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A REVIEW ON MONKEYPOX

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ABSTRACT

Monkeypox is a viral zoonotic illness that is mostly found in tropical rainforests in Central and West Africa, although it can also be found in other parts of the world. Monkeypox is being treated with an antiviral drug that was designed for the treatment of smallpox. Monkeypox has a clinical appearance similar to smallpox, a related orthopoxvirus illness that was proclaimed eliminated globally in 1980. Monkeypox is less infectious and produces less severe sickness than smallpox. Fever, rash, and enlarged lymph nodes are common symptoms of monkeypox, which can lead to a variety of medical issues. Smallpox vaccines protected against monkeypox. There have been new vaccines developed, one of which has been approved for the prevention of monkeypox. The monkeypox virus, a member of the Orthopoxvirus genus in the Poxviridae family, causes monkeypox. Monkeypox is usually a self-limiting disease with symptoms lasting between two and four weeks. It is possible to have a severe case. The case fatality ratio has recently hovered around 3–6%. Monkeypox is spread to humans via close contact with an infected person or animal, or through infected material. Close contact with lesions, body fluids, respiratory droplets, and contaminated materials like bedding allows the monkeypox virus to spread from one person to another.

Keywords: Monkeypox, Orthopoxvirus, zoonotic disease, smallpox

INTRODUCTION

Monkeypox is a contagious viral illness that can affect humans and animals alike. Fever, headache, muscular cramps, shaking, backache, and excessive exhaustion are among the early symptoms. Swollen lymph nodes are most commonly found behind the ear, behind the jaw, in the neck, or in the groyne.[9] This is followed by a rash that produces blisters and crusts across the lips, face, hands and feet, genitals, and eyes, with the rash appearing more commonly in the mouth, face, hands and feet, genitals, and eyes.[1-3] The typical duration from exposure to onset of symptoms is 12 days; however, this might vary from 5-to-21 days.[1-3] Symptoms last between two to four weeks on average.[3] Severe cases can occur, particularly in children, pregnant women, and those with weakened immune systems.[10] Handling bushmeat, an animal bite or scrape, bodily fluids, contaminated objects, or intimate contact with an infected human are all possible ways for monkeypox to spread.[11] Normally, the virus is spread among rats.[11] A test for the virus's DNA can be used to confirm the diagnosis.[5] It might resemble chickenpox in appearance.[6] The smallpox vaccination has a success rate of 85 percent in preventing illness.[5] [12] In the United States, the Jynneos monkeypox vaccine was authorised for adults in 2019.[13] The current treatment standard is tecovirimat, an antiviral designed to

treat orthopoxvirus diseases like smallpox and monkeypox. In the European Union[14] and the United States, it is licenced for the treatment of monkeypox. Cidofovir or brincidofovir may be beneficial as well. [6] [15] If left untreated, the Congo Basin (Central African) clade of monkeypox has been reported to have a mortality rate of 10% to 11%.[3] [16] [7]

Monkeypox was initially discovered in laboratory monkeys in Copenhagen, Denmark, in 1958.[17] The virus does not have a natural reservoir in monkeys.[18] The first human cases were discovered in the Democratic Republic of the Congo in 1970.[17] A 2003 epidemic in the United States was linked to the sale of rats imported from Ghana at a pet store.[5] The 2022 monkeypox epidemic, which began in the United Kingdom in May 2022 and has since been verified in at least 20 nations throughout Europe, North America, South America, Western Asia, and Australia, is the first instance of extensive community transmission outside of Africa.[20-23] Monkeypox is a viral zoonosis (a virus transferred to people from animals) that has symptoms similar to smallpox, but is less severe clinically. Monkeypox has emerged as the most important orthopoxvirus for public health since the elimination of smallpox in 1980 and subsequent suspension of smallpox immunisation. Monkeypox is mostly found in Central and West Africa, particularly near tropical rainforests, and is becoming more common in metropolitan settings. Rodents and non-human primates are among the animals that serve as hosts.

The pathogen

Monkeypox virus is an enclosed double-stranded DNA virus belonging to the Poxviridae family's Orthopoxvirus genus. The monkeypox virus is divided into two genetic clades: central African (Congo Basin) and western African. Historically, the Congo Basin clade was considered to be more transmissible and to produce more severe illness. Cameroon, the sole nation where both viral clades have been identified, has served as the geographic divide between the two clades thus far.

Natural host of monkeypox virus

The monkeypox virus has been found to be vulnerable in a variety of animal species. Rope squirrels, tree squirrels, Gambian pouched rats, dormice, non-human primates, and other species are among those affected. The natural history of the monkeypox virus is still unknown, and further research is needed to determine the specific reservoir(s) and how viral circulation is maintained in nature.

Outbreaks

Human monkeypox was discovered in a 9-month-old baby in the Democratic Republic of Congo in 1970, in an area where smallpox had been eradicated in 1968. Since then, the majority of cases have been recorded from the Congo Basin's rural, rainforest regions, mainly in the Democratic Republic of the Congo, and human cases have been reported from all throughout central and west Africa. Human cases of monkeypox have been documented in 11 African nations since 1970: Benin, Cameroon, Central African Republic, DRC, Gabon, Cote d'Ivoire, Liberia, Nigeria, Republic of Congo, Sierra Leone, and South Sudan. The real extent of monkeypox's impact is unknown. In the Democratic Republic of the Congo, for example, an epidemic was recorded in 1996–97 with a lower case fatality ratio and a greater attack rate than typical. In one example, a concurrent epidemic of chickenpox (produced by the varicella virus, which is not an orthopoxvirus) and monkeypox was discovered, which might explain real or perceived variations in transmission dynamics. Nigeria has been dealing with a major epidemic since 2017, with over 500 suspected cases, over 200 confirmed cases, and a case fatality rate of over 3%. Cases are still being reported today.

Monkeypox is a worldwide public health concern since it affects not just countries in West and Central Africa, but also the rest of the world. In the United States of America, the first monkeypox epidemic outside of Africa occurred in 2003, and it was connected to contact with infected pet prairie dogs. Gambian pouched rats and dormice had been smuggled into the nation from Ghana to house these pets. Over 70 cases of monkeypox were reported in the United States as a result of this outbreak. Travelers from Nigeria to Israel in September 2018, the United Kingdom in December 2019, May 2021 and May 2022, Singapore in May 2019, and the United States of America in July and November 2021 have all been reported to have monkeypox. Multiple cases of monkeypox were discovered in many non-endemic countries in May 2022. Studies are now being conducted to learn more about the epidemiology, infection origins, and transmission patterns.

Transmission

Direct contact with the blood, body fluids, or cutaneous or mucosal lesions of infected animals can result in animal-to-human (zoonotic) transmission. Many animals in Africa have been reported to be infected with the monkeypox virus, including rope squirrels, tree squirrels, Gambian poached rats, dormice, various monkey species, and others. Monkeypox's natural reservoir has yet to be established, while rats are the most likely suspect. A possible risk factor is eating undercooked meat and other animal products from infected animals. People who live in or near wooded regions may be exposed to infected animals in an indirect or low-level manner.

Animal-to-human (zoonotic) transmission can occur through direct contact with the blood, bodily fluids, or cutaneous or mucosal lesions of infected animals. Rope squirrels, tree squirrels, Gambian poached rats, dormice, several monkey species, and others have all been found to be afflicted with the monkeypox virus in Africa. The natural reservoir for monkeypox has yet to be identified, but rats are the most plausible possibility. Consumption of undercooked meat and other animal products from infected animals is a potential risk factor. Infected animals may be exposed to people who reside in or near forested areas in an indirect or low-level way. Transmission can also happen through the placenta (which can cause congenital monkeypox) or through intimate contact during and after delivery. While close physical contact is a well-known risk factor for transmission, it is still unknown if monkeypox may be transferred sexually. To have a better understanding of this danger, more research is required. [14]

Signs and symptoms

Headaches, muscular pains, fever, and weariness are common early symptoms. [24,25] It may appear to be flu at first. [26] The disease might seem like chickenpox, measles,

or smallpox, but the presence of swollen glands distinguishes it. [24] Before the rash appears, they often occur behind the ear, below the jaw, in the neck, or in the groyne. [6] Lesions often begin on the face after a few days of the fever, then spread out to the palms of the hands and soles of the feet in a centrifugal pattern. [24,25] Lesions on the palms and soles afflict three-quarters of those affected, more than two-thirds have lesions in the mouth, a third have lesions in the genitals, and one in five have lesions in the eyes. [24] They start out as little flat patches before developing into small bumps that fill with clear and then yellow fluid before bursting and scabbling. [3] [25] There may be a few or several thousand lesions, which may merge to form larger lesions. [24] The lesions appear in the same stage in every portion of the body that is afflicted. [2] It has the appearance of a smallpox rash. [27] The rash usually lasts for around ten days. [26] Affected individuals may be sick for two to four weeks. [3] The lesions may leave pale markings after healing before producing black scars. [2] In disease-endemic parts of Africa, little person-to-person transmission of illness has been recorded. [28]

Diagnosis

Other rash disorders, such as chickenpox, measles, bacterial skin infections, scabies, syphilis, and medication-related allergies, must be examined in the clinical differential diagnosis. Lymphadenopathy can be used to identify monkeypox from chickenpox or smallpox during the prodromal stage of sickness.

Whenever monkeypox is detected, health personnel should acquire a suitable sample and transfer it securely to a laboratory with the necessary equipment. The kind and quality of the material, as well as the type of laboratory test, all play a role in confirming monkeypox. As a result, specimens must be packed and sent according to national and international regulations. Because of its precision and sensitivity, the polymerase chain reaction (PCR) is the laboratory test of choice. Skin lesions - the roof or fluid from vesicles and pustules, as well as dry crusts – are the best diagnostic samples for monkeypox. Biopsy is a possibility when it is possible. Lesion samples must be kept cold and preserved in a dry, sterile tube (no viral transport medium). Because of the brief period of viremia compared to the time of specimen collection after symptoms begin, PCR blood tests are frequently inconclusive and should not be regularly obtained from patients.

Antigen and antibody detection techniques do not offer monkeypox-specific confirmation because orthopoxviruses are serologically cross-reactive. When resources are few, serology and antigen detection procedures are not suggested for diagnosis or case investigation. Furthermore, recent or distant vaccination with a vaccinia-based vaccine (e.g., anybody immunised before to smallpox eradication, or more recently vaccinated owing to a heightened risk, such as orthopoxvirus laboratory employees) might result in false positive findings. The following patient information must be included with the specimens in order to interpret test results: a) date of beginning of fever, b) date of onset of rash, c) date of specimen collection, d) current state of the individual (stage of rash), and e) age. [14]

Therapeutics

Monkeypox clinical therapy should be properly adjusted in order to reduce symptoms, manage complications, and minimise long-term consequences. To maintain proper nutritional status, patients should be given water and food. Secondary bacterial infections should be treated according to the instructions. The European Medicines Agency (EMA) approved tecovirimat, an antiviral drug designed for smallpox, for monkeypox in 2022 based on findings from animal and human research. It isn't generally accessible yet. Tecovirimat should preferably be studied in a clinical research setting with prospective data gathering if used for patient care. [29-34]

Vaccination

Several observational studies have shown that smallpox vaccination is roughly 85 percent effective in preventing monkeypox. As a result, earlier immunisation against smallpox may result in a milder sickness. A scar on the upper arm is frequently the only sign of previous smallpox immunisation. The original (first-generation) smallpox vaccinations are not available to the general population at this time. Some laboratory employees and health care professionals may have gotten a more current smallpox vaccine to protect them from orthopoxviruses in the workplace. In 2019, a more recent vaccination based on a modified attenuated vaccinia virus (Ankara strain) was authorised for monkeypox prevention. This is a two-dose vaccination that is still in short supply. Due of the cross-protection given by the immune response to orthopoxviruses, smallpox and monkeypox vaccines are created in formulations based on the vaccinia virus. [35-37]

Prevention

Because they are closely related viruses and the vaccine protects animals against experimental deadly monkeypox challenges, it is anticipated that smallpox vaccination will protect against human monkeypox infection.[16] Because systematic smallpox vaccination was ceased after smallpox was eradicated, this has not been shown clearly in people.[38] Among Africa, the smallpox vaccination has been shown to minimise the risk of monkeypox in previously vaccinated people. Monkeypox prevalence is influenced by a decline in poxvirus immunity in exposed populations. It's ascribed to declining cross-protective immunity among those who were inoculated before the end of bulk smallpox vaccinations in 1980, as well as an ever-increasing number of unvaccinated people.[25] The US Centers for Disease Control and Prevention (CDC) recommends that anybody researching monkeypox outbreaks or caring for afflicted people or animals get a smallpox immunisation to protect themselves from the disease. Vaccination is also recommended for anyone who have had close or personal contact with monkeypox-infected persons or animals. [4] Pre-exposure immunisation is not recommended for unexposed veterinarians, veterinary workers, or animal control officials unless they are participating in field investigations, according to the CDC. [4] Before caring for an infected individual, the CDC recommends that healthcare personnel put on a full set of personal protective equipment (PPE). A robe, mask, goggles, and a filtering disposable respirator are included (such as an N95). To prevent others from coming into touch with an infected individual, they should be isolated in a

negative air pressure chamber or at the very least a private exam room. [38]

Reducing the risk of human-to-human transmission

For epidemic control, surveillance and early detection of new cases are crucial. Close contact with sick people is the most major risk factor for monkeypox virus infection during human monkeypox epidemics. Infected health personnel and family members are at a higher risk. Standard infection control procedures should be followed by health personnel caring for patients with suspected or confirmed monkeypox virus infection or handling specimens from them. Persons who have been vaccinated against smallpox should be chosen to care for the patient if at all feasible. Samples collected from people and animals suspected of being infected with the monkeypox virus should be handled by competent personnel in well equipped labs. In compliance with WHO guidelines for the transfer of infectious substances, patient specimens must be securely prepared for shipment using triple packing. Clusters of monkeypox cases were discovered in numerous non-endemic nations in May 2022, with no direct travel ties to an endemic location. More research is being conducted to discover the likely source of illness and to prevent further spread. While the origins of this outbreak is being explored, it's critical to consider all possible mechanisms of transmission to protect public health. [33,34]

Reducing the risk of zoonotic transmission

The majority of human illnesses have occurred as a result of an initial, animal-to-human transmission throughout time. Contact with wild animals, especially those that are sick or dead, should be avoided at all costs, including their flesh, blood, and other body parts. All items containing animal flesh or components must also be fully prepared before consumption. [35]

Preventing monkeypox through restrictions on animal trade

Import restrictions on rodents and non-human primates have been enacted in certain nations. Animals in captivity who may be infected with monkeypox should be segregated from other animals and placed in quarantine right away. Any animals that may have come into touch with an infected animal should be confined, handled with caution, and monitored for 30 days for monkeypox signs.[36]

CONCLUSION

The monkeypox virus, a member of the Orthopoxvirus genus in the Poxviridae family, causes monkeypox. Monkeypox is usually a self-limiting disease with symptoms lasting between two and four weeks. It is possible to have a severe case. The case fatality ratio has recently hovered around 3–6%. Monkeypox is spread to humans via close contact with an infected person or animal, or through infected material. Close contact with lesions, body fluids, respiratory droplets, and contaminated materials like bedding allows the monkeypox virus to spread from one person to another.

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