

Monkey Pox

Suma K R

The last few years have been an era of emerging and reemerging diseases. There have been outbreaks of many viral diseases, out of which, the COVID 19 infection has spread all over the world as a pandemic and has succeeded in bringing the humanity to its knees. Till date it has exacted a tremendous toll, in terms of mortality and morbidity. This pandemic is still ongoing, with multiple mutated variants causing recurring waves of the disease.

There have also been small focal outbreaks of other diseases, like the Nipah virus, Zika virus, Ebola virus, Avian influenza, Kyasanur forest disease, to name a few. The latest viral outbreak to join the bandwagon is the monkey pox virus disease.

Monkey pox is a viral zoonotic disease. It occurs primarily in tropical rainforest areas of Central and West Africa and is occasionally exported to other regions, especially in people who have come in contact with prairie dogs, and other imported animals. Before April 2022, monkey pox virus infection in humans was seldom reported outside African regions where it is endemic. Currently, cases are occurring worldwide, and many cases are being reported from non endemic countries.^[1]

In May 2022, many cases of monkey pox were identified in many countries where it was not seen earlier.^[1] The current monkey pox outbreak is highly unusual because it is spreading widely in North American and European countries where the virus is not usually found. In early May, the United Kingdom reported a case of monkey pox in a person who recently returned from travel to Nigeria. Several days later, the U.K. reported three more cases of monkey pox in people who appeared to have become infected locally. Other European nations, Canada and the U.S. then also began confirming cases. It's unclear where the outbreak actually began. Europe is currently the global epicenter of the outbreak, reporting more than 80% of confirmed infections. Right now, most of the cases are occurring in men who have sex with men, thereby making them a high risk community.^[2]

The U.S. has reported nearly 6,000 cases of monkey pox

across 48 states, Washington D.C., and Puerto Rico, according to the CDC. Around 70 to 75 countries where monkey pox is not endemic have reported outbreaks of the viral disease till date. As confirmed cases crossed 22,100 and the World Health Organization declared the outbreak a global health emergency, on July 23rd, 2022.^[3]

The first 3 cases of monkeypox in India was from Kerala, Delhi reported the 4th monkey pox case, in a person with no travel history. NHM said even one case reported from anywhere in the state should be treated as an outbreak and reported to the district surveillance team. Eight cases of monkey pox have been reported so far in India. It reported first death on Aug. 1.^[4]

About the virus:

Monkey pox virus is an enveloped double-stranded DNA virus, a member of the Orthopoxvirus genus in the family Poxviridae. Animal hosts include a range of rodents, rope squirrels, tree squirrels, Gambian pouched rats, dormice, and other non-human primates.^[1]

Spread:

Monkey pox spreads from person to person through close contact with someone who has a monkey pox rash, which includes face-to-face, skin-to-skin, mouth-to-mouth or mouth-to-skin contact, including sexual contact. For the transmission of the virus from one person to another, close contact with lesions, body fluids, respiratory droplets and contaminated materials such as bedding is necessary. Monkey pox is also spread through skin-to-skin contact during sex. Men who have sex with men are at the highest risk right now, as the majority of transmission has occurred in the gay community. However, the WHO and the CDC have emphasized that anyone can catch monkey pox regardless of sexual orientation.^[1]

Clinical features^[1]:

Monkey pox is usually a self-limited disease. The symptoms usually last from 2 to 4 weeks. Severe cases can occur sometimes. In recent times, the case fatality ratio has been around 3-6%. The clinical presentation of monkey pox resembles that of smallpox, a related

orthopoxvirus infection, (which was declared eradicated worldwide in 1980). Monkey pox is less contagious than smallpox and causes less severe illness.

Signs and symptoms^[1]

The incubation period (interval from infection to onset of symptoms) of monkey pox is usually from 6 to 13 days (range from 5 to 21 days). The infection can be divided into two periods:

- **the invasion period (0-5 days):** characterized by fever, intense headache, lymphadenopathy, back pain, myalgia and intense asthenia. Lymphadenopathy is a characteristic feature of monkey pox compared to other diseases that may initially appear similar like chickenpox, measles and smallpox.
- **the skin eruption:** begins within 1-3 days of appearance of fever. The rash tends to be more concentrated on the face and extremities than on the trunk. It affects the face (95% of cases), palms of the hands and soles of the feet (75%), oral mucous membranes (70%), genitalia (30%), and conjunctivae (20%), as well as the cornea. The rash evolves sequentially from macules (lesions with a flat base) to papules (slightly raised firm lesions), vesicles (lesions filled with clear fluid), pustules (lesions filled with yellowish fluid), and crusts which dry up and fall off. The number of lesions can vary from a few to several thousand. In severe cases, lesions can coalesce until large sections of skin slough off.

When is the patient contagious^[5]

Incubation Period: Not contagious - Monitor for symptoms

Prodrome: Possibly contagious - Isolate (at home or in a healthcare facility, as clinically indicated)

Rash : Contagious - Isolate (at home or in a healthcare facility, as clinically indicated)

A person is contagious until after all the scabs on the skin have fallen off and a fresh layer of intact skin has formed.

In the past, monkeypox normally began with symptoms similar to the flu, including fever, headache, muscle aches, chills, exhaustion and swollen lymph nodes as described above. The disease then progressed into a rash that can spread over the body. But in the current

outbreak the symptoms have been atypical. Some people develop a rash first, while others are showing a rash without any flu-like symptoms^[1]. Many patients have only a localized rash on their genitals and anus.^[2]

Other atypical signs are^[6]:

- few or even just a single lesion
- anal pain and bleeding with absence of skin lesions
- lesions only in the genital or perineal/perianal area
- lesions at different (asynchronous) stages of development
- absence of prodromal period : lesions appear before the onset of fever, malaise and other constitutional symptoms.

A large part of the population is vulnerable to monkey pox virus, as smallpox vaccination, which is expected to provide some protection against monkey pox has been discontinued since the 1980s.

Other persons at risk are

Newborn infants, young children and people with underlying immune deficiencies may be at risk of more serious symptoms, and in rare cases, death from monkey pox. The virus can be passed to the fetus in the womb or to the newborn during or after birth or while breastfeeding. Available information suggests that contracting monkey pox during pregnancy can be dangerous for the fetus.^[7]

Complications from monkeypox

Secondary skin infections, pneumonia, confusion, and eye problems (keratitis) are some complications which were seen. In the past, the death rate was between 1% to 10%. Common reasons for admission were pain and bacterial superinfection. However, some rare serious complications like myocarditis and epiglottitis were also observed.^[8]

Diagnosis

The diagnosis of monkey pox was most commonly confirmed from swab specimens taken from skin or genital lesions, throat or nasopharyngeal swab specimens. Blood was less commonly tested. Anal or rectal swabs should be taken in those who present with anal pain or proctitis.^[8]

The preferred laboratory test is Polymerase chain reaction (PCR), given its accuracy and sensitivity. The optimal diagnostic samples are from skin lesions - the roof or fluid from vesicles and pustules, and dry crusts.

Where feasible, biopsy is an option. Lesion samples must be stored in a dry, sterile tube (no viral transport media) and should be kept cold.^[1]

Management

The most important aspects of caring for patients with suspected or confirmed monkey pox include: early recognition through screening protocols adapted to local settings, prompt isolation and rapid implementation of appropriate IPC measures (standard and transmission-based precautions, such as, the addition of respirator use for health workers caring for patients with suspected /or monkey pox, and an emphasis on safe handling of linen and management of the environment).

The management includes

Testing to confirm diagnosis, symptomatic management of patients with mild or uncomplicated monkey pox,

Monitoring for and treatment of complications and life-threatening conditions such as progression of skin lesions, secondary bacterial infection of skin lesions, ocular lesions, and rarely, severe dehydration, severe pneumonia or sepsis.

Patients with less severe monkey pox who isolate at home require careful assessment of the ability to safely isolate and maintain required IPC precautions in their home to prevent transmission to other household and community members.^[9]

Patients who should be considered for treatment following consultation with CDC might include^[10]

- People with severe disease (e.g. hemorrhagic disease, confluent lesions, sepsis, encephalitis, or other conditions requiring hospitalization)
- People who may be at high risk of severe disease:
 - People with immunocompromise (e.g., human immunodeficiency virus/acquired immune deficiency syndrome infection, leukemia, lymphoma, generalized malignancy, solid organ transplantation, therapy with alkylating agents, antimetabolites, radiation, tumor necrosis factor inhibitors, high-dose corticosteroids, being a recipient with hematopoietic stem cell transplant <24 months post-transplant or ≥24 months but with graft-versus-host disease or disease relapse, or having autoimmune disease with

immunodeficiency as a clinical component)^[1]

- Pediatric populations, particularly patients younger than 8 years of age
- People with a history or presence of atopic dermatitis, persons with other active exfoliative skin conditions (e.g., eczema, burns, impetigo, varicella zoster virus infection, herpes simplex virus infection, severe acne, severe diaper dermatitis with extensive areas of denuded skin, psoriasis, or Darier disease [keratosis follicularis])
- Pregnant or breastfeeding women
- People with one or more complications (e.g., secondary bacterial skin infection; gastroenteritis with severe nausea/vomiting, diarrhea, or dehydration; bronchopneumonia; concurrent disease or other comorbidities)

People with monkey pox virus aberrant infections that include accidental implantation in eyes, mouth, or other anatomical areas where monkey pox virus infection might constitute a special hazard (e.g., the genitals or anus)

Drugs which are approved for treatment^[11]

Tecovirimat

It is an antiviral medication that is approved by the United States Food and Drug Administration (FDA) for the treatment of smallpox in adults and children. Data are not available on the effectiveness of this drug in treating monkey pox infections in people, but studies have shown that it is effective in treating disease caused by orthopoxviruses in animals. Clinical trials in people showed the drug was safe and had only minor side effects.

Vaccinia Immune Globulin Intravenous (VIGIV)

VIGIV is licensed by FDA for the treatment of complications due to vaccinia vaccination including eczema vaccinatum, progressive vaccinia, severe generalized vaccinia, vaccinia infections in individuals who have skin conditions, and aberrant infections induced by vaccinia virus (except in cases of isolated keratitis). It is not known if a person with severe disease will benefit from its use, it may be considered for post exposure prophylaxis in immunodeficient persons.

Cidofovir

Cidofovir is an antiviral medication that is approved by

the FDA for the treatment of cytomegalovirus (CMV) retinitis in patients with Acquired Immunodeficiency Syndrome (AIDS). Data is not available on the effectiveness of this drug in treating human cases of monkey pox. However, it has shown to be effective against orthopoxviruses in in vitro and animal studies.

Brincidofovir

Brincidofovir is an antiviral medication that was approved by the FDA on June 4, 2021 for the treatment of human smallpox disease in adult and pediatric patients, including neonates. Data is not available on the effectiveness of this drug in treating cases of monkeypox in people. However, it has shown to be effective against orthopoxviruses in in vitro and animal studies.

There are no treatments specifically for monkey pox virus infections. However, monkey pox and smallpox viruses are genetically similar, which means that antiviral drugs and vaccines developed to protect against smallpox may be used to prevent and treat monkey pox virus infections.

Precautions and prevention

- 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. Scientific studies are now underway to assess the feasibility and appropriateness of vaccination for the prevention and control of monkeypox. Some countries have, or are developing, policies to offer vaccine to persons who may be at risk such as laboratory personnel, rapid response teams and health workers.^[1]

Isolation of People with Monkey pox^[12]

- People with monkeypox should isolate until rash has fully resolved, the scabs have fallen off, and a fresh layer of intact skin has formed.
- People with monkeypox should follow these recommendations until cleared by state or local public health officials: should not leave home unless for emergencies, or to visit the doctor, avoid meeting friends, avoid contact with pets, refrain from sexual activity, avoid sharing contaminated items like towels, utensils etc, avoid wearing contact lenses, or shaving the affected area.
 - Routinely clean and disinfect commonly touched surfaces and items

- Wear well-fitting medical mask when in close contact with others at home.
- Bathroom usage: If possible, use a separate bathroom if there are others who live in the same household.
- Hand hygiene – frequent use of an alcohol-based hand rub or hand washing with soap and water – should be performed by people with monkeypox and household contacts after touching rash material, clothing, linens, or environmental surfaces that may have had contact with rash material.

Vaccination^[13]

CDC recommends vaccination for people who have been exposed to monkeypox and people who are at higher risk of being exposed to monkeypox, including:

- People who have been identified by public health officials as a contact of someone with monkeypox
- People who may have been exposed to monkeypox, such as:
 - People who are aware that one of their sexual partners in the past 2 weeks has been diagnosed with monkeypox
 - People who had multiple sexual partners in the past 2 weeks in an area with known monkeypox
- People whose jobs may expose them to orthopox viruses

Two vaccines licensed by the U.S. Food and Drug Administration (FDA) are available for preventing monkeypox infection – JYNNEOS (also known as Imvamune or Imvanex) and ACAM2000. People are considered fully vaccinated about 2 weeks after their second shot of JYNNEOS and 4 weeks after receiving ACAM2000. Unlike Covid, vaccines against smallpox and monkeypox can be administered after exposure due to the viruses' long incubation period. But the vaccines need to be administered within four days of exposure for the best chance of preventing onset of the disease, according to the CDC.

The world has already learnt quite a few lessons from the recent COVID pandemic, and it is quite clear that lockdowns, and severe restrictions do not really work but instead only serve to spread fear among the public. The need of the hour is targeted surveillance among high risk populations, by discrete methods so as to avoid stigmatization, and early diagnosis, isolation, contact

tracing, educating the public to recognize the early signs, self quarantine, maintenance of face and hand hygiene, with prompt treatment will help in curtailing the spread of this disease. Vaccination of at risk individuals including health care personnel, and workers handling infected materials can also be considered, to reduce the spread.

The union health ministry has already issued guidelines for management of monkeypox to all states and union territories to ensure preparedness to deal with any potential crisis, and to regard even a single case as an outbreak, and thereby take necessary measures. As the disease has low secondary attack rates, and the government is already experienced in dealing with such situations, we can safely assume that monkeypox will not spread to epidemic proportions in India.

References:

- 1 WHO factsheet on monkeypox, publishing date, 19 May 2022. <http://www.who.int/news-room/factsheets/detail/monkeypox>
- 2 <https://www.cnn.com/2022/07/23/who-declares-spreading-monkeypox-outbreak-a-global-health-emergency.html>
- 3 <https://www.cdc.gov/poxvirus/monkeypox/response/2022/index.html> (27/7/2022)
- 4 <https://www.thehindu.com/news/national/eight-cases-of-monkeypox-task-force-to-monitor-testing-kit-vaccine-development-health-minister-mansukh-mandaviya/article65715764.ece> (27/7/2022)
- 5 Information For Healthcare Professionals | Monkeypox – CDC <https://www.cdc.gov/monkeypox/clinicians23-Jun-2022>
- 6 Multi-country monkeypox outbreak: situation update <https://www.who.int/Disease-Outbreak-News/Item/27-Jun-2022> <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON396>
- 7 Clinical Considerations for Monkeypox in People Who are Pregnant or Breastfeeding Updated July 18, 2022 <https://www.cdc.gov/monkeypox/health-care-professionals/clinical-guidance>
- 8 Monkeypox Virus Infection in Humans across 16 Countries (<https://www.nejm.org/doi/full/10.1056/NEJMoa2207323> by JP Thornhill • 2022)
- 9 WHO disease outbreak news: Monkeypox, all items related to multi-country outbreak: <https://www.who.int/emergencies/emergency-events/item/2022-e000121> (27/7/2022)
- 10 Clinical management and infection prevention and control for monkeypox: Interim rapid response guidance, 10 June 2022. <https://www.who.int/publications/item/WHO-MPX-Clinical-and-IPC-2022.1>
- 11 Interim Clinical Guidance for the Treatment of Monkeypox - CDC <https://www.cdc.gov/poxvirus/monkeypox/clinicians> (July 28 2022)
- 12 Isolation and Infection Control: Home <https://www.cdc.gov/monkeypox/Healthcare-Professionals/Infection-Control> (16-Jun-2022)
- 13 Prevention | Monkeypox | Poxvirus - CDC <https://www.cdc.gov/poxvirus/prevention> (27/7/2022)

Dr. Suma K.R.

Professor,
Department of General Medicine,
Sri Siddhartha Medical College &
Research Centre, Agalakote, Tumakuru
E-mail: drsuma76@gmail.com