

Impact of Severe Acute Respiratory Syndrome (SARS) on Blood Services and Blood in Hong Kong in 2003

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Abstract

The current global pandemic of COVID-19 due to the novel coronavirus SARS-CoV-2 is causing considerable loss of life and enormous social and economic disruption. Here, we describe the response of the blood service, the impact on blood donation and the effects on the blood supply in Hong Kong posed by the earlier SARS epidemic in 2002 and 2003. The infection, like SARS-CoV-2 was highly contagious through droplet transmission.

In the 2003 SARS epidemic in Hong Kong, donor and staff safety was secured by using stringent infection control measures to protect both donors and staff from contacting the virus. All the donors were requested to wear face masks within the donation venue and use an alcohol-based hand rinse. The donors' body temperature was checked before donation and staff's body temperatures were checked daily. The safety of the blood supply was secured by a donor deferral policy for 4 weeks following contact with a confirmed or suspected case of and a post-donation call-back system. Despite scheduling mobile donation sessions and a decrease in donors attending blood donor centers, the blood supply was maintained as there was a 12.8% reduction of the demand of blood and only a 16.9% reduction in the blood donation.

Lessons learnt during the epidemic may help preparation for future epidemics and provide a basis for understanding the pathogenesis, laboratory diagnosis and role of coronaviruses in transfusion medicine. These are continuing problems as coronavirus epidemics may recur with future impact on blood collection and blood donation screening.

Introduction

Transfusion safety is ever challenging as new diseases or risks appear from time to time. Despite the availability of modern sophisticated laboratory testing to better detect those important viral infections, there is still the inevitable limitation due to the possibility of a donor transmitting infection through blood in the window period of infection, when the blood contains infectious pathogens but the biomarkers of infection are undetectable. Therefore, health history enquiry remains an important part of donor screening to exclude those donors who may be at risk to themselves or pose a risk to the blood supply. The health history enquiry covers a broad range of questions from personal health enquiry and travel history to evaluation of the risk of exposure to transmissible infections as a result of the donor's lifestyle. It becomes particularly important when a new disease appears with uncertain impact on blood safety and very limited knowledge of its biology.

In March 2003, Hong Kong faced an outbreak of atypical pneumonia of unknown etiology^{1,2}. Through many efforts, a new coronavirus was subsequently identified to be the causative agent³⁻⁵. As the infection was highly contagious through droplet transmission, the outbreak brought about a significant impact to society. The number of new cases increased exponentially between March and April 2003 before the infection was brought under control. Many health care workers were infected causing much pressure in the provision in the health care service. As a result, there was a significant change in the health care service and the demand for blood. In response to this, the blood transfusion service (BTS) introduced a number of changes during SARS outbreak. Here, we review the changes implemented for the protection of donor and staff safety and maintaining an adequate and safe blood supply. The review covers the time from the outbreak of the epidemic when the WHO gave precautionary advice

not to travel to Hong Kong, until the time when the epidemic was controlled, and Hong Kong was been taken out of the infected area.

Donor and Staff Safety

As SARS is highly contagious infection and transmitted through droplets, stringent infection control measures were required to protect both donors and staff from contacting the virus. From the donor side, educational materials on SARS infection and prevention were put up at the entrance of the collection clinics to remind all prospective donors. All the donors were requested to wear face masks within the donation venue. Moreover, alcohol-based hand rinse was available to all donors so that they could have their skin disinfected before handling their face masks. Body temperature checking was also introduced for every blood donor as part of donor eligibility criteria.

The staff were required to attend infection control course on SARS and constantly updated on the latest developments. Protective measures such as wearing face masks were mandatory within the donation venue and laboratory area. To be in line with the donor, staff were required to have their body temperature taken before reporting for duty every day.

Regarding facility management, the frequency of the cleaning schedule was increased over and above the normal routine to further reduce the risk of contamination.

Blood and Recipient Safety

As SARS was a newly identified viral infection, the understanding of its natural history was relatively limited. Based on the previous case histories, it was estimated

that the incubation period was between 2 to 10 days. Laboratory diagnostic evaluation was based on testing for the virus by RT-PCR from the secretions from upper respiratory tract and paired serological titres by immunofluorescence study. Therefore, the policy to combat SARS in blood safety had to be focused on donor deferral policy and post donation call back system.

The BTS had implemented donor deferral policy to temporarily defer prospective donors who had close contact history with patients who suffered from confirmed or suspected SARS. The initial policy was a two-week deferral followed by an enquiry into the donor's health status and risk exposure. It was then modified to a four-weeks deferral policy and reassessed when the donor came again for blood donation. During this period, a total of 57 donors were deferred because of their contact history (Table 1).

Moreover, all the donors were reminded to report to the BTS if they experienced any SARS-related symptoms within one month after their donations. Table 2 shows the number of post-donation call backs during the period studied. It was found that there were more than double the number of call backs in the year 2003 compared to a similar period in year 2002. The increase in call-backs possibly reflected an increase in the awareness of the donors on their health concern and the BTS effort in donor education. Although some of the donations had been used for transfusion, there were no reports of any adverse reaction on the recipients when these were actively surveyed.

The BTS also followed the WHO recommendation to implement a donor deferral policy for those donors who recovered from confirmed or suspected SARS

(<http://www.who.int/csr/sars/guidelines/bloodsafety/en/>) (accessed 30th April 2020)

though very few donors belonging to this category came back to donate.

Impact on the Blood Supply

SARS had resulted in many significant changes in the health care service in Hong Kong. There was an influx of many SARS patients into hospitals in Hong Kong (e.g. cases from Amoy Garden) and an outbreak of SARS infection in health care workers⁶ and therefore a switch in the normal health care provision was made as the battle against SARS developed.

For the blood supply, the change in the health care had resulted in a 12.8% reduction of the demand of blood (Figure 1). However, the impact of SARS on society and hence the willingness to come forward for blood donation was also significant. There was about a 16.9% reduction in the blood donation as a result of the decrease donors attending blood donor centers and mobile sessions and cancellation of large numbers of scheduled mobile sessions (Figure 2). There was continued difficulty in scheduling new mobile sessions during this period because of the fear of SARS.

Discussion

The new coronavirus and SARS rapidly became a worldwide problem and resulted in a significant impact for the Hong Kong community and health care service. While the BTS normally deals with healthy donors, it could not escape from the pressure of SARS. Many precautionary measures were adopted at the BTS to protect the donors', staff and recipients' safety in addition to its role in maintaining a stable supply of blood products to all the patients in need of transfusion in Hong Kong. It does not appear that SARS was transmitted by blood transfusion. The lessons learnt during the epidemic may help preparation for the current global pandemic of COVID-19 caused by SARS-CoV-2 and provide a basis for understanding the pathogenesis, laboratory diagnosis and role of coronaviruses in transfusion medicine. These are continuing problems as epidemics of coronavirus and other respiratory pathogens may recur with future impact on blood collection and blood donation screening.

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Table 1 Results of donor deferral policy on close contact history

	Numbers
Total donors deferred	57
On follow-up, number of donors did not develop SARS and donors remain healthy and fit. Therefore, donor status can be re-instated.	7
Number of donors found to have ongoing risk of exposure (e.g. working in hospitals, family members of SARS)	50

Table 2 The number of post donation call back with SARS-related symptoms during the period studied.

	11th March 2003 – 23rd May 2003	29th March 2002 – 22nd June 2002
Total number of post-donation calls with self-exclusion	100	68
Number of post-donation calls consistent with symptoms typical of SARS	83 (83%)	51 (75%)

Fig. 1 The change in blood utilization during the period studied

The figure compares blood usage between March and June 2002 and March and June 2003. Overall, there was a drop in blood collection by 6445 units (or 12.8%) during the SARS epidemic in 2003.

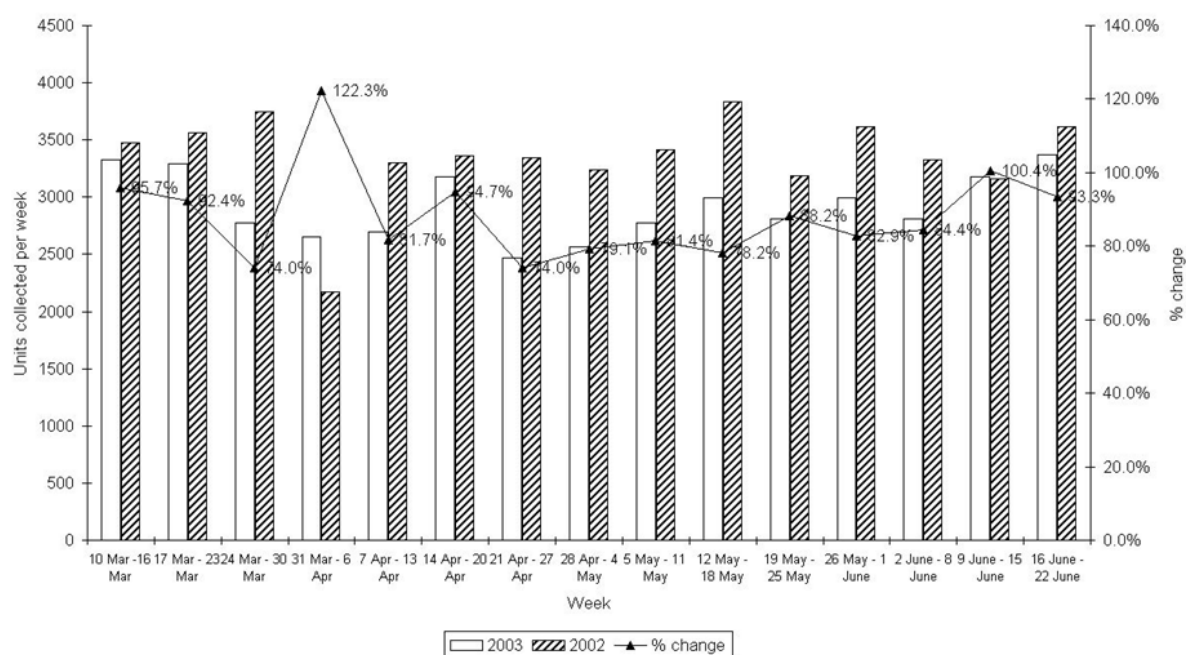


Fig 2. The change in blood collection during the studied period.

The figure compares blood collection between March and June 2002 and March and June 2003. Overall, there was a drop in blood collection by 9365 units (or 16.9%) during the SARS epidemic in 2003.

