A review on severe acute respiratory syndrome (SARS)

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INTRODUCTION

Severe acute respiratory syndrome is an acute viral infectious respiratory illness prompted by SARS-associated coronavirus [1]. Severe acute respiratory syndrome is a rapidly progressive respiratory syndrome. Which was recognised by world health organization in 2002 in Guangdong one of the provinces of China, and issued as a global threat in march 2003. SARS had become the 1st pandemic of 21st century by spreading over 30 countries over the following months [2].
By the end of the outbreak of the spreading of the SARS in July 2003, a total of 8096 cases including 774 death cases were reported throughout the world with a mortality rate of 9.6%. The emergence of SARS featured the evolution of multiple novel pathogens like H5N1 influenza, Nipah virus, Hanta virus and avian flu. However, among these pathogens SARS is unique owing to its capacity and efficacy of transmission from person to person [3].

The causative agent which causes SARS was identified by the world health organization along with centres for disease control and prevention in under two weeks from the outbreak. The agent was a novel coronavirus strain and was given the name SARS associated coronavirus (SARS-COV). Before finalising this as a causative agent, the research teams believed the corona virus being causative agent as it isolated from the secretions of number of SARS patients. The mode of transmission of the virus is through inhaling the air droplets of virus. The treatment of SARS includes primarily supportive and the anti-viral agents are also not effective [4].

Etiology

The etiological link between corona virus and SARS was identified in Hong Kong. And this confirmation was done by satisfying all the Koch postulates.

The SARS-COV had been found in the respiratory exudations of the SARS victims. By testing the urine, faeces and lung biopsy samples of patients suffering with SARS. This micro-organism was separated from the secretions of the SARS patients by using many techniques such as serological technique, RT-PCR tests etc. Scientists done experimental infection of SARS-COV in monkeys [5]. It produces similar infection just like in SARS patients in the monkeys. Also, the corona virus which causes the SARS infection is mainly similar with the ones which present in bats. Thus, the scientists said that may be the source of the SARS-COV is from bats. And also, research teams discovered several corona virus strains which are closely and genetically related to the SARS-COV in two animal species i.e., masked palm civet cat and raccoon dog in Hong Kong and Shenzhen – China. Also, the antibodies against this virus are discovered in Chinese ferret badger. These three species are the wild animals which are traditionally sold in the commercial markets for the human consumption throughout the southern China [6].

Epidemiology

Severe acute respiratory syndrome incidences first reported in Guangdong one of the Chinese provinces in November of 2002 like an epidemic of unusual, severe communicable bronchitis incidents. Also, the 1st instances of SARS discovered in animal attendants whom have acquaintance with the feral creatures, which include palm civet cat which is eventually known as the secondary moderator of the pathogen [7].

During the outbreak majority of the cases reported in China like 83% and then in united states. This total outbreak guided to 8096 instances and 774 victims were died. High rate of risk is to elderly patients with a fatality rate of 43% in elderly adults above 60 [8]. Mainly grownups are impacted by the SARS, children were also affected by this though in less number and no deaths were reported in children. Health care persons were severely impacted by this disease and played big role in boosting up the transmission of severe acute respiratory syndrome. Health care workers held 21% of cases in the outbreak of disease. By the end of July 2003, hardly new infections were noted throughout the world, which leads to lifting of the rules on travelling by who which it placed during the pandemic and also to announce ending of the epidemic [9]. From the midyear of 2004 no cases of SARS were revealed but between the end of 2003 and starting of 2004 there is reemergence of virus due to accidental lab exposure. Like many other respiratory viruses, SARS-COV also spread through person to person by majorly droplet scattered process and also through direct spreading with the patient exudations. After transferring the incubation time of virus is often 2 to 7 days with 95% emerging signs after day 10. Maximum viral release takes place in respiratory exudations 6to11 days after initial symptoms [10].

Pathophysiology

Mode of Transmission: Major route SARS does seem to disperse would be by near man-to-man interaction. The pathogen that induces SARS is believed to be transferred often quickly by respiratory globules generated whenever an
infected individual wheezes as well as sniffs [11]. Beads disperse could occur once globules in sniffle as well as wheezes of a diseased individual are progressed a brief decent distance to three feet in the wind also stored upon that mucosal surface of the eyes, mouth, as well as nose of individuals who seem to be close [12]. The pathogen may also be infected to people who contacts a place as well as item tainted with contagious beads but then comes into contact with their mouth, nose, as well as eyes. Moreover, it's indeed conceivable that perhaps the SARS pathogen could well expand so much widely by the air.

This mode of transmission is of mainly threetypes. They are [13][14]
- **Droplet transmission**
- **Contact transmission**
- **Airborne transmission**

**Figure 1 Pathogenesis of SARS**

**Droplet Transmission**

Respiratory transfer of SARS-CoV could happen through droplet transmissions. Spreading through globules occurs during bearers of the viral infection speaking, wheezing, inhaling as well as sniffing eject bioaerosol particulate that could contact someone else people's mouth, eyes, as well as nose leading to infectious disease.

**Contact Transmission**

The contact transmission of SARS-CoV could occur by surface areas as well as things tainted with SARS-CoV, in which pathogens could continue to survive which led to illness for a few hours and perhaps even days. For example, SARS-CoV could sustain 2–9 days upon that surface areas and things.
Airborne transmission
The process of air-borne transmitting specifically attuned particle nuclei as well as particulate matter along with the pathogen which can remain in the air for such a longer length of time (≥2 h) and also can relocate much further ranges from bearers of SARS-COV.

For instance, air-borne globules which are liberated throughout the time of breathing as well as sniffling by SARS-COV bearers, might well relocate a few meters (8 m), remain for almost 30 min, and stay intact on things for some days.

Symptoms [15]
The most important symptoms of SARS seem to be chills, dry cough, chills, malaise, fever, myalgia, dyspnoea and headache. Throat infection, mucus production, rhinorrhea, nausea, emesis, and drowsiness is much less frequent. Watery diarrhoea had been displaying along 40% to 70% of sick people with SARS and typically took place for 1 week since initial infection. SARS-COV had been identified with in cerebrospinal fluid and serum of 2 sick people intricated by relapses. Geriatric persons accompanied by SARS-COV disease could perhaps exist with less insatiable hunger, a lesson generally healthy person, cracking as well as ambiguity, even though some elderly individuals may not have been able to mount a febrile reaction. In comparison, SARS-COV disease in kids ages under twelve years was relatively innocuous, and whilst disease in young teens closely resembles that within grownups.
Complications [16]
Severe acute respiratory syndrome induces numerous pneumonic and extrapulmonary problems. Which are:
- Respiratory complications
- Cardiovascular complications
- Acute renal failure
- Osteonecrosis
- Bacterial and fungal superinfection
- Endocrine
- Hepatitis
- Psychiatric complications

Diagnosis [17]
The main diagnostic tests for this disease are,
- Reverse Transcriptase-Polymeric Chain Reaction (RT-PCR)
- Complete blood count (CBC) with differential
- Blood cultures
- Pulse oximetry
- Gram stain
- Chest x-ray
- Sputum culturing
- Urinary antigen tests
- Pneumococcal antigen test
- Legionella test

Treatment [18][19]
The specific treatment for severe acute respiratory syndrome id still unknown. But the management of this disease is done by their symptomatic medications. Also, some antiviral agents are used during the epidemic.

Antiviral Therapy
- Ribavirin
- Combination of Lopinavir with Ribavirin
- Combination of Lopinavir with Ritonavir
- Corticosteroids
- Methylprednisolone
- Prednisolone

CONCLUSION
The SARS pandemic illustrated a certain new hyper virulent pathogen traversing the boundary between the animal and human stay crucial to public health safety. SARS presented a serious task regarding world - wide health care services with its unexpected arrival, quick spreading, as well as extinction. The understanding and knowledge gained from SARS-COV epidemiological studies, method of delivery, course of illness, health problems, patient treatment, indicators of less results, as well as infection prevention and control have been tremendously helpful. Although no huge epidemics have taken place from the last revealed SARS incidents involving health care workers in Hong Kong as well as Taiwan, regardless of whether SARS will pop back up and end up causing some other epidemic remains uncertain.

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