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Contents lists available at ScienceDirect

Journal of Infection

journal homepage: www.elsevier.com/locate/jinf

Letter to the Editor

Re-emergence of coronavirus disease in Chinese cities associated with chilled and frozen food products


Dear Editor

The coronavirus disease (COVID-19) pandemic poses a serious global public health challenge.^{1,2} In China, following the emergence of COVID-19 in the Huanan seafood market in Wuhan in December 2019, the Chinese government adopted active and effective measures to control the epidemic.^{3–5} By controlling the infection source, restricting population movement, and barricading transmission routes, the epidemic was contained in April 2020, and no local COVID-19 cases were reported for 2 months.⁶

However, in June, COVID-19 re-emerged in some cities. The infection source was determined to be related to the processing or sale of chilled fresh products, similar to that during the initial phase of the epidemic in Wuhan. Currently (December 2020), three large Chinese cities are experiencing rebounding epidemics, and there is a risk of a large-scale recurrent epidemic in China owing to population movement. Here, we have described the index cases and likely source of re-emergent outbreaks in three cities.

Case 1: On June 11, 2020, a confirmed case of COVID-19 was reported in Xicheng District in Beijing after a 56-day period without any local cases being reported. The index case had no history of travel or close contact with another case in the 2 weeks preceding the onset. There was a rapid increase in the number of confirmed cases reported in Beijing in the following days. By June 15, 2020, the number of newly confirmed cases had exceeded 100. In comparison, in the early stage of the COVID-19 epidemic in Wuhan, it took 11 days for the number of newly confirmed cases to exceed 100. This illustrates the rapidity of the spread of the COVID-19 epidemic in Beijing.

An outbreak investigation revealed that 98.8% of the early confirmed cases had visited the Xinfadi seafood market, and environmental samples from the market were positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Genome sequencing and phylogenetic analysis revealed that the strain responsible for the Beijing epidemic had the same genetic characteristics as the European branch 1 strains of the L genotype, a strain that had not been found in China previously.

In total, 362 confirmed COVID-19 cases and 38 asymptomatic SARS-CoV-2 infections were reported in the Beijing epidemic. The number of newly confirmed cases peaked on June 14, 2020, and 93.5% of the cases were concentrated in the Fengtai, Daxing, and Haidian districts. As of August 6, 2020, all individuals with confirmed infection had recovered and were discharged.

Case 2: On July 22, 2020, a 58-year-old man from Xigang District in Dalian was confirmed to have COVID-19 after a 111-day period without any local cases being reported there. The index case, an employee of the Kaiyang seafood processing company,

processed imported frozen seafood. He had not traveled outside Dalian in the 2 weeks preceding disease onset and had no history of previous SARS-CoV-2 infection. In the following days, several more local cases were reported in Dalian. The epidemic peaked around July 24–26, 2020.

Genome sequencing and phylogenetic analysis revealed that the SARS-CoV-2 strains causing the epidemic in Dalian were highly homologous, indicating a single-source epidemic and that the epidemic strain belonged to the L-Lineage of European Branch I and was unrelated to the epidemic strains in other Chinese cities. The timing and phylogenetic analysis result suggested that the virus was probably imported from abroad. The outbreak in Dalian may have been related to the processing of contaminated imported chilled seafood.

Overall, 118 confirmed cases were reported in the Dalian epidemic, including 92 COVID-19 cases and 26 asymptomatic SARS-CoV-2 infections. In total, 56 confirmed infections were found in workers at the Kaiyang seafood processing company, accounting for 47.5% of the total cases. As of August 29, 2020, all affected individuals had been discharged from the isolation hospital.

Case 3: On August 14, 2020, a 41-year-old woman who worked at Shenzhen's Hema fresh market, which deals mainly in chilled fresh products, was clinically diagnosed with COVID-19 based on fever and diarrhea after a 107-day period without any local cases being reported in Guangdong Province. The medical and health departments immediately conducted nucleic acid testing of close contacts of the patient and environmental samples for SARS-CoV-2. Five asymptomatic SARS-CoV-2 infection cases were reported, of which three were family members of the patient and the other two were coworkers.

Genomic sequence analysis revealed that the full-length genomic sequences of the Shenzhen viruses were highly homologous and shared 99.99% nucleotide similarity with the HK1 branch of the Hong Kong strain, indicating that the Shenzhen outbreak was probably caused by a viral strain imported from Hong Kong.

The number of daily confirmed cases worldwide has increased sharply since October 2020, indicating a global resurgence in the pandemic. After the first epidemic wave following the Huanan seafood market outbreak, the epidemic in China was effectively controlled. The re-emergence of the COVID-19 epidemic in some cities has been linked to imported chilled and frozen seafood products. Since June 2020, more than 10 provinces in China have reported the detection of SARS-CoV-2 in imported chilled and frozen food products, and the latest research has confirmed that live virus can survive on the outer packaging of imported chilled products.

These recent imported epidemics have strained the epidemic prevention resources in China. Therefore, on November 8, 2020, the Chinese government introduced a comprehensive preventive disinfection work plan for imported chilled and frozen food to help

prevent further COVID-19 outbreaks caused by imported chilled and frozen products.

In summary, the COVID-19 pandemic has created major challenges for medical and health departments globally. Recent localized epidemics in China demonstrate that chilled and frozen food products can cause SARS-CoV-2 infections. Moreover, the incidence of respiratory diseases increases in the winter. To prevent similar epidemics during the winter ahead, other countries should strengthen the monitoring and management of the processing and sale of chilled food products.

Declaration of Competing Interest

None.

Acknowledgements

This work was supported by Key Laboratory of Zoonosis Prevention and Control of Guangdong Province, the Guangdong Province Pig Industrial System Innovation Team (Grant Number 2018LM1103), Special fund for scientific innovation strategy-construction of high level Academy of Agriculture Science (R2016YJ-YB2003).

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