

# Human Monkeypox

Human monkeypox virus (MPXV) is a double-stranded DNA virus of the Orthopoxvirus genus of the Poxviridae family. Two genetic clades of the monkeypox virus have been identified: West African and Central African.<sup>1</sup> MPXV was first detected in 1958 in an outbreak of a vesicular disease among captive monkeys transported from Africa to Copenhagen, Denmark for research purposes. In August 1970, the first human case of monkeypox was identified in a nine-year-old child with smallpox-like vesicular skin lesions in the rural area of Zaire.<sup>1</sup>

From January 2022 to June 15<sup>th</sup>, 2022, 2103 confirmed cases from 140 countries were reported with one death.<sup>3,4</sup> Recently, a case series of seven patients with monkeypox from the UK was published. The patients were all young, with no pre-existing comorbidities, and none had received pre-exposure smallpox vaccination. Nonetheless, the majority of the patients experienced a relatively mild course of illness, which is consistent with infection with the West African clade of the monkeypox virus.<sup>2</sup>

It is yet unclear how MPXV is transmitted to humans. Handling monkeypox-infected animals is assumed to be the primary source of animal-to-human infection transmission. It is assumed that the virus enters the body through damaged skin, the respiratory tract, or mucous membranes. Secondary human-to-human transmission is considered to be common, presumably through large respiratory droplets or direct or indirect contact with body fluids, lesion material, and contaminated surfaces, or other material, such as clothing or linens.<sup>1,3</sup>

The most recent cases have mainly involved men who have sex with men. Many of these global reports of monkeypox cases are reported within sexual networks. Although monkeypox has not previously been identified as a sexually transmitted infection, it can be passed on through direct contact during sex.<sup>3,4</sup> Previous smallpox vaccination provides some cross-protection against monkeypox and modifies the clinical picture toward a milder disease. The risk of monkeypox was found to be 5.2-fold lower among the vaccinated than among the unvaccinated (0.78 versus 4.05 per 10,000).<sup>1,5</sup>

One reason for uprising cases is deteriorating immunologic status due to waning vaccine-induced protection among those who were initially vaccinated. Another reason could be the growing proportion of those who have never received the vaccine, i.e., non-vaccinated younger age groups.<sup>1,4</sup> The incubation period has been estimated to be 5-21 days with symptoms and signs lasting two to five weeks. Fever, chills, headaches, lethargy, asthenia, swollen lymph nodes, back pain, and myalgia are some of the nonspecific symptoms and indications that precede the sickness.<sup>3,4</sup>

Within one to five days after the onset of fever, rashes of varying sizes appear, first on the face, then across the body, hands, legs, and feet.<sup>1,3</sup> The rash undergoes several stages of evolution from macules, papules, vesicles, and pustules followed by resolution over time with crusts and scabs. Various stages of the rash could appear at the same time.<sup>1,2</sup> Although the clinical manifestations of monkeypox are milder than those of smallpox, the disease can be fatal, with mortality rates ranging from 1% to 10%. Mortality rate is higher among children and young adults, and the course is more severe in immunocompromised individuals.<sup>1,4</sup>

A clinical sign differentiating monkeypox from smallpox and chickenpox is the presence of enlarged lymph nodes, particularly submental, submandibular, cervical, and inguinal nodes.<sup>1,3</sup> Complications of monkeypox can include pneumonitis, encephalitis, sight-threatening keratitis, and secondary bacterial infections. Rare complications such as thigh abscess and proctitis have been reported.<sup>3,4</sup>

Optimal clinical specimens for laboratory analyses include specimens from skin lesions such as swabs of vesicular lesions, exudate, or crusts stored in a dry, sterile tube.<sup>1</sup> A definitive diagnosis must be made utilizing electron microscopy, culture and molecular analysis identification by polymerase chain reaction, and sequencing in reference laboratories with high containment facilities.<sup>1,4,5</sup>

There is no specific treatment for monkeypox. Supportive care, symptomatic management, and treatment of secondary bacterial infections remain the main recommendations.<sup>1-5</sup> Two orally bioavailable

drugs, brincidofovir and tecovirimat, have been approved for the treatment of smallpox in the USA in preparation for a potential bioterrorism incident. Neither drug has undergone human efficacy trials.<sup>3,4</sup>

Health care workers, anyone who treat or are exposed to patients with monkeypox or their samples, should be immunized against smallpox by national health authorities (Ring vaccination).<sup>1</sup> It is estimated that smallpox vaccination provides 85% cross-protection against monkeypox infection. It is recommended to use the smallpox (vaccinia) vaccine (ACAM2000) or smallpox and monkeypox vaccine (JYNNEOS) for postexposure prophylaxis.<sup>3-5</sup>

**Conflict of Interest:** None declared.

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