

A Study of Coronavirus Outbreak of Global Health Concern

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Abstract: As an RNA virus, 2019-nCoV still has the inherent feature of a high mutation rate, although like other coronaviruses the mutation rate might be somewhat lower than other RNA viruses because of its genome-encoded exonuclease. This aspect provides the possibility for this newly introduced zoonotic viral pathogen to adapt to become more efficiently transmitted from person to person and possibly become more virulent.

Two previous coronavirus outbreaks had been reported in the 21st century. The clinical features of 2019-nCoV, in comparison with SARS-CoV and Middle East respiratory syndrome (MERS)-CoV, are summarised in the table. The ongoing 2019-nCoV outbreak has undoubtedly caused the memories of the SARS-CoV outbreak starting 17 years ago to resurface in many people. In November, 2002, clusters of pneumonia of unknown cause were reported in Guangdong province, China, now known as the SARS-CoV outbreak. The number of cases of SARS increased substantially in the next year in China and later spread globally, infecting at least 8096 people and causing 774 deaths.

Keywords: China, Coronavirus, Outbreaks.

I. INTRODUCTION

In December, 2019, Wuhan, Hubei province, China, have become the centre of an outbreak of pneumonia of unknown cause, which raised severe interest no longer best within China however across the world. Chinese fitness authorities did an instantaneous research to characterise and manage the sickness, consisting of isolation of people suspected to have the sickness, near monitoring of contacts, epidemiological and clinical information series from sufferers, and development of diagnostic and treatment techniques. By Jan 7, 2020, Chinese scientists had isolated a unique coronavirus (CoV) from patients in Wuhan. The genetic collection of the 2019 novel coronavirus (2019-nCoV) enabled the speedy development of point-of-care actual-time RT-PCR diagnostic exams unique for 2019-nCoV (based on full genome sequence statistics on the Global Initiative on Sharing All Influenza Data [GISAID] platform). Cases of 2019-nCoV are not constrained to Wuhan. Nine exported instances of 2019-nCoV infection had been stated in Thailand, Japan, Korea, the us, Vietnam, and Singapore to date, and in addition dissemination thru air journey is likely.

As of Jan 23, 2020, confirmed instances have been consecutively mentioned in 32 provinces, municipalities, and unique administrative regions in China, inclusive of Hong Kong, Macau, and Taiwan.

These instances detected out of doors Wuhan, collectively with the detection of infection in at least one household cluster—suggested with the aid of Jasper Fuk-Woo Chan and colleagues in The Lancet—and the these days documented infections in health-care workers worrying for sufferers with 2019-nCoV suggest human-to-human transmission and for this

reason the risk of an awful lot wider unfold of the sickness. As of Jan 23, 2020, a total of 835 cases with laboratory-shown 2019-nCoV contamination have been detected in China, of whom 25 have died and ninety three% continue to be in sanatorium (discern record scientific functions of the first forty one patients admitted to the designated clinic in Wuhan who had been confirmed to be infected with 2019-nCoV via Jan 2, 2020. The look at findings offer first-hand data about severity of the rising 2019-nCoV contamination. Symptoms on account of 2019-nCoV contamination at the prodromal section, which includes fever, dry cough, and malaise, are non-precise. Unlike human coronavirus infections, upper breathing signs and symptoms are significantly infrequent. Intestinal shows determined with SARS also appear like unusual, although of six cases said by means of Chan and associates had diarrhoea. Common laboratory findings on admission to health center encompass lymphopenia and bilateral ground-glass opacity or consolidation in chest CT scans. These medical presentations confounded early detection of infected instances, particularly against a historical past of ongoing influenza and movement of other respiration viruses. Exposure history to the Huanan Seafood Wholesale marketplace served as an crucial clue at the early level, but its fee has reduced as more secondary and tertiary cases have appeared. Of the 41 patients in this cohort, 22 (fifty five%) evolved extreme dyspnoea and 13 (32%) required admission to an in depth care unit, and 6 died.

Hence, the case-fatality proportion on this cohort is about 14.6%, and the general case fatality percentage appears to be nearer to a few% (desk). However, both of these estimates have to be dealt with with terrific caution because now not all sufferers have concluded their illness (ie, recovered or died) and the proper wide variety of infections and full ailment spectrum are unknown. Importantly, in emerging viral infection outbreaks the case-fatality ratio is regularly puffed up in the early degrees due to the fact case detection is rather biased in the direction of the greater severe instances. As similarly statistics at the spectrum of mild or asymptomatic contamination turns into available, one case of which became documented via Chan and co-workers, the case-fatality ratio is in all likelihood to lower. Nevertheless, the 1918 influenza pandemic is anticipated to have had a case-fatality ratio of much less than five% however had an widespread effect due to tremendous transmission, so there may be no room for complacency.

		2019-nCoV	MERS-CoV	SARS-CoV
Demographic				
	Date	December, 2019	June, 2012	November, 2002
	Location of first detection	Wuhan, China	Jeddah, Saudi Arabia	Guangdong, China
	Age, years	49 (21–)	56 (14–94)	39.9 (1–91)

	(range)	76)		
	Male:female sex ratio	2·7:1	3·3:1	1:1·25
	Confirmed cases	835†	2494	8096
	Mortality	25 (2·9%)†	858 (37%)	744 (10%)
	Health-care workers	16‡	9·8%	23·1%
Symptoms				
	Fever	40 (98%)	98%	99–100%
	Dry cough	31 (76%)	47%	29–75%
	Dyspnoea	22 (55%)	72%	40–42%
	Diarrhoea	1 (3%)	26%	20–25%
	Sore throat	0	21%	13–25%
	Ventilatory support	9·8%	80%	14–20%



Data are n, age (range), or n (%) unless otherwise stated. 2019-nCoV=2019 novel coronavirus. MERS-CoV=Middle East respiratory syndrome coronavirus. SARS-CoV=severe acute respiratory syndrome coronavirus.

*** Demographics and symptoms for 2019-nCoV infection are based on data from the first 41 patients reported by Chaolin Huang and colleagues (admitted before Jan 2, 2020).**

Case numbers and mortalities are updated up to Jan 21, 2020) as disclosed by the Chinese Health Commission.

† Data as of Jan 23, 2020.

‡ Data as of Jan 21, 2020.

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Two previous coronavirus outbreaks had been reported in the 21st century. The clinical features of 2019-nCoV, in comparison with SARS-CoV and Middle East respiratory syndrome (MERS)-CoV, are summarised in the table. The ongoing 2019-nCoV outbreak has undoubtedly caused the memories of the SARS-CoV outbreak starting 17 years ago to resurface in many people. In November, 2002, clusters of pneumonia of unknown cause were reported in Guangdong province, China, now known as the SARS-CoV outbreak. The number of cases of SARS increased substantially in the next year in China and later spread globally, infecting at least 8096 people and causing 774 deaths.

The international spread of SARS-CoV in 2003 was attributed to its strong transmission ability under specific circumstances and the insufficient preparedness and implementation of infection control practices. Chinese public health and scientific capabilities have been greatly transformed since 2003. An efficient system is ready for monitoring and responding to infectious disease outbreaks and the 2019-nCoV pneumonia has been quickly added to the Notifiable Communicable Disease List and given the highest priority by Chinese health authorities.

The increasing number of cases and widening geographical spread of the disease raise grave concerns about the future trajectory of the outbreak, especially with the Chinese Lunar New Year quickly approaching. Under normal circumstances, an estimated 3 billion trips would be made in the Spring Festival travel rush this year, with 15 million trips happening in Wuhan. The virus might further spread to other places during this festival period and cause epidemics, especially if it has acquired the ability to efficiently transmit from person to person.

Consequently, the 2019-nCoV outbreak has led to implementation of extraordinary public health measures to reduce further spread of the virus within China and elsewhere. Although WHO has not recommended any international travelling restrictions so far, the local government in Wuhan announced on Jan 23, 2020, the suspension of public transportation, with closure of airports, railway stations, and highways in the city, to prevent further disease transmission.

Further efforts in travel restriction might follow. Active surveillance for new cases and close monitoring of their contacts are being implemented. To improve detection efficiency, front-line clinics, apart from local centres for disease control and prevention, should be armed with validated point-of-care diagnostic kits.

Rapid information disclosure is a top priority for disease control and prevention. A daily press release system has been established in China to ensure effective and efficient disclosure of epidemic information. Education campaigns should be launched to promote precautions for travellers, including frequent hand-washing, cough etiquette, and use of personal protection equipment (eg, masks) when visiting public places. Also, the general public should be motivated to report fever and other risk factors for coronavirus infection, including travel history to affected area and close contacts with confirmed or suspected cases.

Considering that substantial numbers of patients with SARS and MERS were infected in health-care settings, precautions need to be taken to prevent nosocomial spread of

the virus. Unfortunately, 16 health-care workers, some of whom were working in the same ward, have been confirmed to be infected with 2019-nCoV to date, although the routes of transmission and the possible role of so-called super-spreaders remain to be clarified.

Epidemiological studies need to be done to assess risk factors for infection in health-care personnel and quantify potential subclinical or asymptomatic infections. Notably, the transmission of SARS-CoV was eventually halted by public health measures including elimination of nosocomial infections. We need to be wary of the current outbreak turning into a sustained epidemic or even a pandemic.

The availability of the virus' genetic sequence and initial data on the epidemiology and clinical consequences of the 2019-nCoV infections are only the first steps to understanding the threat posed by this pathogen. Many important questions remain unanswered, including its origin, extent, and duration of transmission in humans, ability to infect other animal hosts, and the spectrum and pathogenesis of human infections. Characterising viral isolates from successive generations of human infections will be key to updating diagnostics and assessing viral evolution. Beyond supportive care, no specific coronavirus antivirals or vaccines of proven efficacy in humans exist, although clinical trials of both are ongoing for MERS-CoV and one controlled trial of ritonavir-boosted lopinavir monotherapy has been launched for 2019-

nCoV (ChiCTR2000029308). Future animal model and clinical studies should focus on assessing the effectiveness and safety of promising antiviral drugs, monoclonal and polyclonal neutralising antibody products, and therapeutics directed against immunopathologic host responses.

We have to be aware of the challenge and concerns brought by 2019-nCoV to our community. Every effort should be given to understand and control the disease, and the time to act is now.

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