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MONKEYPOX A NEW PANDEMIC DISEASE: IMPLICATIONS FOR CLINICAL PRACTICE AND PUBLIC HEALTH EDUCATION. A REVIEW

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Abstract:
The monkeypox virus, which is a member of the orthopoxy virus family, can lead to a number of consequences, including sepsis, encephalitis, keratitis, bronchopneumonia, and superimposed infections. It can also produce fever, lethargy, headaches, lymphadenopathy, myalgia, and rashes. The World Health Organization (WHO) reported two occurrences of monkeypox in the United Kingdom in May 2022, but did not have a complete understanding of the epidemiological connections or the possibility of regional or international transmission of this illness. New instances have been reported in various parts of the world during the past few weeks, prompting worries about the state of the global health crisis and alertness regarding the behavior of novel viral strains. 2103 laboratory cases reported and one probable incidence, which also included one death, had been recorded to WHO as of June 15th. This article's goal was to review the literature in order to get greater knowledge about the illness, which would aid in clinical practice and public health education.

Keywords: monkeypox virus, pandemic diseases, Public Health Education, review

INTRODUCTION

The disease known as "monkeypox," which is similar to smallpox but has been eradicated, is brought on by an orthopoxvirus called "monkeypox virus," which is most frequently found in Central and West Africa. It is a self-limiting illness with symptoms like fever; lethargy; headache; lymphadenopathy; myalgia; and rash that is more prevalent on the face and extremities than the trunk and carries the risk of complications like superimposed infections [1]. The WHO notes that the most recent cases of monkeypox are uncommon since they are occurring in nations in which the virus isn't really widespread. As surveillance increases, WHO then predicted that further cases are expected to be recorded in the ensuing days [2]. According to the European Centre for Disease Prevention and Control, 219 confirmed instances will have been recorded globally by May 25, 2022, with the majority of cases being found in young guys who self-identify as men who have sex with men[3]. The majority of reported cases in the most recent outbreak presented for sexual health or even other health services in basic or secondary healthcare facilities, despite ongoing epidemiological investigations. with a history of frequent local travel or no travel at all, as opposed to frequent travel to places in which the virus was not previously known to exist, such as countries in Europe, North America, or other countries. Close contact is how monkeypox spreads. It typically starts with flu-like symptoms before developing into body rashes. Based on findings in Africa, 1 in 10 individuals who develop the disease may die as a result[2]. The viral zoonosis can spread directly from person to person through close contact with skin lesions, lesions on inner mucosal surfaces, body fluids, and respiratory secretions of the infected individuals. It can also spread through reservoirs like African mice, monkeys, tree squirrels, and prairie dogs. The virus normally enters through the oropharynx, nasopharynx, or intradermal pathway after replication at the inoculation site and spreads through lymph nodes that cause viral dissemination to other organ systems before viremia[4]. Although Iraq hasn't yet recorded a confirmed case of monkeypox, the virus is almost certain to spread throughout the nation. Taking into account the strain that the COVID-19 outbreak has placed on Iraq's struggling healthcare system. To stop its ongoing annihilation, several safety precautions must be taken. Co-epidemics and co-occurrences of COVID-19 infection and viral illnesses

like, hemorrhagic fever, measles, and poliomyelitis have in the past led to a large number of fatalities that could have been avoided by taking advanced precautions [5,6].

Monkeypox Disease History

In sub-Saharan Africa, the monkeypox virus is thought to have infected people for thousands of years[7]. In the Democratic Republic of the Congo, monkeypox was first recognized as a disease that affects humans in the 1970s formerly known as the Republic of Zaire[7,8,9]. Between 1970 and 1980, 59 human monkeypox patients were reported, with a death rate of 17%, following its identification as a human virus. These incidents all involved people who had come into contact with small forest animals in the forested areas of Western and Central Africa like rodents; squirrels; monkeys. In 2003, the United States experienced the Western Hemisphere's first outbreak of monkeypox. There have now been more cases discovered from outside Africa in the last week alone than there have been outside the continent overall since the virus was originally discovered to be a cause of illness in humans in 1970. Scientists are on high alert as a result of its rapid proliferation[10,11]. Travelers from Nigeria to Israel on September 2018; as well as the United Kingdom; on December 2019; May 2021; and May 2022; Singapore in May 2019, and the USA on July to November 2021 have also been reported to have monkeypox. Lots of cases of monkeypox were discovered in May 2022 in numerous nations where the disease had not before been documented, necessitating numerous investigations to comprehend the epidemiology, infection sources, transmission patterns, and other aspects of a disease process[12].

Monkeypox virus's main natural host

It has been determined that some animal species are susceptible to the monkeypox virus. Tree squirrels; Gambian pouched rats; mice; nonhuman primates, and other species are examples of these creatures. Despite this, the history of science of the monkeypox virus remains unclear, and further research is needed to determine the precise reservoirs as well as how virus circulation is kept up in the wild[13].

Period of Incubation

The typical incubation time for monkeypox viral disease is between 6 and 13 days, although it can also be between 5 and 21 days[13].The 2003 outbreak in the United States mentioned above enabled for calculation of the interval between exposure and symptom manifestation. About half of the people said they had been scratched, bitten, or pet by an infected animal[14].The estimated period from exposure to disease for 29 patients was 12 days. The incubation time may be shorter among people who have previously been bitten or scratched by an animal (9 days as opposed to 13 days, respectively).[15].

The Transmission

There are two ways that the monkeypox virus can spread: from animal to human (zoonotic) and from human to human.

Zoonotic (animal-to-human) transmission

Direct contact with blood, body fluids, and cutaneous and mucosal lesions from infected animals can result in animal-to-human (zoonotic) transfer. A bite or scrape, the preparation of bush meat, direct contact with biological fluids and lesion material, and even indirect contact with lesion substance, such as via contaminated bedding, are other possible methods of animal-to-human transfer[16].Numerous animals in Africa, include ; tree squirrels; Gambian poached rats; dormice, various species of monkeys, and others, have shown signs of monkeypox virus infection. Rodents represent the most plausible suspects for the monkeypox natural reservoir, though this has not yet been determined. Eating undercooked meat and other diseased animal products is a potential risk factor. People who live in or close to forests may be indirectly or minimally exposed to diseased animals[17].

Transmission of (Anthroponoses) from human to human

Transmission from person to person might happen by big respiratory droplets. Additionally, intimate touch with infected skin might cause transmission. From touch with lesion material or lesions. Long face-to-face exposure may be necessary for droplet transfer to take place. In the absence of personal protective equipment, within just a two meters radius for approximately three hours[18].In general, there is an extremely little transmission from person to person[19].However, over 90 confirmed instances of a monkeypox outbreak were recorded in May 2022 in a some non-endemic nations[20].The number of person-to-person infections in a community's highest recorded chain of transmission has increased over the years from six to nine. This might be an indication of a general decline in immunity brought on by the end of smallpox vaccination campaigns. Congenital monkeypox can result through transmission through the placenta, which can also happen during intimate contact during labor and after delivery. It is still unknown if monkeypox can be transferred especially through sexual transmission channels, although intimate body contact is a very well risk factor for transmission[21].

The Pathogenesis

- **Incubation period**

This is the time frame between coming into contact with an infection as well as the onset of the initial symptoms. The monkeypox virus enters the body through any entry site or pathway like, oropharynx; nasopharynx; or intradermal, replicates at the site of inoculation, and then spreads to nearby lymph nodes. As the virus progressed to other organs, it eventually caused an initial viremia. This is the incubation period, which can last up to 21 days but is typically 7 to 14 days long[22].

- **Prodromal Stage**

This stage describes the time after incubation but before the typical signs of an illness manifest. Before lesions are visible, there are 1–2 days of prodromal signs including lymphadenopathy and fever caused by secondary viremia. Patients who are sick now might be spreadable. Skin lesions develop from oropharyngeal lesions. By the time lesions start to form, serum antibodies are frequently detected[23].

Clinical Presentation

Monkeypox symptoms include systemic sickness, such as fever; chills; myalgias; muscle aches; back pain; swollen lymph nodes as well as a distinctive rash that must be distinguished from smallpox symptoms. Viral strain might also affect the clinical disease[24]. Typically, the rash appears between one three days after the fever first appears. The body In addition to being flat (macules) or raised up (papules), lesions can be filled with either clear (vesicles) or yellow fluid (pustules), crust over, then dry out and detach. Sores mostly on skin can number anywhere between a few and thousands[25]. The cheeks, palms of the hands, and the soles of the feet are likely areas where the rash will appear. Additionally, the lips, genitalia, and eyeballs all exhibit them. It mostly affects the face (95%) as well as the palms of hands and the soles of feet (75%). Along with the cornea, oral mucous membranes (70%), genitalia, and conjunctivae are all also impacted in 20% of instances. Typically, monkeypox is a self-limiting illness, with symptoms lasting between two and four weeks. Children are more likely to experience severe cases, which are linked to the level of viral exposure, the patient's condition, and the type of problems[26].

The Diagnosis

The Clinical Features : are important in making the diagnosis; although, to distinguish this illness from those brought on by other probable etiologies, laboratory confirmation of the monkeypox virus is required. The (WHO) as well as the US Centers of Disease Control and Prevention For the 2022 outbreak of monkeypox, the Control (CDC) has proposed case definitions that integrate clinical; epidemiologic; and laboratory data.

The Diagnostic assays : include electron microscopy; real-time polymerase chain reaction (PCR); enzyme-linked immunosorbent assay (ELISA); and immunofluorescent antibody assay (Only in specialized laboratories in mammalian cell cultures),[27]. On electron microscopy, the distinctive brick-shaped virions of the poxvirus are visible. Acute inflammation, significant spongiosis, ballooning keratinocyte degeneration, and cutaneous edema can all be present in other viral infections, according to histopathologic study[28]. The Centers for Disease Control and Prevention (CDC) created the immunoglobulin M-capture and an IgG ELISA that showed recent monkeypox virus infection using sera from patients collected it during 2003 United States outbreak. Five and eight days following the commencement of the rash, respectively, serum IgM as well as IgG antibodies were found in the blood[29]. Furthermore, A portion of skin tissue is removed during a biopsy and examined for the monkeypox virus[30].

It should be highlighted that the differential diagnosis of monkeypox, which includes various poxviruses and herpesviruses, especially chickenpox, should be done to exclude these illnesses from the diagnosis because they have similar clinical symptoms with monkeypox. The typical blood tests are also not typically advised since the monkeypox virus only remains in the blood for just a brief period of time and is not a reliable diagnostic for identifying monkeypox[30].

The Treatment

The accurate diagnosis of monkeypox must take into account a number of illnesses, such as varicella; herpes simplex virus; smallpox; and other poxviruses. Monkeypox symptoms frequently go away on their own, necessitating no medical intervention. As there is currently no effective antiviral medication, the management of monkeypox is primarily symptomatic. If at all possible, let the rash dry out before treating it. If necessary, cover the affected area with a wet bandage to provide protection. Don't touch your eyes or mouth sores. You can use eye drops and mouthwash as long as you avoid items that include cortisone[31].

Antiviral Treatment

The majority of individuals with monkeypox experience a moderate, self-limiting illness; however, those who have a severe illness or who are at high risk for a severe illness may benefit from antiviral treatment. patients with infection problems, children under the age of eight, pregnant or nursing mothers, and immunocompromised individuals. Treatment can also be considered for monkeypox infection in traditionally atypical sites, the mouth, eyes, and genital sites. Patients with advanced HIV-1 infection; leukemia; lymphoma; generalized malignancy; solid organ transplantation; therapy with alkylating agents; antimetabolites; radiation; tumor necrosis factor inhibitors; high-dose corticosteroids; and being a recipient of hematopoietic stem cell transplant are common examples of immunocompromised patients[32]. Tecovirimat and brincidofovir are the two antiviral medications that are currently approved for the treatment of monkeypox infections. Any age group may be prescribed brincidofovir, which is administered orally. Because of its unique construction, it is less harmful to the kidneys and helps deliver the proper dosage of the medication into cells so that the cidofovir component can be released. Other antivirals include tecovirimat, which inhibits a protein just on surface of orthopoxviruses to prevent the spread of infection[31]. Only smallpox is licensed for treatment with Tecovirimat in the US. It has been demonstrated in a lab setting that it can stop the smallpox virus in healthy persons. It has not been tested on individuals who have smallpox or other orthopoxviruses. In Europe, tecovitimat has been approved for the treatment of cowpox, monkeypox, and smallpox in special cases[33]. Cidofovir, an injectable medication approved in the UK to treat a severe viral eye infection in persons with Aids, is another antiviral that may be used. Cidofovir is transformed inside the body into the antiviral compound cidofovir diphosphate. Cidofovir is transformed inside the body into the antiviral compound cidofovir diphosphate. The similarly comparable drug brincidofovir, that has been approved for treating smallpox in the US,

may be a preferable alternative to cidofovir because it is such a potent medication and can harm the kidneys. Other viral diseases have been studied on people with brincidofovir. Laboratory tests demonstrating its effectiveness against Orthopoxviruses led to its clearance for treatment in smallpox in the US. Because of this, brincidofovir is also mentioned as a possible medication for treating monkeypox[33].

The Prevention

Data indicate that prior smallpox vaccination reduces the risk of infection and prevents symptoms from symptoms. As stated below, it is uncertain what function the smallpox vaccination or vaccinia immunoglobulin play in post-exposure prophylaxis.

The Smallpox immunization

The clinical signs and symptoms of monkeypox infection may be lessened by prior smallpox immunization with vaccinia virus, which has a considerable protective effect against acquiring this infection[34]. A modified vaccine against Ankara (MVA) will launch in September 2019. was authorized for the prevention of monkeypox and smallpox[35].Advisory Committee and Immunization Practices (ACIP) decided to recommend this vaccine in 2021 for a group of workers who have a high risk of coming into contact with an orthopoxvirus infection, such as research laboratory staff and specialized clinical laboratory staff who conduct orthopoxvirus diagnostic testing. as well as members of the designated response team who run the danger of being exposed to orthopoxviruses at work. Based on shared clinical decision-making, the ACIP also advised vaccination for medical professionals who give ACAM/ 2000. a live vaccine with active protection against the disease. Patients with replication-competent orthopoxviruses should receive smallpox treatment[36].

Control of the Monkey Pox Virus spreading

For those in close touch with an infected patient, preventing monkeypox infection could be difficult. avoiding direct contact to skin lesions or items used by monkeypox sufferers like clothing, bedding, and towels, for instance. is crucial to lowering the risk of infection. Clinicians should wear personal protective equipment, such as a gown; gloves; eye protection, and a fitting N95 mask, when taking care of patients with skin lesions[37]. A patient with suspected or confirmed monkeypox infection should be masked immediately, have lesions covered with a gown or sheet, and be placed in isolation in a single-person room. There is no need for special air handling, but if a patient needs to be admitted to the hospital, they should be put in a negative-pressure room if it is available. Standard disinfection and cleaning techniques are sufficient for environmental infection management, however dirty clothing must be handled with gloves to prevent contact to lesion material that might be present on the laundry. The best strategy to stop the virus that causes monkeypox from spreading is to:

A- Steer clear of contact with infectious animals(particularly ill or deceased animals).
B- Keep from touching beds and other virus-contaminated items.
C- Completely prepare all dishes that use meat or other animal products.
D- Consistently wash your hands with water and soap.
E- Steer clear of direct touch with someone who may be carrying the virus.
F- Engage in safe sexual behavior, such as the use of dental dams and condoms.
G- When you're away from other people, put on a mask which covers the mouth and nose.
H- Decontaminate and clean frequently touched surfaces.
I- Get comfortable wearing personal protective equipment (PPE) while caring for virus-infected patients[38].

CONCLUSION

Currently generating a global pandemic, the monkeypox virus is a highly contagious orthopoxvirus. The good news is that monkeypox rarely goes undetected when that infects a person, in part due to the skin sores it creates, contrasting SARS-CoV-2, that can spread asymptomatically. It would be particularly concerning if monkeypox can spread asymptomatically as it would become the virus more difficult to detect. In order to promote awareness, get the right diagnostic testing, perform contact tracing, and guarantee that afflicted people and associated contacts have access to healthcare, public health officials, physicians, and the community will need to work carefully in collaboration.

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