There are close to 50,000 babies born annually in Singapore. However, less than 10% of expectant parents publicly donate their baby's cord blood voluntarily. The rest of the cord blood units (CBUs) are either discarded or stored with private cord blood banks.



Factors that contribute to the discard of these precious CBUs include expectant moms failing to make an informed decision on their baby's cord blood due to limited knowledge on cord blood banking, and collected CBUs not meeting the minimum quality criteria. These can be addressed with the support of Obstetricians (OBs).

Within their sphere of influence, OBs play an important role in educating the community and building Singapore's public inventory of bankable CBUs.

Two key areas of active support include:

1) *Creating awareness and allaying concerns*

Although information is readily available on the internet, research indicates that expectant parents seek the counsel and endorsement of their OBs regarding cord blood options.

Of SCBB's current pool of mothers who have donated their babies' cord blood, almost 10% did so after talking to their OBs. OBs are thus highly regarded in influencing the expectant parents' decision on cord blood banking.

As such, physicians can contribute by spreading awareness and information on the various types of cord blood banking (donation vs. privately stored) and helping to address any clinical concerns regarding the cord blood collection process.



2) Making every drop count

The goal of cord blood banking is to fully save precious stem cells in order to save lives. To ensure the usefulness of the unrelated cord blood in HSCT, each CBU has to contain at least 1.2 billion stem cells. Making sure that all stem cells are captured during the collection process would therefore increase the bankability of the CBUs.

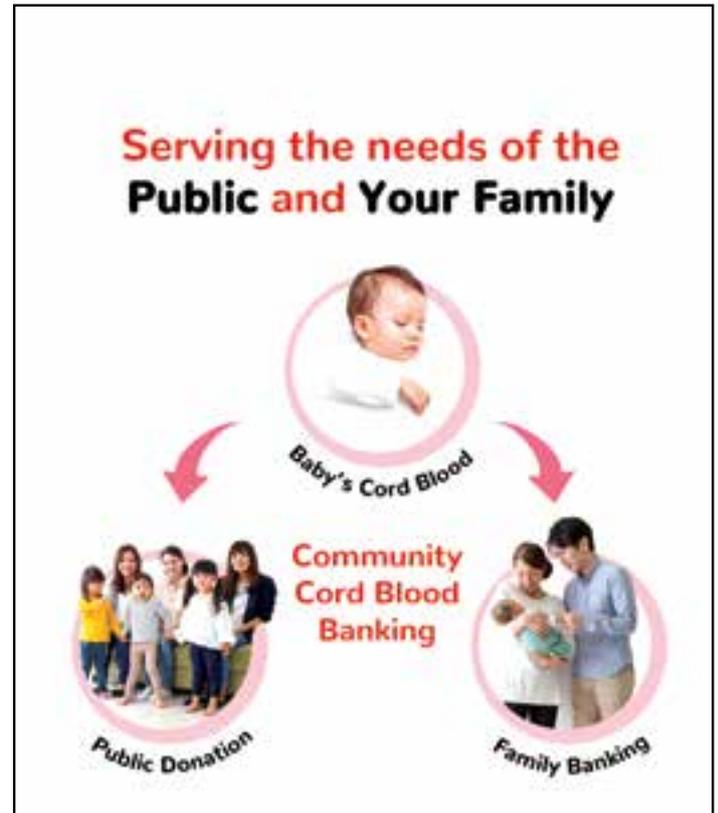
SCBB receives close to 4,000 donated CBUs annually. Of these, only 20% to 25% meet the banking criteria, based on the number of total nucleated cells, number of stem cells, and cell viability (live cells). For those that do not meet these criteria, the CBUs are either discarded, donated for research purposes, or banked for their family's future use.

To make every drop count, best practices that OBs can observe and exercise during the collection process include:

- Clamping cord as close to baby as possible
- Disinfecting venipuncture site thoroughly to avoid contamination
- Using smallest sample necessary for hospital testing
- Minimising manipulation of cord and placenta
- Collecting as much cord blood as possible
- Allowing enough time for cord to blanch

SCBB: AN INTEGRATED HYBRID CORD BLOOD BANKING MODEL FOR THE COMMUNITY

Established in 2005 to provide transplant physicians with a pool of cord blood from within the local community, SCBB today offers both public and family cord banking options to families.



The first of its kind in South-East Asia, this comprehensive approach provides expectant parents with unbiased information on the benefits and limitations of both public and family cord blood banking, enabling them to make an informed decision on their baby's cord blood.

Cord blood is a precious resource that can offer stem cell recipients a new lease of life when a suitable match is found. Together with the community and OB support, lives can be impacted and saved, one donation at a time.



Appointments

DIVISION OF SURGERY & SURGICAL ONCOLOGY, SGH AND NCCS

SingHealth is pleased to announce the formation of the Division of Surgery & Surgical Oncology, SGH and NCCS. The Division marks the coming together of the Division of Surgery, Singapore General Hospital (SGH) and Division of Surgical Oncology, National Cancer Centre Singapore (NCCS), in recognition of the synergies between the two institutions. With 13 departments integrated into the Division, it will leverage the comprehensive suite of services and expand the pool of surgeons, offering seamless care for patients.

GP Referral: 6321 4402 (SGH)
6436 8288 (NCCS)
Email: appointments@sgh.com.sg
callcentre@nccs.com.sg

NEW APPOINTMENTS



Adj Assoc Prof Tan Hiang Khoon
Chairman & Senior Consultant;
Academic Chair, SingHealth Duke-NUS
Surgery ACP



Assoc Prof Ong Hock Soo
Deputy Chairman (Surgery),
Head & Senior Consultant;
Dept of Upper GI & Bariatric Surgery



Adj Assoc Prof Yong Wei Sean
Deputy Chairman (Surgical Oncology) &
Senior Consultant;
Director, Division of Cancer Education,
NCCS;
Director, Education, SingHealth Duke-NUS
Breast Centre



**Adj Assoc Prof Tan Kiak Mien
Veronique**
Head & Senior Consultant,
Dept of Breast Surgery;
Head, SingHealth Duke-NUS Breast Centre



Prof Narayanan Gopalakrishna Iyer
Head & Senior Consultant,
Dept of Head & Neck Surgery



Assoc Prof Andrew Tay Ban Guan
Head & Senior Consultant,
Dept of Oral & Maxillofacial Surgery



**Adj Assoc Prof Chia Shulyn
Claramae**
Head & Consultant,
Dept of Sarcoma, Peritoneal and Rare
Tumours (SPRinT)

INCUMBENT APPOINTMENTS



**Adj Assoc Prof Tan Kwong Wei
Emile John**
Head & Consultant,
Dept of Colorectal Surgery



Adj Asst Prof Ng Chung Fai Jeremy
Head & Senior Consultant,
Dept of General Surgery



Adj Assoc Prof Chan Chung Yip
Head & Senior Consultant,
Dept of Hepato-Pancreato-Biliary/
Transplant Surgery



Assoc Prof Ang Beng Ti
Head & Senior Consultant,
Dept of Neurosurgery



Adj Assoc Prof Yong Tze Tein
Head & Senior Consultant,
Dept of Obstetrics & Gynaecology



Adj Assoc Prof Toh Song Tar
Head & Senior Consultant,
Dept of Otorhinolaryngology -
Head & Neck Surgery



Appointments



Assoc Prof Ho Sun Sien Henry
Head & Senior Consultant,
Dept of Urology



Assoc Prof Chong Tze Tec
Head & Senior Consultant,
Dept of Vascular Surgery

SINGAPORE GENERAL HOSPITAL

GP Referral: 6321 4402
Email: appointments@sgh.com.sg

APPOINTMENT – CONSULTANT



Dr Lim John Wah
Consultant
Dept
Occupational & Environmental Medicine

APPOINTMENTS – ASSOCIATE CONSULTANTS



Dr Vora Bimal Mayur Kumar
Associate Consultant
Dept
Diagnostic Radiology



Dr Jyothirmayi Velaga
Associate Consultant
Dept
Diagnostic Radiology



Dr Karande Gita Yashwantrao
Associate Consultant
Dept
Diagnostic Radiology



Dr Tian Wei Cheng, Brian Anthony
Associate Consultant
Dept
General Surgery



Dr Lawrence Ng Cheng Kiat
Associate Consultant
Dept
Haematology



Dr Tan Si Yun, Melinda
Associate Consultant
Dept
Haematology



Dr Lim Qian Ru Rebecca
Associate Consultant
Dept
Hand & Reconstructive Microsurgery



Dr Hsieh Yi Chen
Associate Consultant
Dept
Internal Medicine



Dr Suraya Binti Zainul Abidin
Associate Consultant
Dept
Orthopaedic Surgery



Dr Ou Yang Youheng
Associate Consultant
Dept
Orthopaedic Surgery



Dr Tay Kae Sian
Associate Consultant
Dept
Orthopaedic Surgery



Dr Tay Xian Khing Kenny
Associate Consultant
Dept
Orthopaedic Surgery



Dr Woo Yew Lok
Associate Consultant
Dept
Orthopaedic Surgery



Dr Edwin Jonathan Aslim
Associate Consultant
Dept
Urology

PROMOTIONS - SENIOR CONSULTANTS



Dr Ho Chia Ming
Senior Consultant
Dept
Diagnostic Radiology



Dr Louis Elliot McAdory
Senior Consultant
Dept
Diagnostic Radiology



Dr Tan Boon Kiat Kenneth
Senior Consultant
Dept
Emergency Medicine



Dr Rajneesh Kumar
Senior Consultant
Dept
Gastroenterology & Hepatology



Dr Nicholas Francis Grigoropoulos
Senior Consultant
Dept
Haematology



Dr Qin Yan
Senior Consultant
Dept
Internal Medicine



Dr Bharadwaj Srabani
Senior Consultant
Dept
Neonatal & Developmental Medicine



Dr Ng Kah Wee
Senior Consultant
Dept
Psychiatry



Dr Chiong Yi
Senior Consultant
Dept
Rehabilitation Medicine



Adj Asst Prof Sewa Duu Wen
Senior Consultant
Dept
Respiratory & Critical Care Medicine



Dr Ho Vui Kian
Senior Consultant
Dept
Surgical Intensive Care



Dr Tang Tjun Yip
Senior Consultant
Dept
Vascular Surgery

PROMOTIONS - CONSULTANTS



Dr Chen Yufan
Consultant
Dept
Anaesthesiology



Dr Low Wen Hao
Consultant
Dept
Anaesthesiology



Dr Loh Jiezheng, Tracy
Consultant
Dept
Anatomical Pathology



Dr Tang Po Yin
Consultant
Dept
Anatomical Pathology



Dr Seow En, Isaac
Consultant
Dept
Colorectal Surgery



Dr Chia Ghim Song
Consultant
Dept
Diagnostic Radiology



Dr Kheok Si Wei
Consultant
Dept
Diagnostic Radiology



Dr Lim Kheng Choon
Consultant
Dept
Diagnostic Radiology



Dr Gayathri Devi D/O Nadarajan
Consultant
Dept
Emergency Medicine



Dr Nur Diana Binte Zakaria
Consultant
Dept
Emergency Medicine



Dr Lam Yun Rui Amanda
Consultant
Dept
Endocrinology



Dr Zhu Ling
Consultant
Dept
Endocrinology



Dr Cheah Chang Chuen Mark
Consultant
Dept
Gastroenterology & Hepatology



Dr Ekstrom Victoria Sze Min
Consultant
Dept
Gastroenterology & Hepatology



Dr Lim Sue Zann
Consultant
Dept
General Surgery



Dr Sim Xiang Ying Jean
Consultant
Dept
Infectious Diseases



Dr Teh Yii Ean
Consultant
Dept
Infectious Diseases



Dr Lee Guozhang
Consultant
Dept
Internal Medicine



Appointments



Dr Woong Liling, Natalie
Consultant
Dept
Internal Medicine



Dr Ng Yeong Huei
Consultant
Dept
Orthopaedic Surgery



Dr Puah Ken Lee
Consultant
Dept
Orthopaedic Surgery



Dr Seng Chusheng
Consultant
Dept
Orthopaedic Surgery



Dr Kiong Liqin Kimberley
Consultant
Dept
Otorhinolaryngology -
Head & Neck Surgery



Dr Loh Ray Han, Shaun
Consultant
Dept
Otorhinolaryngology -
Head & Neck Surgery



Dr Leong Xin Yu, Adeline
Consultant
Dept
Pain Medicine



Dr Liu Peiyun
Consultant
Dept
Renal Medicine



Dr Leong Kah-Lai Carrie
Consultant
Dept
Respiratory & Critical
Care Medicine



Dr Tiew Pei Yee
Consultant
Dept
Respiratory & Critical
Care Medicine



Dr Ng Pei Lun Sue-Ann
Consultant
Dept
Rheumatology &
Immunology



Dr Chen Kenneth
Consultant
Dept
Urology



Dr Lim Kheng Sit
Consultant
Dept
Urology



Dr Chua Ming Er, Jasmine
Consultant
Dept
Vascular &
Interventional
Radiology



Dr Kristen Alexa Lee
Consultant
Dept
Vascular &
Interventional
Radiology

NEW APPOINTMENTS



Assoc Prof Ruban S/O Poopalalingam
Senior Consultant;
Chairman, Medical Board;
Senior Associate Dean, Duke-NUS,
SGH Campus
Dept
Anaesthesiology



Assoc Prof Soh Chai Rick
Senior Consultant;
Chairman, Division of Anaesthesiology &
Perioperative Medicine,
Academic Chair; Anaesthesiology &
Perioperative Sciences ACP
Dept
Anaesthesiology



Assoc Prof Chow Wan Cheng
Senior Consultant;
Group Director, Academic Medicine,
SingHealth;
Senior Associate Dean,
Academic Medicine, Duke-NUS
Dept
Gastroenterology & Hepatology



Dr Lim Chee Hooi
Senior Consultant;
Director, Centre for Digestive and Liver
Diseases (CDLD)
Dept
Gastroenterology & Hepatology



Assoc Prof Loo Chian Min
Senior Consultant;
Chairman (Designate), Division of Medicine
& Academic Chair (Designate),
Medicine ACP
Dept
Respiratory & Critical Care Medicine



Adj Asst Prof Gan Wee Hoe
Head & Senior Consultant
Dept
Occupational &
Environmental Medicine

SENGKANG GENERAL HOSPITAL

GP Referral: 6930 6000
Email: appointments@skh.com.sg

APPOINTMENTS - ASSOCIATE CONSULTANTS



Dr Ang Hui En Hannah
Associate Consultant
Dept
Emergency Medicine



Dr Chan Chee Yun Eunice
Associate Consultant
Dept
Emergency Medicine



Dr Chinmaya Shrikant Joshi
Associate Consultant
Dept
Emergency Medicine



Dr Lau Yee Lyn Corinne
Associate Consultant
Dept
Emergency Medicine



Dr Tan Chieh Ling Jacqueline
Associate Consultant
Dept
Emergency Medicine



Dr Dominic Chen Enhan
Associate Consultant
Dept
General Medicine,
Rehabilitation Medicine



Dr Chua Jia Min
Associate Consultant
Dept
General Medicine,
Endocrinology



Dr Chua Jian Kai Andy
Associate Consultant
Dept
Otolaryngology



Dr Colin Wang Tzong-Yee
Associate Consultant
Dept
Orthopaedic Surgery

PROMOTIONS - SENIOR CONSULTANTS



Dr Naing Chaw Su
Senior Consultant
Dept
General Medicine, Internal Medicine



Dr Lee Lianne Ai Ling
Senior Consultant
Dept
Pathology



Dr Kwok Kah Foo Victor
Senior Consultant
Dept
Psychiatry



Dr Vidya Subrahmanya Upadhyaya
Senior Consultant
Dept
Radiology

PROMOTIONS - CONSULTANTS



Dr Chia Wen Jie Dennis
Consultant
Dept
Emergency Medicine



Dr Koh Shao Hui
Consultant
Dept
Emergency Medicine



Dr Astrid Melani Suantio
Consultant
Dept
General Medicine,
Geriatric Medicine



Appointments



Dr Tan Yan Denise
Consultant
Dept
General Medicine,
Haematology



Dr Soh Xiao Jue Jade
Consultant
Dept
General Medicine,
Infectious Diseases



Dr Peh Wee Ming
Consultant
Dept
General Medicine,
Internal Medicine,
Intensive Care Medicine



Dr Lai Boon Cheok
Consultant
Dept
General Medicine,
Renal Medicine



Dr Muntasir Mannan Choudhury
Consultant
Dept
Orthopaedic Surgery,
Hand Surgery



Dr Seah Renyi Benjamin
Consultant
Dept
Orthopaedic Surgery



Dr Phua Chu Qin
Consultant
Dept
Otolaryngology



Dr Tay Ze Yun
Consultant
Dept
Otolaryngology



Dr Zhang Zhiyong, Edward
Consultant
Dept
Otolaryngology



Dr Cheong Wei Kiong
Consultant
Dept
Radiology



Dr Ngaserin Sabrina Ng Hui Na
Consultant
Dept
Surgery



Dr Tay Jia Sheng
Consultant
Dept
Surgery



Dr Tousif Kabir
Consultant
Dept
Surgery



Dr Yeung Po Man Baldwin
Consultant
Dept
Surgery



Dr Teo Shunming Jonathan
Consultant
Dept
Urology



Dr Liang Weihao
Consultant
Dept
Plastic, Reconstructive
& Aesthetic Surgery
Services

KK WOMEN'S AND CHILDREN'S HOSPITAL

GP Referral: 6692 2984
Email: centralappt@kkh.com.sg

APPOINTMENT – CONSULTANT



Dr Poon Ngar-Yee
Consultant
Dept
Psychological Medicine

APPOINTMENTS – ASSOCIATE CONSULTANTS



Dr Goh Suk-Hui Lynette (Wu Suhui)
Associate Consultant
Gastroenterology,
Hepatology and
Nutrition Service



Dr Kam Kai-Qian
Associate Consultant
Infectious Diseases
Service



Dr Ng Wei Di (Huang Weidi)
Associate Consultant
Dept
Neonatology



**Dr Ee Tat Xin
(Yu Daxin)**
Associate Consultant
Division of Obstetrics
and Gynaecology



**Dr Hui Yan Yan,
Celene (Xu En'en)**
Associate Consultant
Division of Obstetrics
and Gynaecology



**Dr Lim Yu Hui
(Lin Yuhui)**
Associate Consultant
Division of Obstetrics
and Gynaecology



Dr Yip Swee Lin
Associate Consultant
Division of Obstetrics
and Gynaecology



**Dr Yong Su-Ern
Jenica (Yang Su'en)**
Associate Consultant
Dept
Otolaryngology



**Dr Chan Su-Wan
Bianca**
Associate Consultant
Rheumatology and
Immunology Service



**Dr Teh Kai Liang
(Zheng Kailiang)**
Associate Consultant
Rheumatology and
Immunology Service



**Dr Chan Li-Jen
Carolyn**
Associate Consultant
Dept
Women's Anaesthesia



Dr Lim Ming Jian
Associate Consultant
Dept
Women's Anaesthesia

PROMOTIONS - SENIOR CONSULTANTS



**Adj Asst Prof Sita
Padmini Yeleswarapu**
Senior Consultant
Dept
Child Development



**Dr Wong Choong Yi
Peter**
Senior Consultant
Dept
Emergency Medicine



**Dr Kua Phek Hui
Jade**
Senior Consultant
Dept
Emergency Medicine



**Dr Rajat
Bhattacharyya**
Senior Consultant
Haematology/
Oncology Service



**Adj Asst Prof
Chong Siew Le**
Senior Consultant
Nephrology Service



**Dr Mohammad
Ashik bin Zainuddin**
Senior Consultant
Dept
Orthopaedic Surgery



Dr Chan Ching Yee
Senior Consultant
Dept
Otolaryngology



**Adj Asst Prof Yeo
Yen Ching**
Senior Consultant
Dept
Pathology and Laboratory
Medicine



Dr Rajive Dabas
Senior Consultant
Dept
Women's Anaesthesia



Dr Leong Wan Ling
Senior Consultant
Dept
Women's Anaesthesia

PROMOTIONS - CONSULTANTS



**Dr Wong Ju-Ming
Judith**
Consultant
Children's Intensive
Care Unit



Dr Mok Wing Yan
Consultant
Dept
Diagnostic and
Interventional Imaging



Dr Lau Li Ching
Consultant
Dept
Diagnostic and
Interventional Imaging



Appointments



**Dr Tan Ming Ren
Ronald**
Consultant
Dept
Emergency Medicine



**Dr Ho Wen Wei,
Christopher**
Consultant
Gastroenterology,
Hepatology and
Nutrition Service



**Dr Roselyne Shirley
Pat Fong**
Consultant
Dept
Psychological
Medicine



Dr Kazila Bhutia
Consultant
Dept
Urogynaecology

NEW APPOINTMENTS



Dr Lee Yien Sien
Head
Breast Imaging and BMD Services



Dr Teo Sze Yiun
Head
Dept
Diagnostic and Interventional Imaging



Dr Toh Han Wei Luke Michael
Deputy Head
Dept
Diagnostic and Interventional Imaging



Dr Sashikumar Ganapathy
Deputy Campus Director
(Undergraduate)
Education Office



Asst Prof Hong Pheng Amos
Deputy Director
KK Research Centre



**Adj Assoc Prof Koh Jean Aan
Mark**
Deputy Campus Director
Medical Innovation and Care
Transformation



Dr Low Yin Yee Sharon
Head
Neurosurgical Service



**Adj Assoc Prof Lam Ching Mei
Joyce**
Deputy Head
Dept
Pathology and Laboratory Medicine

NATIONAL CANCER CENTRE SINGAPORE

GP Referral: 6436 8288
Email: callcentre@nccs.com.sg

APPOINTMENTS – ASSOCIATE CONSULTANTS



Dr Chiang Jianbang
Associate Consultant
Dept
Medical Oncology



**Dr Saw Pei Li
Stephanie**
Associate Consultant
Dept
Medical Oncology



**Dr Tan Ying Cong
Ryan Shea**
Associate Consultant
Dept
Medical Oncology



Dr Teh Yi Lin
Associate Consultant
Dept
Medical Oncology



Dr Chan Wan Ying
Associate Consultant
Dept
Oncologic Imaging

NEW APPOINTMENTS



Assoc Prof Ong Yew Kuang Simon

Deputy Medical Director,
NCCS (Education);
Senior Consultant,
Division of Medical Oncology, NCCS;
Academic Vice Chair (Education),
SingHealth Duke-NUS Oncology
Academic Clinical Programme



Assoc Prof Toh Han Chong

Deputy Medical Director,
NCCS (Strategic Partnerships);
Senior Consultant,
Division of Medical Oncology, NCCS



Adj Asst Prof Wong Fuh Yong

Director, Cancer Informatics, NCCS;
Senior Consultant,
Division of Radiation Oncology, NCCS

NATIONAL DENTAL CENTRE SINGAPORE

GP Referral: 6324 8798

Email: appointment@ndcs.com.sg

PROMOTIONS – SENIOR CONSULTANTS



Dr Soong Poh Luon

Senior Consultant

Dept

Oral & Maxillofacial Surgery



Dr Quek Heng Chuan

Senior Consultant

Dept

Restorative Dentistry

Sub-specialty

Prosthodontics

PROMOTIONS – CONSULTANTS



Dr Rahul Harshad Nagadia

Consultant

Dept

Oral & Maxillofacial
Surgery



Dr Song Yi Lin

Consultant

Dept

Orthodontics



Dr Chan Pei Yuan

Consultant

Dept

Restorative Dentistry

Sub-specialty

Endodontics



Dr Foo Lean Heong

Consultant

Dept

Restorative Dentistry

Sub-specialty

Periodontics



Dr Yang Jingrong

Consultant

Dept

Restorative Dentistry

Sub-specialty

Periodontics

NATIONAL HEART CENTRE SINGAPORE

GP Referral: 6704 2222

Email: central.appt@nhcs.com.sg

APPOINTMENT - ASSOCIATE CONSULTANT



Dr Chong Jun Hua

Associate Consultant

Dept

Cardiology



Appointments

PROMOTIONS - SENIOR CONSULTANTS



Asst Prof Chin Woon Loong Calvin
Senior Consultant
Dept
Cardiology
Sub-specialties
Cardiac Magnetic Resonance Imaging,
Echocardiography



Asst Prof Koh Su-Mei Angela
Senior Consultant
Dept
Cardiology

PROMOTIONS - CONSULTANTS



Dr Mohammed Rizwan Amanullah
Consultant
Dept
Cardiology
Sub-specialty
Echocardiography



Dr Foo Jie Sheng
Consultant
Dept
Cardiology
Sub-specialty
Adult Congenital Heart Disease



Dr Ho Jien Sze
Consultant
Dept
Cardiology
Sub-specialties
Cardiovascular Rehabilitation &
Preventive Cardiology



Dr Loh Xingyuan Julian Kenrick
Consultant
Dept
Cardiology
Sub-specialties
Heart Failure, Echocardiography



Dr Ng Choon Ta
Consultant
Dept
Cardiology
Sub-specialties
Heart Failure, Echocardiography



Dr Yap Jiunn Liang Jonathan
Consultant
Dept
Cardiology
Sub-specialty
Interventional Cardiology



Dr Kang Ning
Consultant
Dept
Cardiothoracic Surgery
Sub-specialties
Thoracic and Vascular Surgery, Cardiac
Surgery (Adult)

NEW APPOINTMENTS



Prof Koh Tian Hai
Emeritus Consultant, SingHealth
Dept
Cardiology
Sub-specialty
Interventional Cardiology

GP Referral: 6321 4377 (SGH Campus)
6330 6363 (TTSH Campus)
Email: appointments@nni.com.sg

NATIONAL NEUROSCIENCE INSTITUTE

APPOINTMENTS – ASSOCIATE CONSULTANTS



Dr Han Xinguang, Julian
Associate Consultant
Dept
Neurosurgery
(TTSH Campus)

Dr Pang Yu Zhi
Associate Consultant
Dept
Neurology
(SGH Campus)

Dr Chen Min Wei
Associate Consultant
Dept
Neurosurgery
(SGH Campus)

PROMOTIONS - SENIOR CONSULTANTS



Dr Gosavi Tushar Divakar
Senior Consultant
Dept
Neurology (SGH Campus)
Sub-specialty
Epilepsy

Dr Hwang Ying Khai Peter
Senior Consultant
Dept
Neurosurgery (TTSH Campus)
Sub-specialties
General Neurosurgery, Skull Base Surgery

PROMOTIONS - CONSULTANTS



Dr Singh Shekhawat Ravindra
Consultant
Dept
Neurology (SGH Campus)
Sub-specialty
Stroke



Dr Chen Zhiyong
Consultant
Dept
Neurology (TTSH Campus)
Sub-specialty
General Neurology



Dr Neo Xiumin Shermyn
Consultant
Dept
Neurology (TTSH Campus)
Sub-specialties
Parkinson's Disease and Movement Disorders,
General Neurology

Dr Chiew Hui Jin
Consultant
Dept
Neurology (TTSH Campus)
Sub-specialty
General Neurology

NEW APPOINTMENT



Dr Ting Kang Seng Simon
Head of Service & Senior Consultant
Dept
Neurology (SGH Campus)
Sub-specialties
Behavioral Neurology,
Dementia, General Neurology

SINGAPORE NATIONAL EYE CENTRE

GP Referral: 6322 9399
Email: appointments@snecc.com.sg

PROMOTIONS – SENIOR CONSULTANTS



Dr Livia Teo
Senior Consultant
Dept
Oculoplastic
Sub-specialty
Ophthalmology



Dr Donny Hoang Q. V.
Senior Consultant
Dept
Surgical Retina
Sub-specialty
Ophthalmology

PROMOTIONS – CONSULTANTS



Dr Saadia Farooqui
Consultant
Dept
Paediatric
Ophthalmology &
Adult Strabismus
Sub-specialty
Ophthalmology



Dr Lim Hou-Boon
Consultant
Dept
Cataract and
Comprehensive
Ophthalmology
Sub-specialty
Ophthalmology



Dr Ong Hon Shing
Consultant
Dept
Corneal and External
Eye Disease
Sub-specialty
Ophthalmology



DON'T LIMIT YOUR CHALLENGES. CHALLENGE YOUR LIMITS.

If you are a qualified doctor, a challenging career awaits you at SingHealth. We seek suitably qualified candidates to join us as:

- SENIOR CONSULTANTS / CONSULTANTS / ASSOCIATE CONSULTANTS
- RESIDENT PHYSICIANS
- STAFF REGISTRARS / SERVICE REGISTRARS

Interested applicants are to email your CV with full personal particulars, educational and professional qualifications (including housemanship details), career history, present and expected salary, names of at least two professional references, contact numbers and e-mail address together with a non-returnable photograph.

Please email your CV to the respective institutions' email addresses/online career portals with the Reference Number MN1910.



The SingHealth Duke-NUS Academic Medical Centre draws on the collective strengths of SingHealth and Duke-NUS Medical School to drive the transformation of healthcare and provide affordable, accessible, quality healthcare.

With 42 clinical specialties, a network of 4 Hospitals, 5 National Specialty Centres, 9 Polyclinics and Bright Vision Community Hospital, it delivers comprehensive, multidisciplinary and integrated care.

To enhance community care, the new Outram Community Hospital on the SGH Campus will be completed by 2020.

■ Singapore General Hospital

Departments seeking:
Resident Physicians and Staff Registrars:

- Anaesthesiology
- ENT-HNS
- General Surgery
- Emergency Medicine
- Neurology
- O&G

Consultants:

- Acute Care Surgery/Trauma
- Anatomical Pathology
- Geriatric Medicine
- Psychiatrists

Website: www.sgh.com.sg

Career Portal: www.sgh.com.sg/subsites/sgh-careers/medical/pages/career-opportunities.aspx

Email: careers.medical@sgh.com.sg

■ KK Women's and Children's Hospital

Departments seeking:

Consultant/Associate Consultant (Haematologist, Microbiologist, Paediatric Pathologist):

- Pathology & Laboratory Medicine

Consultant/Associate Consultant:

- Diagnostic & Interventional Imaging

Resident Physicians:

- Emergency Medicine
- Obstetrics & Gynaecology

Staff Registrars:

- Diagnostic & Interventional Imaging
- Paediatric Surgery

Staff Physicians:

- Paediatric Surgery

Website: www.kkh.com.sg

Email: medical.hr@kkh.com.sg

■ National Heart Centre Singapore

Departments seeking Resident Physicians:

- Cardiology
- Cardiothoracic Surgery

Website: www.nhcs.com.sg

Email: joyce.soh.y.h@nhcs.com.sg

■ National Neuroscience Institute

Departments seeking Resident Physicians and Service Registrars:

- Neurology
- Neuroradiology
- Neurosurgery

Website: www.nni.com.sg

Email: nni_hr@nni.com.sg

■ Sengkang General Hospital

Departments seeking:
Resident Physicians and Staff Registrars:

- Anaesthesiology
- Cardiology
- Emergency Medicine
- Surgery
- General Medicine (with interest in Dermatology, Endocrinology, Gastroenterology, Geriatric Medicine, Rehabilitation Medicine, Renal Medicine and Respiratory Medicine)
- Intensive Care Medicine
- Neurology
- Orthopaedic Surgery (with interest in Hand Surgery and Orthopaedic Surgery)
- Otolaryngology
- Plastic, Reconstructive & Aesthetic Surgery Services
- Urology

Senior Consultants, Consultant, Associate Consultant:

- Radiology
- Pathology
- Urology

Website: www.skh.com.sg

Career Portal: www.skh.com.sg/careers/Pages/careers.aspx

Email: careers@skh.com.sg

■ Singapore National Eye Centre

Department seeking:

- Resident Physician, Ophthalmology
- Resident Physician, Primary Eye Care

For more information, please visit the Career Opportunities section on the Singapore National Eye Centre website.

Website: www.snec.com.sg

Email: recruitment@snec.com.sg

■ SingHealth Community Hospitals (Sengkang Community Hospital, Outram Community Hospital and Bright Vision Hospital)

Department seeking:
Consultant, Associate Consultant, Staff Registrars, Resident Physician:

- Family Medicine

Website: <http://www.singhealthch.com.sg/>

Career Portal: www.singhealth.com.sg/SCH/careers/Pages/Careers.aspx

Email: schrecruitment@singhealthch.com.sg



Paediatric Epilepsy Training (PET) Course

A Forum for Healthcare Professionals

Date : **PET1** - 24 or 28 February 2020
(Monday or Friday)

: **PET2** - 25 and 26 February 2020
(Tuesday and Wednesday)

Time : 8.30am to 5.15pm

Fee : **PET1** - S\$300.00 - Medical Specialists
S\$250.00 - Allied Health Professionals /
Nurses / Trainees

: **PET2** - S\$600.00 - Medical Specialists
S\$500.00 - Allied Health Professionals /
Nurses / Trainees

Venue: Academia, Singapore General Hospital
(SGH) Campus, 20 College Road, Singapore 169856



Paediatric Epilepsy Training (PET1) Course

24 or 28 February 2020 (Monday or Friday),
8.30am to 5.15pm

PET1 is a one-day course which will be delivered by Consultant Paediatricians. The course is recommended for all doctors and nurses who contribute to the initial or ongoing care of a child experiencing paroxysmal disorders in the acute and community setting.

It is recommended that those who plan to undertake PET2 and PET3 should first complete PET1.*

* Not offered in this event

Paediatric Epilepsy Training (PET2) Course

25 and 26 February 2020 (Tuesday and Wednesday),
9.00am to 5.15pm

PET2 has been developed to improve practice within childhood epilepsies. It is a two-day course, consisting of lectures and interactive workshops. PET2 concentrates on general aspects of the epilepsies (history taking, differential diagnosis, investigation etc) and epilepsies encountered in infants and young children.

It is recommended that all those undertaking a PET2 course should consider attending a PET1 course first.

Registration and payment must be made before 19 February 2020 (Wednesday).
Confirmation of registration will be issued upon receipt of completed registration form and full payment.
Registration fees are non-refundable.

For more details, please call **6394 8746** (Monday to Friday, 8.30am to 5.30pm)
or log on to **www.kkh.com.sg/events**.

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Neurology Service, KKH

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Marketing
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Courses

Basic ECG Course 2020

The ECG Course is an annual event organised by the National Heart Centre Singapore (NHCS).

The course is targeted at doctors (including General Practitioners), Allied Health, Senior Nurses, General Trainees/Fellows, and Medical Students.

Electrocardiogram (ECG) remains as one of the most vital diagnostic tools in the practice of cardiology, as it plays a critical role in the early detection and diagnosis of cardiovascular abnormalities. It is our objective to introduce the importance of ECG to more medical professionals and allow them to become familiar with the interpretations of basic ECG readings.

Date: 8 March 2020, Sunday

Time: 8.30am to 2pm

Venue : NHCS, Level 7

CME Points: 2

Course fees and registration details to be announced. Stay tuned to the NHCS Events webpage for more information at www.nhcs.com.sg/education-training/events-conferences/.



For queries, please email nhccme@nhcs.com.sg or contact Ms Leong Tarn Meng/Ms Kimmey Poh at **6704 2382/2381**.



SingHealth

www.singhealth.com.sg

GP FAST TRACK APPOINTMENT HOTLINES

	Singapore General Hospital	6321 4402
	Changi General Hospital	6788 3003
	Sengkang General Hospital	6930 6000
	KK Women's and Children's Hospital	6692 2984
	National Cancer Centre Singapore	6436 8288
	National Dental Centre Singapore	6324 8798
	National Heart Centre Singapore	6704 2222
	National Neuroscience Institute	6330 6363
	Singapore National Eye Centre	6322 9399

DIRECT WARD REFERRAL CONTACT NUMBERS

	Singapore General Hospital	6321 4822
	Changi General Hospital	6850 1648
	KK Women's and Children's Hospital	6692 2984

SINGHEALTH DUKE-NUS ACADEMIC MEDICAL CENTRE

	Singapore General Hospital		Changi General Hospital
	Sengkang General Hospital		KK Women's and Children's Hospital
	National Cancer Centre Singapore		National Dental Centre Singapore
	National Heart Centre Singapore		National Neuroscience Institute
	Singapore National Eye Centre		SingHealth Community Hospitals
			Polyclinics SingHealth