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Commentary



A commentary on “Unexpected sudden rise of human monkeypox cases in multiple non-endemic countries amid COVID-19 pandemic and salient counteracting strategies: Another potential global threat?” (Int J Surg 2022;103:106705)

Dear Editor,

We read with interest the study by Mohapatra et al. on the potential global health by the current monkeypox virus outbreak [1]. As they mentioned, the unprecedented rise of monkeypox cases in nonendemic regions raised concerns regarding a pandemic risk.

The ongoing monkeypox outbreak was first reported in May 2022 and it had infected over 24,600 patients in multiple countries as of 2 August 2022 (<https://ourworldindata.org/monkeypox>). The World Health Organization (WHO) recently declared the monkeypox outbreak a global health emergency [2].

In order to refer to the pandemic potential of a virus with a similar impact to coronavirus disease 2019 (COVID-19), it is necessary to refer to several factors, including the structural characteristics of the virus, the occurrence of genetic modifications that increase the likelihood of transmission, the major routes of transmission, the possibility of transmission from asymptomatic carriers, the incubation period, and the existence of effective vaccines and treatments.

Recent phylogenomic characterization of the monkeypox virus which caused the outbreak in 2022 revealed that the virus has undergone accelerated evolution as a result of the host's apolipoprotein B mRNA-editing catalytic polypeptide-like 3 (APOBEC3) function [3]. The experience learned from the COVID-19 pandemic indicates that any change in virus behavior should be considered important.

Monkeypox is a double-stranded deoxyribonucleic acid (dsDNA) virus with a higher genetic stability and a more genetic content than coronaviruses, which are single-stranded ribonucleic acid (ssRNA) viruses [1]. When compared to the variola virus which is another member of the Orthopoxvirus genus responsible for smallpox, monkeypox has more genetic contents, higher inverted terminal repeats, and more open reading frames (ORFs) (monkeypox ~197 kb, contains ~180 ORFs; variola virus; ~185 kb, contains ~200 ORFs) [4]. Importantly, the genes, including B7R, BR-203, E7R, and K1L, are of more value due to their roles in monkeypox replication and virulence [5]. In addition, the doubling time of monkeypox is much lower than the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which has a three-day doubling time in the Omicron variant [6].

Fluctuations in gene content, such as reductive evolution as seen in Orthopoxviruses, help these viruses to adapt to the host [7]. It is more difficult to predict the effect of monkeypox mutation on the phenotype when compared with the situation in COVID-19. Generally, the chance of mutation dramatically affecting pathogenicity and contagion in monkeypox is much lower⁵. Accordingly, it can be expected that

protection against monkeypox with vaccinia virus vaccination, which has been discontinued due to eradication of smallpox, might not decline rapidly. A 2003 US monkeypox outbreak study revealed that at least three people who were vaccinated 13–48 years ago and contacted with monkeypox did not show any signs of the disease [8]. Hence, a careful evaluation should be conducted to accurately judge the possible vaccine protection in people vaccinated in the past several decades.

Monkeypox virus has been typically transmitted through contact with infected animals. However, according to the epidemiological outlines, the current outbreak reflects the role of human-to-human transmission. Previously there was no evidence of asymptomatic transmission of monkeypox. However, some of the newly identified cases did not report any history of travel to endemic regions of the virus and contact with symptomatic patients, thus providing evidence of community transmission and even the chance of stealth transmission for this virus. The occurrence of monkeypox infection in contact with asymptomatic patients indicates that isolation of symptomatic patients might not be sufficient to control the outbreak effectively.

Moreover, high persistence of DNA viruses in environment can lead to fomite-mediated transmission through contact with contaminated materials. Monkeypox is also indicated to spread through respiratory particles, although a long duration of face-to-face contact is probably required for airborne transmission. Nonetheless, in terms of contagiousness and transmissibility, COVID-19 is far superior. Even within the genus Orthopoxvirus, the variola virus is more contagious than monkeypox [9].

The long incubation period of monkeypox (5–21 days) and the possible transmission by asymptomatic carriers can complicate disease control [10]. Currently, evidence on higher adaptation and contagion of monkeypox is still lacking. For accurate judgment, there is a vital need for regular sequencing of the virus genome.

Regarding treatment approaches, brincidofovir and tecovirimat have been approved against smallpox based on the “Animal Rule.” Given the self-limiting feature and available treatments and vaccines, the threat from monkeypox is much lower than COVID-19. However, the risk should not be underestimated, and resumption of routine immunization should be considered to contain the current outbreak.

Ethical approval

This article does not require any human/animal subjects to acquire such approval.

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