

Small Pox Versus Monkey Pox - Where are We Heading to from An Indian Perspective

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Abstract: Monkeypox is viral zoonoses with symptoms similar to that of Small Pox which has been eradicated in 1978 except in experimental laboratories. Monkeypox belongs to the genus Orthopox group which also has Smallpox & Cowpox virus. The viral exanthema is associated with fever, bodyache and other prodromal manifestations of common viral infections with Monkeypox infection associated with lymphadenopathy which is characteristic of Monkeypox- as is the name given because it was first found in monkeys in 1980. Transmissibility rate is high in monkeypox unlike smallpox with the approach to a case should be with proper protective equipments (PPE). Mortality rate is low with treatment being on similar lines with other viruses of the genus. The number of infective cases in India is low uptill now whereas the authorities are keeping a close watch on the same to prevent any outbreak of sorts.

Keywords: Smallpox, Monkeypox, Orthopox

1. Introduction

Monkey Pox is a viral zoonoses symptoms similar to those seen in the past in small pox patients advent of Monkey pox presents a new clinical threat - to the global community as it is highly transmissible disease entity. From an Indian perspective – India has recorded less than 10 confirmed cases- but the states & national government are keeping a close watch on the situation.

Monkeypox:

- Uncommon illness
- Results from infection with monkeypox virus
- Monkeypox virus is a member of the genus Orthopox virus in the family poxviridae
- In addition to the Variola virus (which causes Smallpox) & the Vaccinia virus (used in smallpox vaccination) – orthopox virus genus also contains Cowpox virus

2. History

Term Monkey pox was coined in 1958- when two outbreaks of a pox like illness- occurred in a colony of Monkeys – so the name Monkeypox.

First human case of Monkeypox was documented in the Democratic Republic of Congo (DRC) in 1970- which was a time when the pace was speeded up for eradication of Small Pox

Since then, many cases of Monkey pox have been documented – in many Central & West African nations

Cases of Monkeypox which has come to India – has mainly been implicated to foreign travel in cases with Monkey pox or to animals being imported from those places.

Link between Small Pox & Monkey Pox:

Clinical presentations of Monkey pox mimic those of smallpox- an Orthopox virus disease – linked to Monkeypox – that has been eliminated. Small Pox being more

transmissible & more lethal – as around 30% of victims succumbed.

Last case of Small Pox occurred in 1977 & small pox was proclaimed to be eradicated globally in 1980- after a global vaccination & containment effort.

So all nations have discontinued small pox immunisations – using vaccinia based vaccination for atleast 40 years. Since this was stopped some 40 years back & as this vaccinia vaccination – also provided protection against monkey pox in West & Central Africa ⇒ unvaccinated populations are more vulnerable to infection with Monkey pox virus. As Smallpox was officially eradicated in 1978 & there is no longer any naturally occurring disease ⇒ the global health sector ⇒ remains watchful ⇒ in case smallpox reappears ⇒ due to laboratory accident or purposeful release – to assure worldwide preparation in the event of a small pox resurgence ⇒ Researchers are developing new vaccinations, diagnostics & antiviral drugs.

3. Transmission

Transmission from animals to Humans:

- Typically, the virus of Monkeypox is transmitted by contact with an infected animal's body secretions or a bite.
- Humans & Monkeys are accidental hosts – reservoir is unknown: presumably Rodents.

How did the first Monkey pox illness occurred in the West?

Accidental importation of infected rodents from Western Africa into

United States- led to first human Monkeypox illnesses.

Based on the data from an epidemic in the US in 2003 ⇒ the route of infection & degree of exposure (Eg: bite wound versus contact with an infected animal) – might impact the severity of clinical signs of Monkey pox infection.

Transmission from Human to Human

- i) Large respiratory droplets – may play a role in human-to-human transmission.
- ii) Transmission may also occur by contact with infected skin lesions or lesion debris.
- iii) For droplet transmission – continuous face to face contact maybe necessary (eg: within a 6 feet radius for 3 hours in the absence of Personal Protective equipments [PPE]
 - In general person to person transmission is quiet low
 - Recent cases however reflect towards person to person transmission⇒sexual contact with infectious skin lesions which maybe the most probable method of transmission in these clusters.

Clinical Features:

- 1) Symptoms of Monkeypox are comparable to small pox – but they are less severe.
 - 2) Initial symptoms of Monkeypox include
 - Fever
 - Headache
 - Muscular pains
 - Fatigue
- Primary difference with smallpox is that – Monkey pox produces lymphadenopathy while small pox doesnot produce.
- 3) Incubation period: (Incubation period is defined as time from infection to onset of symptoms) – ranges from 5-21 days but is typically 7-14 days.

Sickness starts with:

Fever
Headache
Muscle pains
Backache
Lymphnode enlargement
Chills

Exhaustion

Rashes- Come out within a few days (occasionally may take longer) ⇒usually after the onset of fever

Rashes start most commonly start appearing in the face & then spread to other regions of the body.

As the disease progresses ⇒lesions become or rather progress to ⇒Macules ⇒Papules ⇒Vesicles⇒Pustules ⇒Scabs.

Typically, the disease lasts 2-4 weeks. In Africa, mortality has been upto 10%.

Diagnosis:

Clinical Characteristics of Monkeypox – are useful in establishing the diagnosis

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But laboratory confirmation is required – to dishtinguish this illness – from those caused by other possible etiologies

Diagnostic Tests:

- Virus isolation (in mammalian cell culture)
- Electron Microscopy
- Real time Polymerase Chain reaction
- ELISA
- Immunoflourescent antibody assays

** Local & State Public health authorities – should be alerted ⇒if monkeypox is suspected.

Differential Diagnosis:

- Varicella }
- Herpes Simplex } & other Orthopox viruses should be
- Small pox } considered

Prevention

Interventional procedures/ methods are

- 1) We have to stay away from animals that might carry the infection (these includes animals that are sick- or have died in areas where Monkeypox have occurred)
- 2) Avoid contacts with bed, linen, bodily secretions of an infected /sick animal.
- 3) Isolation of sick individuals
- 4) Practice of proper hand hygiene like using an alcohol based sanitizer (70% alcohol content) or regular handwashing with soap & water.
- 5) In patient care – PPE should be worn.

Vaccination

Due to the effect of Vaccinia Virus immunisation ⇒Monkeypox illness may be less severe ⇒in those who have taken the small pox vaccine.

A modified vaccinia Ankara (MVA) vaccine – marketed as Imvamune & Jynneos was authorised in Sept'19 for the protection of Small pox & Monkeypox .

Multiple studies point towards the fact or prove the fact that – small pox vaccination is almost 85-90% effective in preventing Monkeypox

So, those individuals who are immunised against smallpox – may result in lesser disease.

Those who are vaccinated – have a vaccine scar in the upper arm.

In the year 2019- a vaccine based on the Ankara strain – of modified attenuated vaccinia virus – was authorised for the prevention of Monkeypox

This vaccination requires 2 doses - & is not readily available Cross protection- given by the immune response to Orthopox viruses – smallpox & monkeypox vaccines are formulated with the vaccinia virus

Post Exposure Prophylaxis

For persons who have come into direct contact with a person or animal without PPE ⇒ may benefit from post exposure immunisation with the MVA vaccine As per reports available on smallpox post exposure vaccination – with

vaccinia vaccine - the best periods for monkeypox post exposure vaccination is within 4 days of exposure. But CDC says – immunisation maybe considered for upto 14 days after a close contact exposure.

Who is a Close Contact?

A close contact is defined as direct exposure – within 6 feet ⇒ of a suspected or confirmed case of Monkeypox – in an animal with respiratory symptoms like nasal discharge, cough, conjunctivitis ⇒ mostly in an environment where a animal has been handled (eg: examination room)

Vaccinia Immunoglobulin:

Vaccination with vaccinia virus vaccine – is contraindicated in immunocompromised individuals- with a history of exposure- the use of vaccinia immunoglobulins maybe suggested.

Infection Control Precautions:

Contact & airborne ⇒ precautions are required – for any broad vesicular rash of unknown cause- that includes monkeypox & smallpox in differential diagnosis.

Isolation Procedure of a Case

Persons with suspected monkey pox ⇒ should be isolated for the first week of the rash – until all the scabs have peeled - & the findings of a throat swab Polymerase Chain reaction (PCR) are negative.

How to manage an affected patient:

Supportive Care

- 1) Majority of people have mild disease- so improves without any active interventions or with mild treatment.
- 2) For patients having nausea, vomiting, dysphagia – hydration maybe a problem- so these category of people may require hospitalisation for IV fluid administration.
- 3) Critically ill patients – should get supportive care – till he/ she recovers from the infection.
- 4) Treatment should be directed to
 - Ease symptoms
 - Manage complications , if any
 - avoid long term problems
- 5) Fluids & proper nutrition should be provided – to preserve the nutritional status of the patient.
- 6) Secondary bacterial infections if any & usually its there – as the body's immune status is in a compromised (more so in viral exanthems like monkeypox)
- 7) European Medical Association has approved Tecovirimat – an antiviral drug – designed for smallpox- for Monkeypox 2022 ⇒ based on initial research from animal & humans- Not widely available yet.

Mortality:

Rate in Central Africa: 10% (Most fatalities occur during the second week of illness)

In advanced countries – very less case fatalities ⇒ maybe due to healthier patient population / improved supportive

medical care / less virulent strain of monkeypox imported from Ghana.

Cause of Concern in Respect of India

Less than 10 confirmed cases till now

No immediate cause of worry

No issues to panic

However, strict vigil is necessary with increased monitoring – at all international entry posts, where suspected Monkeypox infections are there.

In today's era – viral illnesses propagate rapidly.

- a) National government has instructed and issued advisories to – to keep a watch on individuals – who exhibit signs of Monkey pox & have a history of travelling to afflicted nations.
- b) MOH&FW Govt of India – further declared that – questionable samples would be sent to – National Institute of Virology (Pune) for testing.
- c) National Centre for Disease Control (NCDC) – has urged States & UT's ⇒ to isolate suspected patients ⇒ until lesions have healed ⇒ and a new layer of skin has grown – or until treating Physician chooses to stop isolation. One case of Monkeypox case died in India on in Kerala- till now only case of death.

References

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