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Case Report

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Mpox in the Mexican population: Case Report and review of the literature

Summary

Mpox is a disease caused by an Orthopoxvirus, first discovered in Denmark in 1958 and presenting its first epidemic outbreaks in 1970. Currently, as of May 2022, numerous cases have been reported in non-endemic countries, generating worldwide concern given the current pandemic disease caused by SARS-CoV-2. To date, more than 85,142 cases have been reported worldwide and more than 3,768 in Mexico, predominantly in the male population, specifically in men who have sex with men and those with a history of HIV as major comorbidity. We present the case of a Mexican patient with a clinical diagnosis of Mpox with evidence of dermatologic lesions and emphasize the clinical context of his infection mechanism. This case report aims to highlight the importance of the underdiagnosis of the disease at the nationwide level and the need for a real epidemiological paradigm in Mexico. Likewise, the objective is to destigmatize the antecedents that lead to a risk of Mpox infection, as well as a review of the literature and correlation of the same with the clinical case in question.

Keywords: Mpox, Orthopoxvirus, Mexico, clinical case, epidemic outbreak, dermal lesions, public health, atypical, HIV

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Introduction

Mpox was discovered in crab-eating macaques in 1958 in a laboratory in Denmark,[1] with reports of epidemic outbreaks in humans since 1970 in the Democratic Republic of Congo,[2] Mpox is a zoonotic disease caused by an Orthopoxvirus, a double-stranded DNA virus, which generates a clinical pattern that typically manifests with fever, headache, swollen neck, armpits, and groin lymph nodes, back and muscle pain, and fatigue.[3] Currently, it has gained relevance due to numerous case reports as of May 13, 2022, in non-endemic countries with atypical clinical manifestations to what has been previously established, becoming an alarming public health problem.[4] Since its first detection in a 9-year-old boy in the Democratic Republic of Congo, cases of Mpox have been continuously reported in tropical regions in Central and West Africa. Since that first event, human cases of Mpox have been confirmed in 11 African countries, and in 2017 an outbreak was reported in Nigeria with over 500 suspected cases, more than 200 confirmed cases, and a fatality rate of approximately 3%.5 The United States of America (USA) reported in 2003, for the first time outside the African continent, an outbreak of over 70 cases of Mpox. New cases have been reported from 2018 to date from people from Nigeria who traveled to various parts of the world such as Israel, the United Kingdom, Singapore, and the U.S. In the current year, new Mpox outbreaks have been noticed in various non-endemic countries.[5] Until January 25, 2023, 85,142 cases and 86 deaths have been confirmed globally.[6] In Mexico 3,768 cases were confirmed, with 341 cases under study and 14 deaths of patients testing positive for Mpox. Among the national epidemiological characteristics, there is a predominance of males 97% between 30-34 years of age, in men who have sex with men (78.9%), and HIV as the main comorbidity (57.9%).[7] According to the UK Health Security Agency, the epidemiologic definition for a possible case of Mpox includes the presence of 1) febrile prodrome (fever %E2%89%A538%C2%B0C, chills, headache, exhaustion, myalgia, arthralgia, back pain, and lymphadenopathy) along with a history of previous contact with a confirmed case within the previous 21 days, or 2) high clinical suspicion of the disease by the treating physician (unexplained oral or anogenital lesions, or unexplained proctitis).8 The definition of a probable case of Mpox includes the presence of unexplained rash or lesions anywhere on the body or proctitis along with 1) a history of previous contact with a confirmed, probable, or highly probable case within the previous 21 days, or 2) identification as a homosexual, bisexual or man who has sex with men, or 3) one or more new sexual partners within the previous 21 days.[8]

Clinical case33-year-old male, native and resident of the CdMX, Mexico, former hotel employee implicated in various international level events, currently unemployed. He presents papular-pruritic lesions with the increase in size and evolution into ulcers on the left forearm (2) and right forearm (1) with the onset of the symptoms on August 18, 2022, after having had close contact with foreign individuals due to a work-related event without the use of masks in their entirety. Subsequently, 2 weeks later, the number of lesions increased, appearing on the face, thighs, and back, reporting symptoms such as headache triggered by exertion, chills, sores on the tongue, insomnia, localized pain in lesions, and probable secondary infection in the feet with subsequent pain and gait impairment. After the appearance of multiple lesions on the trunk and lower extremities, the patient started treatment with symptomatic treatment and erythromycin for 10 days. In October, a rapid HIV test was performed, with a negative result, and he started dermatological treatment. He was kept in isolation for one month, complying with the recommendation of 21 days and continuing this way due to impediments of efforts and lesions in his feet. Evolution of lesions to scabs is observed, denying pruritus in Figures 1–4.

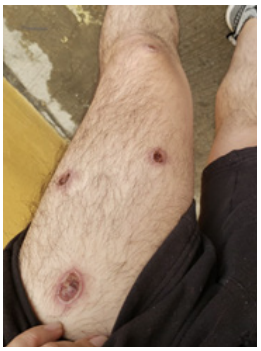

Figure 1 Localized dermatosis on the left lower extremity with ulcerative lesions presenting a necrotic center and an erythematous halo with well-defined and indurated borders.

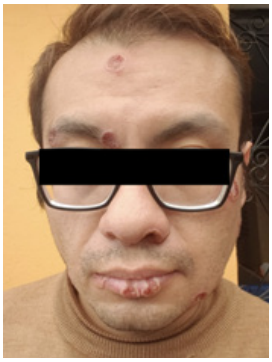

Figure 2 Localized dermatosis on the face with ulcerative lesions with a necrotic center presenting well-defined and indurated borders with signs of perilesional erythema.

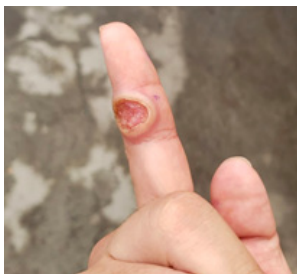

Figure 3 Localized dermatosis on the finger with ulcerative lesion containing a necrotic center and erythematous halo.

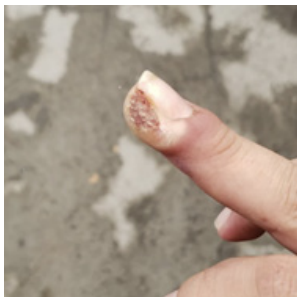

Figure 4 localized dermatosis on the finger with a non-pruritic scabbing lesion affecting the proximal nail folds.

Discussion

The Mpox virus consists of a 197 kb linear DNA genome covered by a lipoprotein envelope with an oval or brick-shaped structure 200-400 nm in size. Phylogenetically, two clades have been described: Clade I (Central Africa) and Clade II (West Africa), subdivided into IIa and IIb. Clade I has historically been associated with greater disease severity and a higher case fatality rate. The present global outbreak in 2022 is caused by variants belonging to Clade IIb, with an estimated R0 of 1.4-1.[8–11] The viral transmission comprises an animal-human or a human-human pathway; transmission from animal reservoirs such as squirrels, rats, and monkeys occurs from contact with contaminated body fluids, bites or scratches from infected animals, or due to consumption of raw or minimally processed meat. Person-to-person transmission has been described through direct contact with body fluids or scabs of infected individuals, indirect contact through clothing or bedding that was exposed to contaminated body fluids, through respiratory secretions or droplets from coughing and sneezing, or vertically due to the ability of the virus to cross the placenta.[12] Orthopoxvirus enters the body cells by fusion through recognition of chondroitin sulfate and heparan sulfate receptors, or by macropinocytosis. Once inside the cell cytoplasm, viral proteins (such as the E3 homologous protein) and enzymatic factors inhibit cellular defense mechanisms and stimulate early protein synthesis, DNA replication, and the production of viral intermediate transcription factors, for subsequent release by lysis or exocytosis.[13] Notably, the Mpox virus can decrease the number of NK lymphocytes, restrict MHC-I receptor function, disrupt CD4+ and CD8+ lymphocyte activation, and inhibit the role of the NF-%CE%BAB pathway as part of immune evasion.[14] After completion of replication in mononuclear phagocytic cells at the initial inoculation site, the virus is released into the blood and lymphatic circulation (primary viremia) to replicate a second time in distant lymphoid organs and lymph nodes, ultimately resulting in infection of epithelia and tertiary organs such as lung, heart, kidney, brain, and ovary.[12,14] The mean incubation period between infection and manifestation of signs and symptoms is estimated to range from 7-9 days.[11] Mpox produces a prodrome (in approximately 48% of cases)[15] lasting 4-5 days, consisting of high-grade fever, chills, intense fatigue and asthenia, myalgia, headache, odynophagia, lumbago, dyspnea, and mainly cervical or submandibular lymphadenopathy (the latter being the clinical differentiator between the prodrome caused by smallpox, chickenpox or measles).[9,12,14] At least one of these systemic symptoms is present in up to 88% of patients at some point in the natural history of the disease.[15] Subsequently, the main feature of Mpox arises, consisting of a few to hundreds of firm or rubbery lesions with well-defined, deep borders, which often develop a umbilication. The evolution of these goes through 4 stages asynchronously: macular (1-2 days), papular (1-2 days), vesicular (1-2 days), and pustular (5-7 days), finally scabbing and desquamation (7-14 days). In the present 2022 outbreak, symptoms of proctitis associated with the lesions have been frequently reported.[16] The lesions usually occur first on the face (95%), palms and soles (75%), oral mucosa (70%), or genitals (30%), and then develop on the conjunctiva or cornea (20%), and other body areas, and are usually painful until the healing phase, where the symptomatology changes to pruritus; finally, after a period of approximately two to four weeks, when the crusts are completely detached and a new layer of skin is formed, the patient is no longer contagious.[16,17] There are reports of atypical presentations of Mpox including oropharyngeal manifestations (erythema, pustules, tonsillar edema or abscess), soft tissue abscesses, penile edema, secondary bacterial infection by *Staphylococcus aureus* and *Streptococcus dysgalactiae*, rectal perforation, solitary skin lesion, polymorphic lesions, confluent lesions, sudden erythematous maculopapular rash separate from pustular lesions, generalized maculopapular exanthema, beta-lactam related morbilliform rash, viral exanthem, urticarial exanthema, and erythema multiforme.[15,18] Complications in immunocompromised patients include severe dehydration due to impaired fluid intake from mouth lesions, complete loss of skin pigmentation, superimposed cellulitis, vision loss due to corneal infection, encephalitis, and transverse myelitis, bronchopneumonia, myocarditis, and pericardial disease, sepsis, hemophagocytic lymphohistiocytosis, necrotizing or obstructive lymphadenopathy, paraphimosis, urethritis, and penile necrosis, urethral and intestinal stenosis, and intestinal obstruction due to exudative lesions or tissue edema.[14,17,19] In Mexico, the clinical characterization of Mpox-positive cases includes exanthema (100%), fever (72.1%), headache (62.8%), lymphadenopathy (61.5%), myalgia (60.8%), asthenia (52.5%), arthralgias (48. 5%), chills (41.4%), odynophagia (40.2%), diaphoresis (29.2%), lumbago (27.5%), painful ulcers (15.7%), cough (13.2%), nausea (10.7%), conjunctivitis (6.1%), bleeding ulcers (4.4%), and vomiting (3.7%).[7] It should be noted that the patient described above

only presented two episodes of chills as a systemic symptom and differs from the medical literature by reporting the first lesions on both forearms and later on the face, oral mucosa, hands, thighs, back, and feet. In addition, it highlights the probable secondary bacterial infection of the lesions on the feet soles that caused gait impediment as a complication not previously reported in Mexican patients. The clinical diagnosis is based on the previously discussed epidemiological definitions of the possible and probable case;8 however, some authors recommend suspecting the diagnosis in the presence of a triad consisting of skin lesions, lymphadenomegaly, and fever.[4] Laboratory test abnormalities that support the suspected diagnosis include altered aminotransferase values, leukocytosis, thrombocytopenia, and hypoalbuminemia.[12] The laboratory test considered the gold standard for confirmation of Mpox is based on real-time polymerase chain reaction (RT-PCR) preferably of fluid from vesicles or pustules (99% sensitivity), or failing that, from saliva, blood, urine, semen, stool, as well as anal (78% sensitivity) or nasopharyngeal swabs (70% sensitivity).[4,15] If confirmatory testing is not available, the demonstration of detectable levels of anti-orthopoxvirus IgG or IgM antibodies 5 to 8 days after the lesions appear provides support for the diagnosis.[12] The patient in the current case report did not undergo confirmatory testing for personal reasons, so his diagnosis remains a probable case according to the epidemiological definition. According to CDC and WHO guidelines, there is no specific treatment regimen for Mpox, since symptoms are usually mild and treatment guidelines focus on symptom relief.[17] In case the patient to be treated belongs to an at-risk group or presents at onset in a severe state, there are antiviral drugs approved for therapeutic use that include Tecoviramat, the preferred drug of choice which has a mechanism of action that inhibits the coat protein VP37; Cidofovir and Brincidofovir are selective DNA polymerase blockers, with a risk of nephrotoxicity and hepatotoxicity, respectively; or Trifluridine, an inhibitor of Thymidylate synthetase, which is indicated for corneal and conjunctival involvement.[12,14] Mexican practice guidelines do not recommend a specific treatment for Mpox infection but rather focus on symptom relief, ensuring the nutritional status and adequate hydration, as well as prevention of complications and mental health care. These guidelines indicate hygiene measures such as keeping the lesions clean and dry and contraindicating both debridement and the use of prophylactic antibiotics for the prevention of secondary infections. The administration of antipyretics and analgesics for symptom reduction is suggested, as well as oral rinses, and the use of antiseptics such as Chlorhexidine and/or local anesthetics for oral lesions.[20] Similarly, the guidelines indicate Sitz baths with warm water and sodium bicarbonate for genital or anorectal lesions. Some of the literature recommends the use of astringent antiseptics due to the consequent development of the lesions into impetigo.[21] The patient was treated with medications that align with the objectives of the Mexican guidelines such as Ibuprofen and Loratadine with Betamethasone to reduce inflammation and pruritus, complementing the symptomatic treatment with Clonazepam. The mention of contraindicated drugs prescribed to the patient, such as Erythromycin, is relevant due to the lack of scientific grounds to recommend the use of antibiotics in a viral infection, as well as the previously mentioned prophylactic contraindication with antibiotics.[20] Specific prevention of the disease can be performed in persons belonging to behavioral or occupational risk groups using the third-generation modified attenuated vaccinia virus Ankara vaccine (JYNNEOS in the United States, IMVANEX in the European Union and IMVAMUNE in Canada), which is 85% effective in preventing the disease.[4,12,17] Currently, Mexico does not have any type of vaccination plan against Mpox. Historically, Mpox reported a lethality of 1-10% based on phylogenetic clade and medical care received;[9] however, in the present 2022 outbreak, Mpox has presented a lethality of approximately 0.1%.6 Similarly, it should be noted that infection in immunocompromised patients, children under eight years of age, pregnant and lactating women, the presence of target organ damage, and infection in unusual sites (such as the eyes) are independent predictors of disease severity.[12,17]

The reported patient presented a favorable evolution with no long-term clinical complications. Mpox is a reemerging disease that has had a significant impact globally and in Mexico in 2022. Although it is mainly transmitted sexually and occurs primarily in men who have sex with other men, it is important to take into account that other methods of transmission do not involve direct contact with a sick patient, as in the case of the patient reported, to avoid the medical stigmatization of cataloging it as only present in this risk group or with the need for an obligatory sexual history.

Similarly, the lack of epidemiological notification at the time of the evaluation of the patient mentioned reminds us of the importance of the need for epidemiological reporting of a suspected case to avoid underdiagnosis at the national level and to have a real paradigm of the current situation in Mexico. The above is with the intention of raising awareness among the population about primary prevention measures to avoid the spread of the virus, mainly in specific risk groups. Finally, the occupational risk due to indirect contact with foreigners stands out, as in the case of our patient as a hotel worker, which highlights the question about the benefits of introducing the pre-exposure vaccine in Mexico in the population at occupational risk. The need for it is a point of research that deserves consideration in Mexico in the absence of a specific prevention measure for the disease.

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Conflicts of interest

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