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Monkeypox: an emerging zoonotic disease with pandemic potential

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Since the first published report of a confirmed human case of monkeypox[1] occurring in a 9-month-old child in Democratic Republic of Congo (DRC) (former Zaire) in August 1970, several outbreaks were reported in central and west African countries including Gabon, Cameroon, Republic of Congo (ROC), Central African Republic (CAR), Sudan, DRC, Nigeria, Liberia, Ivory Coast and Sierra Leone. Sporadic cases and outbreaks outside African countries were rare and mostly imported. Monkeypox remained as a neglected disease for the scientific community over several decades since identification and drew attention after the largest outbreak in the United States of America (USA) in 2003 (imported from Ghana).[2] The recent and rapid spread of *monkeypox virus* is a major global health concern amid the coronavirus disease 2019 (COVID-19) pandemic and the World Health Organization (WHO) Director-General on July 23, 2022 declared the global monkeypox outbreak as a public health emergency of international concern.[3]

The *monkeypox virus* [a deoxyriboneucleic acid (DNA) virus], the causative agent for the emerging zoonotic disease, monkeypox, was first discovered in 1958 and is a member of *Orthopoxvirus* genus in the *Poxviridae* family. Among the four members of the pathogenic *Orthopoxvirus* species, *monkeypox virus* is the most important (designated by the Global Commission for the Certification of Smallpox Eradication) after eradication of small pox (caused by *variola virus*) in 1980 and the other two are *cowpox virus* and *vaccinia virus*. Under the WHO surveillance programs, the numbers of reported cases of monkeypox were increasing in the early 1980s. Monkeypox can occur in a wide range of mammalians, identification of the virus was possible from rope squirrel in DRC and a sooty mangabey in Ivory Coast.[4,5] Human outbreaks in African countries were often temporally related to political unrests compelling people migrate and enter deep into the forests and come in close contact with animals and human-to-human transmission is also reported.[6] The threat for the disease would further increase through increasing viral virulence, natural or through genetic engineering, viral infection among widely distributed mammals or an expansion outside endemic African continents. The *monkeypox virus* remains as "biosafety level 3" category, the "high threat" biodefence category in the European Union (EU) and is on the list of select agents in the USA.[7]

Transmission of *monkeypox virus* is thought through respiratory droplet infections and saliva, contacts with lesion exudates, body fluids and crusts. Patients may present with fever, rash and lymphadenoapthy after an incubation period of 6 to 13 (5 - 21) days[6]; lymph node enlargement can occur during the fever onset and is a strong clinical differentiating point against small pox. Rashes are usually peripheral in distribution and occur and evolve simultaneously. Complications include secondary bacterial infections, respiratory distress syndrome, bronchopneumonia, gastrointestinal involvement, encephalitis and corneal infection often leading to vision loss. Vaccination against small pox may give protection; most primary cases occur in unvaccinated young male children while, secondary house-hold infections predominantly occur in women. Monkeypox was generally regarded as a self-limiting disease; however, reports show case fatality rates between 0 and 11%, more for the central African clade. Clinical disease may last for 2 to 4 weeks and crusts may take 4 weeks to desquamate.[7]

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Taking history of travel and potential exposure to animals or patients suffering from monkeypox is of immense importance during evaluation of patients with fever, rash and lymphadenopathy, as the differentials are not exhaustive. Polymerase chain reaction (PCR) from respiratory and other samples are needed to have a confirmed diagnosis. Once suspected, isolation of patients may reduce chance of human-to-human transmission. Treatment is symptomatic and supportive; off-label use of antiviral agent, brincidofovir caused elevated liver enzymes resulting in cessation of therapy, while tecovirimat shortened duration of illness and viral shedding.[6] Center for Disease Control (CDC) published Guidance for Tecovirimat Use Under Expanded Access Investigational New Drug Protocol during 2022 U.S. Monkeypox Cases[8] and included patients who are severely ill, likely to have severe disease and aberrant infections. Tecovirimat is licensed by the European Medicines Agency (EMA) for monkeypox in 2022 based on data in animal and human studies[9] and candidate vaccines are on way, one newer vaccine based on a modified attenuated *vaccinia virus* (Ankara strain) was approved for the prevention of monkeypox in 2019.

The recent outbreak started since May, 2022 in the United Kingdom (UK) in a returning traveller through Nigeria and continued to spread throughout Europe and Americas, predominantly among male homosexuals. From January 1, through August 7, 2022, total 27,814 laboratory confirmed cases of monkeypox and 11 deaths have been reported to WHO from 89 countries, territories and areas in all six WHO Regions.[10] No case in Bangladesh is reported till date but cases and death have been reported from neighboring India. Extensive travel between Bangladesh and India and other countries exposes Bangladesh at the risk of imported monkeypox cases. Avoiding travel through countries facing ongoing monkeypox outbreaks, avoiding contacts with infected cases (both human and animal), restricting animal trades (rodents and non-human primates) and implementing strict quarantines, appointing health care personnels previously vaccinated against smallpox virus for treatment and care of patients, disseminating knowledge of risk factors for acquisition of infection among general people - all may help in preventing and containing monkeypox cases. Finally, a high index of suspicion is needed among health care providers and general people should be made aware of the condition.

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