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Review of Monkey Pox – A Reemerging virus

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Abstract

Background: Global travelling for vacation, educational & official purpose along with deforestation has made several microbes to cause multiple infections in man, migrating from known to unknown global regions. The first human case was reported in 1970, which occurred several years before 2022 epidemic. Rationale: Now that there is an outbreak, that bears a dark cloud in every human mind, whether they have to face a pandemic crisis as it happened with Corona virus. The ORTHO POX virus, that is responsible for the current pathogenic infection coined as Monkey pox, usually cause self-limiting illness.

Keywords: Orthopox virus, monkey pox, vaccinia, rashes & vaccines.

1. Introduction

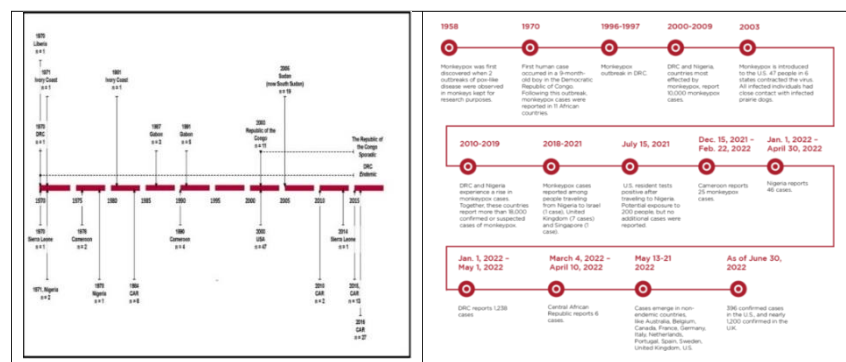
Background

Global travel has become an essential part of life; in the current era. It happens due to professional purpose, educational upliftment, family visits, not forgetting holiday tour for sightseeing. Along with this deforestation aides in the infections happen at international platform. It makes the microbes to shift from known to unknown geographical regions, to be precise from endemic to non-endemic areas (1). One such viral infection which has spread from Africa to other regions of the globe is Monkey pox.

Monkey pox is a reemerging viral disease, as it was discovered in 1958, when two outbreaks of a pox like diseases occurred in colonies of monkeys kept for research (2). Hence named as Monkey pox virus. The first human case was recorded in 1970(3), reported from west & central Africa, then it was linked to international travel, where the disease was endemic.

The rationale behind this article is that this infection has attained the status of “PHEIC” by WHO, on July 23rd 2022, after Corona, Ebola viral, SARS infections in the recent past (4). A detailed review of the virus including its morphology, pathogenicity, clinical features, lab diagnosis, treatment, preventive measures including vaccines will provide clarity on this viral infection & adhere to safe practices in breaking the spread of infection

Epidemiology



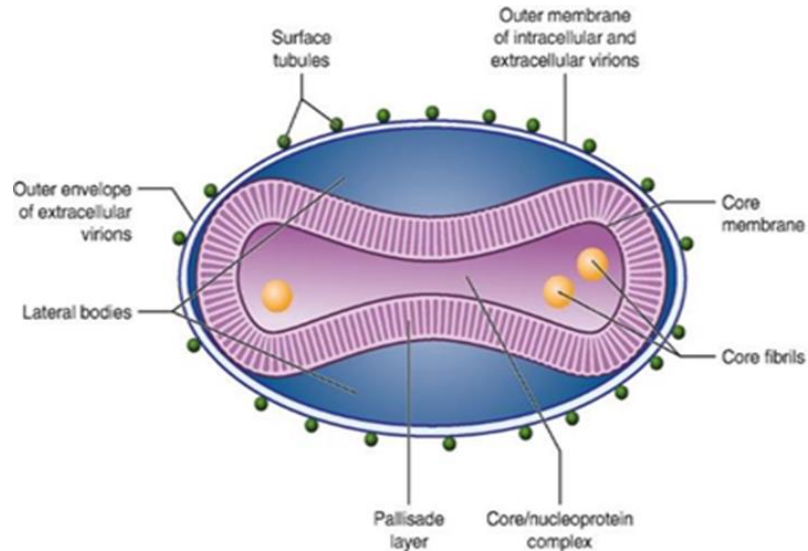
Discussion

ORTHOPOX Virus is a genus in the family Pox viridae. infections associated with this genus includes Small pox, Cow pox, Camel pox & Monkey pox. Monkey pox has been existing for more than 5 decades in humans (3) but was localized only to Africa, currently its spread to other countries has created turbulence in the medical field as well

as in the common man from the march 2022, instilling the fear of pandemic (5).

Morphology of the virus is as follows: an enveloped double stranded DNA virus having 190kb genome, dumb bell shaped with lateral bodies, existing throughout the world (6)

Morphology of Monkey Pox virus



It infects vertebrate & invertebrate species, replicating in cytoplasm (7). It is divided into 2 clades: WA & Congo clade. The Congo or central African clade is known to cause more severe infections than the West African clade (7)

PATHOGENESIS: Infection in humans is due to close contact with animal – classical example of Zoonotic disease (8), it also spreads from an infected human (9)

Transmission in humans happens due to close /intimate contact like sexual acts like oral, anal, vaginal or touching the genitals of the infected person with Monkey pox. Prolonged face to face contact, hugging, kissing can also precipitate infection (10). More commonly observed among homosexuals (11).

Transmission also happens from infected animals to man by bites, scratches or consumption of meat prepared from

infected animal (12)

Touching inanimate objects like bed, towels, clothes, objects & surface that has been touched by the infected person also transmit the virus. The surface laden with respiratory secretions/ droplets of the diseased will also enhance the spread

The virus once gain access into the host, gets localized, then spread through lymphatic channel to rest of the human body. incubation period is 6 to 13 days. After which there is fever, chills, swollen lymph nodes, exhaustion, muscle aches, back pain, headache, and respiratory tract symptoms (13). This lasts for 3 weeks after exposure to the virus.

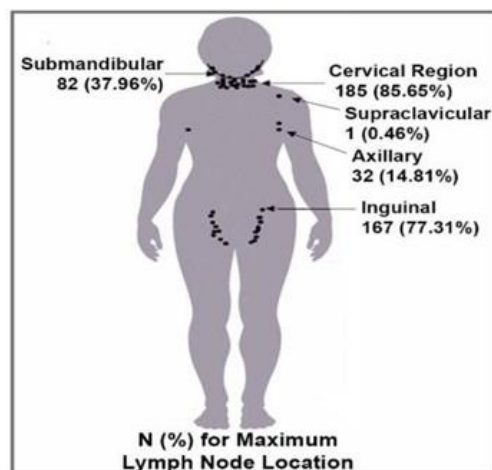
Rash develop 1 -4 days after the exposure. Begins as 2-5 mm diameter maculopapules that evolve into vesicles, pustules & later crust. Rashes last for 10 days approximately (14).

Cutaneous lesions of Monkey Pox



Lymphadenopathy in Monkey pox





Rashes are commonly seen on the face & extremities (95% of cases) rather than the trunk. Also observed in oral mucosa, palms, soles, genitalia, conjunctiva as well as cornea (14).

Usually observed as self-limiting disease, may become associated with complications like sepsis, encephalitis, bronchopneumonia, secondary infections depending on the immune status of infected person. Complications are seen more among the immunocompromised persons (15)

Lab diagnosis

Samples that need to be collected include: 1) swabs from the rash/ lesions (2) swabs from vesicular roof - transport the samples in Viral Transport media (VTM) in suitable temperature (16)

Each sample need to be placed in a separate container, ship / store at 2-8° C or frozen at - 20°C, as required. In India, the confirmation of monkey pox infection is done in NIV, PUNE (17)

While transporting, samples need to have the low temperature, so dry ice need to be kept along with the specimen, samples received outside the acceptable temperature range will be rejected. (17). Confirmation is done by the molecular technique PCR (18)

Treatment

Many have mild self-limiting illness –so symptomatic treatment is the main stay.

However, anti-viral developed for treating Small pox may prove beneficial in Monkey pox infections

1. Tecovirimat (TPOXX, ST-246) –approved in US-clinical trials in people have shown the safety & minor side effects, US allows the use of this drug in an outbreak (19)
2. Vaccinia Immune globulin intravenous (VIGIV)-administered in complicated cases of vaccination with vaccinia virus, data not available in monkey pox cases (20)
3. Cidofovir (Vistide) –approved by FDA, in treating cytomegalovirus infections, it's effectiveness against orthopoxviruses IN VITRO has been demonstrated (19)
4. Brincidofovir (CMX 001, Tembexa) - has a safety profile over cidofovir, approved by FDA 2021.

Data not available with monkey pox case (19).

Prevention

For this self-limiting illness, hygienic habits are the main

preventive measure (20)

- Washing hands after coming in contact with contaminated surface & objects is a mandate for reducing the transmission of the virus
- Appropriate disinfectants to be used to remove the infectious agents. (21)
- Reduce the number of sexual partners, avoiding close contact are the other preventive techniques (22)
- Isolation of the infected person will eventually break the cycle of outbreak.

Handling animals with care to avoid bites & scratches are the other corrective measures in controlling the disease spread.

Vaccines

1. JYNNEOS – live, non-replicating attenuated 3rd generation small pox vaccine was approved by FDA in 2019 for health care workers, as intradermal injection for 18 years & above. For persons below 18 years with high risk of Monkey pox infection, it's given as S/C injection (23)
2. ACAM 2000- a replicating vaccinia virus-based 2nd generation small pox vaccine, has serious side effects including myocarditis in small pox patients.
3. MVA-BN - modified vaccinia Ankara Bavarian Nordic –attenuated strain, generated by > 570 serial passages in chick embryo fibroblast, is administered to adults beyond 18 years. Previously administered as IMVANEX for small pox (24)
4. LC16 –an attenuated, replicating small pox vaccine, derived from lister strain of vaccinia. It's immunogenic after a single dose.

Summary

The monkey pox, a zoonotic viral infection, has international relevance & concern due to various reasons as discussed above due to the outbreak that happened in early 2022.

When the community is already challenged with preexisting pandemic corona virus with varied clinical manifestations including complications & mortality (25), it becomes a mandate that every individual is personally responsible for controlling the next reemerging viral threat in the name of Monkey pox by adhering to safe hygienic habits & vaccination protocols (26)

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Conflict of interest

The corresponding author declares on behalf of all authors that there is no potential conflict of interest to publish the article.

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