Notes from the Field

Suspected Yellow Fever Case Determined to be Adverse Vaccine Reaction

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Jiangxi Provincial Center for Disease Control and Prevention (Jiangxi CDC) received an alert at 23:45 on November 7, 2019 from Nanchang Customs that yellow fever virus was detected in a foreign national.

On November 8, county, municipal, and provincial CDCs of Jiangxi Province carried out epidemiological investigations to show that the suspected case was found in a 35-year-old male patient from Addis Ababa, Ethiopia. On November 5, this patient began to have yellow-fever-like symptoms such as onset of fever, chills, and headache. At 16:11 on November 6, the patient and 12 accompanying colleagues arrived in Guangzhou where his temperature was measured at 38.0 ℃. Blood samples were collected by the Guangzhou Customs Laboratory and RT-PCR test results illustrated that the patient was experiencing yellow fever viremia. On November 7, the patient and his colleagues landed in Nanchang, and the Guangzhou Customs Laboratory alerted Nanchang Customs to inform Jiangxi CDC of the patient's test result.

On November 8, the patient's temperature had returned to normal and his other symptoms were relieved. None of the patient's colleagues exhibited any symptoms. Jiangxi CDC tested the patient's blood sample and the result showed that the yellow fever viremia disappeared. After 24 hours on November 9, the patient's blood was tested for yellow fever virus a second time, and this result was negative again. Further investigation revealed that the patient received a yellow fever vaccination on November 1, 2019, as indicated by his immunization certificate.

On November 11, the Guangzhou Customs Laboratory finished RNA sequencing of the isolated virus and proved that the detected virus is a strain of the yellow fever vaccine virus. Based on evidence yielded by the investigation, including epidemiological history, onset of relatively mild symptoms, laboratory test results, and vaccination history, the patient's symptoms were considered to be adverse reactions to the yellow fever vaccination.

Discussion

Yellow fever vaccine is a live-attenuated virus vaccine, a type of vaccine in which the virulence of the pathogen has been reduced, that has been available since the 1930s. The vaccination of yellow fever is required for entry into certain countries (*1*). The viremia may occur in a newly-vaccinated person two to six days following vaccination, and the detectible window for the most people ranges from four to six days after immunization (*2*). The adverse reactions incurred by vaccination are generally mild and include headaches, muscle aches, low-grade fevers (*1*). According to reports by the Vaccine Adverse Event Reporting System (VAERS), the occurrence rate of an adverse event is 43 per 100,000 vaccination (*3*). A mild reaction generally does not require treatment, but in rare scenarios, a newly-vaccinated person may require special healthcare in response to severe or possibly life-threatening reactions (*4*).

In this case, the patient entered China from a country without yellow fever epidemic. At the time of entry into China, the patient was having viremia and other symptoms associated with yellow fever vaccination. However, before a determination could be made on the patient's condition, Chinese clinicians and public health professionals were extremely worried that a true yellow fever patient might cause local transmission.

This case report suggests that many clinicians, customs officials, and public health professionals lack essential knowledge and training to properly address infectious disease events such as yellow fever. To use this current case as an example, accurate diagnoses and the implementation of effective control and prevention measures depend on public health professionals' ability to intensively collect epidemiological information, such

as vaccination history, prior two-week travel history, and the infectious disease epidemic situation of countries of origin, etc., and clinicians' ability to make clear and characterized clinical observations. Furthermore, if the presenting symptoms are severe, the viral genome should be sequenced to distinguish vaccine viremia from yellow fever disease as soon as possible.

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