



Monkeypox Virus (MPX)

Monkeypox (MPX) is a viral zoonotic disease with symptoms similar to smallpox, although with less clinical severity.

Host: Rodents (rats, rope squirrels) and primates are known to be naturally susceptible to the virus.

Incubation period (interval from infection to onset of symptoms of MPX) : 7 to 14 days (range : 5 to 21 days).

Period of communicability: 1-2 days before the rash till all lesions have crusted over and all the scabs fall off/get subsided and a new layer of skin has formed underneath.

Mode of transmission: Human-to-human transmission through close/direct contact with someone who has a MPX rash, infectious sores, scabs, bodily fluids or with materials that have touched bodily fluids or sores, e.g. contaminated clothings, linens or utensils of an infected person including through face-to-face, skin-to-skin, mouth-to-mouth or mouth-to-skin contact primarily through:

- **Large respiratory Droplets/respiratory secretion** through short-range aerosols during prolonged close/face-to-face contact.
- **Animal-to-human transmission:** may occur by bite or scratch of infected animals.
- **Environment** can become contaminated with the MPX virus, e.g. when an infectious person touches clothing, bedding, towels, objects, electronics and surfaces. Someone else who touches these items can then become infected.
- **Fomite transmission :** getting infected from breathing in skin flakes or virus from clothing, bedding or towels.
- **Ulcers, lesions or sores in the mouth** can be infectious.
- **Maternal-foetal transmission :** Mother to Child transmission or after birth through skin-to-skin contact, or from a parent with MPX to an infant or child during close contact.

Who is at risk of catching MPX?

- People who live with or have close contact with someone who has MPX or who has regular contact with infected animals.
- Newborn infants, young children and people with underlying Immune deficiency/Immunocompromised and are directly proportionate to the extent of viral load, immunity and nature of complications.
- People who have been vaccinated against Smallpox may have some protection against MPX but they should continue to take precautions to protect themselves and others.

Clinical Features : MPX is usually a self-limited disease. Symptoms last from 2 to 4 weeks. The case fatality ratio is around 3-6% and is higher among young children.

After the appearance of a fever, rash usually develops on the face and then spreads to the other parts of the body.

A person of any age having history of travel to affected countries within last 21 days presenting with an unexplained acute rash and one or more of the following flu like symptoms or signs :

Prodrome (0-5 days) :

- Fever
- Headache, muscle aches, body aches
- Chills and/or sweats
- Sore throat and cough, profound weakness
- Lymphadenopathy : unilateral or bilateral (typically occurs with fever)

Skin involvement (rash) :

- a) Usually begins within 1-3 days of fever onset, lasting for 2-4 weeks
- b) Painful Lesions until the healing phase when they become itchy (in the crust stage)
- c) Stages of rash (slow evolution)

Macules starting from face spreading to arms, legs, palms, and soles, within 24 hours.

Classic lesion is vesicopustular.

Face (98%), palms and soles (95%), oral mucous membranes (70%), genitalia (28%), conjunctiva (20%). Skin rashes are more apparent on the limbs and face than on the trunk.

Predilection for palm and soles is characteristic of MPX.

The skin manifestations depend on vaccination status, age, nutritional status, associated HIV status. MPX chiefly occurs in those who are malnourished, suffering from parasitic infections, immunocompromised which could impact the prognosis of a patient with MPX.

The total lesion burden at the apex of rash can be quite high (>500 lesions) or relatively slight.

Severity of MPX :

In most cases, the symptoms of MPX go away on their own within a few weeks. However, in few cases, infection can lead to medical complications or death. Newborn babies, children and people with underlying immune deficiencies may be at risk of more serious symptoms and death from MPX.

Complications :

- Secondary skin infections
- Pneumonia, sepsis, encephalitis
- Corneal involvement may lead to loss of vision

Aims of Surveillance Strategies : to rapidly identify cases & clusters of infections and the sources of infections as soon as possible in order to:

- a) isolate cases to prevent further transmission
- b) provide optimal clinical care, identify and manage contacts
- d) protect frontline health workers
- e) effective control and preventive measures based on the identified routes of transmission.

Each case of MPX is to be considered as an outbreak.

Core Surveillance Strategy :

- a) **Hospital based Surveillance:** Health facility-based surveillance & testing in Skin (Dermatology) clinics, STD clinics, Medicine, Pediatrics OPDs etc.
- b) **Targeted Surveillance:** Achieved by: i) By Immunization division ii) Targeted intervention sites identified by **National AIDS Control Organization (NACO)**.

Diagnostic modalities for MPX :

For confirmation of MPX on the suspected clinical specimens:

- a) **Polymerase Chain Reaction (PCR) for Orthopoxvirus genus.**
- b) If specimen is positive for Orthopoxvirus, it would be further confirmed by **MPX specific conventional PCR or real time PCR for MPX DNA.**
- c) Additionally, **virus isolation** and the **Next Generation Sequencing** of clinical samples will be used for characterization of the positive clinical specimens.

All the clinical specimens should be transported to the Apex laboratory of ICMR-National Institute of Virology, Pune routed through the Integrated Disease Surveillance Programme network of the respective District/State.

Principles of Management :

- Quarantine the patient
- Protection of compromised skin and mucous membranes
- Rehydration therapy and Nutritional support
- Symptoms alleviation
- Monitoring and treatment of complications

Patient Isolation in an isolation room of the Hospital/ at home in a separate room with separate ventilation.

Patient should wear a triple layer mask.

Skin lesions should be covered to the best extent possible (e.g. long sleeves, long pants) to minimize the risk of contact with others.

Isolation to be continued until all the lesions have resolved and scabs have completely fallen off.

During the period of isolation closely monitor the patient for the appearance of any of the following symptoms :

Pain in eye or blurring of vision, shortness of breath, chest pain, difficulty in breathing, altered consciousness, seizure, decrease in urine output, poor oral intake, lethargy.

- Cover the rash with clothing or bandages.
- Avoid touching each other.
- Use a separate bathroom, or cleaning after each use.
- Clean frequently touched surfaces with soap and water and a household disinfectant and avoid sweeping/vacuuming as it might disturb virus particles and cause others to become infected.
- Use separate utensils, towels, bedding and electronics.

- Do your own laundry (lift bedding, clothes and towels carefully without shaking them, put materials in a plastic bag before carrying it to the washing machine and wash them with hot water > 60 degrees).
- Open the windows for good ventilation.
- Encourage everyone in the house to clean their hands regularly with soap and water or an Alcohol-based hand sanitizer.
- Maintain at least 1 meter distance.

Contact identification:

Cases can be prompted to identify contacts across household, workplace, school/nursery, healthcare, transportation, sports, social gatherings.

Contact monitoring:

- a) Contacts should be monitored at least daily for the onset of symptoms & signs for a period of 21 days from the last contact with a patient or their contaminated materials during the infectious period. In case of occurrence of fever, do clinical and lab evaluation.
- b) Asymptomatic contacts should not donate blood, cells, tissue, organs or semen while they are under surveillance.
- c) Pre-school children may be excluded from day care, nursery or other group settings.
- d) Health workers who have unprotected exposures to patients with MPX or possibly contaminated materials do not need to be excluded from work duty if asymptomatic, but should undergo active surveillance for symptoms for 21 days.

Care of a Child who has symptoms that could be MPX :

The MPX rash can resemble other common childhood illnesses, such as chickenpox and other viral infections. Children should be closely monitored. A parent or caregiver will help to get them tested and to access the care they need. The parent or care giver who is healthy and at low risk of MPX will be allowed to isolate with them.

Risk Communication and Preventive Measures :

1. Raise awareness of risk factors through the channels that target audiences on how the disease transmits, its symptoms, preventive measures and what to do in case of suspect or confirmed infection. This should be combined with targeting community engagement to the population groups who are most at risk, working closely with health care providers, including STD clinics, and civil society organizations.

Communication should be given so that there are no rumours or misinformation.

2. Educating the people about the measures they can take to reduce exposure to the virus.

Practice good hand hygiene after contact with infected animals or humans, e.g. washing hands with soap and water or using an Alcohol-based hand sanitizer. Use appropriate Personal Protective Equipment (PPE) which includes Coveralls/Gowns, N-95 mask, Face shield/protective goggles, double pair of gloves, when caring for patients.

Avoid contact with any material, such as bedding, that has been in contact with an infected/sick person. Isolate infected patients from others. Avoid contact with anything that could harbour the virus. Isolate infected patients who could be at the risk of infection from others.

Reducing the risk of human-to-human transmission:

Surveillance and rapid identification of new cases is critical for outbreak containment. Close contact with infected persons is the most significant risk factor for MPX virus infection. Health workers caring for patients with suspected or confirmed MPX virus infection, or handling specimens from patients, should implement standard infection control precautions. Samples taken from people and animals with suspected MPX virus infection should be handled by trained staff working in suitably equipped laboratories. Patient specimens must be safely prepared for transport with triple packaging in accordance with WHO guidelines for the transport of infectious substances.

Evacuation of patient in Ambulance : When a patient has to be evacuated in an Ambulance, the personnel accompanying the patient should wear PPE. Give prior information to the Hospital of the admission/transfer of a potentially infectious person. Request the patient to wear a mask and advise about Respiratory Hygiene and Cough Etiquette. If lesions are present, cover them with long sleeved clothing/long pants or a clean sheet to minimize contact with others. In the ambulance, use disposable linen, if available. The ambulance should be cleaned and disinfected before using for the other patients. After wearing PPE, surfaces (stretcher, chair, door handles etc.) should be cleaned with a freshly prepared 1% Hypochlorite solution. Carefully place reusable blankets in a bag without shaking or fluffing them, then put them into a laundry bag and send for laundering clearly labeling it so that person in the laundry wears appropriate PPE before handling or autoclaves it before opening. Follow manufacturer's instructions for cleaning/disinfecting reusable equipment in the ambulance. All masks and any waste contaminated with crusts, secretions, serum or body fluids should be disposed off as infectious waste in a yellow bag. In the ambulance, if the driver's chamber is not separate, he should also use PPE.

Additional Precautions:

Put on PPE before entering the patient's room and for all patient's contacts. All PPE should be disposed off prior to leaving the isolation room where the patient is admitted. Correct containment and disposal of contaminated waste (e.g., dressings) in accordance with Biomedical Waste Management guidelines for infectious waste must be adhered to. Care must be taken when handling soiled laundry (e.g. bedding, towels, personal clothing) to avoid contact with lesion material. Soiled laundry should never be shaken or handled in manner that may disperse infectious particles. Care must be taken when handling used patient-care equipment in a manner that prevents contamination of skin and clothing. Ensure that the used equipment has been cleaned and reprocessed appropriately. Ensure that provisions are in place for cleaning and disinfecting environmental surfaces in the patient care environment.

Infection Prevention and Control : A combination of standard operating procedures/precautions must be adhered in all healthcare settings by all individuals, including family members, visitors and Health Care Workers (HCWs) when a patient presents with fever and vesicular/pustular rash.

Early recognition and immediate placement of patient in a separate area from other patients (source control) is must.

Patient should be managed in isolation, precautions should be taken to minimize exposure to surrounding persons, which include placing a well-fitting surgical mask over the patient's nose and mouth and covering any of the patient's exposed skin lesions with a sheet or gown.

Infection Prevention and Control at home:

Patients who do not require hospitalization may be managed at home taking following preventive measures:

Patients should be isolated in a room or area separate from other family members. Healthy household members should limit contact with the patient. Patients should not leave the home except for medical care. No visitors should be allowed at home. Patients, especially those who have respiratory symptoms (e.g., cough, shortness of breath, sore throat) should wear surgical masks. Disposable gloves should be worn for direct contact with lesions and disposed off after use. Skin lesions should be covered to the best extent possible (e.g. long sleeves, long pants) to minimize the risk of contact with others. Contain and dispose off contaminated waste (such as dressings and bandages) in a Biomedical waste disposable bag. Do not dispose off waste in landfills or dumps. Proper hand washing with soap and water (or use of an Alcohol-based hand rub) should be performed by the patient and other household members after touching the lesion material, clothing, linens, or environmental surfaces that may have had contact with the lesion material. Laundry (e.g. bedding, towels, clothing) may be washed with warm water and detergent. Care should be used when handling soiled laundry to avoid direct contact with contaminated material. Soiled laundry should not be shaken in a manner that may disperse infectious particles. Dishes and other eating utensils should not be shared. Soiled dishes and eating utensils should be washed with warm water and dish washing soap. Contaminated surfaces should be cleaned and disinfected. Standard household cleaning/disinfectants may be used in accordance with the manufacturer's instructions. Pets and domestic animals should be excluded from the patient's environment.

Duration of Isolation: individuals should avoid close contact with the immunocompromised persons until all crusts are gone. Isolation precautions should be continued until all lesions have resolved and a fresh layer of skin has formed.

Precautions to be taken if exposed to someone who has MPX :

If one has had close contact with someone who has MPX or an environment that may have been contaminated with the virus, then one should closely monitor for symptoms and signs for 21 days after the time one was last exposed. Limit close contact with other people as much as you can, and when it is unavoidable let your contact(s) know that you have been exposed to MPX.

Until one receives the test result, isolate from others, if possible.

The risk of catching MPX from animals can be reduced by avoiding unprotected contact with wild animals, especially those that are sick or dead.

People who have confirmed or suspected MPX should avoid close contact with animals, including pets, livestock and wildlife.

Treatment of MPX :

Symptoms normally resolve on their own without the need for treatment. If needed, medication for pain and fever can be used to relieve some symptoms. Stay well hydrated, eat well, and get enough sleep.

People with MPX should avoid scratching their skin. Take care of the rash by cleaning the hands before and after touching lesions and keeping skin dry and uncovered (unless they are in a room

with someone else, in which case they should cover it with clothing or a bandage until they are able to isolate again). The rash can be kept clean with sterilized water or Antiseptic. Saltwater rinses can be used for lesions in the mouth. Warm baths with baking soda and Epsom salts can ameliorate the lesions on the body.

Vaccination :

Newer vaccine based on a modified attenuated vaccinia virus (Ankara strain) was approved for the prevention of Monkeypox in 2019. This is a two-dose vaccine for which availability remains limited.

Chances of becoming a larger outbreak :

MPX is not as contagious as some other infections because it requires close contact with someone who has MPX, with a contaminated environment or with an infected animal to spread. **There is a window of opportunity to control this outbreak by working closely with people/groups at higher risk to stop transmission. It is essential for everyone to work together now to stop the spread by knowing the risks and taking proactive action to contain it.**

Advisory for International passengers :

- Avoid close contact with sick people, including those with skin lesions or genital lesions.
- Avoid contact with dead or live wild animals such as small mammals including rodents (rats) and non-human primates (monkeys, apes).
- Avoid eating or preparing meat from wild game (bush meat) or using products derived from wild animals (creams, lotions, powders).
- Avoid contact with contaminated materials used by sick people (such as clothing, bedding, or materials used in healthcare settings) or that came into contact with the infected animals.
- Consult the nearest health facility if one develops symptoms suggestive of MPX like fever with rash and were in an area where MPX has been reported or had contact with a person that might have had MPX.

World Health Organization (WHO) is responding to this outbreak as a high priority to avoid further spread.

The Pandemics have demonstrated that no one wins if someone gets left behind.

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