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Review Article

Risorgimento of Monkey Pox in 2022: A literature review from South East Asia

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ABSTRACT

India has confirmed its first monkeypox death case on 1st August 2022. Knowledge about its symptoms and spread is of utmost importance. With an incubation period of 6-13 days monkey pox distinctive symptom is lymphadenopathy. Close contacts are at the highest risk of contracting the disease and Polymerase chain reaction is the preferred laboratory test. This review article briefs on the important aspects of monkeypox disease including the measures taken by national and international agencies to spread awareness and steps taken to confine the spread of the disease. The article elaborates the role of ICMR New Delhi India and NIV Pune India in taking necessary actions to curtail the exposure of cases and the efforts taken in the invention of invitro diagnostic kits and providing resources for vaccine development.

Key message: This article attempts to describe the spread symptoms and measures taken by the competent authorities of The Government of India for immediate prevention, action and development of IVD kits and vaccination for monkeypox outbreak in the year 2022.

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1. Introduction

On 1st August 2022 Kerala Health Ministry, India confirmed the first monkeypox death case of South East Asia. The 22 year old young man had recently travelled from United Arab Emirates and had developed swollen lymph nodes with no rashes. The family members confirmed on 30th July 2022 that he was tested positive for monkeypox at UAE. The samples were tout de suit sent to National Institute of Virology Pune, India for confirmation. His condition quickly started deteriorating in the hospital and was on ventilator support before he died. As on 1st August 2022 this is the forth monkey pox death case outside the

African continent. A high level scientific committee has been formed to look into the medical reports. Earlier on 15th July India had confirmed its first monkeypox case in South East Asia region and since then The Central Government of India through Indian Council of Medical Research has taken necessary measures to initiate surveillance and testing for monkey pox at designated Viral Research and Diagnostic Laboratory centres in the country by RT PCR technique. With over 6600 confirmed cases globally in a short span indicates the need for immediate action and preventive measures to contain the spread of the disease.¹

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Fig. 1: Geographic distribution of suspected and confirmed cases in India as on 6th of August 2022

2. History

Monkeypox was first discovered in the 1950s and jumped into humans in the 1970s. Human monkeypox was first discerned in humans in the year 1970 in the Democratic Republic of the Congo in a 9 month old male child in a region where smallpox had been eliminated in 1968. Monkeypox belongs to the family of poxviridae and genus orthopoxvirus. Most of the cases so far have been observed from rainforest and rural areas of the Congo basin in the Democratic Republic of Congo.² Monkeypox is invariably a disease of global public health importance as it is not confined to West and Central Africa anymore and has spread to the rest of the world. In 2003, the first monkeypox outbreak outside of Africa was in the United States of America and was linked to contact with infected pet dogs sheltered with Gambian pouched rats and dormice naturalized from Ghana.

3. Current Status

Since early May of 2022, cases of Monkey pox have been reported from countries formerly not identified as endemic. Maximum cases have been identified from primary and secondary health care facilities including sexual health services. Cases identified in the primary stage have been found with history of men having sex with men. In a recent press note Centre for Disease Control Director estimates 1.7 million gays who are HIV positive in United States are at the highest risk from contacting monkey pox. World Health organization has been

actively sharing guidelines in order to increase awareness, identification and clinical management for the infection prevention and control.¹ Currently four laboratories have been selected as referral centres for cases in South East Asia region for virus isolation namely National Institute of Virology Pune India, National Institute of Health Thailand, Chulalongkorn University Thailand and Victorian Infection Disease reference laboratory Australia. On 27th July 2022 WHO released the geographic distribution of monkeypox cases identifying 42 countries outside the African continent reporting an escalation in the number of cases due to global travel. Maximum cases within Africa have been found in Nigeria followed by Democratic republic of Congo, Central Africa and Ghana.

4. Natural Host

A number of animal hosts have been identified including squirrel, Gambian pouch rats, dormice and non human primates.³ The natural history of the virus yet remains uncertain and further studies are required to identify the exact reservoir. Monkey pox is not previously known to be categorized as a sexually transmitted disease but the latest outbreak may be evidence for the same.



Fig. 2: Dormice picture creditfabrizio moglia

5. Symptoms

Monkeypox is a zoonotic orthopox enveloped double stranded DNA virus with a genomic size of 197kb, the incubation period of which ranges from 6 to 13 days but can also extend upto 21 days. It contains 190 non overlapping open reading frames more than 180nt. The central coding region sequence of monkeypox nucleotide that positions at 56000 – 120000 is highly conserved and flanked by variable ends that contain inverted terminal repeats ITR. Monkeypox contains 4 ORFs in the ITR region

The infection can be divided into two phases, the invasion period characterized by fever, intense headache, lymphadenopathy, back pain, myalgia and intense asthenia

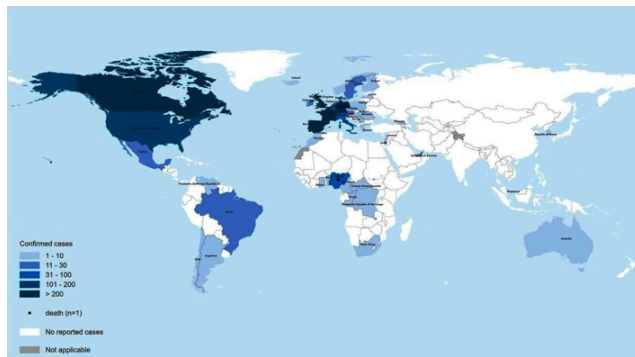


Fig. 3: Confirmed cases of monkeypox by WHO region and country from 1st January 2022 to 17th June 2022

(lack of energy) in the initial 5 days. Lymphadenopathy is the distinctive feature of monkeypox compared to other diseases that may initially appear similar like chickenpox, measles, smallpox. After the eruption of skin lesions within 1 to 3 days of fever the rash seems to be concentrated on face and extremities. In 95% of cases it affects the face, and palms of the hands and soles of the feet. It might also affect the oral mucous membranes in 70% of cases, the genitalia in 30% cases, and conjunctivae in 20% of cases. The rash evolves sequentially from macules to papules, vesicles, pustules, and crusts which dry and fall off in a span of 2-4 weeks.⁴ Relating to the severity and extent of virus exposure children are the most common group identified.

Pre existing immune deficiencies may precede to worsen the outcome. With the current obtainable data, individuals younger than 40 to 50 years of age may be more susceptible to monkeypox due to cessation of smallpox vaccination campaigns globally after eradication of the disease. Complications of monkeypox can result in secondary infections, bronchopneumonia, sepsis, encephalitis, and infection of the cornea with ensuing loss of vision. Status of asymptomatic individuals and their aptitude to spread is yet to be determined. With a case fatality ratio of 3 to 6% monkeypox is unquestionably a global health concern. The name monkeypox is somewhat misleading as it is a virus that circulates most often in small mammals in Africa, such as rats, which are believed to be the reservoir.⁵

6. Transmission

Direct contact with blood, cutaneous lesions or bodily fluids can emanate in animal to human transmission. Human to human transmission via droplet respiratory particles can set a health worker, household members and other close contacts of active cases at higher risk. There is a decline in immunity to monkey pox as a result of cessation of vaccine for smallpox. Close physical contact is a known risk factor for transmission, yet more insight is required to confirm if monkeypox can disseminate through sexual transmission.



Fig. 4: Skin lesion and microscopic image of Monkey pox virus

Newer statistical data is needed to better appreciate this risk in a long term trial.⁶

7. Diagnosis

Other rash illnesses, such as chickenpox, measles, bacterial skin infections, scabies, syphilis, and medication associated allergies need to be ruled out while diagnosing monkeypox. Lymphadenopathy during the prodromal stage of illness is a clinical feature to distinguish monkeypox from chickenpox or smallpox.

Once monkeypox is conjectured, a trained health worker wearing personal protective equipment can collect an appropriate sample store at lower temperature and have it transported safely to the nearest public health service laboratory in a triple packing method.⁷ According to Centre for Disease Control, Polymerase chain reaction (PCR) is the preferred laboratory test. For this, optimal diagnostic samples for monkeypox are from skin lesions or fluid from vesicles, pustules, and dry crusts. Samples need to be stored dry unaccompanied with vtm at a lower temperature.

8. Treatment, Vaccination and Disinfection

The European Medicines Agency for orthopoxvirus has recently approved Tecovirimat an antiviral drug for infections associated with monkeypox on the bases of drug safety, pharmacokinetics and pharmacodynamics in human trials. Through several observational studies it is found that vaccination against smallpox demonstrated 85% effectiveness in preventing monkeypox.⁸ According to recent reports United States would be making 7,86,000 vaccine doses available to local health departments soon after receiving approval from The Department of Food and Drugs Administration. Each individual would be requiring two doses of the vaccine at an interval of 28 days. The monkeypox virus is susceptible to 0.5% sodium hypochlorite, chloroxyleneol based household disinfectants, glutaraldehyde, formaldehyde and paraformaldehyde.

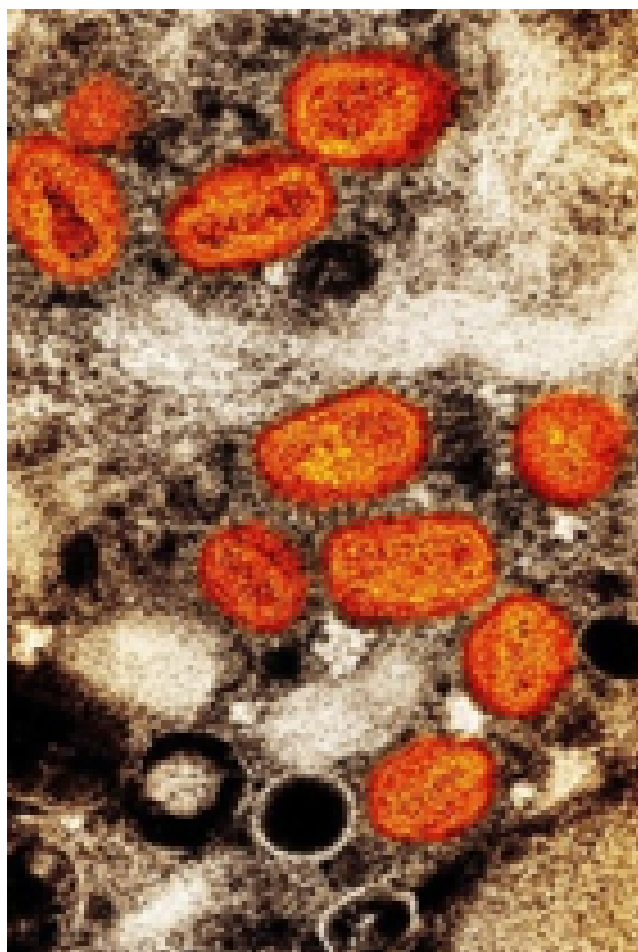


Fig. 5: Microscopic image of Monkey pox virus as illustrated by National Institute of Allergy and Infectious disease.

9. Role of National Institute of Virology, Pune and ICMR New Delhi India

Indian Council of Medical Research New Delhi is the zenith body in India for the conceptualization, supervision and endorsement of biomedical research. On 27th July 2022 The National Institute of Virology (NIV) in Pune under ICMR New Delhi successfully isolated monkeypox virus from the clinical specimen of a patient. Indian Council of Medical Research has been swift to act in strengthening the existing Viral Research and Diagnostic Laboratories across India for quicker identification of Monkey pox virus. Also on 28th July 2022 ICMR has released an Expression of Interest to experienced vaccine manufacturers and pharma companies for development of vaccine and in vitro diagnostic kits.

10. Discussion

Till date worldwide, over 16,000 cases of monkeypox have been reported from 75 countries. The main prevention strategy for monkeypox is to raise awareness, educate the

masses and take necessary measures to curtail the exposure of individuals to the virus. Close contact with infected individual remains the most important risk factor for spread of monkeypox infection. The isolation of monkey pox at NIV Pune India opens doors for advancement of invitro diagnostic kits and vaccine development. Early detection and intense response would be required to curtail the spread of the ongoing outbreak. Newer research studies would be essential to better recognize the etiology, spread, and transmission of the risorgimento of monkeypox in 2022.

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13. Conflict of Interest

None.

References

1. Available from: <https://www.who.int/emergencies/situations/monkeypox-oubreak-2022>.
2. Arita I, Jezek Z, Khodakevich L, Ruti K. Human monkeypox: a newly emerged orthopoxvirus zoonosis in the tropical rain forests of Africa. *Am J Trop Med Hyg.* 1985;34(4):781–9.
3. Khodakevich L, Szczeniowski M, Ma-Disu M, Jezek Z, Marennikova S, Nakano J, et al. The role of squirrels in sustaining monkeypox virus transmission. *Trop Geogr Med.* 1987;39(2):115–22.
4. Jezek Z, Grab B, Paluku DM, Szczeniowski MV. Human monkeypox: disease pattern, incidence and attack rates in a rural area of northern Zaire. *Trop Geogr Med.* 1988;40(2):73–83.
5. Available from: <https://www.cdc.gov/poxvirus/monkeypox/outbreak/usoutbreaks.html>.
6. Fine PE, Jezek Z, Grab B, Dixon H. The transmission potential of monkeypox virus in human populations. *Int J Epidemiol.* 1988;17(3):643–50. doi:10.1093/ije/17.3.643.
7. Olson VA, Laue T, Laker MT, Babkin IV, Drosten C, Shchelkunov SN, et al. Real-time PCR system for detection of orthopoxviruses

and simultaneous identification of smallpox virus. *J Clin Microbiol.* 2004;42(5):1940–6. doi:10.1128/JCM.42.5.1940-1946.2004.

8. Bray M. Pathogenesis and potential antiviral therapy of complications of smallpox vaccination. *Antiviral Res.* 2003;58(2):101–14. doi:10.1016/s0166-3542(03)00008-1.

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