



## A brief communication on Monkeypox

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### ABSTRACT

Monkeypox virus (MPXV) is double-stranded DNA virus that belongs to the Orthopoxvirus genus. Monkeypox has a clinical appearance like that of smallpox. It affects the neurological, respiratory, and gastrointestinal systems. Monkeypox is usually a self-limiting disease and less infectious than smallpox. Fever, rash, and enlarged lymph nodes are common symptoms of monkeypox. The outbreaks of this viral infection due to the eradication of smallpox and ensuing floppiness in vaccination efforts. It was first diagnosed in 1970 in the Democratic Republic of Congo and has spread to many countries worldwide, including the USA. The most recent outbreak occurred in 2022. Our review focuses on the quick view for the effective management, prevention, and counselling of monkeypox patients worldwide.

### INTRODUCTION

Monkeypox is a rare disease that is caused by infection with monkeypox virus (also known as MPV), which belongs to the Orthopoxvirus genus in the family Poxviridae. The Orthopoxvirus genus also includes variola virus (which causes smallpox), vaccinia virus (used in the smallpox vaccine), and cowpox virus [1]. The outbreak of monkeypox virus infection currently in humans suggests changes occur in biologic aspects of the virus, changes in human behavior, or both. The changes might be driven by waning smallpox immunity, relaxation of coronavirus disease 2019 (Covid-19) prevention measures, resumption of international travel, and sexual interactions associated with large gatherings. The current spread has affected men who are gay or bisexual, other men who have sex with men, which indicate the development of transmission through sexual networks [2].

Monkeypox acquired its name from the discovery of the virus in monkeys under investigation in a research lab in Denmark in 1958. The first human monkeypox was identified in 1970 in the

Democratic Republic of the Congo in a 9-month-old boy in a region where smallpox had been eliminated in 1968. The outbreaks of monkeypox have been restricted to the tropical rainforests of central and western Africa, particularly in the Democratic Republic of Congo. The virus is the principal *Orthopoxvirus* affecting human populations since smallpox eradication, confirmed by the World Health Organization in 1980. The first reported infection of humans was in the Democratic Republic of the Congo in 1970. The first monkeypox outbreak outside of Africa was in the United States of America in the year 2003 and was linked to contact with infected pet prairie dogs. These pets had been housed with Gambian pouched rats and dormice that had been imported into the country from Ghana. This led to over 70 cases of monkeypox in the U.S. Monkeypox has also been reported in travelers from Nigeria to Israel in September 2018, to the United Kingdom in September 2018, December 2019, May 2021, and May 2022, to Singapore in May 2019, and to the United States of America in July and November 2021. In May 2022, multiple cases of monkeypox were identified in several non-endemic countries. [1]

**Pathogenesis:** Monkeypox virus is double-stranded DNA virus that belongs to the *Orthopoxvirus* genus. Two distinct genetic clades of the monkeypox virus are there: the central African (Congo Basin) clade and the west African clade. The Congo Basin clade has historically caused more severe disease and was more transmissible. The geographical division between the two clades has so far been in Cameroon, the only country where both virus clades have been found. The pathogenesis of human monkeypox is very close to that of smallpox. The virus enter from wildlife occurs small lesions on the skin or oral mucous membranes. The virus can also enter through the respiratory tract in rare cases of person-to-person transmission. Same as smallpox, the monkeypox virus replicates in lymphoid tissue, and has a greater degree of lymphadenopathy. After entering the host, virus first localizes in mononuclear phagocytic cells and release into the bloodstream, and then localizes again in skin cells.

**Incubation Period:** The incubation period for monkeypox is normally 7–14 days but can also range from 5–21 days.

**Clinical features:** In first 5 days of the infection the patients start to experience 'flu-like' symptoms including fever, headache, muscle aches, back pain, malaise (lack of energy), lymphadenopathy (lymph node swelling). *The key sign that differentiates monkeypox from chickenpox presence is lymphadenopathy. Lymphadenopathy was not a characteristic feature of smallpox.* After this period, a rash like same as seen in chickenpox develops. This lesion frequently present as first macular, then papular after it becomes vesicular and pustular. The number of lesions may range from a few to thousands. The lesions predominate on the face but also develop on the palms, soles, and dorsal hands and feet (the latter being unusual in chickenpox). Genital and peri-genital lesions have been conspicuous in the recent 2022 outbreak. The rash begins as 25 mm diameter maculopapules, which develop into vesicles (small fluid-filled blisters), pustules and then crust over. The rash lasts for about 10 days. The lesions can ulcerate, crust over, and then begin to heal in about 14–21 days [3]. The lymph nodes usually swell during this time. The severity is more common among children and are related to the extent of virus exposure, patient health status and nature of complications. Complications of monkeypox include secondary infections like bronchopneumonia, sepsis, encephalitis, and infection of the cornea which result in loss of vision. Underlying immune deficiencies can lead to worse outcomes. [4]

**Transmission of virus:** Monkey pox virus transmission are through animal-to-human. Animal vector can be a monkey, mouse, rope/tree squirrel or a Gambian rat. The transmission occurs only in people who have been in contact with an animal carrying the disease. The monkeypox virus is transmitted from one person to another by contact with lesions, body fluids, respiratory droplets, and contaminated materials such as bedding. Risk of human-to-human transmission of the virus is low but has been recorded in people who had very close contact with infected individual. Eating poorly cooked meat and other animal products of infected animals is a possible risk factor. The virus can also spread from pregnant to the fetus through the placenta. [5]

### Prevention:

1. Raising awareness of risk factors and educating people about the measures they can take to reduce exposure to the virus is the main prevention strategy for monkeypox.
2. Avoid contact with animals that could harbor the virus

3. Avoid contact with any materials, such as bedding, that has been in contact with a sick animal.
4. Any animal meets an infected animal should be quarantined, handled with standard precautions, and observed for monkeypox symptoms for 30 days.
5. Isolate infected patients from others who could be at risk for infection.
6. Practice good hand hygiene after contact with infected animals or humans. Eg: washing hands with soap and water or using an alcohol-based hand sanitizer.
7. Use personal protective equipment (PPE) when caring for patients.

### Prevention of zoonotic transmission

Most human infections have resulted from animal-to-human transmission. Unprotected contact with wild animals, especially those are sick or dead, including their meat, blood and other parts must be avoided. All foods that contain animal meat or parts must be properly cooked before eating. [1]

### Prevention of human-to-human transmission

During human monkeypox outbreaks, those who had close contact with infected persons is the most significant risk factor for infection. Health workers caring for patients with suspected or confirmed monkeypox virus infection, or handling specimens from them, should implement standard precautions. If possible, persons previously vaccinated against smallpox should be selected to care for the patient. Patient specimens must be safely prepared for transport with triple packaging in accordance with WHO guidance for transport of infectious substances.

### Diagnosis:

Lymphadenopathy during the illness can be a clinical feature to distinguish monkeypox from chickenpox or smallpox. The confirmation of monkeypox depends on the type and quality of the specimen and the type of laboratory test like, a) Polymerase chain reaction (PCR) is the preferred laboratory test given its accuracy and sensitivity b) Orthopoxviruses are serologically cross-reactive, antigen and antibody detection methods do not provide monkeypox-specific confirmation.

### Treatment and Management:

There is no specific treatments or vaccinations currently available for monkeypox. A broad-spectrum antiviral agent, such as cidofovir, can be used in very severe cases but its efficacy is unknown. Vaccinia vaccine that used for smallpox eradication programme was also protective against monkeypox. A new third generation vaccinia vaccine has been approved for prevention of smallpox and monkeypox. In the UK, the smallpox vaccine (Imvanex) is the recommended vaccine for post-exposure prophylaxis against monkeypox [5].

Clinical care for monkeypox should be fully optimized to reduce symptoms, manage complications, and prevent long-term sequelae. Patients should provide fluids and food to maintain adequate nutritional status. Secondary bacterial infections should be treated as indicated. An antiviral agent known as Tecovirimat that was developed for smallpox was licensed by the European Medicines Agency (EMA) for monkeypox in 2022 based on data in animal and human studies. During patient care, tecovirimat should be monitored in a clinical research context with prospective data collection. The oral DNA polymerase inhibitor

Brincidofovir, oral intracellular viral release inhibitor Tecovirimat, and intravenous Vaccinia immune globulin have unknown efficacy against the monkeypox virus. The preventive measures can help to prevent an outbreak. The infected individual should remain in isolation, wear a surgical mask, and keep lesions covered as much as possible until all lesion crusts have fallen off naturally. For individuals those who exposed to the virus should monitor temperature and symptoms twice per day for 21 days because that is the upper limit of the monkeypox incubation period. Vaccination within four days of exposure may prevent disease onset, and vaccination within 14 days may reduce disease severity.[6]

**JYNNEOS™** (also known as Imvamune or Imvanex), an attenuated live virus vaccine is currently approved by the U.S. Food and Drug Administration for the prevention of monkeypox. The Advisory Committee on Immunization Practices (ACIP) is currently evaluating JYNNEOS™ for the protection of people at risk of occupational exposure to Orthopoxviruses such as smallpox and monkeypox.

## CONCLUSION

Cases of monkey pox is increasing worldwide. Monkey pox does not have any specific treatment. Everyone should follow proper preventive measures as there is no sufficient studies about the secondary complications. Healthcare workers as well the public should be educated on management of communicable diseases and good hygiene practices. A better understanding of factors affecting the spread of this virus will help in ensuring public health awareness and developing strategies against future threats.

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