Elsevier has created a Monkeypox Information Center in response to the declared public health emergency of international concern, with free information in English on the monkeypox virus. The Monkeypox Information Center is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the editor

Monkeypox treatment: Is tecovirimat the answer?

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Dear Editor,

Monkeypox virus is a member of the Orthopoxvirus genus of viruses. As an Orthopoxvirus, Monkeypox has some resemblance to smallpox, which was eradicated in 1980. Monkeypox virus can spread from person to person via contact with infected respiratory secretions, skin lesions, or fomites [1]. Following an incubation period lasting between 5 and 21 days, infected individuals report symptoms such as fever, myalgia, and lympadenopathy [1]. About one to three days following the fever's onset, patients develop skin eruptions, typically on their face and extremities [1]. These eruptions then progress from their initially macular morphology into papules, vesicles, and dried crusts. Although these symptoms usually last two to four weeks, Monkeypox can cause more severe complications, including encephalitis, secondary infections, loss of vision, and sepsis [1]. These contribute to the disease's recent case fatality ratio of 3–6%, and it is subsequently labeled a biosafety level four pathogen by the Centers for Disease Control and Prevention (CDC) [1].

Since the first reported case in 1970, there have been outbreaks of Monkeypox virus in various regions of Africa [1]. Historically, the virus has remained largely confined to this region, with cases outside endemic countries a rare occurrence. In 2022, however, the disease has spread at an unprecedented rate. Between April and June, at least 528 new infections were diagnosed in 16 different countries [2]. Of these, 13 were non-endemic, including the US, UK, Australia, and Germany, among other high-surveillance countries [2]. As of September, at least 95 non-endemic countries have reported cases of Monkeypox, bringing the total cases to over 56,000 [3]. As the prevalence of asymptomatic infections is under investigation, the true number of cases may be much higher. The WHO has thus declared the spread of Monkeypox as an international public health emergency, the seventh after COVID-19, zikavirus, H1N1, Polio, Ebola, and Smallpox [4].

As per CDC guidelines, there are no specific treatments for Monkeypox infections; most patients improve with supportive care via rehydration [5]. For severe cases, however, there is a need for treatment options as the mortality rate is high. As an Orthopoxvirus, Monkeypox virus has similar genetic sequences to smallpox virus. Studies suggest that individuals immunized against smallpox have a degree of protection against Monkeypox, improving clinical presentation [5]. Two vaccines have been tested to this effect, JYNNEOS™ and ACAM2000®, both of which have been shown to have a protective effect against Monkeypox virus [5]. There is also work underway for a vaccine specifically against Monkeypox [6]. Similarly, there is evidence that several pharmacological interventions approved for use against smallpox may be effective anti-virals to treat Monkeypox. Among these, Tecovirimat and Brincidofovir are of particularly high promise [5].

Brincidofovir and Cidofovir are anti-virals that act by inhibiting the viral DNA polymerase [5]. While these drugs show promise against orthopoxviruses, clinical testing against monkeypox, in both human and animal-based trials, has not been extensively conducted [5]. Moreover, the two drugs are associated with significant adverse effects such as elevated liver enzymes and bilirubin, and intravenous normal saline with probenecid therapy must be administered alongside cidofovir [5]. Tecovirimat was the first anti-viral approved for use against smallpox. Tecovirimat functions as a virustatic drug by blocking virus particle release from infected cells [7]. By inhibiting the protein p37 present in all orthopoxviruses, the drug prevents the formation and subsequent escape of enveloped virions [7]. This results in drastically reduced virulence. Following tests for efficacy in animals, Tecovirimat safety was followed in randomized controlled trials and returned positive results, with a similar side-effect profile to placebo [7]. When given orally, Tecovirimat can cause headache, abdominal pain, and rarely, neutropenia [8];

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Intravenous use of the drug can result in subsequent pain, headache, and infusion site erythema, extravasation, or swelling [8].

The efficacy of Tecovirimat as a possible treatment of Monkeypox is currently under investigation. In one UK-based study, the sole patient on Tecovirimat therapy reported a shorter disease duration, no adverse effects, and quicker discharge from the hospital compared with the other six [9]. Owing to the evidence of its usefulness in combating Monkeypox, Tecovirimat has been approved for treatment in the EU. The FDA has approved use of the drug for Monkeypox in emergency conditions, such as for those with severe Monkeypox, in immunocompromised patients or those under immunosuppression therapy, and pregnant or breastfeeding women [8].

The diagnosis of Monkeypox is primarily done via Real Time Polymerase Chain Reaction (PCR) [10]. This requires specialized diagnostic laboratories that many middle-to-low-income countries, such as Pakistan and Afghanistan, do not possess in sufficient number. Should Monkeypox outbreaks occur in these regions, the effects can be devastating [10].

The COVID-19 pandemic has taught us the importance of swift action to curb the growth of diseases before their effects become widespread. It is thus somewhat fortunate that this precedent was set before the Monkeypox virus's current surge in growth. With this newfound awareness of the possible severity of these outbreaks, we now know that it is in these initial stages of the virus's spread that the proper countermeasures be set in place. With the right preparation and due caution, patients can receive the best possible treatment, hospitals can be less crowded, and the worst avoided.

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Competing interests

The authors declare that they have no competing interests.

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Availability of data and material

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