
SMA



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PAIN MANAGEMENT:

East MEETS *West*



Chronic Pain Management
in General Practice

Learning and Practising
Acupuncture



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PUBLISHER

Singapore Medical Association

2985 Jalan Bukit Merah

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Singapore 159457

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The EDITORS' MUSINGS

Dr Tina Tan

Editor

Dr Tan is a psychiatrist with the Better Life Psychological Medicine Clinic, and a visiting consultant at the Institute of Mental Health. She is also an alumnus of Duke-NUS Medical School. Between work and family life, she squeezes time out for her favourite pastimes – reading a good (fiction) book and writing.

Let's talk briefly about trauma. Specifically, the re-experiencing of it.

This editorial comes on the heels of the ever-growing COVID-19 cluster at Tan Tock Seng Hospital.

Although we live in an era where rapid advances in medical science and technology have increased global average life expectancy greatly, there remain many unknowns and unanswered questions in the realm of western medicine. Hence, more people are increasingly looking to alternative medicine, be it for disease prevention, medical treatment or for health maintenance.

In this issue, we are delighted to have Dr Bernard Lee, interventional pain specialist and founder of Singapore Paincare Center, to share with us his insights into pain management. We also have Dr Tan Tee Yong, an anaesthesiologist who subspecialises in pain medicine, to shed light on his interesting journey of learning acupuncture and how his patients benefitted from it.

As we enter the second year since the COVID-19 pandemic hit us, many

Last year, just as western media sources praised Singapore's COVID-19 response, we were hit by a tsunami of dormitory cases and smacked with the circuit breaker.

Today, I feel the same eerie sense of déjà vu. Just one week prior to writing, *Bloomberg* listed Singapore as the "world's best place to be amid COVID-19". #premature

Honestly, I'm just waiting for the Prime Minister to appear on national television with that magical language-changing blue cup of his.

For better or worse, our days of reprieve are over. It is not ideal, but sadly not unexpected, given how other countries have

of us have leveraged on telemedicine to provide remote medical care for our patients. Mr Jansen Aw and Dr Alex Cheng touch on telemedicine and the legal aspects surrounding its use. Dr Kenneth Lyen also pens his reflections on taking the COVID-19 vaccine and the different types of vaccines available around the world.

Research has shown that the SARS-CoV-2 virus is linked to cardiovascular diseases and vice versa. Dr VP Nair, interventional cardiologist, shares with us more on cardiac biomarkers, how the virus causes damage to the heart and how having cardiovascular diseases increases the risk of a person contracting severe forms of COVID-19.

Finally, look out for the book reviews from our Editor Dr Tina Tan chronicling the journeys of medical students and doctors in their care of patients.

There is an old Chinese saying that goes, "学海无涯，唯勤是岸".

been struggling with this wily, elusive and evolving virus.

All I can say is this – vaccination remains to be our best shot (pun intended) at reducing COVID-19's impact. That, and stringent safe-distancing measures and appropriate border controls. Both require decisiveness on the Government's part, while adherence to safe-distancing measures the absolute cooperation of the populace. It is clear that things have been lax on the parts of many. We have gained invaluable experience in the past year dealing with COVID-19. Only time will tell whether that experience, wrought through the tireless efforts of many, will tide us through this current crisis.

Dr Chie Zhi Ying

Deputy Editor

Dr Chie is a family physician working in the National Healthcare Group Polyclinics. She also holds a Master of Public Health from the National University of Singapore and is a designated workplace doctor. She enjoys freelance writing and writes for Chinese dailies *Lianhe Zaobao*, *Lianhe Wanbao*, *Shin Min Daily News* and health magazine *Health No. 1*. She can be contacted at chiezhiying@gmail.com.

It means knowledge, like a sea, is boundless; only through hard work can one reach the destination. Only by keeping an open mind and zest for learning can we better the lives of ourselves and others. With this, I hope you enjoy the issue. ♦

Chronic Pain Management in General Practice

Text by Dr Bernard Lee

FEATURE



Dr Lee is the chief executive officer of Singapore Paincare Holdings, a consultant pain specialist with more than 15 years of clinical experience and the founder of Singapore Paincare Center. He is also trained in acupuncture. He has been actively volunteering in elderly homes and senior centres, providing free medical consultations and treatments to needy patients since 2010.



Introduction

Chronic pain is a common condition that challenges both doctors and patients, with the elusive concept of cure being the goal of medical intervention and treatment. Pain is a complex biopsychosocial phenomenon. According to the International Association for the Study of Pain's (IASP) definition, pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described by the patient in terms of such damage.¹ IASP further defines chronic pain as "pain which has persisted beyond normal tissue healing time." While the shift from acute to chronic pain is arbitrarily placed at a three-month duration, the main differentiation in management is that in acute pain, the focus is on addressing the cause of the pain, while in chronic pain management, the focus is on managing the pain, addressing the effects of the pain and maximising function and quality of life.

Prevalence of chronic pain varies between 8% and 45% of the population, with 10% to 15% of the population presenting to their GPs.² This prevalence of chronic pain increases with age. Chronic pain affects 100 million Americans,³ 25 million of whom report chronic daily pain.⁴ With an estimated economic cost of \$560 to \$635 billion/year,^{3,5} chronic pain is one of the most important issues in both medicine and public health. In a survey of Australian GPs, they found that at least 11% of chronic problems managed by GPs were pain conditions and that 37.5% of adult appointments in a typical week involved chronic pain complaints. It also stated that analgesics were among two of the top five most prescribed medications.⁶ Our local Singapore prevalence study of chronic pain reported 8.7% in the *Annals, Academy of Medicine, Singapore* in November 2009.⁷ Even though the prevalence of chronic pain was found to be marginally lower compared to other studies, the impact of pain was just as significant.

Pain is commonly encountered in general practice. The literature shows that GPs have low satisfaction in treating patients with chronic pain and only 34% of GPs felt comfortable in managing these patients.^{8,9} Many GPs feel that they do not have adequate training from their medical school training (82%) or postgraduate general practice training (55%) to manage patients with chronic pain.⁸

Most patients who experience chronic pain live with it for at least seven years and one in six chronic pain sufferers says that their pain is sometimes so bad that they want to die.¹⁰ Of participants

surveyed, 27% said that they were less able or unable to maintain relationships with friends and family and over 40% of chronic pain sufferers say their pain impacts everyday activities.¹⁰ Breivik demonstrated that 21% of chronic pain patients had been diagnosed with depression because of their pain, 61% were less able or unable to work outside the home, 19% had lost their jobs and 13% had changed jobs because of their pain.¹¹ It is estimated that 40% to 60% of patients with chronic pain have inadequate management of their pain.^{10,11}

Torrance et al established that severe chronic pain was significantly associated with all-cause mortality and particularly death from cardiovascular disease.¹² Such evidence suggests that in assessing patients with chronic pain, physicians should view chronic pain as a serious risk marker for premature mortality.^{12,13}

GPs in primary care are "first-contact, accessible, continued, comprehensive and coordinated care"¹⁴ providers. In most countries, of the 20% of the general population who experience chronic pain, the overwhelming majority are managed in primary care by their GPs, while only 0.5% to 2% are referred to secondary care for pain management.¹⁰ Consultations on pain account for 22% of all primary care consultations,¹⁵ and pain is one of the main reasons for patients seeking contact with healthcare.¹⁶ Patients with chronic pain visit their GPs twice as often as patients without chronic pain.¹⁷

GPs see undifferentiated illness in patients whom they assess, diagnose

and manage in the space of a five to ten-minute consult. The successful management of chronic pain in primary care relies on a multidisciplinary and holistic approach aimed at both minimising pain as much as possible and teaching patients how to live well with chronic pain. It is not easy nor realistic to expect this type of multi-dimensional touchpoints via our GPs in Singapore. However, the importance of addressing chronic pain in primary care avoids the risk of “biased” professionals from disparate backgrounds offering treatments based on their specialty skill sets instead of providing the comprehensive multidisciplinary pain care that many patients need.³ Hence, for any advances in identification and management of chronic pain to be useful in a primary care setting, they must be useable within the time and resource constraints and restrictions that are inherent to general practice.

Identification of chronic pain in primary care

Because of the relative newness of pain medicine as an independent subspecialty and the existence of multiple pain professional organisations with differing agendas and disciplines offering “pain relief”, pain management risks are inconsistent and uncoordinated.³ Addressing chronic pain in a general practice setting has the potential to provide high quality, readily accessible pain management which is available to the population in the volume required. However, inherent to that solution are the challenges posed by identifying and managing chronic pain within the constraints of general practice.

In managing patients with chronic pain in primary care, the aim is generally to rule out treatable and modifiable causes and then support the patient to live as well as possible, with the maximum quality of life despite their chronic pain. This approach takes the form of bedside intervention, drug, non-drug and self-management interventions.

I have devised a “4Ps” mnemonic for assessment and management of chronic pain through my experience in educating GPs and specialist pain medicine trainees. Many have found this useful, especially when the case is highly complex.

Pain picture

The location and nature of the pain (eg, persistent shoulder pain with restriction of movement). Labelling of the pain enables one to be able to distil and categorise the pain syndrome (eg, cervicgia with radiculopathy or lumbago with sciatica; coccydynia and atypical facial pain).

Pain pathology

The possible mechanisms and/or pathologies that may be causing the pain are as follows.

Mechanical cause of pain: There may be obvious mechanical pain generators versus unknown elusive causation of pain. Mechanical pain generators follow the Cartesian model of pain pathway such as meniscal tear in chronic knee pain or a facet-mediated pain in arthrosis of the facet joints in the spine. Chronic inflammatory conditions, such as rheumatoid arthritis and ankylosing spondylitis, perpetuate their pain through ongoing destruction of the surrounding tissue via unabated immunological hyper-response.

In low back pain, its heterogeneous causes of non-specific lumbago can make any medical practitioner look incompetent. There are indeed many causes ranging from spinal causes such as disc herniation, facet arthropathy and nerve impingement, to musculoskeletal factors such as back sprains and muscle spasticity. Muscle knots and spasms are worth mentioning as they can cause significant pain and distress.

Functional cause of pain: Pain sensitisation can be via central nervous system (CNS) and peripheral nervous system amplification. In fibromyalgia, it is CNS sensitisation that results in generalised body pain. In these conditions, there is no stimulus or pain generator at all to start with. This is similar to a sensitive tooth syndrome whereby there is no mechanical cause such as cracked tooth, gingivitis or related pathologies. In persistent post-traumatic painful conditions where the original pain generator has healed, the remaining pain is due to the sensitisation of the autonomic sensory nerves, giving rise to an uncoupling of the stimulus-response relationship (eg, complex regional pain syndrome). Other common

Case scenario

Mrs Lim CK, aged 54, suffered from painful shoulder with restriction of movement for more than a year.

It started as a discomfort in her right shoulder. She worked as a human resource manager and thought that she had pulled something while carrying files or holding the telephone cradle. But within a few months, the pain was so bad that she could not sleep at night.

She tried many different treatments and remedies including chiropractic, traditional Chinese medicine, osteopathy and physiotherapy.

She had deep tissue massage as well as manipulation of her shoulder joints which made the pain worse, increasing its stiffness. She was told to bear with the pain while being manipulated as the qi had to be unblocked through painful massage. She tried ice and heat treatment. She had some limited response with acupuncture. Painkillers did not relieve her shoulder pain, not one bit. The shoulder surgeon wanted to operate

functional pain syndromes include trigeminal neuralgia, irritable bowel syndrome and migraine headaches.

Psychological influences

Anxiety or depressive symptoms will impact and influence the pain experience and its report. Often, patients do not articulate their depressive symptoms. These may need additional closed-ended questions regarding their energy level, interest in their surrounding and social interactions.

Performance status

It is important to know the activity level and function of the patients, whether the patients are de-conditioned and/or having pacing issues. Apart from mechanical activity performance level, it is necessary to know about the sleep performance of the patient. Sleep habits and hygiene are documented to establish the patient's baseline and its impact to his/her next day's cognitive function as well as energy level.

on her shoulder, to “trim” away the acromial bone spur and repair the frayed supraspinatus tendons.

By this point in time, her arm was so stuck that her husband had to help her hook her bra strap, wash her hair and even pull over or take off any T-shirt. Her shoulder abduction was 0 to 90 degrees, extension 0 to 10 degrees, and external/internal rotation 0 to 40 degrees. There was significant disability due to restriction of motion of the painful joint. At night, she could not sleep on her affected shoulder. It would be so painful that it woke her from her sleep. Soon she was only able to lift her arms up to her sides and not up towards her head. The range of movement of her right shoulder was so limited that she could not even lift a bowl of soup or carry any load.

After six months of living with the pain, Mrs Lim was treated with the following:

1. Supraspinatus cortisone injection
2. Subacromial bursa injection
3. Subscapularis myofascial injection.

Application of the 4Ps to the case

Pain Picture

What is the nature of the shoulder pain: is it a localised pain or a referred pain condition? Is the pain brought on upon movement of the shoulder joint, which is more likely a local pathology (eg, rotator cuff syndrome or osteoarthritis or shoulder sprain)? Referred pain to shoulder may have its origin in the cervical spine such as C5 radiculopathy secondary to foraminal stenosis or nerve impingement from disc herniation. While referred pain conditions may present with pain inhibition, its passive movements would usually not be impeded nor restricted.

Pain Pathology

Mechanical causes: Adhesive capsulitis (frozen shoulder) is a condition that causes restriction of motion in the shoulder joint. The cause of a frozen shoulder is not well understood, but

it often occurs for no known reason. Frozen shoulder causes the capsule surrounding the shoulder joint to contract and form scar tissue. Its origin may be secondary to tears of the rotator cuffs caused by acromion bone spur or osteoarthritis of the glenohumeral joint. Other differential diagnoses may be shoulder bursitis or tendinitis with severe pain restriction of movement.

Functional Causes: The likelihood of a functional cause for the shoulder pain is low. The mechanical cause accounts for the persistence of shoulder pain. The functional aspect of frozen shoulder may be contributed via menopausal hormonal imbalance, adding to the progression of pain after the initiation of the pain from the primary injury and inflammation.

Psychiatric/psychological contribution

There were no significant depressive or anxiety symptoms. Despite having chronic pain from her condition for more than six months, she did not exhibit any psychological ramification from the impact of pain. Look actively for unexplained weight loss, low mood or low energy to prompt further evaluation. Sometimes chronic pain impacting insomnia and poor sleep quality may be the start of a stress disorder.

If there are any underlying untreated low-grade depression or anxiety syndromes, these would have bearings on the outcomes and prognosis of our treatment of pain conditions.

Performance impact

There is significant impact on function and disability. The frozen shoulder has resulted in inability of wearing clothes, washing hair and lying dependent on the painful shoulder. An MRI of shoulder may be warranted if weakness was assessed, to exclude possible rotator cuff tears.

In our evaluation of performance, we look specifically at fear avoidance and poor pacing behaviour. These traits will predispose to poorer outcomes and need for more intense interventions.

Pain management strategies^{18,19}

When we are faced with any painful condition, it is in our innate self to eradicate the pain generator and provide long-term elimination of pain. We often

view all pain conditions as acute pain models whereby if we reverse the primary pathology, the pain will be resolved.

Persistent pain is a chronic illness. Treatment should shift focus to management of the pain pathway and functional gains rather than treating the pain alone. An overemphasis on pain reduction will often result in frustration for the treating doctor and the patient. Hence surgery often does not have a place in chronic pain syndrome except for chronic inflammatory nociceptive conditions such as cancer, arthritis, connective tissue disorders and/or instability conditions.

After a holistic biopsychosocial assessment, a framework of a comprehensive pain management strategy can therefore be planned. A different set of 4Ps can be used.

Pharmacological medications

It is important to consider if appropriate medication has been used and whether further optimisation of medication is required. Depending on the possible mechanism of the pain, different types of medication could be considered.

There is a role for anti-inflammatory steroidal (Prednisolone or Dexamethasone) and non-steroidal prostaglandin inhibitors (Celebrex, Naprosyn) for Phase 1 of acute frozen shoulder. It is helpful to add adjuncts to down-regulate the CNS amplification. Addition of low doses of anticonvulsants and antidepressants would reduce the requirements of anti-inflammatory treatments, providing a multi-modal approach to nociceptive pain.

Procedural intervention

Are there any bedside procedures that may be helpful (eg, local anaesthetics or corticosteroids injected around the nerve [nerve blocks])?

Subacromial bursa block, supraspinatus cortisone injection and/or intra-articular glenohumeral injection is very helpful with pain relief. These injections, when applied to the respective rotator cuff cum shoulder joint, will give immediate pain relief, allowing participation in intensive rehabilitation. This will improve the range of movement and thawing of the

frozen shoulder. These can be provided by the GP at the bedside safely without too much downtime to the patient. In selected frozen shoulder cases, the use of platelet-rich plasma injections may be indicated for better outcomes.

These pain procedural interventions are not temporalising effects of pain relief. They serve to reduce the pain while attempting to reactivate the recovery of the injured or affected organ/joints. They are usually performed once, although very rarely they may be repeated for add-on effect. These procedures should not be done solely without any plan of rehabilitation or reactivation being put in place.

Psychological²⁰

Psychological strategies for pain management may be useful and include pain education, management of pacing strategies, fear avoidance and anxiety, and stress management. Various techniques, including cognitive behavioural therapy, acceptance-based treatment and mindfulness, may be employed or made available to the patient. An appropriately trained pain psychologist with experience in managing chronic pain patients would be necessary. Psychiatric review for diagnosis and management may also be required for patients with significant psychiatric comorbidity.

Physical

Physical reactivation, including an exercise programme, and stretching programme will be beneficial to chronic pain patients. An appropriately trained physiotherapist, who can also provide pain education to reinforce this, would be helpful in these circumstances. After careful evaluation of the painful condition by the GP, one has to decide if the painful area can be engaged and mobilised without further damage or injury to the joint, spine or respective body parts.

Contrary to popular notions that the pain needs to be protected and immobilised, or to let pain be your guide when engaging the painful part of the body, these beliefs have to be expunged and recalibrated with “no pain

no gain”. Keeping focus on the functional goal is the key rather than letting pain be the obstacle holding the patient back. Combined with adequate pain management, this functional physical reactivation can be achieved readily.

The case would benefit from targeted and global physical therapies to the shoulder. While the physiotherapists may start off with passive manipulation and increasing of the range of movement and pain engagement, patients are expected to progressively take on more functional and behavioural modification.

The treating GP should provide appropriate ongoing pain education. Good communication between the treating doctor and other health providers is paramount in managing most chronic pain. ♦



Scan QR code or visit <https://sma.org.sg/5305-Feature>, for the full article including a second case example and its discussion alongside printed case scenario for comparison and further understanding.

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Healthcare Insurance: *A CHRONIC ISSUE*

Text by Dr Tan Yia Swam

There has been much public interest and debate on the problem of private insurance, in particular the SMA Position Statement which registered the 61st Council's views on Integrated Shield Plans (IPs) (<https://bit.ly/3wPPlwv>, <https://bit.ly/3sfshnn>). Since then, there have been further developments with Senior Minister of State for Health Dr Koh Poh Koon announcing the formalisation of the existing pro-tem committee into the Multilateral Healthcare Insurance Committee (MHIC) appointed by the Minister for Health.

I realised that not many people know the background and evolution of private insurance and many may not quite understand the multiple layers of its complexity. Allow me to summarise in the form of a timeline, which guides my subsequent discussion:

- 1994: First IPs started by NTUC Income, followed by others (co-payments were present from 1994 to 2005)
- 2005: As-charged plans introduced and first-dollar coverage riders were offered in 2006 by insurers themselves
- 2007: SMA Guidelines on Fees was withdrawn in compliance to the Competition Act, leaving doctors/patients without guidance on what fees were reasonable¹
- 2015: Health Insurance Task Force (HITF) convened and their recommendations published in 2016²
- 2018: Ministry of Health (MOH) published fee benchmarks for private sector professional fees

Escalating healthcare costs are a concern for many governments. Learned economists have studied it and there is no simple answer. Personally, I see the need for everyone to be part of the solution. I list five key factors which I will be discussing in this article:

1. Advances in technology leading to better quality of care

2. Healthcare facilities costs
3. Doctors' fees
4. Patients' health-seeking behaviours
5. Insurers

Healthcare technology advances

As research and experimental trials become validated, technological advances grow to be accepted in mainstream clinical practice. Here is an example in the field of breast surgery: 30 years ago, most breast cancer patients had to accept a mastectomy and the resulting change in appearance was unacceptable to some. Now, patients can opt for nipple-sparing mastectomy and immediate reconstruction which allows the patient to regain a physical appearance similar to her former state. This brings better outcomes for some patients, but clearly with increased costs – more complex surgery, longer operating times and longer hospital stays. Clinicians would agree that the advances in medicine are immense, including the use of CT scans/MRIs, use of percutaneous catheters for a myriad of vascular interventions, and medications (especially in oncology).

Healthcare facilities costs

The costs of private healthcare facilities also seem to have been frequently overlooked as a contributing factor of increasing healthcare costs. In 2013, a series of online articles commented on the high markups of a bag of normal saline in the US,³ and then the subsequent government probe into a national shortage of saline.⁴ Now, keep in mind that these are US reports – I do not have any Singapore references, and I have only my own hospital bills to refer to. When I receive the itemised bill as a patient however, how would I know which items are reasonably charged, and which are not? I am heartened that the MHIC will include representatives from

private healthcare organisations as part of the solution.

Doctors' fees

Doctors' fees have often been regarded as the main source of increased costs. How true is this? Historically, SMA had published its Guidelines on Fees since 1987, but it had to be removed in 2007 as it was deemed anti-competitive. Then in end 2017, MOH announced that fee benchmarks would be implemented. Since then, the benchmarks served as a guide on what and how doctors should charge. A good analogy is that of speed limits – without a speed limit listed, people tend to drive faster. But if there is a clear limit in place, most people would respect that and drive within the specified limits.

I have personally received mixed feedback stating that although most doctors are now abiding by the fee benchmarks, a few have been implementing multiple codes inappropriately. The professional bodies will work with MOH to better understand the scope of the problem, and assist in (1) education, (2) guidance and (3) peer counselling, failing which recalcitrant doctors will be referred to the Singapore Medical Council (SMC) for disciplinary action.

Patient's behaviours

Patients' health-seeking behaviours also affect costs. When people fall sick, how do they choose their care? Do they just take some painkillers and rest? See a GP, or a traditional Chinese medicine physician? Do they go to a polyclinic, the emergency department, or straight to a specialist? Do they choose a doctor based on an Internet search, or their friends' or insurance agents' recommendations?

Insurers

Finally, how are insurers involved?

Patients factor in financial costs when they need to see a doctor. Some will go

only to their company doctors based on their corporate insurances. When they need to have hospital admissions, day surgeries or major operations, that's when their IPs will come in useful. In my recent Budget speech in Parliament, I highlighted the importance of shared decision-making in healthcare⁵ when making medical decisions, and by extension to the patients' purchase of medical insurances!

How much do we actually know about health insurance?

All Singapore citizens and Permanent Residents are covered under Medishield Life,⁶ which covers a proportion of bills for B2 and C class admissions. If one chooses to be in A or B1 class in a restructured hospital, or seek treatment in private hospitals, one will need to top up the difference with their Medisave account or cash.

As such, one may buy additional private insurance in the form of IPs.⁷

In my parliamentary speech, I stated that close to 70% of Singapore citizens have an IP. This is based on published 2018 statistics: 2.749 million policy holders⁸ on a population base of 3.99 residents (Singapore citizens and Permanent Residents).⁹

Some terms that we need to know about IPs include:¹⁰

- **Deductibles:** What a patient has to pay first, before any payout.
- **Co-payment:** What the patient has to pay, after the deductible (often expressed as a percentage between 5% and 10%).
- **Riders:** Optional extras to cover deductible and co-payment, or additional benefits.

To recap, 70% of Singapore citizens have IPs and 29% have riders.¹¹ Since **March 2018**, MOH has required all new rider plans to include 5% co-payment. So what happens to the 29% who had pre-existing policies with riders? MOH has stated that insurers are allowed to impose the 5% co-payment, as part of the contractual terms.¹² As much as I, as a policyholder, don't like it, I see that there is no choice but to have such a mechanism in place to curb the "buffet syndrome" which describes over-consumption, over-servicing and over-charging of healthcare services.

Policyholder's choice

Of note, there is also the phenomenon of policyholders who are eligible to utilise private healthcare services, but instead choose to go to a restructured hospital. Why is this a problem?

If the patient's IP includes private care in a restructured hospital, he/she is still using the resources of the restructured hospital which adds on to the waiting time for scans, operations, etc. I have not left restructured service long enough to forget how "A class" patients expect fast service, only to be told that there is no special queue for private patients. I am aware that some departments have come up with certain slots to try to accommodate these patients, but I also know that we clinicians **prioritise medical need** over class status, as should be the case.

What's even stranger is if the policyholder decides to seek treatment via a polyclinic, to get access to subsidised care in restructured hospitals! This means that the current insurance plan that he/she has paid for would be "wasted". This patient would also be using government subsidies which could have gone to patients who are truly in need. **I vouch for the quality of care**, but we are acutely aware that teaching hospitals come with certain needs and requirements. I know that my patients with breast lumps have declined examination by anyone other than the attending surgeon and requested for the surgery to be done only by a consultant. Can the restructured hospital services accommodate every such request? As a consultant, I have always reassured my own patients that having trainees is part of the system. These are qualified doctors, training to be specialists, and we all have to start somewhere. I also reassured them that I will be there for the whole surgery to personally supervise every step.

So, it is again down to the patient's choice and right. If the patient has been paying for private care and wants to utilise it when he/she needs it, shouldn't he/she have the peace of mind to get the type of care he/she wants?

Another variation that we should know about are **corporate plans**, or employee benefits. These come with different reimbursement rates for

doctors, which are frequently pegged very low in return for high volumes of patients. For example, I own company ABC with 50,000 employees. I buy a corporate health plan for them from Insurer XYZ, but my own human resource team is unable to process the paperwork, so I outsource this to a third-party administrator to manage the claims. I urge all SMA Members to think carefully and read the fine print well, whether you are a GP or specialist. What kind of contract are you signing? Are the terms fair?

What about the SMA Position Statement?

As the current President, I felt that there was a need to speak up for doctors and patients. The 61st Council unanimously voted to put out a Position Statement (<https://bit.ly/2OLi98g>). This forms the basis for any future negotiations, moving forward.

A lot of attention was previously given to how doctors charge, and how insurers can control costs by keeping panels small and reimbursing at lower rates. Some key points to note:

1. Insurers themselves must bear responsibility for contributing to this situation.
2. Insurers should review their management and commission costs.
3. We seek fairness in allowing patients the access to their doctors of choice, without additional man-made barriers or financial disincentives (eg, significant differences in seeing panel versus non-panel doctors).
4. More objective review of insurers, with ranking and a Complaints Committee.

What's the big deal about panels?

Analysis by a team of doctors from the Academy of Medicine, Singapore (AMS) and SMA has shown that panels may have only 20% of registered specialists participating. Of course, this varies from company to company and even by speciality.

For instance, there are around 50 breast surgeons in Singapore, roughly half in private practice. Some panels have 20 doctors, some have five. One

patient told me her panel only has male doctors, but she had preferred a female doctor. As a result, she would have to co-pay more than if she went with a panel doctor.

Patients should have the choice, without feeling like they are being punished for choosing outside the panel. Most of us would rely on a friend's or doctor's recommendation for a good doctor. Now it seems like the first step is to check if they are a panel doctor or not.

Getting a breast cancer diagnosis is very stressful and emotional for most women. In the midst of accepting the diagnosis and worrying about the surgery, upcoming chemotherapy and radiotherapy, they worry about the costs. At the point that they most need health insurance to step in and be fuss-free, they have to check through the fine print of coverage. I have met cases where the policy agents themselves are not familiar with the claims process, and tell patients to just go to their panel doctors to ensure that everything goes smoothly.

The HITF's original intent of panels was to reduce costs by ensuring that doctors' fees are reasonable. Now with MOH fee benchmarks to guide us, perhaps panels can be widened, to allow patients more options.

I am glad that the insurers have taken steps to expand their panels, and in time to come, the SMA will collate more feedback as an ongoing review of insurers.

Proposed ranking and Complaints Committee

Over the years, we have received many anecdotal complaints from doctors about unfair behaviour by insurers. We don't know the full extent of the problem. I want this to be a factual exercise, and to collect objective data. These are some parameters we will look at:

- (a) Inclusiveness of panels;
- (b) Transparency of selection criteria of doctors for panels;
- (c) Ease and timeliness of pre-authorisation process;
- (d) Timeliness of payment;
- (e) Appropriateness of fee scales with respect to the MOH fee benchmarks; and

- (f) Degree of friction and penalties imposed on policyholders when non-panel doctors are used.

The Complaints Committee is for doctors to submit information to, when they find that IP providers have not been fair. This could include patients being denied insurance coverage or doctors not being adequately reimbursed for their services. Members of the public may write in, and the SMA will redirect them to the Financial Industry Disputes Resolution Centre.

What is the next step?

Some newspapers and even some doctors have been calling this a war with insurers. I disagree. What I want is "world peace", or sustainable healthcare. What I see is both sides – insurers and doctors – each saying the other is the cause for war, and arming up to fight to prove that they are peaceful!

To truly get "world peace", negotiations have to happen. We all have to see the many sides that make up this problem: doctors, payers, insurers, policyholders, taxpayers, healthcare facilities and pharmaceuticals!

Healthcare is not like other commercial businesses as patients are typically at a disadvantage, especially if they do not have knowledge of the medical care they need and how much it should be priced at. That is why the professional bodies (AMS, College of Family Physicians Singapore and SMA) and our regulatory body, the SMC, have a strong duty to ensure that doctors are practising good medicine and putting patients' interests first, by providing good medical care and ensuring that charges are within reasonable range.

As announced in the news, the SMA has representatives in the Minister-appointed MHIC. A lot more work lies ahead as the various stakeholders need to hold honest and sometimes painful discussions on (1) existing problems, (2) potential solutions and (3) trade-offs. There may not be a perfect solution, but we will all have to learn together.

Like-minded people from all industries should be aligned in protecting patients' interests. There has to be mutual trust and we will all have to work together to build a sustainable healthcare system, and

support a robust subsidised system and fair private practice.

We will all be patients one day – we will need to make sure that we can afford and receive good care when we need it. This will also be for our children, and their children someday. ♦

Dr Tan is a mother to three kids, wife to a surgeon; a daughter and a daughter-in-law. She trained as a general surgeon, and entered private practice in mid-2019, focusing on breast surgery. She treasures her friends and wishes to have more time for her diverse interests: cooking, eating, music, drawing, writing, photography and comedy.



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2021

SMA Annual General Meeting

Text by Lee Sze Yong, Manager, Council Support

The SMA Annual General Meeting (AGM) was held on 25 April 2021.

Dr Tan Yia Swam started the proceedings by thanking Members for attending the AGM via teleconference. She highlighted the following key points during the President's message:

1. Adapting to change – New SMA leadership and new Chief Administrator in FY2020/2021
2. Adversity – COVID-19, support for doctors (masks, communication, mental health), partnering with the Ministry of Health
3. Advocacy – Website listing doctors without permission, health insurance, harassment/bullying concerns

Honorary Secretary Dr Ng Chew Lip highlighted the ground rules for the teleconferencing AGM, and referred Members to the SMA Annual Report 2020/2021 themed "Together, We Can".

Next, Honorary Treasurer Dr Lim Kheng Choon presented the 2020 accounts for SMA, of which he highlighted an

operating surplus of \$707K (excluding investment accounts) in 2020.

The accounts for SMA Pte Ltd (SMAPL) was presented by Adj Prof Tan Sze Wee, Chairperson of SMAPL. SMAPL's profit and loss statement largely depends on the performance of its investments. For 2020, SMAPL investment account achieved a net profit of \$110K after tax.

Dr Chong Yeh Woei, Chairperson of the SMA Charity Fund (SMACF), then presented his report. In 2020, SMACF awarded bursaries to 55 medical students, disbursing a total of \$275,000. Members present at the AGM were encouraged to donate to SMACF.

Members present affirmed the SMA Council's proposal to unanimously elect A/Prof Cheong Pak Yean and Dr Thirumoorthy s/o Thamotharampillai as SMA Honorary Members.

Elections for the 62nd SMA Council were then conducted. Dr Tan Yia Swam was re-elected as SMA President and two new Council members, Dr Lee

Yee Mun and Dr Raj Kumar Menon made introductions to the Members in attendance. Following which, the election for the executive committee was conducted.

The AGM meeting recorded a vote of thanks for the two outgoing Council members, A/Prof Tan Choon Kiat Nigel and Dr Woon Yng Yng Bertha, for their contributions to SMA.

The AGM approved the re-appointment of the following Trustees for the SMA Trust Fund, for a three-year term from 2021 to 2024:

- A/Prof Cheong Pak Yean
- Dr Lee Pheng Soon
- Prof Low Cheng Hock
- Dr Tan Kok Soo
- Dr Tan Yew Ghee

The AGM also approved a motion of thanks to Mr Gan Kim Yong, outgoing Minister for Health, for his contributions to the healthcare profession.

With that, the AGM was concluded. ♦

62nd SMA Council 2021-2022



President

Dr Tan Yia Swam
MBBS (S), MMed (Surg), FRCS
• Nominated Member of Parliament
• General Surgeon at Thomson Breast Centre



Honorary Treasurer

Dr Lee Hsien Chieh
MBBS (S), MPH (Harvard), GDFM (S)
• General Manager & Chief Operating Officer at Thomson Medical



1st Vice President

Dr Ng Chee Kwan
MBBS (S), FRCSEd, FRCS (Glasg)
• Urologist in CK Ng Urology & Minimally Invasive Surgery



Honorary Assistant Treasurer

Dr Chie Zhi Ying
MBBS (S), MPH (S), MMed (FM)
• Family Physician at National Healthcare Group Polyclinics



2nd Vice President

Dr Tammy Chan Teng Mui
MBBS (S), GDOM (S), GDMH (S)
• Family Physician in T C Family Clinic



Council Member

Dr Anantham Devanand
MBBS (Lond), MRCP (UK)
• Specialist in Respiratory Medicine, Intensive Care Medicine, Internal Medicine at Singapore General Hospital



Honorary Secretary

Dr Ng Chew Lip
MBBS (S), MRCS (RCSEd, UK), MMed (ORL) (S)
• ENT Surgeon at Ng Teng Fong General Hospital



Council Member

Dr Lee Pheng Soon
MBBS (S), FFPM (Pharmacology) (RCP, UK)
• Family Physician at Family Doctors at 365



Honorary Assistant Secretary

Dr Benny Loo Kai Guo
MBBS (S), MMed (Paed) (S), MRCPCH
• Paediatrician at KK Women's & Children's Hospital



Council Member

Dr Lee Yee Mun
MMed (Surg), MPH, FRCSEd
• Urologist at Tan Tock Seng Hospital

HIGHLIGHTS

From the Honorary Secretary

Report by Dr Ng Chew Lip

Meeting with Minister for Health

The SMA Council met with Mr Gan Kim Yong, Minister for Health, and other Ministry of Health (MOH) officials on 15 April 2021, at the College of Medicine Building.

Health insurance was the main issue on the agenda. SMA provided feedback on concerns raised by both patients and doctors.

SMA appreciates the opportunity to engage MOH on this important issue. We look forward to regular dialogue with MOH on various issues relating to healthcare in Singapore.

Conversations on Singapore Women's Development

SMA co-hosted an online forum with the Ministry of Culture, Community and Youth as part of the series of Conversations on Singapore Women's Development.

The event, held on 5 May 2021, was targeted at female professionals in healthcare. SMA President Dr Tan Yia Swam co-hosted the event with Dr Janil Puthucherry, Senior Minister of State for Health. More than 100 healthcare professionals participated in the feedback session. ♦

SMA letter to LIA on Integrated Shield Plans

SMA has responded to a request from Life Insurance Association in their media statement dated 31 March 2021.

Members can access the letter by logging in at <https://www.sma.org.sg/ourvoice/index.aspx?ID=395>.

62nd SMA Council 2021-2022



Council Member

Dr Lim Kheng Choon
MD (S), FRCR (UK), MMed (Diag Rad)
• Radiologist at Singapore General Hospital



Council Member

Adj Asst Prof Tan Tze Lee
MBChB (Edin), MRCP (UK), FRCP (Edin)
• President of the College of Family Physicians Singapore
• Family Physician in The Edinburgh Clinic



Council Member

Dr Ivan Low Jinrong
MBBS (S)
• Doctor at HQ Medical Corps, Singapore Armed Forces



Council Member

Dr Tan Zhenwen Tina
MD (S), MRCPsych (UK), FAMS
• Psychiatrist at Better Life Psychological Medicine Clinic



Council Member

Dr Low Tchern Kuang Lambert
MBBS (S), MRCPsych (UK), Dip Acup (S)
• Psychiatrist at Institute of Mental Health



Council Member

Dr Toh Choon Lai
MBBS (S), MMed (Surg), FRCSEd
• Orthopaedic Surgeon at Orthopaedic Associates



Council Member

Dr Raj Kumar Menon
MBBS (S), MMed (Surg), FRCSEd
• General Surgeon at National University Hospital



Council Member

Dr Wong Chiang Yin
MBBS (S), MMed (Public Health), FAMS
• Executive Director & Group Chief Executive Officer at Thomson Medical



Council Member

Adj Prof Tan Sze Wee
MBBS (S)
• Assistant Chief Executive, Enterprise at Agency for Science, Technology and Research (A*STAR)



Council Member

Dr Wong Tien Hua
MBBS (S), MRCP (UK), GDFM (Monash)
• Family Physician at Mutual Healthcare Medical Clinic

Appreciation FOR OUR *Comrades*

SMA would like to show our heartfelt support and appreciation for our brave friends and colleagues in Tan Tock Seng Hospital (TTSH) with this poster by local artist/author Josef Lee (@joseflee.stories on Instagram), who has been illustrating stories of healthcare workers during the pandemic.

We salute them for their dedication to duty and courage in service, and honour their families' sacrifices in supporting them in the fight against COVID-19. Singapore is safer because of their service.

To forward or share the poster, visit our Facebook account at <https://bit.ly/33sjAMw> to access the post.

**Singapore salutes you, TTSH Staff and Families,
for your courage and sacrifice**



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BRAVE THE VACCINE!

Text and photo by Dr Kenneth Lyen



Dr Lyen is a consultant paediatrician at Mount Elizabeth Hospital Orchard and a visiting consultant at the Health Promotion Board, Ministry of Health. He founded the Rainbow Centre, which manages three special schools for disabled and autistic children. He has co-authored 14 books on paediatrics, parenting, creativity and education. Website: <http://kenlyen.wixsite.com/website>.



I recently received the Pfizer-BioNTech COVID-19 vaccine. After the painless injection, I waited outside the room for 30 minutes in case of any severe allergic reactions. As there were none, I registered to return in three weeks' time to receive my second dose.

Eight hours after the injection, I felt a slight ache in my arm but when I examined the injection site, there was only the red mark of the needle entry and no bruising or swelling. I felt warm but when I checked my temperature, it was 36.8°C. I was otherwise totally asymptomatic. *Phew!*

Three weeks later, I received the second dose. The side effects were identical to the first dose, that is, minimal.

My colleagues who received the vaccine also complained of arm pain.

Some had fever, tiredness, headaches, dizziness and chills which lasted for a day or two. Fortunately, nobody I know had any severe allergic reactions.

Early history of the COVID-19 vaccines

Like many kiasu doctors, I did some research on the different vaccines before accepting this vaccine. It is true that the COVID-19 vaccines were achieved in record time, under one year. Some say this was too rushed, and point to some severe reactions.¹ There are two aspects to vaccine development: laboratory research and animal tests, and clinical trials.²

The first coronavirus was identified in 1965, but vaccine development did not start until the SARS epidemic in 2003. Unfortunately, research stalled because the outbreak evaporated within a year. The same thing happened again with the MERS outbreak in 2012.³ Singapore and other countries joined in the vaccine research, but once again the outbreak subsided and research was suspended, never progressing to clinical trials.

Katalin Kariko and Drew Weissman

Groundbreaking research that later emerged to become the foundation of the current messenger RNA (mRNA) vaccine was conducted initially without any connection to the vaccine. Notable is the work of Katalin Kariko and Drew Weissman, who jointly developed the ability to translate mRNA into

predetermined proteins and to insert the mRNA into cells. The history of Kariko's work is tantalising.⁴ In the 1980s, she joined the University of Pennsylvania and proposed that mRNA could be used not only to fight diseases but also for vaccine development. Sadly, the university consistently rejected her unorthodox ideas and research grant applications, and even demoted her in 1995 from her academic position; at the same time, she was diagnosed with cancer. Luckily, Kariko's colleague Weissman believed in her ideas and collaborated with her. Kariko did not resign from her position, but persevered with their research which was published in 2005. Eventually, her prescient idea of an mRNA vaccine was recognised by others, and later by two pharmaceutical companies – BioNTech and Moderna.

Mechanisms of action of different vaccines^{5,6}

mRNA vaccines

A special coded message in the mRNA is presented to the ribosome, which will then translate the message to manufacture the desired protein antigen – in this case, the spike protein found on the COVID-19 virus. Kariko's contributions were crucial. Firstly, she produced a lipid nanoparticle coat that enables the mRNA to penetrate the cell membrane of macrophages and dendritic cells found close to the injection site. Secondly, she discovered exactly how to rewrite the mRNA to give a precise instruction for the cell to produce the immunogenic protein.

mRNA vaccines are advantageous as no virus is used, so one will not come down with COVID-19. The vaccine mRNA does not enter the cell nucleus and therefore cannot affect the genetic material inside the nucleus.

Pfizer-BioNTech and Moderna adopted this vaccination technique, and each completed a Phase 3 double-blind placebo-controlled trial. By December 2020, they confirmed its safety with minimal side effects, and achieved 95% efficacy. The US Food and Drug Administration quickly gave emergency approval. The Pfizer-BioNTech vaccine needs to be stored below -70°C, and the second dose is given three weeks later,⁷ while the Moderna vaccine has to be stored at -20°C, with the second dose given four weeks later.⁸

Weakened virus inserted into another viral vector

The use of the adenovirus as a vector to help insert the genetic material of a virus into a cell has previously been employed for measles, Ebola, Zika and HIV vaccines. The adenovirus DNA is first removed, leaving an emptied protein coat or capsid. This is then filled with the intended SARS-CoV-2 virus which has been weakened or inactivated. The adenovirus capsid helps insert the inactivated coronavirus into the cells, thus mimicking a viral infection.⁹

Oxford-AstraZeneca chose to use a chimpanzee adenovirus as its vector. In an editorial published in the November 2020 issue of *Cell*, adverse side effects include “fever, pneumonia, diarrhea, transient neutropenia and lymphopenia, fatigue, labored breathing, headaches, liver damage, and fasting hyperglycaemia. Rare adverse reactions include blood clots affecting the abdomen or brain,¹⁰ neuropathies such as Bell’s palsy, Guillain-Barré syndrome, gait disturbance, and transverse myelitis.” So far, the Oxford-AstraZeneca trial results show 70% efficacy,¹¹ and the Russian Sputnik V vaccine, which uses the same technique, is said to be 91.4% effective.¹² Both vaccines need to be stored between 2°C to 8°C.

Double strand DNA inserted into adenovirus

Johnson and Johnson’s vaccine differs from other vaccines in that it uses DNA and not RNA. A doubled strand of DNA is inserted via an adenovirus vector. The DNA enters the cell’s nucleus and carries instructions to manufacture a special non-viral mRNA, which in turn translates the instructions to manufacture the spike protein of the SARS-CoV-2 virus. The other difference of this vaccine is that it only requires a single dose. The vaccine is undergoing Phase 3 clinical trials, and to date the efficacy is between 66% to 72%. It is stored between 2°C to 8°C.

Weakened viruses injected directly

The Salk polio vaccine, most influenza vaccines and the hepatitis A vaccine use the technique of weakening or inactivating the virus which is then injected directly into the subject. This technique has been employed in two of the China-produced vaccines, Sinopharm’s BBIBP-CorV and Sinovac’s CoronaVac,¹³ and India’s Bharat Biotech’s Covaxin.¹⁴ These “killed” virus vaccines can be stored between 2°C to 8°C. Some

commentators are uncertain about the efficacy and side effects of these vaccines.

Subunit vaccines

The Novavax vaccine takes a purified piece of the spike protein of the SARS-CoV-2 virus, and adds an adjuvant which enhances the immunogenicity of the spike protein. Both the spike protein and adjuvant are injected into the subject. So far, the immune response in terms of antibody production as well as increased T-cells have been promising. However, Phase 3 trial data has not been released to date. Novavax can be stored between 2°C to 8°C.¹⁵

The information above is summarised in Table 1.

Vaccine hesitancy

Many people have a fear of needles stemming from medical injections over the years. Compounded by over-dramatised information, such as anaphylactic shock and deaths following vaccinations, there is a reluctance for some people to voluntarily accept the vaccines. Most of these severe side effects and deaths have been shown to be unrelated to the vaccine.¹⁶

Severe allergic reactions to the vaccine do occur, but they are very rare and are found in those who have a past history of severe allergic responses.^{17,18} Those who have a history of such reactions are advised not to take the vaccine. These severe responses usually occur within 15 minutes of the vaccination, and hence vaccinated subjects are observed for 30 minutes after the injection.

Even in Singapore, a survey conducted on 26 April 2021 showed that 67% are willing to accept the free vaccination offered by the Government.¹⁹ Perhaps Singapore may be a victim of its own success.²⁰ It has famously flattened the infection curve and reduced the local spread to less than five per day, sometimes with zero cases. The total



Dr Lyen receiving his COVID-19 vaccine

death rate in the past year reached 32 (as of print), which contrasts with the thousands of daily deaths in most other countries. This has led some Singaporeans to believe that since there are virtually no locally transmitted cases of COVID-19, there is no benefit to getting vaccinated. The Mayo Clinic outlines the benefits.²¹

While Singapore may be doing well in controlling the spread of coronavirus, the world is still teeming with millions of cases. Travellers to Singapore will inevitably bring some of the virus to our country. There is another potential problem; namely, new mutations.

New mutations

New mutations of the virus have been discovered in the UK, Brazil, South Africa²² and India.²³ They have been found to be highly infective, probably due to better binding of the virus to the Angiotensin Converting Enzyme 2 receptor, which increases a person’s susceptibility to the virus. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases has stated that the British new mutant variant is more deadly than the original virus.²⁴

At the moment, the Pfizer-BioNTech and Moderna vaccines seem capable of stimulating a vaccinated person’s antibodies to neutralise the invading mutant variants.^{25,26}

Prof Ooi Eng Eong of Duke-NUS Medical School told the *Straits Times* that “Singaporeans need not worry about the mutations being reported or the possibility of having to alter the vaccine in the near term.”²⁶

But we cannot sit on our derrières. Although virologists believe it is unlikely, it is not impossible in the future for a virus to mutate into a new strain which is resistant to the current vaccines.

Who should receive the vaccine?

It is recommended that everybody should seriously consider receiving the vaccine. Those who have had severe allergic reactions in the past, pregnant mothers, children under the age of 12* years and severely immunocompromised people are not recommended to receive the vaccine. Those who have already contracted COVID-19 are recommended to still receive the vaccine.

The Singapore Government promises that all citizens will have access to the full

two doses of vaccines, and even long-term residents will also be eligible.²⁷ The Islamic Religious Council of Singapore holds the position that a COVID-19 vaccine is permissible for Muslim use. The recommended timing of the second vaccine dose varies slightly according to the vaccine manufacturer.

Final thoughts

At the time of writing, we do not know the effectiveness of the vaccines because clinical trials were only started in the middle of 2020. Our past experiences with other vaccines remind us that no vaccine is 100% protective. We also do not know how effective the vaccines are against the new mutant variants.

The vaccine is probably our best chance of controlling the pandemic. By taking the vaccine, you become immune to the SARS-CoV-2 virus, which means that not only will you be protected, but you will not transmit it to others. If more than 80% of the population is protected, then this is effective herd immunity.

In the meantime, please continue to wear masks, observe social distancing and keep clean. The benefits of the vaccine will trump the side effects. My advice is: "Go for it!" ♦

Table 1: Currently available vaccines arranged according to mechanism of action

MECHANISM	INSERTION	NAME	COUNTRY	APPROVED	EFFICACY	DOSES	STORAGE
mRNA	Lipid nanoparticle	Pfizer-BioNTech	Germany USA	93 countries	95%	2	-70°C
mRNA	Lipid nanoparticle	Moderna	USA	43 countries	95%	2	-20°C
Modified virus	Adenovirus	Oxford-Astra Zeneca	UK Sweden	149 countries	62-90%	2	2° to 8°C
Modified virus	Adenovirus	Gamaleya	Russia	33 countries	92%	2	2° to 8°C
Double strand DNA	Adenovirus	J&J Janssen	USA	17 countries	66-72%	1	2° to 8°C
Weak/ Inactive Virus	Direct	Sinopharm	China	38 countries	79%	2	2° to 8°C
Killed Virus	Direct	Sinovac	China	24 countries	51-91%	2	2° to 8°C
Killed Virus	Direct	Bharat Biotech	India	1 country	81%	2	2° to 8°C
Subunit Spike Protein	Direct	Novavax	USA	-	96%	2	2° to 8°C

Source: <https://nyti.ms/3hu5OBI>

Information in this article is accurate as of 21 May 2021.

*Singapore has approved the Pfizer-BioNTech vaccines to be given 12 years and above.

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A PATH LESS TRAVELLED

Learning and Practising Acupuncture

Text by Dr Tan Tee Yong

Acupuncture is an old art with a history of more than 3,000 years. The term “acupuncture” is derived from the Latin word “*acus*” (needle) and “*puncture*” (pricking). Acupuncture literally means to puncture with a needle. This art was first documented as early as 200 BC in the first book for traditional Chinese medicine (TCM), *Huang Di Nei Jing* (黄帝内经).

An art with such a long history of practice has to have something worthy which one could learn from. Hence I started my journey seeking to learn this ancient art. In addition to reading acupuncture-related journal articles, I stumbled upon a two-year course organised by the Singapore College of Traditional Chinese Medicine, targeted for Singapore Medical Council (SMC) registered medical doctors to be trained and certified as TCM-registered acupuncturists.

Integrating acupuncture with Western medicine

Learning TCM was akin to repeating a totally different medical education. Although there were certain similarities when seeing a patient, the underlying thinking was radically different. Instead of physiology and pathophysiology, which many medical doctors are familiar with, the disease processes were instead explained in term of Yin (阴) and Yang (阳); the five elements, namely metal (金), wood (木), water (水), fire (火) and earth (土); the concept of qi (气) and blood (血); and the relationship between solid organ (脏, *zang*) and visceral organ (腑, *fu*).

After learning an entirely different field of medical knowledge, integration

and application was what mattered most to me. Reconciling the differences was difficult as the understanding of underlying disease processes was completely different. Although there were Western medical literatures on the efficacy of certain acupuncture treatments for various conditions, many were written in silo with little cross-reference to TCM concepts. Thus, initial practice was like looking at two unrelated and isolated issues. The way forward was to look for the opportunity to apply both acupuncture and western medical therapy together.

Integrating the two practices did produce unexpected but positive results. I remember a middle-aged Caucasian lady who was having neck pain and upper limb radicular pain. She was started on physiotherapy, anti-neuropathic medication and finally underwent a cervical nerve root sleeve injection. Improvement was seen but the patient remained symptomatic. A TCM assessment was made and acupuncture was chosen to treat her condition, in addition to conventional medical therapy. She then underwent one short course of acupuncture treatment together with physiotherapy and anti-neuropathic medication, and her pain resolved after just one session of acupuncture. This small success was the first step towards a progressive integration of TCM diagnostics and acupuncture management within my medical practice.

Acupuncture and pain management

I have been practising acupuncture for many of my patients in the past ten years.

TCM acupuncture works well to complement Western medical care. The TCM diagnostic tool offered a different way of patient assessment and the therapeutic tool offered a different way of managing patients. The most powerful advantage to Western-trained medical doctors is the fact that we are trained well in the pathophysiology of diseases and can then combine the therapeutic options of both Western medicine and TCM acupuncture. To complement our knowledge, TCM theories provide a more holistic view in the management of any pain syndrome, and it helps to widen the diagnostic view even of a locally painful condition.

I remember another patient with severe and uncontrolled trigeminal neuralgia pain. Despite high doses of anti-neuropathic medications, little pain relief was achieved. TCM diagnostics was used and the patient was deemed to be having “qi stagnation and blood stasis”. With the combination of acupuncture and anti-neuropathic medications, the acute pain exacerbation became well controlled. As there was no need to further escalate, but in fact a slight reduction in the medication intake for symptom control, side effects from medication became very well moderated. There were many such stories, and it gave practitioners like myself the conviction that combining acupuncture with conventional pain management provided patients with more choices, better results and fewer side effects from drugs.

But it is important to point out that acupuncture is not always effective. In my experience, I find it difficult to apply acupuncture for cancer pain patients. In

addition, the successful application of acupuncture for pain originating from osteoarthritis of the knee and hip is more limited.

Significantly better pain control can be achieved for acute back and neck sprains, chronic spinal pain, chronic headache, facial pain and neuropathic pain conditions. And the synergistic effect seen with Western medical therapy frequently produces surprising results.

It is also important to realise that acupuncture could result in severe acupuncture-related adverse events. Conditions like pneumothorax, cardiac tamponade, infection, fainting and subarachnoid haemorrhages were reported in medical journals. But overall, acupuncture is deemed a relatively safer procedure with minimal long-term side effects, when compared to many of the pain management procedures.

Continuing professional education

With the enactment of the Traditional Chinese Medicine Practitioners (Amendment) Act 2020, the compulsory Continuing Professional Education (CPE) Programme for TCM practitioners was implemented from 1 April 2020 for all fully and conditionally registered

TCM practitioners. Compulsory CPE requirements of 50 points over a two-year period need to be met before the practising certificate (PC) can be renewed.

This is nothing new to a SMC-registered medical practitioner as there are similar requirements for the SMC PC renewal. But for a doctor who is registered on both Boards, additional effort is needed to ensure registration on both. As such, I am deeply concerned that this new requirement would discourage Western-trained medical doctors from taking up the course to train to be a TCM-registered acupuncturist.

Conclusion

Overall, I am impressed by the alternative facet of TCM diagnostics and the positive effect of acupuncture treatment in managing patients with painful conditions. I strongly support and encourage all medical practitioners who are interested to spend time learning this alternative form of medicine. Acupuncture application is very wide and it covers a multitude of medical conditions. Also, it provides an alternative management option, which can be integrated together with conventional Western medical treatment to benefit our patients and aid in their recovery. ♦

Dr Tan is an anaesthesiologist, subspecialised in the field of pain medicine and was conferred as Fellow of the Faculty of Pain Medicine, Australian and New Zealand College of Anaesthetists. He has received training in acupuncture at the Singapore College of Traditional Chinese Medicine and is a fully registered acupuncturist.



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Medicine and the Law

TELEMEDICINE

(PART 1) Text by Jansen Aw and Dr Alex Cheng Wei Ray

This is the first of a two-part series. In this, the authors discuss issues where law and technology converge in the realm of telemedicine. In the next part, they explore the legal-technological aspects surrounding the use of telemedicine.

One of the clearest lessons to emerge out of the COVID-19 maelstrom is that the way the world conducts its business must change. Amid global lockdowns, businesses have shifted towards remote or online services. The healthcare industry is no exception. Perhaps, now more than ever, there is greater impetus for medical practitioners to embark on telemedicine in delivering medical services.

Telemedicine refers to the provision of healthcare remotely through means such as information and communications technology (ICT).¹ Generally, telemedicine encompasses four distinct domains:²

- (a) **Teleconsultation or tele-treatment** comprises interactions between healthcare professionals, mainly doctors, and patients or their caregivers, for the purpose of providing direct clinical care resulting in diagnosis and treatment;
- (b) **Tele-collaboration** refers to interactions and discussions of a patient's case files between healthcare professionals for clinical purposes;
- (c) **Tele-monitoring** refers to the remote, ICT-enabled collection of data from patients for the purpose of health monitoring; and
- (d) **Tele-support** comprises the utilisation of online, ICT-enabled services for non-clinical purposes to support patients.

The telemedicine climate in Singapore

Telemedicine is not new to Singapore. For example, WhiteCoat, which started in April 2018, was one of the earliest telemedicine providers under the Ministry of Health's (MOH) regulatory sandbox. However, even before that, Telecare, in which nurses provide follow-up consultations for chronic conditions, started as early as 2011 in SingHealth hospitals and polyclinics.²

Recently, MOH has proposed new regulations which will govern telemedicine in Singapore. This is a welcome development as there is a need to regulate the provision of such services, especially if they are being offered by companies operating out of offices (and sometimes out of jurisdiction) that may not be affiliated with medical clinics.³ Chief among the objectives of the new regulations is to mitigate the risks of teleconsultation in the interests of patient safety. In particular, MOH has stipulated that all medical practitioners seeking to offer teleconsultation are required to obtain a licence in the future. This requirement will come into force in 2022 under the new Healthcare Services Act (HCSA).⁴

In the domains of tele-collaboration and tele-support, MOH will continue to monitor developments for the time being and may implement regulations where needed.⁵

In the past few years, although the total number of players has

increased,⁶ telemedicine remains predominantly the province of private healthcare providers. COVID-19 changed this landscape. In the first half of 2020, with COVID-19 in full swing, various restructured hospitals⁷ and government polyclinics have also jumped on to the teleconsultation bandwagon.⁸ In recognition of the commercial potential, non-traditional healthcare providers like the Overseas-Chinese Banking Corporation have also teamed up with partners and entered the fray to provide value-added services to its customers by offering fixed-fee teleconsultation.⁹

Given the benefits that underlie telemedicine, MOH set up a Licensing Experimentation and Adaptation Programme regulatory sandbox in 2018 to review telemedicine practices with the aim of collaborating with industry stakeholders to develop the regulations that would govern the industry.¹⁰

In recognition that the fight against COVID-19 is likely to be long-drawn, the Government has also taken steps to encourage the development of telemedicine to reduce unnecessary travel and prevent another wave of infection. Among the various initiatives, the Government has expanded the scope of the Productivity Solutions Grant (PSG) to support healthcare providers in providing teleconsultation (video) solutions to patients. All eligible healthcare providers will be able to

receive up to 80% PSG support to incorporate these solutions into their existing business and can apply for it through the Business Grants Portal.¹¹

Current and future laws

Various disparate laws apply to telemedicine services in Singapore; however, there is no specific piece of legislation governing such services.

For a start, the common law would apply to certain aspects or activities of telemedicine, such as the contracts between the service provider and the patient. The law of tort will also continue to apply to the advice and treatment given to the patient. The law of confidentiality would also apply to a patient's confidential data that is obtained for the purposes and in the course of providing telemedicine services.

Additionally, doctors registered with the Singapore Medical Council (SMC) would also need to comply with the SMC Ethical Codes and Ethical Guidelines (ECEG). The ECEG states that doctors must endeavour to provide the same standard of medical care as they would in an in-person situation.¹² In addition, medical practitioners providing telemedicine should abide by the National Telemedicine Guidelines, which cover four domains: clinical standards and outcomes, human resources, organisational and technology, and equipment.² It is to be noted that these telemedicine guidelines are entirely honour-based and are premised on a professional and moral standard.

The Health Products Act (Cap. 122D) regulates telehealth products that may be used for the provision of telemedicine services. Generally, the Health Sciences Authority employs a rule-based approach to classify such medical devices or products, as set out in the relevant guidelines.¹³

The Personal Data Protection Act (No. 26 of 2012) would also apply to the personal data collected, used and disclosed for the purposes of providing the telemedicine service. Given that patient medical data is involved, which is considered "sensitive personal data", the service provider must take care in ensuring

that a higher standard of protection be accorded to safeguard such data.¹⁴

While there is no single piece of legislation governing telemedicine in Singapore, this is set to change once the HCSA comes into force in 2022.¹⁵ The Healthcare Services Bill was passed on 6 January 2020 and is intended to repeal the outdated Private Hospitals and Medical Clinics Act (Cap. 248) which was enacted decades ago. The Bill modifies the regulatory regime for healthcare services from a "premises-based" to a "services-based" form of licensing. The Bill is expected to be implemented in three phases, starting from September 2021 and ending in March 2023. Telemedicine will be regulated in Phase 2, which is expected to take place in the second half of 2022.¹⁶

The HCSA will also allow for a more flexible and modular services-based licensing regime that caters to the licensing of different healthcare services, while enabling the development of new and innovative services. This form of healthcare licensing is similar to that practised by Malaysia¹⁷ and the UK,¹⁸ for example.

To ensure accountability, the HCSA will also introduce new "step-in" provisions to authorise MOH or an appointed "step-in" operator to temporarily take over the operations of a service provider that has violated the regulatory regime or is operating in a way that is detrimental to patients' interests.¹⁹

The legal-technological considerations of telemedicine

On issues of negligence and breach of duty

The provision of telemedicine services is inherently limited by the state of technology and practical constraints in carrying out medical assessment and treatment remotely. For example, a telemedicine service may be constrained by technical limitations of an end user lacking reliable broadband access, or by practical limitations of carrying out a physical examination of the patient. Given these limitations, it is understandable for there to be concerns that a doctor may not be able to meet the standard

of care in treating or advising the patient, thereby setting up for the risk of negligence or breaching the doctor's duty to the patient.

In the recent judgement in an Indian case of *Deepa Sanjeev Pawaskar and Anr v State of Maharashtra*²⁰ the court found that the physician had prescribed treatment to the patient over telephone without an appropriate diagnosis which ultimately led to the patient's passing. The physician was found guilty of criminal negligence for the teleconsultation given to the patient. This judgement was interpreted by some Indian doctors as deeming the practice of telemedicine and teleconsultation itself illegal and has resulted in the Indian Medical Association seeking clearer guidelines from their own medical council to clarify the status of telemedicine in India. As a result, an amendment to the Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002 that gave statutory support and basis for the practice of telemedicine in India was subsequently published in March 2020.²¹

In Singapore, medical negligence is presently determined based on: (a) the Bolam-Bolitho test in respect of a patient's diagnosis and treatment,²² and (b) the Modified Montgomery test espoused in *Hii Chii Kok v Ooi Peng Jin London Lucien*²³ in respect of the advice given to a patient. On 6 October 2020, the Singapore Parliament passed the Civil Law (Amendment) Bill which enacted a new section 37 that will come into effect soon to replace the current standard of care for medical advice. In the context of telemedicine, given the inherent risks and limitations underlying such services, it would be important for a doctor to pay special care and attention to these risks and limitations in seeking to meet the prescribed standard of care.

For example, in the case of upper respiratory tract infections (URTI), this usually presents with combinations of symptoms of runny nose, cough and sore throat. However, more serious conditions like asthma, pneumonia, tuberculosis and heart failure can also masquerade as various forms of cough.

If the patient is a poor historian then it is only likely through auscultation that a doctor can differentiate them with certainty. Since it is not feasible to auscultate by teleconsultation, it is likely that some of these more serious cases are misdiagnosed as URTI due to the limitations of physical examination in teleconsultation.

There is perhaps no silver bullet in overcoming these challenges in telemedicine services. However, with careful planning and consideration before rolling out the telemedicine service, the authors are of the view that the doctor can still provide the appropriate care and treatment to the patient, and mitigate the risks involved. Some of the considerations a telemedicine service provider should consider include:

- (a) What are the boundaries of the telemedicine services that I will provide?
- (b) What are my contingency plans if the remote means of providing diagnosis, treatment and advice are not feasible for a particular patient? (ie, emergency situations)
- (c) Have I done a risk assessment and testing of the system to ensure that there are sufficient safeguards in place?
- (d) Have I covered all the relevant guidelines in implementing the telemedicine services?
- (e) Does the telemedicine platform properly obtain express consent from the patient?
- (f) Do I have the relevant legal protections in place, such as a contract limiting liability on certain aspects of my telemedicine activities?
- (g) How often should I carry out a review of my system and processes in place to check for any weaknesses or flaws?
- (h) Have I obtained regular feedback in order to improve my system and processes?

By drawing the contours of what the telemedicine service can offer, and adopting the proper policies and processes, the telemedicine service provider is able to control its exposure to risk better. ♦

Jansen is a partner with the Litigation and Dispute Resolution Practice, and Technology and Data Protection Practice in one of the oldest law firms in Singapore, Donaldson & Burkinshaw LLP. Jansen is an advocate and solicitor of the Supreme Court of Singapore.



Dr Alex is a family physician who works as a locum medical doctor during his free time. He is currently pursuing a Master of Laws with the University of London. Aside from his medical qualifications, he also holds the degrees of Bachelor of Laws, Master of Professional Accounting and Master of Business Administration. He is an incoming practice trainee lawyer at Donaldson & Burkinshaw LLP.

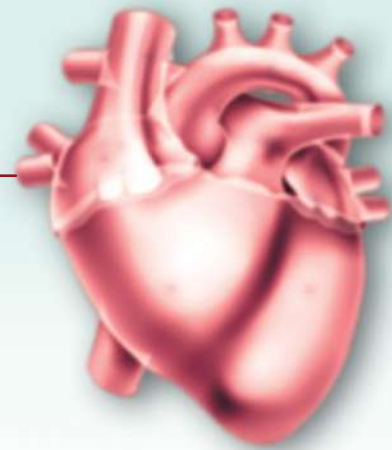


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Cardiac Biomarkers and Their Application

Text by Dr VP Nair



Introduction

Cardiac biomarkers, which include enzymes, hormones and proteins, are biological markers or measurable endogenous indicators that are released into the blood stream when the heart is stressed or damaged. Biomarkers are cardinal indicators in the diagnostic armamentarium of disease trait (risk marker or risk factor), disease state (clinical or pre-clinical) and disease rate (progression or prognosis).

Noting an increase in one or more cardiac biomarkers can assist in the identification of patients with acute coronary syndrome (ACS) and acute myocardial infarction (AMI), allowing rapid diagnosis and treatment.

Cardiac biomarkers tests

Cardiac biomarker testing aids in detecting the presence of ACS and AMI and the evaluation of its severity, so that appropriate therapy can be administered to the patient. It is important to differentiate a heart attack from angina, heart failure or any other condition, since treatment and monitoring requirements are different for each condition. As time is muscle, prompt medical or surgical intervention is vital to minimise heart damage and future complications. Essentially, cardiac biomarker tests ought to be accessible quickly to doctors – 24 hours a day, seven days a week.

The tests may be performed at point of care, in the emergency room, or at the patient's bedside. Serial testing of one or more cardiac biomarkers is advised, to ensure that their upsurge in blood levels is not missed and to estimate the severity of a heart attack.

Normal values for cardiac biomarkers are as follows:

Creatinine kinase (CK): 20-192 units/l

Creatinine kinase myocardial band (CK-MB): 0-6 ng/ml

High-sensitivity cardiac troponin T (hs-cTnT): <14 ng/l, or I (hs-cTnI): <17.4 ng/l

High-sensitivity C-reactive protein (hsCRP): 0-3 mg/l

The troponin T or I will start to rise three to four hours after injury and can stay elevated for up to two weeks. Within the normal healthy population, 99% will have an hs-cTnT (@ Mount Elizabeth Hospital < 14 ng/l) or hs-cTnI (@ National University Hospital < 17.4 ng/l). Cardiac troponins peak between 24 and 28 hours after initiation of infarction. Values above 30 ng/l are more likely to be consistent with a myocardial infarction (MI). The higher the level the more likely the patient has had an MI, although stable levels marginally above 30 ng/l do occur with alternative pathology.

At the European Society of Cardiology (ESC) Congress on 1 September 2019, it was shown that a rapid assessment algorithm based on hs-cTn and sampling at 0 and 1 hour is recommended to rule-in and rule-out AMI. Serial CK-MB and troponin T or I are important. Myoglobin

is detectable in the serum after AMI. It is one of the earliest cardiac biomarkers to increase in concentration in the blood following AMI. However, there are many other causes of raised myoglobin in serum and urine. As such, it is not currently in the guidelines for diagnosis.

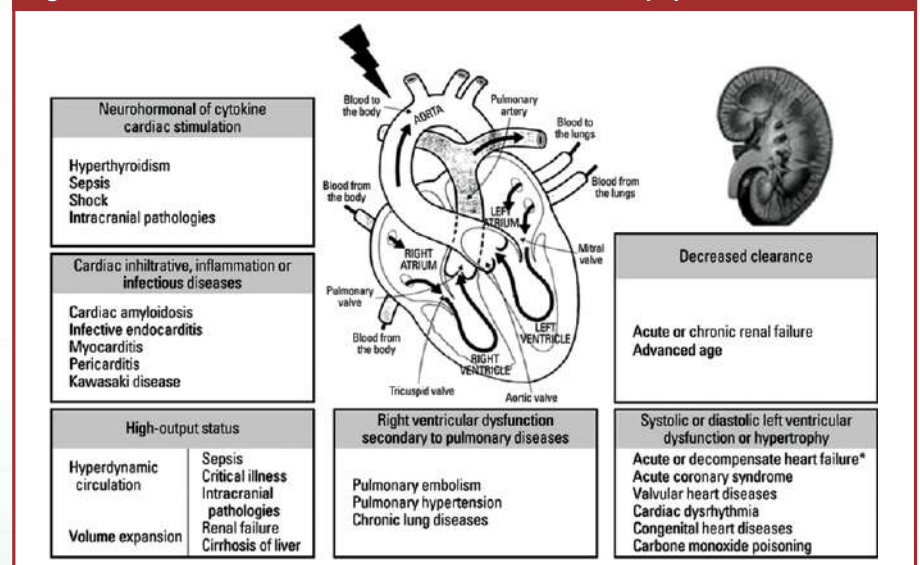
D-dimer

D-dimer testing is of clinical use when there is a suspicion of deep venous thrombosis, pulmonary embolism or disseminated intravascular coagulation. It is under investigation in the diagnosis of aortic dissection. The reference range of D-dimer is 0.00-0.49 ug/ml.

B-type natriuretic peptide

B-type natriuretic peptide (BNP) belongs to a family of naturally occurring hormones known as natriuretic peptides and are produced by the heart. The N-terminal-pro BNP (NT-proBNP) is a non-active pro-hormone which is released from the same molecule that produces BNP. Being synthesised in the cardiac ventricles, both BNP and

Figure 1: Causes and mechanisms of elevated natriuretic peptides – NT ProBNP



Source: Scientific figure on ResearchGate. Available at: <https://bit.ly/3tGHkHj>.

NT-proBNP are liberated in response to changes in the pressure inside the heart. These changes can be linked to heart failure or other cardiac events. The levels of BNP and NT-proBNP go up when heart failure develops or gets worse, and their levels drop when heart failure stabilises. Being a relatively specific biomarker for cardiac dysfunction, BNP and especially NT-proBNP are increasingly being used in the evaluation and management of heart failure. ESC guidelines recommend a Class 1a use of BNP/NT-proBNP concentrations as a key element in the early diagnosis of heart failure.

The US Food and Drug Administration approved a cut-off value of NT-proBNP for the diagnosis of congestive heart failure (CHF) as 100 pg/ml in 2019. (A normal value in Parkway Laboratory is 0 to 100 pg/ml.) In NT-proBNP, the optimal cut-off values for confirmatory (rule-in) decision limits for CHF are 450 pg/ml for ages less than 50 years, 900 pg/ml between 50 to 75 years, and 1,800 pg/ml above 75 years of age. The exclusionary (rule-out) decision limit of NT-proBNP for cardiogenic acute dyspnoea in all ages is less than 300 pg/ml. Natriuretic peptides are useful markers in differentiating acute dyspnoeic patients and are potent prognostic markers for CHF.

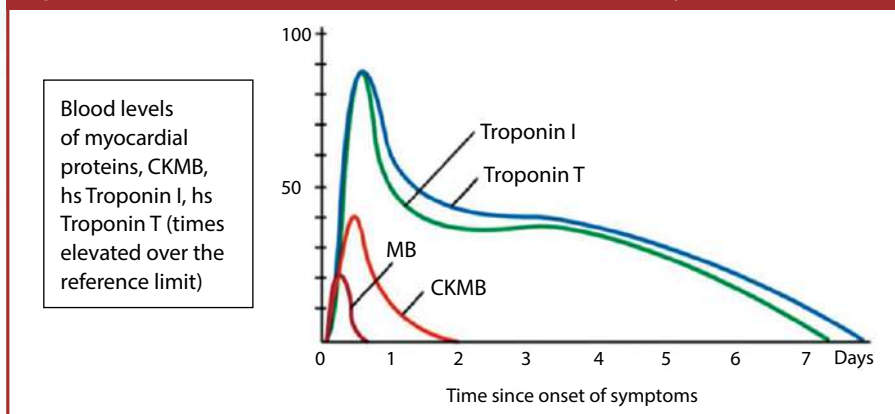
New cardio biomarkers in the pipeline

Cardiovascular disease is one of the leading causes of mortality in the world. Thus, there is an emerging need for rapid diagnosis and intervention for management of ACS. This, in turn, is continually propelling investigations into potential molecular cardiac biomarkers. Several candidate molecules are in the discovery and development pipeline, including growth differentiation factor 15, soluble suppression of tumorigenicity 2, heart-type fatty acid binding protein among others.

Although most cardiovascular biomarkers are used by clinicians without taking gender into account, sex-specific differences in biomarkers evidently exist. Women and men differ in their cardiac physiology and manifestations of cardiovascular disease.

Baseline concentrations of most common biomarkers (including cardiac troponin and natriuretic peptides) differ between men and women, but these sex-specific differences do not usually translate into a need for differential

Figure 2: Cardiac biomarkers – pattern of association with myocardial infarction



Adapted from ECG & Echo Learning – Diagnostic Criteria for Acute Myocardial Infarction: Cardiac troponins, ECG & Symptoms. Available at: <https://bit.ly/3y7UP6l>.

sex-based cut-off points. Furthermore, most biomarkers have similar diagnostic and prognostic implications regardless of the sex, with the potential exception of cardiac troponins measured through high-sensitivity assay. Troponin levels are lower in women than in men and, with the use of high-sensitivity assays, sex-specific cut-off points may improve the diagnosis of ACS.

In addition, proneurotensin is a novel biomarker that has been found to be predictive of incident cardiovascular disease in women but not in men, and was also predictive of incident breast cancer. If this is confirmed, proneurotensin might be a unique biomarker of disease risk in women.

With any biomarker, an understanding of sex-specific differences might improve its use and might also lead to an enhanced understanding of the physiological differences between the hearts of men and women.

About 70% of cardiovascular disease (CVD) cases and deaths are attributed to modifiable risk factors, which could be predicted through history-taking and cardiac-biomarker testing, allowing the individuals concerned to alter lifestyles and address the risk factors. These biomarkers provide important prognostic information in addition to clinical parameters. Additional diagnostic tests such as serial ECGs, treadmill stress tests and chest X-rays; imaging modalities including echocardiography and stress echoes; and perfusion studies such as technetium-99m sestamibi or myocardial perfusion imaging, rubidium positron emission tomography scans and computer tomography coronary angiograms, allow proper diagnosis and effective management.

Damage to the heart muscle cells from ACS is the classic cause of elevated troponin. Although cardiac troponins have been accepted as the gold standard in the diagnosis and risk stratification of ACS, misinterpretation of detectable troponin levels in the emergency department or other in-hospital settings may lead to confusion in terms of diagnosis and choice of suitable therapy options. Physicians should be aware of the non-ischemic causes of troponin positivity as well as their pathophysiology and clinical impact to prevent unnecessary invasive and non-invasive treatments and coronary-care-unit admissions.

There are many other (albeit minor) causes for elevated troponin levels, among them acute and chronic heart failure, myocarditis and cardiac contusion from trauma. There are also many non-cardiac causes of increased troponin levels, such as renal failure, pneumonia and pulmonary embolism.

COVID-19 and the heart

The morbidity and mortality in COVID-19 are primarily related to respiratory and/or circulatory failure. The respiratory distress in severe COVID-19 cases may be the result of the combination of lung injury (pneumonia/acute respiratory distress syndrome) and heart failure due to ACS or myocardial injury.

Dr Allan Jaffe of Mayo Clinic stated that high-sensitivity troponins T (hsTnT) or I (hsTnI) may be elevated in COVID-19 patients whose hearts are affected by SARS-CoV-2. In some cases, 25% to 30% elevation of hsTnT is possible. In the majority of cases where non-ST-segment elevation myocardial infarction is the diagnosis, the management should

be conservative. If plaque rupture is suspected or there is ST-segment elevation myocardial infarction, then coronary angiography and percutaneous coronary intervention may be done with utmost precautions with personal protective equipment. Both short-term and long-term prognosis may be worse in these classes of patients.

Dr Dara K Lee Lewis, co-director of the women's cardiology programme at Lown Cardiology Group, stated that pre-existing heart conditions and poor metabolic health increase risk of severe COVID-19, compared to the general population.

Diabetes increases risk of severe COVID-19 by suppressing the immune system, while other illnesses like asthma increase risk by weakening the lungs.

People with CVD were more than twice as likely to contract severe forms of COVID-19. There are two explanations as to how CVD increases the risk of severe COVID-19. The first is that pre-existing heart conditions, such as damaged heart muscle or blocked heart arteries, weaken the body's ability to survive the stress of the illness. A person with a vulnerable heart is more likely to succumb to the effects of fever, low oxygen levels, unstable blood pressures and blood clotting disorders (all possible consequences of COVID-19) than someone previously healthy.

A second explanation relates to poor underlying metabolic health, which is more common in those with heart disease. Poor metabolic health refers to diseases such as type 2 diabetes or prediabetes and obesity, which themselves cause inflammation and risk of blood clots, compounding the effects of COVID-19 and increasing the likelihood of devastating complications of COVID-19.

Increased cardiovascular risks with COVID-19

COVID-19 can damage the heart in several ways. The virus may directly invade or inflame the heart muscle, and it may indirectly harm the heart by disrupting the balance between oxygen supply and demand. Heart injury, which may be measured by elevated hsTnT in the bloodstream, has been detected in about one-quarter of patients hospitalised with severe COVID-19 illness. Of these patients, about one-third have pre-existing CVD.

The majority of people with COVID-19 will have mild symptoms and recover

fully. However, about 20% will develop pneumonia and about 5% will develop severe disease. In the severe form of COVID-19, the body's immune system overreacts to the infection, releasing inflammatory molecules called cytokines into the bloodstream. This "cytokine storm" can damage multiple organs, including the heart.

Myocarditis typically occurs only in advanced COVID-19 disease. Myocarditis can result from direct heart invasion by the virus itself, or more commonly by inflammation caused by the cytokine storm. When this occurs, the heart may become enlarged and weakened, leading to low blood pressure and fluid in the lungs. While this severe form of myocarditis is rare, recent studies have suggested that a milder form of heart muscle inflammation may be much more common than previously recognised. A recent study showed that asymptomatic heart inflammation was seen on MRI in up to three-quarters of patients who had recovered from severe COVID-19. Increased oxygen demand and decreased oxygen supply lead to heart damage.

Fever and infection cause the heart rate to speed up, increasing the work of the heart in COVID-19 patients who develop pneumonia. Blood pressure may drop or spike, causing further stress on the heart, and the resulting increase in oxygen demand can lead to heart damage, especially if the heart arteries or muscle were unhealthy to begin with.

Heart damage is most often caused by heart attacks, which result from the formation of a blood clot in a vulnerable heart artery, blocking delivery of oxygen to the heart muscle. COVID-19-related inflammation raises the risk of this type of heart attack by activating the body's clotting system and disrupting the blood vessel lining. When inflamed, this lining loses its ability to resist clot formation. These blood clots in the arteries of the heart cut off its supply of oxygen. The increased clotting tendency can also lead to blood clots in the lungs, which can cause a drop in blood oxygen levels. Severe pneumonia drops blood oxygen further. When the oxygen demand exceeds supply, the heart muscle is damaged.

People with CVD who adopt adequate physical activity and a healthy diet can strengthen their defences and reduce any long-term risk of CVD from COVID-19.

Getting protected from COVID-19

Vaccination is important to protect all and create herd immunity. Vaccination generates both the desired antibodies and the immune cells, the T-cells. There are many players in this field: Pfizer-BioNTech, Moderna, Oxford-AstraZeneca, Russia's Sputnik V, China's Sinovac and India's Covaxin. The first two have 90% to 95% protection while the other three claim more than 85% protection. All of them need two doses and special storage facilities. Moderna and Pfizer-BioNTech are novel types of vaccines made from messenger RNA (mRNA) and are effective against the original and probably the more contagious mutated strains which appeared in South Africa, Brazil, the UK and India. Mutations in the virus are due to random changes in its genetic sequence. Messenger technology can directly start to engineer a vaccine which completely mimics this new mutation.

The mRNA vaccine involves injecting only fragments of the genetic material. When these viral genetic fragments enter the human cell, they commandeer the cell to produce the signature protein of the coronavirus. This trains the body to recognise the key part of the virus – the spike protein, without exposure to the whole virus. This contrasts with previous methods where the protein itself is used, which usually takes years to manufacture the vaccine, but which recently only took two to six weeks.

In January 2021, two new vaccines from the US, Johnson & Johnson's single dose vaccine and Novavax have come into the market. Ideally, a universal vaccine effective against all variants and mutations of COVID-19 should be available in the near future. ♦

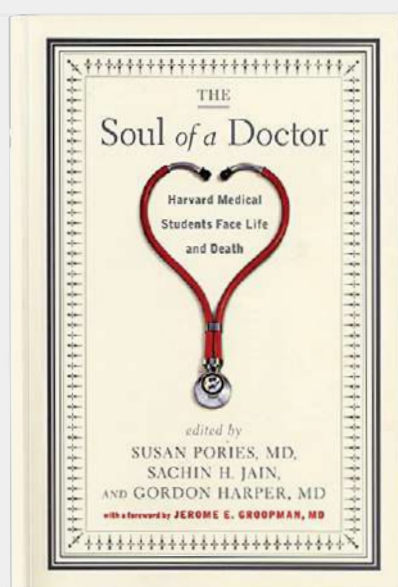
Dr Nair is a cardiologist with clinics at Mount Elizabeth Hospitals. He had cardiology training with Prof Ronald Campbell, the British Heart Foundation Professor of Cardiology and Prof Richard K Myler at the San Francisco Heart Institute. He has been doing angioplasty and stenting for the last three decades.



Through the eyes of Medical Students

Review by Dr Tina Tan, Editor

The following two book reviews are accompanied by my personal call to medical students and doctors in training (DITs). Learning the art and science of medicine never stops, and the experience can be overwhelming. Yet, all of us are expected to maintain some sort of “clinical detachment” as we get thrown into the deep end of our learning. I’m not saying students and DITs need to be spoon-fed or have their hands held though. A balance needs to be achieved between “getting the job done” (ie, learning and being efficient) and “what this job is really about” (ie, the art of things). I sincerely hope to invite more medical students and DITs to write about their experiences, to say things that are uncomfortable and ask questions that no one dared to ask.



Title: *The Soul of a Doctor: Harvard Medical Students Face Life and Death*

Editors: Susan Pories, Sachin H. Jain and Gordon Harper

Number of pages: 248

ISBN: 9781565125070

Type of book: Paperback

Publisher: Algonquin Books

Year of publication: 2006

The Soul of a Doctor: Harvard Medical Students Face Life and Death

Do you remember your “firsts” as a medical student? The first time you clerk a patient can be the most nerve-racking thing you’ve ever done. Or perhaps that’s a far second compared to taking bloods or inserting a urinary catheter for the first time. What about that bedside tutorial you had with five other students and that one scary professor staring at you? Or maybe your first case presentation (such an elusive art, it is) made to a surgeon who then tells you how terrible your summary was.

The transition from a medical student who possesses a lot of clinical knowledge to a doctor can be daunting. It is life-changing and, as the saying goes, a steep learning curve. All of the things required of medical students put your personal

strengths and weaknesses on full display for patients, peers, seniors and nurses to see, until that transformation occurs within you and you become a confident – and hopefully competent – doctor.

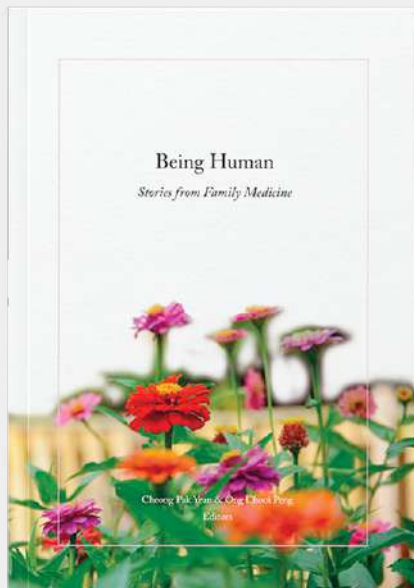
This book features a group of medical students and their experiences as they moved through that transformative process. Some of these students could probably have a side career in writing, as they described the most unexpected incidents, weaving in their personal lives and cultural backgrounds into their testimonies.

Now that I am reminded of how much medical students have to say, it makes me wonder how much of what I experienced as a student has been suppressed, forgotten or just somehow incorporated into my identity as a doctor now. Looking back, there were things I’d witnessed, overheard or experienced that were not spoken about subsequently. *Just take it in, and move on. Don’t ask so many questions.*

I hope that we can change things moving forward. It is a well-known fact that becoming doctors can make you jaded, angry and disillusioned. But I’m sure that for many of us, it was a gradual process rather than a sudden change. Let’s listen to what our future colleagues have to say. After all, we were all once students ourselves.

Dr Tan is a psychiatrist with the Better Life Psychological Medicine Clinic, and a visiting consultant at the Institute of Mental Health. She is also an alumnus of Duke-NUS Medical School. Between work and family life, she squeezes time out for her favourite pastimes – reading a good (fiction) book and writing.





Title: *Being Human: Stories from Family Medicine*

Editors: A/Prof Cheong Pak Yean and Dr Ong Chooi Peng

Number of pages: 248

ISBN: 9789811414602

Type of book: Hardcover

Publisher: College of Family Physicians Singapore

Year of publication: 2018

Being Human: Stories from Family Medicine

I didn't really know what to expect when I received this book. When I skimmed the pages, I discovered colourful drawings and eye-catching images that illustrated various aspects of medicine which we often do not voice out – the human side of things. Like the faceless person behind a patient's medical problems, the unspoken stressors that the patient doesn't know how to voice, or the hapless medical student encountering difficult situations for the first time.

In fact, the artwork in *Being Human* were done entirely by medical students as part of A/Prof Cheong Pak Yean's creative method of incorporating their family medicine experience into a visual montage. I suppose it was probably



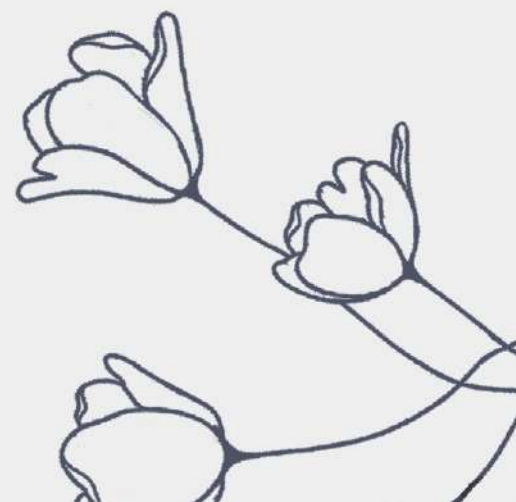
therapeutic for the students, to be able to translate into images what words could not express about their patient encounters.

The interesting thing was what they did with the drawings later. The editors of this book showed the drawings to a group of doctors, mostly GPs, and tasked them to write about the images with a focus on the humanistic aspect of the patient's care. These doctors rose to the occasion and came up with heartfelt and poignant snippets about their experiences in healthcare, each interpreting the artwork for themselves, independent of what the original artists (the students) had thought.

Thus, this book gives an insight into what medical students see as they train to become doctors, as well as being a platform for the contributing doctors to express their creative juices. This aspect of the book is what's rather lacking in our day-to-day practice, amid the busy hubbub of ward rounds, clinics, medical reports and meetings. But it really shouldn't be ignored. Some of us process difficult experiences in words (such as a journal), or over a round of coffee (or alcohol) with friends. Some of us simply have a hard time expressing emotions and end up compartmentalising or suppressing what we've seen. Yet, as doctors, who are exposed to a range of challenging situations, it is important to have an outlet. Oftentimes, a picture speaks a thousand words. Some of my patients go through art therapy, or use art as a form of expression. I think doctors should be given a chance to do the same. It would probably benefit us more than we realise. ♦



Drawings by NUS Yong Loo Lin School of Medicine students in tutorials conducted by A/Prof Cheong PY



KEEPING ACTIVE AMID THE LOCKDOWN

Text by Dr Chie Zhi Ying



Dr Chie is a family physician working in the National Healthcare Group Polyclinics. She also holds a Master of Public Health from the National University of Singapore and is a designated workplace doctor. She enjoys freelance writing and writes for Chinese dailies *Lianhe Zaobao*, *Lianhe Wanbao*, *Shin Min Daily News* and health magazine *Health No. 1*. She can be contacted at chiezhiying@gmail.com.



The COVID-19 pandemic has seen countries around the globe going into lockdowns. In Singapore, we had the circuit breaker (CB) measures between April and May 2020 to prevent and minimise the spread of the virus. This was also the period when some lamented that they put on a considerable amount of weight due to constant snacking and lack of exercise. Yet, there are many others who have adapted and found new ways of keeping themselves fit and healthy.

Basic brisk walking for everyone

To begin, I must first confess that I am neither a health fanatic nor a fitness enthusiast. I have had my fair share of “couch potato” moments and need constant self-reminders to get up and exercise. But having exercise buddies (my mum and sister) really helped to keep me in check and motivate me to take that first step out of the house.

Before the pandemic hit us, my exercise routine would involve brisk walking at night around the park connectors (PCNs) in my neighbourhood about five times a week, for a distance of about five to six kilometres over an hour or so each time. Sometimes when I was just too tired, I wondered if I was really just strolling. However, I was glad that the CB measures allowed us to continue to exercise in the open and I made it a point to do so throughout those two months.

Simply attired in a T-shirt and shorts with a pair of soft and comfortable walking shoes (and not forgetting my mask), I would commence my daily exercise routine in the dark, at an hour when I really wished to be lazing around at home. But as the old Chinese saying goes, “A journey of a thousand miles begins with a single step” (千里之行，始于足下); once I overcame the inertia and took the first step out of my comfort zone, the rest of it was quite a breeze. On my brisk walking journeys, I get to enjoy the greenery in the form of tall shrubs, trees and bushes, all dimly lit by lamp posts, creating a serene and surreal feeling. Best of all, there is the opportunity to take in some fresh air and enjoy life outdoors, away from an air-conditioned environment. I often see the same group of people exercising, most of them jogging or running while checking their vitals on the latest health apps. These familiar faces reminded me that exercising is akin to a slow marathon; we need to put in conscientious ongoing efforts to make it part of our daily routine. In the initial stages during CB, the PCNs were mostly deserted. But

as we entered Phase 3 of reopening, activities have mostly resumed and we often see families bringing their little ones out to play and people walking their dogs leisurely. Of course, not to be forgotten are the busy food and goods delivery personnel riding their bikes as they go on their way to complete delivery missions.

Expanding one's exercise options

However, when rain and storms came, my brisk walking plans would inadvertently be thwarted. In the past, I would usually take it as a sign that it was time to lay back at home and enjoy some quiet time. During the CB period however, I decided to try something different – doing fitness workouts at home. With the ongoing safety measures, this was a reasonable alternative for those who would much prefer to stay at home and avoid the crowds. For me personally, it served as a plan B for rainy or “I don’t feel like going out” days.

Just simply search for fitness workouts on YouTube and you get tons of video results ranging from yoga to dance. I scrolled through a few top hits before settling on one that incorporated dance movements into the routine – a Zumba workout! The exercise regimen is a 30-minute workout that is both intense and energising. So instead of putting on my walking shoes and preparing to go out of the house, I laid out my newly bought yoga mat in front of my laptop and got the video playing. The Zumba instructor was chirpy and

bursting with energy, and with other participants following along in the video, it felt like a group workout and that I was not alone in this.

After doing some initial stretches to warm up, things just got started really fast. With upbeat Latin music in the background and the lively instructor giving short quick instructions on the moves, I was busy coordinating my steps with what was shown on the laptop screen. Not one with good hand-eye coordination when it came to dance, I did my best to familiarise myself with the different moves. With various consecutive steps, jumps, squats and hand movements, I was breaking into a sweat and heating up just a mere five minutes into the workout. By the 15-minute mark, I was already panting, palpitating and perspiring profusely. I rested during the short break and had a few gulps of water. As the workout continued, I wiped my sweat off and tried to focus on it, doing my best to mirror the instructor's steps while modifying the moves when they proved to be too difficult. You can imagine how glad I was when the timer showed that 30 minutes was up. I clapped enthusiastically and beamed as a sense of achievement engulfed me. I successfully finished this intense workout, yay!

A reminder to have a balanced lifestyle

Alas, keeping fit is not just about exercise, it also involves the right kind of diet. During the CB period, I got to eat more home-cooked food, thanks to the fact that my sister was working from home. My mum sometimes joked with others that she spent virtually all her time in the kitchen over the last year, whipping up different dishes for lunch and dinner. How I appreciated that at the end of a hard day at work, I got to munch on delicious greens, drink warm tasty soups and enjoy other simple home delicacies that were also healthier and nutritional. Life is indeed full of bliss!

Finally, we need to set aside time to unwind and have some "me-time" for overall wellness. So don't forget to engage in your favourite hobbies and spend time with your loved ones. Get up now and start moving your way to a healthier life ahead! ♦

MORE HOME FITNESS TIPS

The 2020 circuit breaker forced us to be creative in how we kept fit. In the days and months since, many innovative online fitness programmes have sprung up, taking advantage of technological advances to help us keep fit anywhere, anytime. Here are three such programmes readers can consider adding to your fitness routines!

1 ➤ All-inclusive fitness and health programmes

Featuring home workout videos, meal plans and active communities, these programmes offer an all-in-one solution to staying trim and fit from the comfort of home. Workout programmes are tailored to all levels from beginner to advanced, and offer anything from Pilates to boxing. Manage your nutrition as well with their meal plans and recipes to really keep your health and fitness in check.

2 ➤ Online personal training

With the advent of Zoom and other videoconferencing technologies, personal training has also gone online. Most of the big gym chains now offer online personal training, where you can tailor a programme according to your fitness goals and book sessions with your favourite trainer, with flexible timings to suit your busy schedule.

3 ➤ Bodyweight workouts

Sometimes, you don't need to go to the gym to work up a good sweat. Bodyweight exercises utilise your own weight, instead of gym equipment, to create resistance. Done correctly, bodyweight workouts have been shown to improve strength and endurance, and have the potential to burn many calories. A full workout alternates between periods of rest and work, making it similar to high intensity interval trainings. Check out three bodyweight workouts at <https://on.ft.com/3xLo12U>.



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Dr Sue-Ann Ho Ju Ee
Dermatologist
and Dermatologic Surgeon,
MBBS (Singapore), MRCP (UK),
FAMS (Dermatology)

Dr Ho received her Bachelor of Medicine and Bachelor of Surgery (MBBS) from the National University of Singapore in May 2005. In Oct 2009 she became a member of the Royal Colleges of Physicians of the United Kingdom (MRCP(UK)) and received Specialist Accreditation in Dermatology (Singapore) in June 2013.

After completing her basic and advanced medical training, Dr Ho was awarded the prestigious Academic Medicine Development Award by NUH to pursue further training in dermatology surgery and Mohs Micrographic Surgery in Ninewells Hospital, Dundee, Scotland. Upon her return, she set up NUHS's first Mohs Micrographic Surgery service in 2015. She was also the first Skin Tumour Board Lead in NUH. She has performed more than 500 Mohs surgeries successfully.

Dr Ho's areas of interests include general dermatology, skin cancer and dermatosurgery particularly Mohs Micrographic Surgery. She still serves as a visiting consultant to NUH.



Dr Kok Wai Leong
Dermatologist
MBBS (NUS, Singapore),
FAMS (Dermatology)

Dr Kok received his Bachelor of Medicine, Bachelor of Surgery (MBBS) from the National University of Singapore in 2008. He received Specialist Accreditation in Dermatology (Singapore) in 2018.

Prior to joining Dermatology & Surgery Clinic, Dr Kok was a visiting consultant at Khoo Teck Puat Hospital and at the National Skin Centre. He also previously practised as a dermatologist in the Military Medicine Institute of the Singapore Armed Forces and is proficient in the management of occupational-related skin diseases.

Dr Kok's areas of specialty include eczema, psoriasis, photodermatology and skin cancers. His broad range of expertise include general dermatology, skin allergies, skin surgery, aesthetic and laser procedures.



Dr Evelyn Tay
Dermatologist
and Dermatologic Surgeon,
MBBS (Singapore) MRCP (UK)
FAMS (Dermatology)

Dr Tay graduated from the National University of Singapore in 2010 with a Bachelor of Medicine, Bachelor of Surgery (MBBS) and received Specialist Accreditation in Dermatology (Singapore) in 2016.

She was awarded the Health Manpower Development Programme Award to pursue a fellowship at the Dermatological Surgery and Laser Unit at St John's Institute of Dermatology, Guy's Hospital in London. She trained under the tutelage of renowned dermatologic, cosmetic and plastic surgeons to advance her skills and knowledge in dermatologic and nail surgery, lasers, injectables and Mohs Micrographic Surgery. Prior to joining Dermatology & Surgery Clinic, Dr Tay was a Consultant Dermatologist and Dermatological Surgeon at Changi General Hospital.

Dr Tay was been awarded several research grants to advance knowledge in the field of skin ageing and holds a patent for a novel skin biopsy device. She is also a Fellow of the American College of Mohs Surgery with sub-specialty interests in Dermatologic and Nail Surgery, Mohs Micrographic Surgery, Lasers and Cosmetic Dermatology.



Dr Kong Yan Ling
Dermatologist
MBBS (Singapore), PG Dip
(Practical Derm) (UK),
FAMS (Dermatology)

Dr Kong graduated from the National University of Singapore in 2011 with a Bachelor of Medicine and Bachelor of Surgery. She completed her specialist training in Dermatology in 2018, exiting top of her cohort.

Prior to joining Dermatology & Surgery Clinic, Dr Kong was a Consultant Dermatologist at the National Skin Centre (NSC), and a Visiting Consultant at Khoo Teck Puat Hospital. At NSC, she was a core dermatologist in the divisions of paediatric dermatology and inpatient/hospital dermatology.

She has special interest in paediatric dermatology, inpatient/hospital dermatology and aesthetic dermatology and lasers. She is also experienced in skin surgery and in managing general dermatology conditions.

We are recruiting



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Dermatology & Surgery CLINIC

Dermatology & Surgery Clinic is a Private Dermatology Practice in Singapore with a team of seven accredited Dermatologists, practicing across five clinic locations in Singapore – Raffles Place (Shenton), Gleneagles Hospital, Parkway East Hospital and two clinics at Orchard Paragon.

Our integrated sub-specialisation clinics include:



**Skin
Cancer
Centre**



**Paediatric
Dermatology**



**Women's
Health
Clinic**



**Difficult
Dermatoses**



**Venearology/
Genito-Urinary
Medicine**



**Aesthetic
& Laser
Centre**

It is our goal to offer solutions to every skin concern and our comprehensive range of services include:

- **Skin Cancer Screening**
- **Mole Mapping**
- **Mohs Micrographic Surgery**
- **Phototherapy & Photodermatology**
- **Hair & Nail Problems**
- **Evening Clinic**

We collaborate closely with General Practitioners and other Speciality Centres and Hospitals to offer seamless dermatology and specialised skin treatment to patients with various skin issues or concerns.



**Dermatology
& Surgery
CLINIC**

Contact Us

Tel:

+65 6881 0028

WhatsApp:

+65 8031-0038

Our Experienced Team



Dr Henry Loh

Dermatologist M.B.B.S (Melbourne),
MRCP (London),
FAMS (Dermatology)



Dr Tay Liang Kiat

Dermatologist
& Dermatologic Surgeon
MB ChB (Glasg) (UK), MRCP (UK), MRCPs
(Glasg), FRCP (Edin), FAMS (Dermatology)



Dr Coni Liu

Dermatologist
M.B.B.S. (S'pore),
M.R.C.S. (Edinburgh),
FAMS (Dermatology)

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* Singapore Mental Health Study 2016

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