AMPATHCHAT no. 90

MPOX (MONKEYPOX) DISEASE

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VIROLOGY AND EPIDEMIOLOGY

Mpox disease is caused by the Monkeypox virus (MPXV). This virus is a member of the family Poxviridae, genus Orthopoxvirus, species Monkeypox. Like many of the Poxviridae (other than Smallpox and Molluscum contagiosum, which are primarily human pox infections), Monkeypox is a zoonotic virus that spills over into people, and can then be transmitted within the human population.

Monkeypox virus has traditionally been thought to circulate naturally in Central and West African regions and has occasionally been exported to other countries outside of Africa. Human infections with this virus have always been rare, until the outbreak in 2022, and the current resurgence in South Africa in 2024.

Monkeypox virus is a large (300 nm), brick-shaped, enveloped virus. It contains double-stranded DNA, with a viral variant of DNA-RNA polymerase. Pox viruses do not generally use specific cell receptors. Instead, they utilise a complex interaction with mammalian cell surface molecules and extracellular matrix to fuse with the cell and initiate infection and replication within the host cell.[1]

There are two genetic clades of Monkeypox virus: Clade I (Congo Basin clade) and Clade II (West African clade), which is further divided into subclasses IIa and IIb. Clade IIb was associated with the recent global outbreak in 2022.[2] Clade I is the causal agent of an outbreak in the DRC, with over 5 000 cases reported to date. Clade I has been associated with more severe disease and higher rates of transmission than Clade II, typically within household settings.

About 70% of Clade I cases in the DRC were in children, which is typical of the historical epidemiological pattern seen in this region. There are usually multiple chains of transmission in these settings, with children more likely to acquire the infection from small animals, setting up chains of transmission in households. A different epidemiological pattern is, however, seen in South Kivu province, where adults are disproportionally affected, and disease is usually associated with sexual transmission. Outbreaks have been recently described in female sex workers and, to a lesser extent, in men who have sex with men (MSM).[3]

TRANSMISSION

Person-to-person

- Prolonged contact (skin to skin, kissing, sexual contact). This is the main way to transmit this virus.

Zoonotic

- Contact with infected animals:
  - Bites, scratches, bush meat, butchering, inadequately cooked meat, contact with contaminated surfaces or implements.
  - Rodent (most likely primary host) and primate (more likely to be incidental host) species.

Less important possible routes of transmission

- Contact with materials contaminated by lesion material (bed linen, clothing).
- Possible large droplet transmission.

Research has indicated that infected people may transmit the virus from four days prior to symptoms developing until all lesions have healed (scabs have fallen off and healthy skin is visible where the scabs separated from underlying tissue).[4]

CLINICAL FEATURES

Typical presentation

- Incubation period of 3 to 17 days (monitor exposed people for 21 days).
- Prodromal period may be encountered with the following possible symptoms and signs: fever, cough, sore throat, headache, malaise, lymphadenopathy.
- Rash:
  - Check for enanthem, as the rash is not always confined to the skin.
  - Many people develop lesions on the palms and soles.
  - Macules for the first two days.
  - Papules for the following two days.
  - Vesicles for the following two days.
  - Pustules for the next 5 to 7 days.
    - Rounded, firm, opaque lesions.
    - The lesions umbilicate (the centre becomes depressed).
    - The pustules ultimately form scabs.
  - Scabs for up to the next two weeks.
  - Once the scabs fall off and the underlying skin has healed, the patient is no longer infectious.[5]

Atypical signs and symptoms associated with the global outbreak since 2022

- Variability in the rash lesions:
  - These may be more localised in distribution.
  - There may be lesions in the genital, peri-anal, rectal or oral areas.
  - Lesions may not be present on palms and soles.
  - There may be as few as a single lesion.
  - *While typically the lesions all evolve in synchronicity (i.e all the lesions are at the same stage of development), this outbreak has shown that some people present with lesions at different stages of development* (more akin to VZV infection).
- There may be marked rectal or anal pain with rectal bleeding:
  - The prodrome might be absent, or appear after the rash has started.
  - Other organ systems may be involved (CNS, respiratory tract, ocular disease).[6]
- In advanced HIV disease:
  - Patients with CD4 counts of less than 200 cells/mm^3 showed a higher mortality rate, especially if the HIV viral load was also high.
  - Patients with CD4 counts of less than 100 cells/mm^3 were more likely to have severe complications with necrotising or haemorrhagic rash lesions, lung involvement, CNS involvement, ocular disease, secondary infections (including abscess formation) and sepsis.[7]

MANAGEMENT OF MPOX DISEASE

If the patient has signs suggestive of Mpox:

- Isolate the patient.
- The recommended PPE for HCW is the use of gloves, gowns, eye protection (goggles or visor), N95 or KN95 mask.
- Collect a sample for Monkeypox PCR: Using a dry swab, unroof a lesion and collect the resulting fluid on the swab, swab the base of the ulcer with the same swab, sheath the swab. Scabs may also be sent for PCR.
  - Samples must be triple packaged before transporting to the laboratory.
  - Complete the case reporting form from the NICD to accompany the sample.
  - The PCR will be done at Ampath's Molecular Biology laboratory in Centurion.
  - Samples that test positive on PCR are sent to the NICD for further sequencing. This will not delay the PCR result being communicated to the clinician from Ampath.
- Notify the case telephonically and through the Notifiable Medical Conditions (NMC) App.
- Inform the provincial CDCC telephonically so that it can immediately begin contact tracing activities.
- Inform your Infection and Prevention Control team if the patient presents at a hospital.[8]

If the patient can be managed at home:

- Sexual and close contact involving skin-to-skin contact should be avoided.
- The patient should self-isolate at home, and avoid travel until the patient is non-infectious. The home should only be left for urgent medical appointments.
- They should try to avoid sharing eating utensils, bedding, clothing, towels and wash cloths, toothbrushes or razors with others.[9]

There is no approved antiviral treatment for Mpox disease. In general, if the patient is not immunocompromised, and does not suffer from underlying skin disease such as eczema, the management is mainly supportive care and management of pain.

In patients with severe clinical disease and those who are immunocompromised, antiviral treatment may be required. Complicated disease may include ocular infections, mucosal disease and the complications associated with myopericarditis, neurological disease, and severe uncontrolled disease in immunocompromised people.

Possible (unapproved) antiviral treatments:

Limited data are available for the use of these drugs in Mpox disease.

- Tecovirimat (TPOXX) 600 mg BID for 14 days, available as both oral and IV formulations. Limited and controlled access may be obtained on a Section 21 application in South Africa.
  - Indications for use:
    - PCR positive and acute disease in keeping with Mpox.
    - Immunodeficiency.
    - Extensive lesions (more than 100 lesions).
    - Complications (ocular, mucosal disease with resulting complications with urination, swallowing, breathing, intractable pain, CNS, myocarditis).
- Brincidofovir (Tembexa) is a prodrug of Cidofovir. Brincidofovir may be used in combination with Tecovirimat in very severe disease, and in patients with disease progression while using Tecovirimat.
- Cidofovir (Vistide). There is no evidence for the use of this drug in Mpox disease. However, efficacy has been shown in vitro and in animal studies. Whether there is benefit in infected people is unknown, but it might be considered in severe disease where other options are not available.[1,5]

Vaccination:

- Jynneos (live, non-replicating vaccine for smallpox and Mpox):
  - Used as PEP (must be administered within four days of exposure) or PrEP in high risk groups – two doses 28 days apart.
  - Not available yet in South Africa, but a working group is preparing a case for accessing the vaccine.

REFERENCES

1. Efridi W. and Lapin S. 2023. Poxviruses: Poxviruses − StatPearls − NCBI Bookshelf (nih.gov) 29 May update.
2. Santiago F-C. and Orviz E. 2023. Mpox global outbreak: Update in epidemiology, clinical spectrum, and considerations in prevention and treatment. Rev Esp Quimioter 36 (Supplement 1): 29−32.
3. Centers for Disease Control and Prevention. 2024. Mpox rapid risk assessment. May 10. CDC.
4. Brosius I. Van Dyk C., Coppens J. et al. 2023. Presymptomatic viral shedding in high-risk Mpox contacts: A prospective cohort study. Journal of Medical Virology95: e28769.
5. Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases (NCEZID). 2023. Division of High-Consequence Pathogens and Pathology (DHCPP) August update.
6. World Health Organisation. 2022. Multicountry outbreak: Situation update June. WHO.
7. Mitja O., Alemany A., Marks M. et al. 2023. Mpox in people with advanced HIV infection: A global case series: Lancet 401, 18 March.
8. Southern African HIV Clinicians Society: Mpox Information Sheet.
9. NICD mpox updates: Help stop the spread of Mpox. Available: https://www.nicd.ac.za/mpox-updates.

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