

A CASE STUDY OF SARS IN GENERAL PRACTICE PRESENTING AS BIPHASIC FEVER

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SUMMARY

A probable SARS patient who developed biphasic fever in general practice is depicted to alert frontline doctors to this mode of presentation. He had absence of a travel history to SARS affected area nor a positive contact history. He developed chest X-ray changes compatible with atypical pneumonia and the diagnosis was confirmed by PCR studies. The patient's condition deteriorated, treated in intensive care unit but subsequently recovered.

Key words:

SARS, biphasic fever

INTRODUCTION

SARS is a new disease and its modes of presentation gradually unfold. The provisional diagnosis of SARS has relied on the WHO criteria of a recent travel history to SARS affected area or exposure to SARS infected individuals together with the concurrent symptoms of fever of 38°C and higher, cough and progressive breathlessness.

We present a patient initially managed in General Practice who developed a biphasic fever. The case study aims to highlight the difficulties encountered by general practitioners because of this mode of presentation. The case also stresses the importance of seeing the same doctor or practice as the disease progresses, the need for continuing vigilance by the GPs and the necessity for interim preventive measures to protect the patient's family, colleagues and the primary care healthcare professionals during SARS outbreak. What is remarkable was this patient sought medical care from the same practice five times in Singapore, where doctor-hopping takes place easily.

CASE HISTORY

Outpatient phase

Visit 1 – Day 1 (5 May 2003)

A 39-year-old Chinese man, Mr X, consulted his GP for one-day history of fever and cough. Clinically he appeared well but febrile with a temperature was 38°C. The lungs were normal

on auscultation. He was treated as an upper respiratory tract infection and was prescribed Ethyl Erythromycin Succinate and paracetamol for the pyrexia. He was given sick leave for 2 days.

Visit 2 – Day 3 (7 May 2003)

Mr X was seen at the same clinic on Day 3. He complained of diarrhoea during the preceding two days. His temperature was 36.8°C. The GP advised Mr X to stop the erythromycin, of which diarrhoea is a common side effect, and provided symptomatic treatment.

Visit 3 – Day 4 (8 May 2003)

On Day 4, Mr X consulted the GP again, this time for a periumbilical urticarial rash that had appeared for a day. He was treated symptomatically. His temperature was recorded as 37.3°C.

Visit 4 – Day 5 (9 May 2003)

The next day Mr X had recurrence of fever and throat discomfort. His temperature was noted to be 37.6°C. The lungs remained clear on auscultation. The doctor was beginning to be puzzled. He retook the travel history and ordered blood tests. The full blood count showed mild leukopaenia (Total leukocyte count: $3.7 \times 10^9/L$, platelet count: $210 \times 10^9/L$). The blood film was negative for malaria parasite.

Visit 5 – Day 7 (11 May 2003)

On Day 7, Mr X was seen again at the same clinic for cough and fever. His temperature had risen to 39.0°C and crepitations were auscultated on both lungs. He did not complain of breathlessness. The possibility of SARS was considered in view of the SARS outbreak in Singapore, notwithstanding the absence of a positive travel history nor a contact history. The attending doctor decided to send Mr X to a local hospital designated for the management of SARS. A dedicated ambulance was used according to the Ministry's of Health's advisory. The clinical progress is summarized in Table 1.

Table 1. Clinical Progress of Patient in the first 7 days of Illness

Day of illness	Temperature (degree °C)	Symptoms and clinical findings
Day 1	38.0	Fever 1 day, cough 1 day. Chest clear
Day 3	36.8	Diarrhoea 2 days
Day 4	37.3	Periumbilical rash
Day 5	37.6	Recurrence of fever and throat discomfort
Day 7	39.0	Cough and fever. Crepitations heard in both lungs

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The temperatures of the patient during the five visits to the clinic were measured aurally using the Braun Thermoscan. The GPs who treated Mr X wore N95 mask but were without gown and gloves. They have remained well. As a precaution, they placed themselves under self-quarantine and did not see patients until the 10th day after exposure was up.

Hospital phase

Mr X was admitted on 11th May and discharged on 6th June. His temperature on admission was 39°C. The chest X ray (CXR) on admission showed right lower zone haziness (Fig 1). He was started on ciprofloxacin. The next day, his oxygen saturation decreased to 60% and shortness of breath occurred. The CXR showed worsening pneumonia and extended to the left lung. He was transferred to Intensive Care Unit the following day and was intubated two days later when his condition deteriorated. Saliva PCR was positive for Corona virus. Serum SARS Corona virus antibody was positive. ETT RNA extract was SARS PCR positive. He was given intravenous methylprednisolone. Fever settled on 22nd May with gradual clinical improvement. CXR showed marked improvement on 6th June. He was discharged and put on Home Quarantine Order (HQO) for 14 days.

Source of infection

Mr X did not report any travel and SARS contact history on visit 1. Re-taking the history by the GP on Day 4 revealed a travel history to a neighboring city, Johor Bahru (JB) in Malaysia on 18th April, 1st May and 5th May 2003. He did not have any known contact with SARS cases in Singapore.

A total of 139 possible contacts were drawn up by the Ministry of Health contact tracing team. Detailed contact tracing was mounted but there had been no lead up to the present day. The patient infected no other person. There was no official report of any SARS outbreak in JB and it was thus unlikely to be the source of the infection.

DISCUSSION

This patient's initial presentation of SARS was noteworthy in several aspects. First, the patient presented with a fever and a cough for one day. Next, his fever settled with symptomatic treatment. It was not certain if the diarrhoea was part of the presentation or the side effect of the macrolide given. He also had a rash of one-day duration appearing at Day 4 of the fever. The doctors looking after this patient were asked if they would have clinched the diagnosis at this stage. They reported that they would not have done any better. The typical SARS symptoms such as fever, cough and breathlessness made the diagnosis more apparent as the disease progressed to Day 7 of the illness. This case was also of interest because Singapore had no new suspect SARS cases since April 26 over a stretch 16 days.

Pattern of fever

The patient appeared to have a brief respite of fever (Day 2 to 4) between the initial presentation and subsequent progress of the disease. Wu and Sung¹ also reported an afebrile period between the viraemic and lung inflammatory phases of the illness in their case analysis of a Hong Kong doctor infected with SARS. This fever-free period may mask the diagnosis and conferred a possible false sense of recovery to the patient.

Healthcare workers including GPs should be aware of the fluctuating pattern of the fever in SARS. The Ministry of Health of Singapore had distributed thermometers to all the school students and eventually to every household to encourage the citizens to monitor their daily temperature. The serial temperature measurements could perhaps provide useful information and assist in the clinical diagnosis of the early phase of SARS. However temperature charting has its pitfall as the practice of self-medication with anti-pyretic such as paracetamol is prevalent in Singapore and may mask the initial febrile episode or distort the fever pattern.

Period of observation

The patient developed full-blown SARS features at least a week after the onset of symptoms. Until the development of a suitable sensitive diagnostic kit, it is important to monitor the progress of patients with non-specific symptoms for at least 7 days. Hsu et al² reported that in the Singapore case series of patients infected by the first index case, the median period of onset of symptoms to admission was 6 days (range 0–9 days).

Continuity of care

Singapore has a walk-in system for outpatients in primary care. Patients should be educated on the importance and relevance of continuity of care at one specific clinic as regular monitoring of symptoms would help to spot the disease. Vigilance on the part of the GP is critical. If their patient did not improve as expected from the clinical presentation, then there is a need to review the diagnosis.

Travel history and SARS exposure

Travel to SARS affected areas provides a clue to the diagnosis of SARS. Although healthcare professionals enquire about travel history to SARS hit countries as part of routine history and routinely included in health declaration form, such information may not always be available or reliable at time of consultation as patient may either not volunteer such history or ignore it as the country visited may not be in the WHO enlisted SARS affected countries. This case is a good illustration where the initial travel was not uncovered till the disease had advanced for a week. The Ministry of Health of Singapore has since instituted legislation to ensure truthful declaration of travel history and failure to abide the regulation will be liable to punishment by fine or imprisonment or both.

Personal protective gear

SARS is characterized by its propensity for nosocomial spread. As the initial SARS symptoms are often ill defined, the risk of transmission to patient's immediate family, relations and colleagues as well as the healthcare workers will continue to occur. It is prudent therefore for the febrile patient to put on a surgical mask to minimize the spread of the virus as well as to minimize the contact with others.

GPs and community nurses are often the first contact healthcare providers of SARS patients and are vulnerable to contract the disease. Wearing protective gear such as mask, gown and gloves and adopting infectious disease control measures in the primary care clinics are of paramount importance to ensure safety of these healthcare workers, including non-medical staff such as front desk officers and even cleaners.

A case control study³ in five Hong Kong hospitals comprising 241 non-infected staff and 13 infected staff with documented exposures to 11 index SARS patients showed an odds ratio of the use of mask of 13 (95% CI 3–60), hand washing of 5 (95% CI 1–19) and use of gloves of 2 (95% CI –6.7). The use of masks and hand washing were associated with non-infection. No staff became infected when they used all four measures (mask, gloves, gowns and hand-washing), suggesting that these precautions against droplets and contact were adequate for the prevention of nosocomial SARS transmission.

The advent of SARS will result in a paradigm shift among primary healthcare workers, as infection control will take on unprecedented critical role in general practice. Fortunately none of the primary healthcare workers in Singapore have been infected up to the present day. It is only with undivided vigilance and behaviour change towards adopting stricter infection control in their practice that the health and safety of the medical professionals, their patients and their families can be secured.

CONCLUSIONS

Early presentation of SARS in the first week of onset is often unremarkable. This case study showed that WHO's criteria for diagnosis SARS from history and symptoms might not always

be apparent or useful in the first few days of illness. Patients may need to be monitored for at least a week before the disease become more obvious. Primary healthcare professionals including GPs should be alerted to possible SARS if their patients with flu-like symptoms failed to recover within the usual convalescent period of time. Personal protective equipment especially the use of mask and hand washing prevents nosocomial spread.

What is known

- The median period of onset of symptoms to admission was 6 days
- Mask and washing hands are important in preventing nosocomial spread

What is new

- The patient may appear to improve before becoming worse – so it is important to remember this pattern
 - Encouraging the patient to stick to the same clinic is important in diagnosis and restriction of spread
 - Vigilance continues to be a take home message – be on the lookout for a patient that does not get well.
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