

SARS (and You) (Part 2)

By Prof Chee Yam Cheng, Editorial Board Member

Editorial note:

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By now, most people throughout the world would have heard about SARS and the death toll associated with it. In this article, I would like to examine SARS from YOUR perspective rather than mine. And I would define you as the medical profession out there in Singapore, faithfully practising long hours in the heartland, in not so busy Orchard Road, and much less busy private hospitals. What were your thoughts and reactions as the crisis broke?

How did our frontline doctors even within TTSH feel?

SITUATIONAL ANALYSIS

It was on 1 March 2003 that one of the first imported cases was warded at Tan Tock Seng Hospital (TTSH). She was young and febrile with a cough that worsened and a CXR that worsened even more rapidly. As usual, she was under the care of our doctors (house officers, medical officers, registrars and consultants). The Infectious Disease physician was involved as her pneumonia failed to respond to the usual antibiotics. We would have given her the usual antibiotics for community-acquired pneumonia. The fact that she was in Hong Kong recently (we do routinely take a travel history, especially for those with fever) did not ring any bell. She was in a general ward, and the nurses and other staff treated her like any other patient. There was no indication to isolate her.

However, as the blood cultures repeatedly failed to grow bacteria, and as her chest X-ray worsened and her fever refused to settle, it became more and more clear that this pneumonia was unusual (or in medical terms – atypical). The addition of levofloxacin to her

antibiotic regimen made little difference.

By 7 March 2003 (that is 7 days later), the first healthcare worker took ill and was warded at TTSH. And over the next week, more and more nurses and a few doctors looking after in-patients took ill with fever and a rapidly deteriorating CXR. Of course, the ID team of doctors (including Dr Leong) were involved in their care, and finally it clicked. The transmission of virus was amongst hospital staff who had been in contact with the index case. And to confirm the transmission, the index case's father and other family members were warded, as was the pastor who visited her.

So began a frantic exercise to trace contacts. By the start of the second week, we learnt that patients in the same ward as the index case had also contracted the illness. It became clearer by the day that from one index case, her family was down, her pastor was down, and the staff in that ward were also coming down with the illness. More than that, patients around her, admitted for other non-infectious diseases, like the Malay lady with diabetes, had become infected.

When we were clear about the epidemiology of spread within TTSH and among our staff, all these patients were isolated, some cohorted together, and the staff looking after them were in full protective gear – proper N95 mask, gloves and gown. This policy was instituted on 15 March. That is 8 days after the first nurse took ill and was warded, and 15 days after the index case was warded. That meant that for 15 days, the index case was spreading the virus to those around her (the in-patients), to those in the other departments (e.g. X-ray department, other surgical doctors, cardiology doctors who were looking after other patients in the same ward), to her family and friends who visited her. However, it could have been lesser days of exposure as at some point before

15 March, she was in an isolation room or in the ICU.

As the contacts of the index case were traced (i.e. second wave), we were concerned about a third wave of patients who included healthcare workers. It was possible that their families could be affected. At TTSH from 15 March, we fearfully awaited the onset of third wave cases amongst healthcare workers (who could be doctors, nurses, allied health professionals, pharmacists, attendants, ward clerks, radiographers, etc.). By 21 March, no new healthcare workers of TTSH were affected. This meant the protective gear implemented some 6 days before had proved effective.

At TTSH, the safety of our staff is paramount. Staff who had taken the full universal precautions had minimised the risk of contracting the disease to near zero. Further, this fact went a long way to support the assumption that the spread is by close contact through droplets, and is not by airborne particles. So, only those involved in the direct care of patients with the condition needed to wear universal precautions. Close contact has been officially defined as having cared for, having lived with, or having had direct contact with respiratory secretions and body fluids of a person with SARS. Thus, whatever the final aetiology turns out to be, be it one or two viruses, or whatever, for nursing care of SARS patients, strict attention to details and the meticulous adornment of the N95 mask together with gloves and gown is protective. This "experiment" had proven successful.

Would healthcare workers continue to get infected? Theoretically, yes. It could occur in situations where the caregiver is unaware the patient has SARS. For example, if a patient with severe pneumonia thought not to have SARS, has a lung lavage done through a bronchoscope and secretions are splashed into the air as droplets, it is conceivable



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that the doctor could be infected if the patient subsequently turns out to have SARS. It is therefore safest to wear goggles, space suits if necessary, when performing such risky procedures. Take no chances as the disease remains without cure. The other scenario is that the patient is unable to give you any history of contact with SARS or having travelled to those countries with SARS. So in this case, the best advice is for all healthcare workers to wear masks when dealing with them, when their complaint is fever and the cause likely to be the respiratory tract.

On 16 March, we were informed that the WHO had revised the name of this illness to SARS. SARS is an atypical pneumonia for which the cause is not yet determined. At the triage station of clinics and ED, procedures to identify patients who could satisfy the criteria for suspected case of SARS, were in place. They were to be separated from the main crowd and seen in the express stream. The 2 criteria then were high fever (38°C) with history of travel to Hong Kong, Hanoi or Guangdong. Once such a suspect case was diagnosed, a chest X-ray was done. If there were infiltrates in the lung fields, the case was upgraded to probable. Either way, suspect or probable, the patient if adult, was sent to CDC Ward 72, and if a child, to KK ED. However, should the case be seriously ill, the patient was to be admitted in whichever hospital it was at first contact.

By this time, Singapore had 3 cases of atypical pneumonia (our first 3 index cases from Hong Kong, courtesy of the Metropole Hotel), and another 6 admitted for pneumonia in TTSH and SGH, of whom 2 were staff with TTSH involved in caring for the cases. The guideline to other hospitals regarding infection control included the wearing of surgical masks (14 March), but on 16 March, this was upgraded to N95 respirator masks and proper hand washing. These procedures were to be observed when the suspect cases were managed at ED, wards, and during transport to CDC. Visitors were restricted

to immediate family members only and they were to observe the same infection control procedures.

MOH CIRCULAR

To the many doctors outside of TTSH and restructured hospitals, I note that MOH's first circular was dated 13 March 2003 (Thursday). (At this time, I was still in the UK.) The circular alerted the doctors to the outbreak of atypical pneumonia in Hanoi, Hong Kong and Guangdong, as well as the 3 cases in Singapore. A further circular stated that as at 16 March 2003 (Sunday), Singapore had a total of 20 patients with SARS. 10 were the family members and friends, and 7 were hospital staff who had attended to the first patients in hospital. It was stated expressly that "the transmission of the infection among the cases in Singapore appear to be due to close contact with the patients with SARS through droplet transmission."

From this day, 16 March 2003, SARS was made a notifiable infectious disease, and notification of the disease was required under the Infectious Diseases Act. Notification of the disease is mandatory to MOH, by fax or electronically, not later than 24 hours from the time of diagnosis. I would therefore assume that all doctors would have received this MOH medical alert signed by the DMS himself. And different doctors would have different reactions and thoughts on the next steps regarding their practice.

So maybe I could address these as follows:

- (i) What is SARS and would I be able to make the diagnosis?
- (ii) Do I need a CXR done before I make the diagnosis?
- (iii) How do I protect myself from my patients? How do my patients waiting in my clinic protect themselves from another who may have SARS?
- (iv) Once I have notified MOH and given the patient a referral letter to TTSH, is that the end of my responsibility towards that patient?
- (v) What about my staff in the clinic?
- (vi) How will my patient arrive in TTSH? Can the patient use public transport?
- (vii) After I have made the diagnosis

of SARS in my patient, am I now considered a contact of a SARS patient, and therefore what happens to my practice?

SARS: DIAGNOSIS

By WHO's case definition, the diagnosis is made on clinical history, clinical examination and a chest X-ray when indicated. The case definition falls into 2 categories:

- (i) Suspect case – With high fever (above 38°C) and respiratory symptoms, including cough and shortness of breath or breathing difficulty. And close contact with a person diagnosed with SARS, or history of travel to areas reporting cases of SARS. So there are 2 criteria to be met.
- (ii) Probable case – Suspect case with chest X-ray findings of pneumonia or respiratory distress syndrome. OR a person with unexplained respiratory illness resulting in death, with an autopsy examination demonstrating the pathology of respiratory distress syndrome without an identifiable cause. (*Reference: DMS Circular, 17 March 2003*)

So, as a GP or polyclinic doctor, or even an ID or respiratory physician out there, you can make the diagnosis clinically. Your diagnosis would be a suspect case of SARS. Should you send this suspect case for a CXR? The answer is no. The reason is this. If the patient did actually have SARS at this early but symptomatic stage, he would be able to theoretically infect you, his doctor, your nurses, the people in the bus, or MRT, or taxi, as he made his way to the X-ray facility and back to you, etc.

The advice given is that such suspect cases must be referred immediately to Ward 72 of CDC TTSH, for further assessment and management. The 2 key operative words are "must" and "immediately". It is a highly contagious disease. The public must be protected. Thus, your referral would be to TTSH ED, and not CDC.

CXR: FOR DIAGNOSIS

The CXR is essential to make a diagnosis of probable SARS, not a suspect SARS.

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As a frontline doctor, you must not send a suspect case for a CXR out in the community. Certain precautions are necessary to protect the public at large, the radiology staff and others involved in acquiring the CXR. You also will not be expected to sign up a death due to SARS as an autopsy is mandatory to confirm the diagnosis, and SARS has been made a notifiable disease under the Infectious Diseases Act.

PROTECTION: SELF AND OTHERS

Triage at the waiting area of clinics and ED is essential for protection of staff and public from a suspect SARS case. Therefore, the moment a patient walks into your clinic, he should be screened for possible SARS with the criterion above; that is, if he is febrile with respiratory symptoms, he should be segregated from all other patients, and seen fastest possible instead of waiting in queue.

The nurse, or clinic assistant doing the initial screen should be properly protected. Such a possible SARS patient should be asked not to cough or sneeze, and be given a mask to wear.

So, at this point of contact, staff should be protected from possible suspect cases, and other members of the public should not be in the same waiting area as this suspect case.

When examining the patient who is a possible SARS patient, the doctor and nurse should be fully protected. And if the patient thereafter is deemed a suspect case of SARS, besides referring the patient to TTSH, the clinic staff must also do 2 other things.

The first is to generate a list of contacts in the clinic, i.e. all those in the waiting area, staff on duty, etc. Name, address, telephone number and gender will be requested by MOH officials doing contact tracing, should the patient you have referred to TTSH becomes a SARS case.

The second is to call TTSH ED to ensure the patient was seen and find out what happened to the patient – admitted, or discharged, or given MC, and what the diagnosis is.

REFERRAL TO HOSPITAL AND TRANSPORT

Once you have made the diagnosis of a suspect case of SARS, you are obliged to notify MOH and to refer the patient immediately to CDC Ward 72 TTSH, or KKH ED. On 22 March, this changed. All referrals are not to CDC or KKH, but to Emergency Department TTSH. How does the patient get to TTSH? He should not go by public transport. You will remember the lady and her mother arriving on CZ 355 (China Southern Airline), who took a taxi to SGH from Changi Airport, which resulted in a 3-day hunt for the taxi driver.

It was not until the first week of April that MOH made available to GPs who notified MOH that they had a case in the clinic, a telephone number to call for a dedicated ambulance service. Before that, any ambulance service could be called upon to provide the necessary transport. (*Reference: MOH Circular, 3 April 2003*).

CLINIC STAFF

As frontline staff in this warfare, we need protection. First is segregation of patients with possible suspect SARS. The faster they are seen and sent to TTSH, the better. The clinic nurse or assistant should wear a surgical mask as she screens the patient. However, once a possible suspect SARS is picked up, all further contact with that person should only be staff (nurse or doctor) with full protection i.e. N95 mask, gown and gloves. As TTSH ED is now the central screening centre for Singapore, this is how our staff are dressed up for their protection. And of course, proper hand washing after every patient, after the gloves are removed and disposed away, is mandatory.

The assumptions operative here are as follows. SARS is a viral illness and the spread is thought to be by droplet (although on 3 April 2003, it was announced that the virus was also found in the urine and faeces of patients i.e. not just respiratory tract but also the gastrointestinal tract). So, if the patient coughed and sneezed,

or spoke too much, saliva, sputum and nasal secretions would deposit on you as droplets. Hence, the gloves and gowns. As the virus is known to attack the respiratory tract, the N95 mask is therefore to prevent entry of the virus into the upper airways.

Why is the ordinary surgical mask not adequate? As you already know, in the operating theatre or when doing procedures in endoscopy, the surgical mask is to prevent the doctor or nurse transmitting his or her germs into the open wound of the patient. That is, the mask is to protect the patient from us who are doing or assisting in the procedures. That is why sick doctors or nurses are given medical leave (to protect the patients from them). Use of the N95 mask has the reverse reason – to protect us from a potentially highly infectious patient, which for maximum safety means we use the best mask for our protection (and the surgical mask is not the best available).

Of course, this assumes soiled masks, gowns and gloves are changed, and in between patients we also change to prevent transferring infection from one patient to another. It also means these items are worn properly. For the N95 mask, it must fit tightly without air leaks between the facial skin and the mask. Therefore, if the N95 mask is properly worn, breathing is less easy and there has to be intervals of respite from the mask. That is, you take off and go for rest somewhere else before wearing the mask properly again. It is not possible to wear the N95 mask for 8 hours, not even 4 hours at a stretch.

WHO IS A CONTACT?

From the official definition of a close contact, all nurses and doctors, and other persons caring for the patient with probable SARS, and even suspect SARS, can be deemed as close contacts. Not a few of those in the suspect SARS category get upgraded to probable SARS when their CXR becomes abnormal. Actually today, we are even sub-categorising suspect SARS into low and high suspect SARS sub-groups.

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But the critical point is that if we, as healthcare workers, are properly protected when we deal with these SARS patients (suspect and probable) then we are not categorised as contacts and are therefore not served Quarantine Orders and not placed on the list for contact tracing by the authorities. So we in TTSH are not defined as contacts just because we work here. But if before 15 March 2003 (when the full barrier protection instructions were issued for total compliance), we had managed patients who were suspect or probable SARS and been ordinary patients (who later turned out to have SARS), then we were definitely contacts and were put on daily surveillance, etc. Once symptomatic, our status would change from contact to patient – suspect at first but should the CXR become abnormal, then we would be upgraded to probable.

So this means that if you practise outside TTSH, you might come in contact with patients who you will diagnose as suspect SARS, but once you are adequately protected when seeing them in your clinic, taking history and during the physical examination, you are not deemed a contact case in need for MOH surveillance and even quarantine. However, should you become ill with fever, etc. after having diagnosed even one case of suspect SARS, then you should come to TTSH ED for proper screening to rule out SARS in yourself. This is your medical responsibility toward yourself, your family and the community.

GP SYMPOSIUM

On a Sunday afternoon, 29 March 2003, the MOH and the College of Family Physicians held a symposium in the auditorium of the College of Medicine Building. The Minister of State for Health, Dr Balaji Sadasivan graced the occasion. As the auditorium would house 300 people at most, many GPs would not have been present. I was not there but I am sure

many questions were asked and clarifications sought. In particular, the mask issue would have been addressed, including the adequate supply and adequacy of masks in Singapore. I hope some doctor would summarise that afternoon's proceedings for the benefit of all who were not there.

As of 3 April 2003, the SARS countries include the first 3 (Hong Kong, Guangdong and Hanoi) plus Singapore, Shanxi, Taiwan and Toronto. Further, the period between travel to these countries and the start of relevant symptoms for SARS is now taken as 2 weeks, for the travel

history to be considered relevant to the diagnostic criteria. Previously, no duration was stated.

CONCLUSION

I am sure you as a practising doctor outside of TTSH would have further questions and concerns which I have failed to address. Or you may have felt isolated and abandoned in your solo practice. Letters to the Editor would be welcome. I hope all these published information would aid us in defining a national master plan to control diseases of a similar nature in the future. ■

*Dedicated to our healthcare workers who put others
above themselves in the SARS outbreak.*

4 April 03

TTSH ICU

*Tan Tock Seng Hospital, ICU,
after closure due to
SARS outbreak*

By The Hobbit

The unhurried whispers
They seem to rush at you with an unnatural cadence
And remind you that they are here,
They that fight with almost nothing
But a mechanical lullaby of a ventilator
Against a long, oh, very long, sleep

Masked from fatigue and feelings
We try to wrangle some hope
From cold beeps of monitors and trickles in tubes
To stay the unseen sickle consuming
The spirits of those that lie before us
They who only yesterday were among us

The fulsome silence of emptied corridors
Begs for answers from an invisible foe
Deafened with echoes of grim steps
We make our way through
Closed wards and vacant corridors
Hopefully to some end of this grand suffocation