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Review Article

OVERVIEW OF MONKEYPOX (MPOX) PRESENTATION, MANAGEMENT, AND PREVENTION

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Abstract:

Background: The 2024 monkeypox (mpox) outbreaks are characterized by significant epidemiological shifts and health impacts, particularly in the Democratic Republic of Congo (DRC) and among high-risk populations globally. The resurgence of mpox has raised concerns about its transmission dynamics and the effectiveness of public health responses.

Aim: This overview will discuss the Mpox outbreak presentation, management, and prevention.

Method: This is a comprehensive review COPD. The PUBMED and Google Scholar search engines were the main databases used for the search process, with articles collected up to 2016. This thorough review ensures that the information presented is reliable.

Conclusion: The Mpox situation in 2024 showcases a blend of epidemiological dynamics, public health initiatives, and persistent research into prevention and treatment. Transmission remains primarily through close contact, with respiratory methods being less significant, highlighting the need for heightened public awareness, especially in non-endemic areas. To effectively manage and control monkeypox outbreaks, a comprehensive approach involving advanced diagnostic techniques, antiviral therapies, and vaccination strategies is essential, along with continuous research to adapt to evolving challenges.

Keywords: monkeypox (mpox), outbreak, presentation, management, prevention.

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INTRODUCTION:

As of 2024, the global landscape of monkeypox, now referred to as Mpox, continues to evolve following significant outbreaks in previous years. The 2022-2023 Mpox outbreak was notable, with cases reported in over 110 countries, particularly concentrated in the Americas and Europe. (1) This unprecedented spread has raised concerns about the disease's potential to become a pandemic. The outbreak's dynamics, transmission patterns, and public health responses are crucial to understanding the current situation and future implications. Mpox is a zoonotic viral disease endemic to Central and West Africa, but the 2022 outbreak saw a global spread, with nearly 92,500 confirmed cases documented by the World Health Organization (WHO). (2) This alarming trend has prompted researchers to investigate the epidemiological shifts that have allowed Mpox to thrive beyond its traditional boundaries. Notably, the outbreak's correlation with sexual networks among men who have sex with men highlights a critical area for further study, as 98% of reported infections were linked to this demographic. (3) The transmission dynamics of monkeypox (Mpox) continue to be a significant public health concern, particularly in light of its recent outbreaks outside endemic regions. The primary mode of transmission remains through close physical contact with infected individuals, specifically through direct contact with skin lesions, body fluids, and respiratory droplets. This close contact is often facilitated during intimate interactions, where lesions may be present in mucosal areas, thus heightening the risk of transmission. (4, 5) In addition to direct contact, monkeypox can also spread through contaminated surfaces, such as clothing and bedding, which may harbor the virus. (6) This emphasizes the importance of hygiene and sanitation in preventing the spread of the virus, especially in communal living situations. While human-to-human transmission is the most effective route, the risk of secondary household transmission appears to be low, suggesting that close, direct contact is crucial for the virus to spread. (5) Respiratory transmission, although considered a potential route, is currently viewed as less significant compared to direct contact methods. Research indicates that while aerosol transmission may occur over short distances, the overall risk remains low compared to other respiratory viruses like COVID-19. (5) The Centers for Disease Control and Prevention (CDC) has noted that the monkeypox virus can enter the body through the respiratory tract, but this route is not the primary concern for transmission. (7)

Clinical Presentation of Monkeypox

Mpox, is a rare zoonotic disease caused by the monkeypox virus (MPXV), which belongs to the Orthopoxvirus genus. The clinical presentation of monkeypox closely resembles that of smallpox but is generally milder, with a lower mortality rate ranging from 1% to 10%. (8) The symptoms typically begin with a high-grade fever, headache, muscle aches, and swollen lymph nodes, which are significant indicators of the infection. (9, 10) The onset of monkeypox is characterized by a sudden appearance of these systemic symptoms, often followed by the development of a distinctive vesicular and pustular rash. This rash usually appears 1 to 3 days after the initial symptoms and starts on the face before spreading to other body parts, including the palms and soles. The rash progresses through various stages, beginning with fluid-filled blisters that eventually crust over, similar to the progression seen in smallpox. A notable clinical feature that distinguishes monkeypox from smallpox is lymphadenopathy, or the enlargement of lymph nodes, which is not observed in smallpox patients. (9) This enlargement is indicative of the immune response to the infection and is a critical aspect of the clinical diagnosis. (9, 10) The presence of skin rashes in defined body regions serves as a crucial diagnostic indicator, particularly in the context of recent outbreaks, which have prompted global health concerns. (10) The World Health Organization (WHO) declared the monkeypox outbreak a Public Health Emergency of International Concern (PHEIC) in July 2022, highlighting the need for effective surveillance and control measures. (9)

Diagnosis and Differential Diagnosis

Diagnosing Mpox involves several advanced molecular techniques that ensure high sensitivity and specificity. The preferred method for diagnosis is Polymerase Chain Reaction (PCR) testing, which utilizes samples from skin lesions to detect the presence of the monkeypox virus (MPXV). Among the various PCR assays developed, the LightCycler quantitative PCR (LC-qPCR) system stands out due to its direct targeting of the A-type inclusion body gene (ATI gene) of MPXV, making it a reliable diagnostic tool. (11) The LC-qPCR has demonstrated over 90% sensitivity and specificity when validated against virus isolation, confirming its effectiveness in diagnosing MPXV infections. (11) In addition to LC-qPCR, other PCR-based assays have been developed. The E9L-NVAR assay, a TaqMan-based real-time PCR, targets the orthopoxvirus DNA polymerase gene and is designed to detect various Eurasian orthopoxviruses, including MPXV. Furthermore, the B6R assay employs a hybridization method using an MGB Eclipse™ probe to specifically detect the envelope

protein gene (B6R) of MPXV, providing an additional layer of confirmation for monkeypox infections. (12) For rapid and sensitive detection, the loop-mediated isothermal amplification (LAMP) assay has been introduced. This method is not only effective for diagnosing MPXV but also allows for the assessment of viremia levels, which correlate with the severity of symptoms. A combined LAMP assay (COM-LAMP) has also been developed to differentiate between the Congo Basin and West African strains of MPXV, which is crucial given the varying virulence of these strains. (13) The use of specific strains, such as MPXV Zr-599 (Congo Basin strain) and MPXV Liberia (West African strain), in validation studies has further enhanced the specificity of these diagnostic approaches. Unique genetic markers have been identified that allow for the differentiation between these strains, ensuring accurate diagnosis and treatment. (11)

Management of Monkeypox Cases

the management of Mpox remains a critical public health concern, particularly in light of its potential to spread and cause significant morbidity and mortality. The current strategies for managing monkeypox infections emphasize the use of antivirals, vaccines, and clinical support, reflecting a multifaceted approach to treatment and prevention. Antivirals are essential for treating monkeypox, especially during the initial diagnosis phase, which occurs approximately 10-15 days post-infection. The rapid diagnosis and subsequent antiviral intervention are crucial, as they can significantly improve patient outcomes. (14) While there are no specific approved treatments for monkeypox, several antiviral medications originally designed for smallpox are being considered for use. (9) Notably, two anti-smallpox virus drugs have been approved for treating monkeypox, providing specific therapeutic options for managing infections. (8) Vaccination also plays a vital role in monkeypox management. The smallpox vaccine has been shown to provide approximately 85% protection against monkeypox virus (MPXV) infection, making it a relevant strategy for preventing outbreaks. (8) However, the practical application of preimmunization in at-risk populations is limited, and the therapeutic use of vaccines is ineffective after four days of infection^[7]. Therefore, a combination of vaccines and antivirals is suggested as a potential management strategy for those infected. (14) The CDC Emergency Operations Center serves as a critical resource, offering guidance on the use of medical countermeasures, including antiviral drugs and vaccines, which are vital for managing monkeypox outbreaks. (9) This support is particularly important in

low-resource settings, where standardized clinical management guidelines for monkeypox are still lacking. (15) Moreover, the review of monkeypox management emphasizes the urgent need for novel anti-MPXV strategies to control the spread of the virus and prevent future outbreaks. This includes innovative management approaches that address the unique challenges posed by monkeypox, such as its transmission pathways and clinical presentation. (15) Additionally, providing clinical support to mitigate the consequences of compromised skin and mucosa in monkeypox patients is essential for effective management. (15)

Prevention Strategies

In 2024, the prevention strategies for Mpox are increasingly critical due to the resurgence of the monkeypox virus (MPXV) and its potential threat to public health. The smallpox vaccination remains a cornerstone of prevention, providing approximately 85% protection against MPXV infection, although it is not specifically designed for monkeypox. (8) In addition to this, several vaccines have been developed and approved specifically for monkeypox prevention, including JYNNEOS, ACAM2000, MVA-BN, and LC16. (16, 17) These vaccines are particularly important given their immunological cross-protection against Orthopoxvirus, which includes both smallpox and monkeypox. The implementation of these vaccines is part of a broader strategy that includes timely identification and isolation of confirmed cases, as well as vaccination of close contacts to curb the spread of the virus. (18) Furthermore, the adoption of novel anti-MPXV strategies is essential to control outbreaks and prevent epidemics, especially in light of the recent increase in cases across Europe and other regions. (8) In addition to vaccination, comprehensive patient care strategies are vital. This includes the prevention and treatment of secondary bacterial infections, which can complicate monkeypox cases. Ensuring adequate hydration and nutrition is also crucial for supporting patients and mitigating the severity of the illness. Moreover, protecting vulnerable anatomical locations, such as the eyes and genitals, is a targeted prevention strategy that can help reduce complications associated with the disease. (15)

Public Health Response to Monkeypox Outbreaks

In 2024, the public health response to monkeypox outbreaks remains critical, particularly following the World Health Organization's declaration of the monkeypox outbreak as a Public Health Emergency of International Concern (PHEIC) in July 2022. This declaration underscores the need for a coordinated global response to manage the ongoing threat posed by

monkeypox, which has spread beyond its endemic regions in Africa. (9) To effectively control the outbreak, mass awareness campaigns are essential. These campaigns aim to educate both the general public and healthcare workers about monkeypox, its transmission, and prevention strategies. Additionally, enhancing global health sector preparedness is vital, as the existing health systems are still strained from the COVID-19 pandemic, limiting their capacity to respond swiftly to new outbreaks. (19) Overall, a strategic focus on education, preparedness, and coordinated responses will be crucial in mitigating the impact of monkeypox in 2024 and beyond.

CONCLUSION:

The Mpox situation in 2024 showcases a blend of epidemiological dynamics, public health initiatives, and persistent research into prevention and treatment. Transmission remains primarily through close contact, with respiratory methods being less significant, highlighting the need for heightened public awareness, especially in non-endemic areas. To effectively manage and control monkeypox outbreaks, a comprehensive approach involving advanced diagnostic techniques, antiviral therapies, and vaccination strategies is essential, along with continuous research to adapt to evolving challenges.

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