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Monkeypox Virus a Rising Concern in Current age: A Mini Review on Epidemiology, Clinical Manifestations and Therapeutic interventions

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Abstract

The aim of our study is to enhance the awareness about monkeypox virus among people so that its drastic effects can be overcome easily. An orthopox virus of the poxviridae family called the monkeypox virus (MPV) is currently causing worry on a global scale. It has two recognized viral clades and is indigenous to central and western Africa. The natural reservoirs are probably a variety of African rodents and primates. Direct contact with diseased animals, such as bites, scratches, and butchering, results in zoonotic transmission. Human to human transmission happens when two people come into close touch (for example, through skin-to-skin contact, sexual contact, or respiratory droplets). Human MPV illness often starts with a fever prodrome and lymphadenopathy,and then progresses to a diffuse maculopapular to vesiculopustular skin/mucosal lesion eruption. The febrile prodrome may be lacking in the current 2022 outbreak, which is mostly affecting males who have sex with men (MSM), and skin/mucosal lesions. The data in this study was collected from different data basis like google scholar, pubmed and medline etc by using various key words. However, the existing data is clearly indicating the drastic impact of MPV on human health and necessay steps must be taken to overcome it.

Keywords: Monkeypox virus, Transmission, Human health, Awareness.

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INTRODUCTION

In smallpox's history, significant efforts are being made to eradicate the illness from populous regions having high frequency of illness. Variola is regarded as a disease that can be passed from person to person; no further reservoir for the virus that causes smallpox has been found. The recent discovery of the "monkeypox," a closely related pox illness in monkeys (70), has sparked interest in the clinical and epidemiological relationships between these two diseases [1, 2]. Several significant concerns about the origin of monkey pox relate to its etiology. Did someone accidently infect captive monkeys with a variola virus that a human associate was incubating? Is there a strain of the variola virus that has been well-adapted to humans and is now zoonotic in some species? Perhaps the same inquiries with regard to the vaccine virus could be made. Finally, consideration is given to the question of whether or not monkeypox may be caused by a different, as yet unidentified member of the variola vaccinia complex. Epidemiological issues must also be brought into sharp focus because natural monkey pox virus (MPV) infection in humans has been documented [3, 4]. A dozen African nations have an endemic case of the infectious illness monkeypox. Past reports of imported cases outside of Africa have also been made. Monkeypox infections, including human-to-human transmission, have been documented in a multi-country epidemic in non-endemic nations since early May 2022. The World Health Organization (WHO) proclaimed the situation a Public Health Emergency of International Concern (PHEIC) in July 2022. As of 20 September 2022, 115 countries across five WHO regions had confirmed a minimum of 62,798 human cases of monkeypox, including 20 fatalities. Fever, rash, and swollen lymph nodes are frequently symptoms of monkeypox disease, which is spread to humans through close contact with infected people or animals by the monkeypox virus (MPXV). MPXV is currently divided into the West and central African clades, two lineages. However, the majority of the MPXV strains identified in human outbreaks from 2017, 2018, and 2022 as well as the previous Central African clade and the prior West African clade have recently been proposed a novel classification into MPXV clades. An outbreak of monkeypox is escalating in areas where the virus is not typically common. Monkeypox emerged suddenly and quickly in many countries at once,

suggesting that undocumented transmission may have persisted. Globally, the number of reported cases is steadily rising. At least 20 non-African nations have reported more than 57662 suspected or confirmed cases as of September 9th, including Canada, Portugal, Spain, and the United Kingdom. The size of this epidemic is unprecedented outside of Africa. Researchers are working hard to identify the genes that contribute to the virus's increased virulence and transmissibility. Given the similarity of the viruses, many nations have started receiving smallpox immunizations, which are thought to be particularly effective against monkeypox.

The aim of our study is to enhance awareness about monkeypox virus among individuals so that it can be diagnosed and treated easily. The number of monkeypox virus is increasing day by day and necessary steps must be taken by whole world to avoid its serious complications.

Epidemiology

The MPV virus causes monkeypox and is an enclosed, double-stranded DNA orthopox virus belonging to the poxviridae family. Currently, it is a global concern. A more virulent Congo Basin (Central African) strain and a less virulent West African clade make up the MPV, which is native to Central and Western Africa.1 Small African mammals including dormice, African rope squirrels, Gambian pouched rats, and other most likely, the MPV's natural reservoirs are primates. Zoonotic transmission can occur as a result of direct contact with diseased animals, such as bites, scratches, or the preparation of bush meat. Human-to-human transmission can also occur as a result of direct skin-to-skin (or mucosal) contact with infected wounds, contaminated bedding and clothing, and contaminated respiratory secretions [5, 6]. In 1958, a lab outbreak of vesiculo-pustular skin eruptions in crab-eating macaques in Denmark led to the discovery of MPV [7]. Subsequent years saw other outbreaks of MPV disease in lab monkeys, with a major outbreak in 1964 among anteaters and other primates in the Rotterdam Zoo. In the 1970s, the first human cases of MPV illness were discovered in Central and Western Africa, mostly in children who had a diffuse vesiculopustular rash, lymphadenopathy, and fever [8]. The Congo Basin saw the majority of the succeeding decades' hundreds to thousands of new human MPV disease cases [9]. In 2003, a cross-infection outbreak due to pet prairie dogs kept with imported African rats led to dozens of unexpected cases of human MPV illness in the Midwest of the United States [10].

Clinical Manifestations

The clinical presentation of the monkeypox virus, a member of the orthopoxvirus genus, is comparable to that of smallpox [11, 12, 13, 14, 15]. Human incubation lasts between 7 and 14 days on average, but it can last anywhere between 4 and 21 days [16, 17, 18, 19]. The illness begins with a 1-4 day febrile prodrome that is accompanied by headache, backache, and muscle aches. Sometimes it is also accompanied by weariness, sweating, and lethargy, as well as the cutaneal presentation. 1-3 days following the onset of a fever, skin rashes start to occur. Rashes show up on the face, inside the mouth, on the hands and feet, on the chest, on the genitalia, on the anus, and in the eyes. Rash may occasionally appear first, then subsequent symptoms. The quantity of lesions varies. After being filled with clear liquid, they take on a "vesicle" appearance. "Pustules" develop when the formerly clear liquid inside the vesicles changes to a yellowish liquid. With the fall of the crusts, pustules, crusts, and lesions go. Patients are regarded as being non-infectious after the crust falls off. When an individual's immune system is inhibited, the disease is thought to be more severe. Scarring from the rash is the most typical consequence of an infection. A 2009 study on monkeypox in people found that more severe side effects, like respiratory distress and bronchopneumonia, could also occur. Ocular infections can develop and may cause corneal scarring and even irreversible vision loss. More severe complications have been reported to occur more frequently in unvaccinated patients than in those who have received vaccinations [20, 21, 22, 23, 24, 25].

According to previous reports, instances between 1970 and 2019 ranged in age from four to twenty-one with men being more at risk than women. Additionally, the majority of cases following the 2022 outbreak are men (98%) in their thirties who had sex with other men—gay or bisexual men—and are guys. 69% of cases additionally display flu-like symptoms, and 96% of cases have rashes [26]. The most prevalent signs and complications are respiratory distress, sepsis, ulcers, fever, super-infection of the skin, gastrointestinal/mouth/throat, inflammation/lymphadenopathy, corneal infection, and skin scarring/cellulitis/skin lesions [27]. Clinical symptoms that persist between two and four weeks can start unexpectedly and get a little worse [28]. However, each person's MPX condition develops and progresses in a different way. A prodrome of fever, malaise, headache, myalgia, and/or lymphadenopathy appears 4–17 days after exposure in the classic human MPV illness [29]. This is followed by a typical maculopapular rash that may be unpleasant or itchy and progresses into vesiculo-pustular lesions. These lesions can be dispersed across the face, oral mucosa, trunk, and extremities (including the palms and soles), and are often of similar size stage and stage of progression, well-circumscribed, and possibly umbilicated (Fig). Typically, the illness lasts 2-4 weeks with a low death rate. However, the normal prodromal symptoms have frequently been absent or have appeared after the rash in this most recent MPV disease outbreak (known as the West African clade) [30, 31]. It has been noted that the rash in this epidemic begins in the oral, vaginal, and anal mucosal areas (or nearby skin areas) and may not extend to other places. There have also been reports of severe cases of proctitis, urethritis, balanitis, and pharyngitis. Additionally, bacterial super-infections of lesions have happened. Once prodromal or rash symptoms appear, patients are regarded as contagious until lesions scab over, fall off, and a new layer of skin or mucosa grows underneath. Importantly, these skin and mucosal lesions may resemble other illnesses such acute HIV, molluscumcontagiosum, varicella zoster, herpes simplex, syphilis, or varicella zoster.

Diagnosis

For public health and healthcare professionals (HCW), monkeypox poses difficulties in terms of surveillance and laboratory capabilities. Monkeypox, a typically endemic illness, is currently being reported as having expanded to non-endemic regions due to an increase in cases in Europe, North America, and Australia [32, 33, 34, 35, and 36]. This might be as a result of more infected people travelling, a lack of surveillance procedures, and laxer COVID-19 regulations. Additionally, since 1982, the smallpox vaccination, which offers around 85% protection against monkeypox infection, has not been used. Any relevant epidemiological data should be examined to aid the surveillance effort. It is known that many of the initial patients reported international travel in the 21 days before the onset of symptoms, visiting nations where monkeypox is not known to be endemic, as well as taking part in big festivals and other events where close, direct skin-to-skin contact probably took place. Recent travel records, however, do not prove that the virus was contracted while travelling. A growing number of reported cases have been connected to local community transmission since late June [37]. Clinical signs and symptoms are not always specific, as was already mentioned. Because there are many illnesses that can produce skin rashes and the clinical presentation may be more frequently abnormal in this outbreak, it may be challenging to separate monkeypox solely based on clinical presentation, especially for those with an aberrant look. As a result, it's crucial to take into account additional possible causes of various skin lesions or a widespread rash. Herpes simplex virus, varicella zoster virus, molluscumcontagiosum virus, entero-virus, measles, scabies, syphilis, bacterial skin infections, rickettsia pox, drug allergies, parapoxviruses, or other diseases are other examples of aetiologies for skin lesions that look similar at different stages of development [38, 39]]. Clinicians should be on the lookout for patients who exhibit a fresh, distinctive rash or who fit one of the epidemiologic criteria and

have a strong clinical suspicion of having monkeypox. The rash associated with monkeypox can be mistaken for rashes from herpes, syphilis, and varicella, among other rashes seen in clinical practice. Anyone who meets the clinical and epidemiologically suspected case definition for monkeypox should be provided testing [40].

Therapeutic interventions

According to a paper released by the Institute of Medicine back in 2003 as a follow-up to their 1992 report, specialists have recognized the serious threat of zoonotic illnesses coming from constant remodeling of ecosystems. Since, SARS outbreak in 2003 and even earlier [41]. The World Health Organization (WHO) and the Centers for illness Control and Prevention (CDC) both refer to MPX as an emerging illness [42]. The battle to stop the spread of MPX is being fought on numerous fronts, on the ecological front, reducing human exposure to suspicious host species must be the first step since, according to the existing data, endemic disease cannot persist without recurrent zoonotic introductions [43]. This can be accomplished by decreasing human reliance on hosts, particularly rodents, as sources of protein and increasing reliance on vegetarian substitutes [43]. Additionally, urban growth into previously forested areas needs to be researched to avoid displacing reservoir animals. Ecological protection is crucial since new strains might not need to be introduced repeatedly if they become more human-transmittable [44]. Protecting at-risk populations, such as healthcare professionals, those who know MPX patients, and people who work in rural regions, would be another front. The CDC advises obtaining this protection with the smallpox vaccine [45], as evidence suggests that this vaccine offers 85% protection against MPX through cross-immunity [46]. The CDC advises that in hospital settings, patients should be segregated in rooms with negative pressure and that medical staff should exercise proper contact and droplet precautions [47]. This is the recommended course of action when a patient has a fever and a widespread vesicular or pustular rash [48]. According to data, MPX is less contagious among humans than smallpox, and the longest chain of infected people is six patients or less [49].

Monkeypox does not currently have a permanent cure. However, some smallpox drugs and treatments, like tecovirimat, cidofovir, and immunoglobulin vaccinia (IVG), may be able to treat monkeypox. Monkeypox and other orthopoxviruses have been specifically targeted by tecovirimat. It should be utilised cautiously though, as it is not currently generally accessible. While tecovirimat prevents the virus from spreading inside cells and may be useful in treating monkeypox, cidofovir is an antiviral that inhibits viral DNA polymerase. The main method of controlling monkeypox is still supportive and symptomatic therapy, notwithstanding the potential of these therapies [50, 51]. A 2018 study looked into the use of monoclonal antibodies to stop severe MPXV infection. Two antibodies were utilized in the study: 7D11 and c8A [52]. By attacking mature virions (targeted by 7D11) and extracellular virions (targeted by c8A), these monoclonal antibodies effectively prevent the virus from proliferating. The results of the trial showed that these antibodies were effective in avoiding and easing MPXV symptoms. Two of the three treated animals survived and showed no symptoms, demonstrating that 7D11 was able to reduce the amount of virus by up to 90% at dosages above 1250 PFU/ml. Another intriguing medication with the potential to be used to treat MPXV is interferon-beta (IFN-). IFN is a protein that is used as a treatment for a variety of illnesses, including multiple sclerosis (MS). It functions by encouraging the expression of IFN-induced genes. As a result of this activation, infected cells undergo apoptosis, macrophage and NK cell activity is enhanced, and protein synthesis within the cell is inhibited. Additionally, these genes promote major histocompatibility complex-1/II expression, which can be advantageous in the fight against the virus [53].

CONCLUSION

Neurologists should be ready to recognize, diagnose, and treat probable neuroinvasive illness or other neurologic symptoms even though human MPV infection neurologic manifestations are uncommon given the vast number of growing cases worldwide. The 21 days prior to the development of symptoms, suspected MPV disease cases should be questioned about travel and possible exposures (including sexual exposures). Acute HIV, varicella zoster, herpes simplex and other mimics should also be taken into account. It is crucial to emphasize that although MSM have been the majority of cases to date, cases have not only been detected in this demographic, and more cases are anticipated to appear in other communities with comparable intimate interactions. For information on reporting, contact tracing, testing, and getting vaccines and antivirals, local, state, or territorial health departments should be consulted. On the websites of the CDC or the World Health Organization (WHO), patients and healthcare professionals can find the most recent information [54, 55].

Conflict of interest

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