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SARS, The First Pandemic of the 21st Century: A Case Study

Introduction

The SARS pandemic occurred from November 16th 2002 through July 5th 2003 having originated in the Guangdong Province of China. Ultimately 8,096 people across 29 countries, including the US and Canada were affected, leading to a total of 774 deaths, mainly in health care workers.[1,2] Swift action from the World Health Organization (WHO) in declaring a Global Alert for the initial outbreak along with its coordination among laboratories and facilities helped to quickly identify the source of the disease. This greatly decreased the risk of a large-scale global pandemic. However, continued globalization as a result of increased accessibility to rapid air travel and many other factors increases the likelihood for pandemic events to occur with an increased frequency in the future.[3,4]

Facts of the Case

Severe Acute Respiratory Syndrome, or SARS, is caused by a novel coronavirus that crossed to humans from wild animals held in a "wet" (i.e., live animal) market in Guangdong, China in November of 2002.[1] In the months following the initial infection in a local person who visited the wet market (i.e., the index case), it is now known that the outbreak was circulating yet still localized to cities in the area.[5] The global spread of SARS is thought to be attributed to a Chinese Doctor who had treated patients in Guangdong with what was considered an atypical pneumonia at the time.[2] The Doctor attended a wedding at the Metropole Hotel in Hong Kong and was admitted to the hospital for respiratory failure the following day. Through contacts at the hotel, the doctor transmitted the virus to other guests who then traveled by airplanes to various locations in the world, resulting in the global spread of SARS to 29 countries.

Over eight months, from the first case in November, SARS affected 8.906 patients and caused 774 deaths globally. With the majority of cases occurring across East and Southeast Asia, the economic toll was significant. An estimated $60 billion was lost in business revenue due to social isolation and quarantine practices and an overall decrease in normal commerce due to fears of acquiring the virus through normal interactions.[2] While the pandemic was officially considered contained by the WHO on July 5th 2003, an additional 17 cases were reported between September 2003 through May 2004, with the majority of these cases caused by laboratory exposure and the infection of others by the lab workers who were exposed.

Epidemiological aspects of the event

Studies conducted on the 2003 SARS pandemic detail the impact across the various countries affected as well as the spread among health care workers treating patients with SARS. One such study conducted by Tai et al provides statistics regarding the impact of SARS.[1] As indicated in their study, the case fatality rate for the five countries with the highest number of cases included China (6.6%), Hong Kong (17.0%), Taiwan (10.7%), Canada (17.1%), and Singapore (13.9%). The majority of transmission occurred among healthcare workers in hospitals and other institutions, with 76% of all infections occurring this way in Singapore, and 72% and 55% respectively in Toronto and Taiwan. Additionally, healthcare workers accounted for a significant percentage (21%) of patients treated for the disease, causing shortages of staff and added burden to healthcare systems. While a majority of patients who were hospitalized with SARS did not require critical care, approximately 1 in 5 patients were admitted to the intensive care unit (ICU), with the majority requiring mechanical ventilation due to severe respiratory distress.

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Management and Communication of the event

From a global perspective, the overall management of the event was effective, especially the actions of the WHO. Upon discovering cases of SARS occurring in Hong Kong and after the untimely death of the top infectious disease specialist at the WHO after contracting SARS, the WHO declared a Global Alert and communicated the potential threat as a result of SARS to the world, providing countries the ability to prepare for a potential global pandemic.[3] The leadership of the WHO in helping laboratories in collaborating through the sharing of information and specimens led to the quick discovery of SARS being caused by a coronavirus, and the sequencing of the genome of the virus within 5 weeks of the Global Alert issued by the WHO.[4] While the coordinated effort led by the WHO helped to provide information critical to containing the spread of the virus, initial actions by China in remaining relatively silent about the disease for months had a significant impact on the spread of the disease.

On a more localized level, the use of preventative public health measures became an effective means of limited community transmission of SARS. Through the use of techniques such as early case detection, isolation, contact tracing, quarantine, surveillance, and the education and use of personal protective equipment and infection control practices, many countries impacted by SARS were able to effectively control the spread and limited the impact of the disease among the greater population.

As globalization continues, greater coordination and continued surveillance of emerging infectious diseases are critical to prevent future global pandemics. One such example was the WHOs continued development of the Global Alert and Response Network, an important collaborative effort among labs and institutions critical to the response efforts to emerging threats from infectious diseases. In addition, accountability for countries to report and communicate with international organizations such as the WHO regarding discoveries of emerging threats is one of the most important aspects in helping to mitigate the impact and allow for quicker response, thereby decreasing the impact of future outbreaks.

Summary

The SARS pandemic, while causing a significant number of cases and deaths globally, was contained and managed effectively, thus preventing a more widespread disaster. In hindsight, especially with the current situation with the COVID-19 pandemic, the emergence of SARS should have been a driving force and a “wake-up call” for the global community regarding the threat of emerging infectious diseases and the importance of a coordinated response and preparedness across countries. It is apparent however that the lessons learned were not sufficient in helping to lessen the impact of COVID-19 and shows that it is becoming increasingly important that countries increase their preparedness and mitigation efforts to decrease the severity of future pandemics. Hopefully, the experiences from both SARS and COVID-19 will help lead to a heightened focus on the significant threats that emerging infectious diseases present. These diseases do not conform to countries' boundaries, thereby requiring a global coordinated effort to decrease the impact and save lives.

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