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Popular Article

Monkey Pox: A Re-emerging zoonoses of Public Health Concern

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Introduction

The socioeconomic and public health effects of emerging and re-emerging zoonotic diseases have been huge, and they will continue to be a significant problem in the future. Zoonoses are a dual-edged sword since they both harm animal health and productivity and result in serious and sometimes deadly diseases in people. Additionally, the most common cause of infectious disorders is zoonotic diseases. It is hard to predict where, when, or even what the next unique zoonotic infection will look like or mean in the long run. Their management requires ongoing monitoring, investigation, and training, as well as enhanced diagnostic facilities and a modernized, well-equipped public health system.

In recent decades, a number of viral zoonoses have emerged in various parts of the world, drawing the attention of public health authorities. A zoonotic illness known as monkeypox is on the rise once again and has negative effects on public health. The disease known as "monkeypox" was first recognized in 1958 when two outbreaks of a pox-like illness were found in colonies of study monkeys. In the Democratic Republic of the Congo, the first case of human monkeypox was discovered in 1970. Since then, the bulk of incidents have occurred in Western Africa and the Congo Basin. The Midwest of the United States was the first region outside of Africa to have monkeypox cases reported in the spring of 2003. This review's main goal is to outline monkeypox's emerging

status as a zoonotic pathogen that poses a threat to global public health. This review's main goal is to outline monkeypox's emerging status as a zoonotic pathogen that poses a threat to global public health (1).

Epidemiology

Monkeypox was first identified in colonies of captive monkeys in 1958 after two outbreaks of a disease resembling the pox; hence, the name "monkeypox." In 1970, the Democratic Republic of the Congo reported the first human case of monkeypox during a time of heightened smallpox eradication efforts. Since then, monkeypox cases in humans have been reported in a number of Central and Western African countries. Risk factors for monkeypox infection include living in heavily forested and rural areas of central and western Africa, handling and cooking bush meat, caring for someone who is infected with the monkeypox virus, and not having had the smallpox vaccine. Early in May 2022, the UK reported 9 instances of monkeypox, with the first case having recently travelled to Nigeria (2). On May 18, 2022, an adult male who had just returned from Canada was diagnosed with monkeypox by the Massachusetts Department of Public Health. Monkeypox was proven outside of Africa in 15 European countries, 6 Asian countries, Australia, the United States, and Canada as of May 26, 2022. Each of the six US states had at least one instance of the disease. 219 confirmed cases in all have been reported by these countries (3).

Etiology

The causative agent of monkeypox is the monkeypox virus; it is a double-stranded DNA virus that belongs to the Orthopoxvirus genus and family of Poxviridae. The Orthopoxvirus genus includes the variola virus (which causes smallpox), vaccinia virus (which is used in the smallpox vaccine), and cowpox viruses. There are two genetic subclades of the monkeypox virus: West African and Congo Basin (Central African). In contrast to the Congo Basin (Central African) clade, which has historically been linked to higher rates of human-to-human transmission and morbidity and a case fatality ratio of 8–13%, the West African clade is typically associated with milder clinical presentation and a case fatality ratio of 0-6%. The virus has a dumbbell-shaped core, lateral bodies, and an envelope. Its diameter ranges from 140 to 260 nm and its length ranges from 220 to 450 nm. It is impervious to phenolic disinfectants, and polar lipophilic solvents like chloroform and low pH inactivate it (4).

Transmission

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Monkeypox's natural reservoir has not yet been identified. However, the virus can still be carried by non-human primates (like monkeys) and infect people. Rope squirrels, tree squirrels, poached Gambian rats, dormice, numerous monkey species, and other animals have all been identified as having the monkeypox virus in Africa. In endemic locations, the monkeypox virus is spread to people by bites or direct contact with an infected animal's blood, flesh, bodily fluids, or cutaneous or mucosal sores. It is well known that human-to-human transmission of monkeypox, including nosocomial and domestic transmission, occurs. On the other hand, networks of human-to-human transmission have received less focus. The virus is presumed to enter the body through cuts, openings in the skin, or mucous membranes (such as the eyes, nose, or mouth), most likely through large respiratory droplets or direct or indirect contact with bodily fluids, lesion material, contaminated surfaces, or other materials, like clothing or linens. The extended interaction with patients makes hospital staff and family members more prone to infection (5).

Clinical Spectrum

Monkeypox can incubate for a period of 5 to 21 days, although often it takes 7 to 14 days. Anorexia, prostration, pharyngitis, shortness of breath, cough (with or without sputum), lymphadenopathy, malaise, headache, myalgia, and fever (usually 38.5-40.5°C) are among the symptoms of the prodromal or pre-eruptive stage (swollen lymph nodes). In contrast to smallpox, monkeypox results in lymphadenopathy (7). Both sides of the body may have swollen lymph nodes in the neck's submandibular and cervical, armpits' axillary, and groin's inguinal regions. Lesions will develop in the exanthem (eruptive) stage after these symptoms, both in the mouth and on the body. Lesions go through a number of stages before disappearing. The phases are enanthem, macules, papules, vesicles, pustules, and scabs. After the scabs have gone off, pitted scars and/or regions of lighter or darker skin may remain. A person is no longer contagious once all scabs have gone off (6).

Diagnosis

Clinical presentation and illness development are routinely used to make presumptive diagnosis. The clinical differential diagnosis must take into account other rash conditions such chickenpox, measles, bacterial skin infections, scabies, syphilis, and medication-related allergies. The prodromal stage of monkeypox can be recognised from chickenpox or smallpox by lymphadenopathy. The polymerase chain reaction (PCR) is the primary laboratory test due to its accuracy and sensitivity (8). The best diagnostic samples for monkeypox are the skin lesions—the roof or fluid from vesicles and pustules, as well as dry crusts. When it is feasible, a biopsy may be

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performed. Because orthopoxviruses are serologically cross-reactive, antigen and antibody detection techniques do not provide confirmation unique to monkeypox. When it is feasible, a biopsy may be performed. Because orthopoxviruses are serologically cross-reactive, antigen and antibody detection techniques do not provide confirmation unique to monkeypox. Serology and antigen detection techniques are not advised for case inquiry or diagnosis when resources are limited. In addition to PCR, acceptable techniques to confirm the infection include viral isolation from a clinical specimen, electron microscopy, and immunohistochemistry.

Treatment

Monkeypox disease currently has no specific clinically proven treatments. The treatment for most viral diseases is supportive, including antipyretics, fluid balance, and oxygenation . The condition is usually self-limiting, with a resolution time of 2-4 weeks. The mortality rate in African cases ranged from 1 to 10%, and death was linked to the patients' health and other comorbidities. The European Medicines Agency (EMA) approved tecovirimat, an antiviral drug developed for smallpox, for monkeypox in 2022 based on findings from animal and human research. It isn't yet widely available yet . Under an IND or EUA, the FDA-approved antivirals cidofovir and brincidofovir could be used to treat monkeypox, albeit there is inadequate data on their effectiveness in humans. Animal studies, on the other hand, have shown that it is beneficial against monkeypox in certain mammalian species . Vaccinia immune globulin (VIG) is another possible treatment for monkeypox. However, there has been no human testing of VIG for monkeypox or smallpox, and no data on its efficiency against either virus (9).

Control and Prevention

The primary approach to preventing monkeypox is to increase public awareness of risk factors and inform people of the activities they may take to reduce their exposure to the virus. Take the necessary precautions to prevent monkeypox infection, including avoiding contact with sick or dead animals found in monkeypox-prone areas, refraining from touching bedding or other items that have come into contact with sick animals, separating infected patients from those who might contract the disease, and washing your hands after contact with infected humans or animals.

Until all lesion crusts have naturally fallen off and a new skin layer has grown, the infected person should be kept in isolation, wear a surgical mask, and keep lesions covered as much as is practical. The capacity of an interdisciplinary team of medical professionals, nurses, virologists, veterinarians, and public health specialists to quickly recognise monkeypox infection in humans and

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animals, apply preventative measures, and start public health reporting serves as a safeguard against a disastrous outbreak (10).

Available Vaccines in Market

The two licensed smallpox vaccines are JYNNEOSTM (also known as Imvamune or Imvanex) and ACAM2000®. Monkeypox is another condition for which JYNNEOSTM is authorized. The JYNNEOSTM vaccine is at least 85% effective at preventing monkeypox, according to evidence from Africa. Additionally, research is being done on the JYNNEOSTM vaccine as a potential post-exposure prophylactic to lessen disease development and severity. The third smallpox vaccine is the Aventis Pasteur Smallpox Vaccine (APSV). It is a vaccine against the vaccinia virus that has replication capacity and might be used with an IND or emergency use permission (EUA). This vaccine would be used in place of the officially licenced smallpox vaccines if they were unavailable or inappropriate. Other monkeypox vaccines, such as VAC-6 and LC-16, are in development (10).

Conclusion

A common viral illness called monkeypox can spread from animals to humans. Numerous countries around the world have recorded cases of sickness, which affects many people. The most typical illness signs include fever, rash, and enlarged lymph nodes. No longer is monkeypox only found in endemic regions. As a result, monkeypox is a dangerous new illness that has taken over the entire planet. Monkeypox infection today has no effective or safe treatment. The novel smallpox vaccine JYNNEOS has been approved by the FDA for the treatment of both monkeypox and smallpox. After touching ill animals or biological materials, it is advised that one wash their hands thoroughly to stop the transmission of disease.

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