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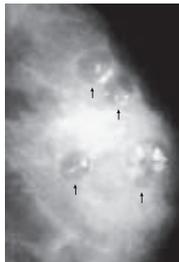
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**Cover Picture:**  
Oil cysts. Left craniocaudal mammogram shows multiple radiolucent masses (arrows) with thin-rimmed calcifications and macrocalcifications.  
(Refer to page 211-215)

# The SARS Outbreak: How Many Reminders Do We Need?

**P A Tambyah**

Four years ago, an editorial in this journal<sup>(1)</sup> accompanying one of the world's first reports of the Nipah virus infection made a desperate plea for a sentinel system of active surveillance to detect emerging infections as well as for enhanced efforts to develop our capabilities for laboratory detection and clinical management of infectious diseases in general. The first steps have been taken with the establishment of facilities like the Environmental Health Institute, the Novartis Institute for Tropical Diseases and the accelerated development of the Defence Medical Research Institute and the virology laboratories at the Singapore General Hospital Department of Pathology, the Institute for Molecular and Cell Biology and the National University of Singapore among other institutions. Unfortunately, nature has once again moved two steps ahead of us with the emergence of the novel coronavirus which causes the severe acute respiratory syndrome (SARS) which might have been renamed by the time you read this editorial.

While the Nipah virus devastated the pig industry in Malaysia and caused the deaths of more than one hundred pig farmers and their relatives, Singapore got off "relatively lightly" with one death and a dozen clinical infections with a similar number of asymptomatic seroconverters<sup>(2)</sup>. The disease was confined to a small sector of the population and did not spread efficiently from person to person. Widespread contagion was avoided, numerous resolutions were made to pay more attention to emerging infectious diseases but unfortunately, the majority of us went back to business as usual.

Now we are confronted with a far more aggressive foe. The as yet unnamed coronavirus like organism which causes SARS seems to be very efficiently transmitted from person to person by either large respiratory droplets or by contact. There is also new speculation about rare airborne routes of contagion. Singaporeans from all walks of life from pastors to children to healthcare workers have been infected. It is this last group which is particularly alarming. At the time of writing, more than 90 Singaporeans had been infected with the virus, about half of whom were healthcare workers including doctors, nurses and allied health professionals. Few infectious diseases are so selective for healthcare workers. The rare and deadly haemorrhagic viruses – Lassa fever and Ebola virus have infected large proportions of the staff of small rural hospitals mainly in Africa. In temperate countries, winter respiratory viruses such as respiratory syncytial virus (RSV) and influenza take a disproportionate toll of healthcare workers, but these rarely cause more than a few days' inconvenience.

Most of the nosocomial SARS infections have occurred in individuals looking after undiagnosed patients before the widespread use of complete

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respiratory and contact precautions. Asymptomatic individuals have not been reported as a source of contagion and the key to control seems to have been the prompt diagnosis and appropriate isolation of febrile individuals with either pneumonia not responding to standard therapy or undifferentiated fever without an alternative diagnosis. Our healthcare system has been severely taxed and the unprecedented step (in recent memory) of closing an entire large public hospital has been taken to control the spread of this virus. Numerous heroes have emerged from this epidemic, foremost among whom are the Tan Tock Seng Hospital staff both Singaporean and foreign who have persevered in taking care of patients and colleagues despite the fears that would naturally accompany the emergence of a new and unknown virus. Other Singaporeans have responded generously and the collaboration and integration of the response of the various agencies has been a testimony to the organisational skill of the leadership of the Ministry of Health. At the same time, the questions have to be asked: “Why?” and “How?” Why did this virus emerge to cause such havoc among doctors and nurses? How did it manage to spread so efficiently despite all the modern technology on display in our hospitals?

The origins of this virus are unclear for now. Many coronaviruses like paramyxoviruses infect animals as well as humans and there is much speculation about a zoonotic origin of this virus. How did it rapidly disseminate once it crossed the species barrier? Many of us in the Infection Control community see this as the time bomb that was waiting to happen. We have preached universal precautions for years and have called for enhanced respiratory isolation facilities, universal glove use, widespread availability of alcohol handrubs; organised handwashing competitions and given countless talks and exhortations. Yet, in many parts of the world, infection control is often perceived as expensive and unnecessary. Infection control practitioners are viewed as “naggy” and those who call for increased surveillance and resources to deal with pressing everyday problems such as multi-resistant bacteria are voices in the wilderness. In a community where less than 1% of GDP is spent on public sector healthcare<sup>(3)</sup>, we are not surprised at the devastation caused by a highly transmissible nosocomial viral infection.

In this respect, we have much to learn from industry. The aviation industry has been cited as a model for error reduction in medicine in this journal<sup>(4)</sup> and others. Singapore’s semi-conductor industry boasts standards of hygiene which would make any Infection Control Practitioner struggling to maintain Operating Theatre standards green with envy. Also, while we are dealing with a new virus, much data exists on our old foes. A recent review in the New England Journal of Medicine<sup>(5)</sup> asks the question, “How contagious are common respiratory tract infections?” and elegantly answers the questions many of our patients and relatives have been asking us about airborne transmission (for tuberculosis and influenza) versus droplet aerosols (for rhinovirus, Group A streptococci and RSV). The experimental data supporting the role of fomites and contact with hands, eyes and respiratory secretions in the spread of these infections are also reviewed and it is essential reading at this time for all medical practitioners.

In this issue of our journal<sup>(6)</sup>, Kaw et al highlight the radiological features of this novel emerging infection. This is to our knowledge, one of the first published clinical reports of this syndrome. In a disease which shares many clinical features with common upper respiratory tract infections,

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the rapid X-ray changes have been among the few consistent features of most cases of the disease and this report nicely demonstrates the rapid progression despite therapy in a healthy young woman. A minority of patients have had relatively normal X-rays but rapidly progressed to the adult respiratory distress syndrome<sup>(7)</sup>. Singapore doctors need to have a high index of suspicion for cases of respiratory tract infection which do not respond to conventional therapies. More details of the clinical features of this infection will doubtless emerge in the next few weeks and there are reports that a diagnostic test is around the corner and may be available by the time you read this.

Our Minister has commented that we will find it hard to return to the “pre-SARS” era in Singapore healthcare. One can only hope that we will never return to the era when we treated respiratory isolation in a cavalier fashion, when we ignored handwashing guidelines, “forgot” to gown and mask for procedures and insisted on keeping patients crowded into beds near enough for the efficient nosocomial transmission of large droplet nuclei. How many more reminders do we need before we devote more resources to the surveillance, detection, diagnosis and treatment of emerging infections? **SMD**

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