By Prof Chee Yam Cheng, Editorial Board Member

Infectious Diseases @ TTSH over 4 Decades

Photo of the main entrance of the old Tan Tock Seng Hospital, taken on 3 February 1979. (Credit: Tan Tock Seng Hospital)

The Tan Tock Seng Hospital (TTSH) at Moulmein Road was a unique hospital. Its entrance had two gate pillars with housing quarters beside it and a few bungalows on one side of the road. Opposite were housing quarters for doctors, nurses and administrators. Then came the six-storey building (the highest hospital in Singapore at that time) followed by rows of 'huts' whose design was to permit fresh air, good ventilation, sunshine and a sanatorium atmosphere. Nestled to one side was the Rotary Clinic, no doubt a gift from the Rotary Club members of Singapore. This served as the outpatient clinic. There was no emergency clinic. Welcome to the late 1960s; this was my first contact with TTSH.

TUBERCULOSIS

Tuberculosis (TB) was rife then. It was common to see many old men (some of them also opium addicts) coughing their way in and out of TTSH. In the drains, were found packets of dark brown tablets (PAS/INH) discarded by patients too nauseated to appreciate the potency of these drugs on their disease. As medical students posted there, we were amazed at the range of chest X-rays available depicting nearly every possible presentation and complication of TB. Management seemed simple enough: one disease, two holes (cavities), and three drugs.

In the museum, we learnt about TB treatment before three drugs became standard chemotherapy. It was about pneumothorax and pneumoperitoneum. These were artificially induced to collapse the diseased lungs and deprive the TB germs of their oxygen supply. If insufficient, phrenic crush was done so that the diaphragm was temporarily paralysed. If disease affected large parts of a lung, a plombage was inserted into the pleural space to physically occupy space and so collapse the lung. And if that was not successful, there was this deforming

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Singapore operation: a thoracoplasty of sorts that had ribs removed such that the shoulder on that side caved into the chest. Patients survived, some long enough to benefit from chemotherapy when they relapsed in ripe old age.

As a medical registrar posted to TTSH in 1977 (and I have not left ever since then), I was used to managing many TB patients, both in- and outpatients. In the four chest units at TTSH, among respiratory diseases, TB and COPD were the main diagnoses followed by bronchial asthma and lung cancer. At each outpatient clinic, for two to four hours, I saw 30 to 40 patients. It was a simple affair and we were very efficient. The X-ray boxes were four to six feet long and all relevant chest X-rays were displayed for comparison. PA, lateral and apical films were clearly dated and compared. Sputum for AFB (acid fast bacilli) smears and TB culture was expertly collected in a space capsule-like cubicle; if needed, the larynx was tickled to ensure a good specimen. Of course, the laboratory technician was properly protected in a 'space suit'. It used to be three daily morning specimens for DS (direct smear) and LS (laryngeal swab), and the results would take a few days for smear and six weeks or more for cultures to return. If positive, sensitivity study results would take yet another six weeks (total of three months) to return. It had to be niacin-positive to confirm it was mycobacterium tuberculosis and not some other atypical mycobacteria (which was rare). By three months, the compliant patient would have stopped coughing, put on weight, and his chest X-ray would be much improved.

The chemotherapy regimens were standard. It used to be daily intramuscular Streptomycin (unless the patient was too old or the kidneys had 'kaput') for up to three months (or 100 injections) together with oral 20 PAS/INH tablets (combination pills – way before oral contraceptives used this combination principle) daily for 18 to 24 months depending on disease severity. No wonder many patients did not take breakfast – these tablets were their breakfast. By the late 1960s, Ethambutol became available so we dispensed with PAS/INH and prescribed EMB and INH as separate tablets. So, from 20 tablets, the number decreased to one tablet of INH 300mg and three to four tablets of EMB (either 400mg or 100mg tablet given at a dose of 15 to 25mg/kg body weight). Now the patients could take breakfast.

The next useful drugs to come along were Rifampicin and Pyrazinamide, and these allowed trials for short course chemotherapy to begin in Singapore in collaboration with the British Medical Research Council. So, from one and half years to two years, the duration was reduced to six to nine months. Instrumental in this research from the Singapore side were Nurse Foo (now migrated to Australia), doctors Chew Chin Hin, Poh Soo Chuan, Lee Siew Khow and William Chan (recently deceased), who were the department heads of the medical units, together with doctors Ong Yong Yau, Tan Tiong Har (now at Gleneagles Medical Centre) and Teo Seng Kee (recently retired from Alexandra Hospital). Staff nurse Nunis and Nursing Officer Tang of the Rotary Clinic were also very helpful in the project.

Today, the number of TB cases has fallen and with the STEP (Singapore Tuberculosis Elimination Programme) in place, the hope is to eliminate TB in Singapore – hopefully within 60 years of the first use of streptomycin for TB.

In the inpatient setting, we had chronic wards for the long-stay patients. They either had resistant disease but were loners with nowhere to go, or were not reliable enough to be compliant with treatment. There were a few 'famous' patients who made use of our hospitality – free food and lodging, and they walked in and out as they desired. Some were in Ward 55 on the fifth storey and decided to jump down and end their lives. Others hung themselves with the bedsheet in the toilet. In the acute wards were those with spontaneous pneumothorax and severe hemoptysis on a background of present or past TB.

As its old name suggests, some patients had 'galloping consumption'. They withered and wasted away before our eyes. Some had miliary TB, but with such powerful drugs they were cured without great harmful sequelae. Potts' Disease, TB of bone and joints, renal TB, TB meningitis and TB lymphadenopathy were also seen in diminishing numbers. Rarely did we have to call upon the services of our surgical colleagues to deal with TB.

It is amazing that TB is so difficult to conquer even when its treatment and hospitalisation were free-of-charge to patients. And now, with HIV, that goal does appear elusive.

HIV

Sometime during the 1980s, a new disease struck the western world and reared its ugly head first among the 'H' community: Homosexuals, Hemophiliacs, Haitians, and so on. With more

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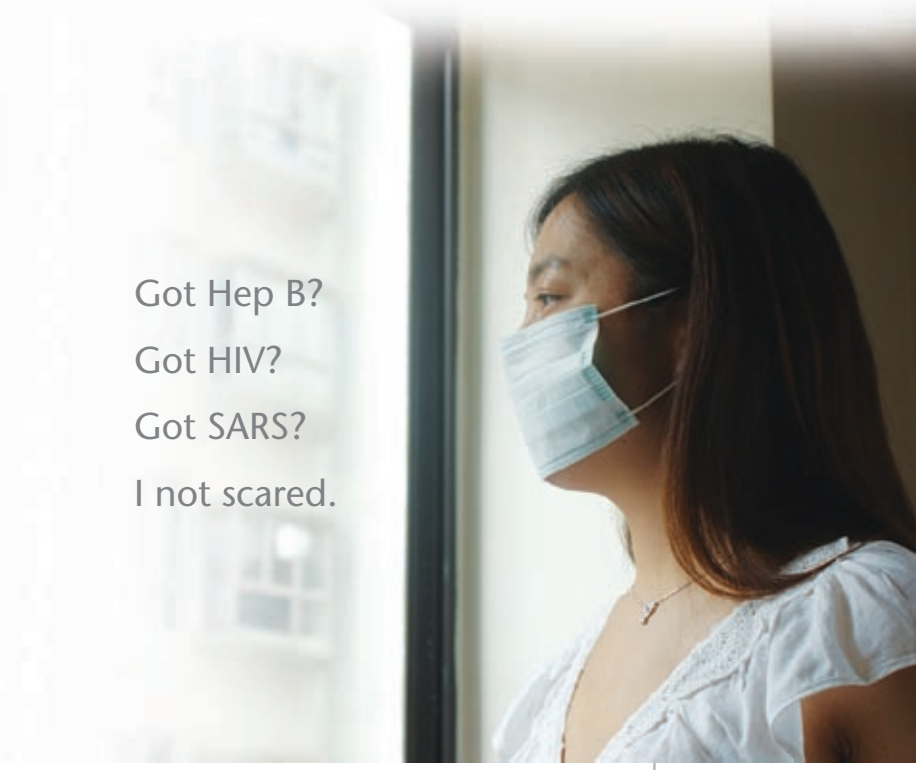
research and knowledge, we now know that HIV spares nobody and if high-risk behaviour is present, then HIV can spread. It was through a blood transfusion with tainted blood in the USA for bleeding gastric ulcer that an elderly male Singaporean seaman became Singapore's first HIV patient. There was some panic when HIV came into Singapore.

I remember Dr E Monteiro at Middleton Hospital (now the Communicable Disease Centre or CDC) bravely meeting the challenge of caring for such patients. The Ministry of Health, with Dr Chew Chin Hin and Dr Ho May Ling at headquarters, designed a strategy and implemented the education and guidelines for doctors, nurses, and the public. Fear was paramount. A dedicated operating theatre was constructed at the CDC for the sole use of these patients. Not many surgeons nor bronchoscopists volunteered to be rostered to serve them.



For some peculiar reasons, HIV blood-testing was special in that the patient had to give specific consent for the test to be done; the patient could refuse the test. Some doctors felt this was unfair on them as it exposed them to HIV-contaminated blood in their course of work. But doctors soon realised that this was yet another of the accepted and expected risks of clinical practice – it could have been hepatitis B or any other blood-borne disease. Neither could be cured. So the hysteria died down and implementation of universal precautions against all infectious diseases became the norm. Not every surgeon or doctor agreed to be HIV-tested, either. Patients had the right to refuse HIV-testing; so too health professionals. Hence we assume every and any patient to be a potential source of HIV or hepatitis B, and we protect ourselves in every encounter.

The blood bank had to be protected and laws were enacted to ensure a safe supply. Only recently, some blood donors were dealt with by the courts under this law as they had lied in answering the questionnaire about high-risk behaviour and HIV status. Unfortunately, as had happened with our very first case of HIV, there were recipients of tainted blood and blood products before these measures took effect.

Although the number of patients with HIV in Singapore has risen, the net increase has been manageable. The CDC is the main outpatient clinic although the STD clinic at Kelantan Road also sees some cases. The very ill patients are also seen at the CDC but they could choose to be in any non-subsidised ward in any hospital in Singapore if they could afford it. Just as is the case with TB, any doctor can manage a patient with HIV. However, both diseases by law need to be notified to the Ministry of Health and there is an effective tracking and monitoring system in place. This goes some way in protecting the public at large.

With HIV/AIDS patients, TB has resurged into prominence and atypical mycobacteria has become more pathogenetic in them. Together with the respiratory physicians of TTSH, the ID physicians effectively manage the lung complications that occur when the CD4 counts reach really low levels. The emergence of HIV/AIDS as a new disease in the 1980's could have been one reason for the birth of the Department of Infectious Disease at TTSH. It was Professor Feng Pao Hsii who initiated the idea of training physicians in infectious diseases. Was not TB for which TTSH is famous for in the 20th century an infectious disease? Surely yes, but somehow it came under the respiratory physicians. But for HIV/AIDS, there were no takers among the various physician groups.

DEPARTMENT OF ID

While Dr Helen Oh (now in Changi General Hospital) was away in Canada on HMDP training in infectious diseases, Dr David Allen from USA was employed to run the service with Dr Monteiro and jump-start the

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Department of Infectious Diseases. Being board-certified in internal medicine and infectious diseases, and having had experience with HIV/AIDS patients, he came here with great enthusiasm for his role in helping us develop this specialty. Then, Dr Wong Sin Yew and Dr Lam Mun San (both now in Mount Elizabeth Medical Centre) went for training in the USA (one on the west coast, and the other on the east). On their return, we had, in a way, imported the Canadian and American experiences on infectious diseases, particularly HIV/AIDS. Of course, others were trained, including Dr Leo Yee Sin (present Head of Department), Dr Brenda Ang and Dr Tan Ban Hock (now in Singapore General Hospital). Dr Paul Ananth Tambyah also trained in the USA and is board-certified. He practises at National University Hospital/National University of Singapore.

As with geriatric medicine, from a small start at TTSH, the specialty of infectious diseases has spread to the other hospitals and the private sector.

OTHER INFECTIONS

Patients with pyrexia of unknown origin (PUO) are managed by the general physicians. It cannot be assumed that pyrexia means infection. And with antibiotics freely available, many febrile patients of some duration have negative blood and urine cultures. Typhoid fever is not common now. It used to give us interesting challenges in its diagnosis. Who can forget the Widal Weil Felix test – peculiar in that it tests for a bacterial (typhoid fever) and rickettsial (typhus) disease? Or rose spots? Or for that matter, malaria where neither blood culture nor antibody test is possible? Do you not remember thick and thin blood films, Field's stain A and B? And of course, falciparum malaria in a patient is an emergency and if so handled, then no cerebral malaria or blackwater fever will occur? Thankfully, these infections are not common, but not that rare either.

The one infection that continues to create outbreaks is the MRSA (and more recently the VRE). The rules of transfer of patients from one facility to another are unequal and disfavour the restructured hospitals. The latter cannot discharge or transfer out their patients till their MRSA status is negative (if it was positive previously). But no such rule applies to transfers in, be it from a road traffic accident, nursing or old people's home. Most are carriers, and some are infected patients with bed sores.

These challenges carry over into the 21st century.

21ST CENTURY

The first bug we prepared for was the Y2K bug. We must have spent millions of dollars. Yet, no computer crashed that midnight hour. Were we taken for a ride? If that bug was indeed prevented, the continuing onslaught of computer viruses has not abated. Also worms have invaded and created chaos. But I digress.

For the next three years, we became concerned with biological agents that could be used in bioterrorism: anthrax, plague, botulinum toxin, small pox, and others. We had to revise our long forgotten knowledge on these infections. The only one that appears to give any profit is botox.

2003

The year started off without fanfare but two months hence, SARS broke. It was a novel coronavirus, a zoonosis probably from the civet cat. TTSH bore the brunt of the three-month scourge. Patients died. Health professionals also succumbed. It was commented that this was the first time in Singapore's short medical history that doctors and nurses died fighting disease in their line of duty. Yes, when the Japanese bombed Singapore, lives were lost including several medical students. But that was real war. SARS was an unknown enemy. It too came by air carried by tourists returning home from Hong Kong.

SARS allowed Singapore researchers the opportunity to sequence its genome, make diagnostic test kits and do further research on it in the laboratory (with one accident and infection). But there is no cure. Treatment is symptomatic, management supportive. SARS allowed Singapore to show the world that if indeed draconian social measures like home quarantine were needed, it would be effectively implemented. SARS allowed Singapore to assume a regional role in the fight against global threats by infectious agents.

2005

If not for an opposition Member of Parliament raising the issue of bed shortage at TTSH in the latter half of 2005, the year would have passed quietly. However, he was bitten by a mosquito, came down with dengue fever and sought help at the Emergency Department of TTSH. He observed, took note and voiced his concerns. Suddenly, the spotlight was again on TTSH. Another virus long known to be endemic locally had caused an epidemic with over 12,000 cases in the year and not a few deaths, which occurred

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not just in those with haemorrhagic fever, but also in those middle-aged and elderly who had other chronic diseases. At its peak, over 400 beds in Singapore's public sector hospitals were occupied by patients with this diagnosis.

An expert committee was appointed by the Ministry of Health to deal with this and three external experts served (a Brazilian, an American working in Hawaii, and an Englishman working in Paris). Their conclusion was that more research was needed to find out why and where the mosquitoes were breeding (despite fogging and house inspections for breeding sites) and how, despite no new virus strains, so many Singaporeans fell ill, and with many deaths. One of them commented that while on a field trip to an HDB estate, no mosquito was in sight and none buzzed around him despite searching for them in closets and dark places in the houses. All this seemed a puzzle and with the year-end monsoons drowning all mosquitoes and washing their eggs away, the epidemic seemed to have abated. However, the battle is not yet won. Questions were raised, but no answers from research have materialised.

2006

What of 2006? Your guess is as good as mine. Avian flu of the H5N1 strain is slowly increasing its death toll in Asia, especially in China, Vietnam and Indonesia. But it remains influenza of the fowls and birds, many of whom have died carrying the virus on their migratory journeys to faraway places into Russia and Europe. The dreaded fear is that some genetic rearrangement of this virus in another host, like the pig, may facilitate its easier infection from man to man. Today, the avian flu virus can infect man who recovers or dies. There has been no documented case of an infected person transmitting avian flu to another human being directly. We hope it will not happen. But experts say it is not if, but *when* it will happen.

Governments who are able to, have begun stockpiling Tamiflu, a drug that works in human influenza if taken early enough. It is our best hope against avian flu today but reports of resistance to this drug in patients with avian flu have raised doubts if this drug will be useful when disaster strikes.

For SARS, TTSH was able to bear the brunt of the battle with casualties. For avian flu, one hospital, even TTSH, will not be enough. ■