Case report

Atypical case of monkeypox with bacterial skin superinfection and mini review of literature

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Case report

A 52-year-old Caucasian MSM presented in September 2022 to the Infectious Disease Unit of AOUP "P. Giaccone" University Hospital in Palermo, Italy due to the onset of skin lesions, high fever, and systemic symptoms four days prior. He reported multiple previous sexual intercourse, as well as an unprotected anal sexual intercourse 14 days ago with a partner who later tested positive for MPXV.

The physical examination revealed ten skin lesions, including one on the dorsal surfaces of the right hand and the rest on the back, anogenital region, right thigh, buttock, and groin. The lesion first appeared on the right hand and glans before spreading throughout the body. In some instances, the lesions were pustules with central umbilication and crusted scab (Fig 1a). Bacterial cellulitis was diagnosed due to the presence of significant edema, erythema, and pain in the hand (Fig 1b), thigh (Fig 1c), and buttock (Fig1d).

The results of routine blood tests were as follows: AST 40 U/L, ALT 59 U/L, creatinine 1.02 mg/dL, urea 27 mg/dL, C-Reactive Protein 32.2 mg/L, hemoglobin 13.9 g/dL, hematocrit 43.1%, leukocytes 5,930 cells/μL, neutrophils 3,960 cells/L, lymphocytes 1,200 cells/μL, platelets 228,000 cells/μL. Given the suspicion of monkeypox, pustule, nasopharynx, urethra, rectum, blood, and urine samples were collected, and a real-time polymerase chain reaction (PCR) assay was performed. Positive PCR results for MPXV were observed in swabs and in both blood and urine samples.

Hepatitis C, hepatitis B, and syphilis were negative, as were urethral *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Mycoplasma genitalium* infections, and genital Herpes Simplex Virus 1/2. Seven days of empiric treatment with 100 mg of doxycycline bid were followed by a complete recovery.

Discussion

Human monkeypox (MPX) is a zoonosis caused by an orthopoxvirus known to be transmitted primarily through contact with the blood, bodily fluids, or cutaneous or mucosal lesions of infected animals. The disease was confined to certain regions of Africa. The current outbreak of 2022 in many non-endemic countries almost exclusively affects men who have had sex with other men, and sexual transmission has been strongly postulated since MPX virus (MPXV) was found via qPCR in semen of men who have sex with men (MSM)[1].

Classically, the disease is preceded by an invasion period that lasts between 0 and 5 days and is marked by fever, headache, lymphadenopathy, back pain, myalgia, intense asthenia, and rash. Traditionally, the skin eruption began 1–3 days after the onset of fever, with the rash being more common on the face and extremities than on the trunk. In 95% of cases, it affects the face, and in 75% of cases, it affects the palms of the hands and soles of the feet, and the rash progresses cephalocaudally, with lesions at a single site often in the same phase of development, from macules to papules to vesicles to pustules to crusts that dry out and fall off. The clinical manifestations of the 2022 outbreak may differ from those previously described as isolated genital and perianal presentations and proctitis are increasingly identified, and sometimes make the differential diagnosis with other sexually transmitted diseases difficult [2,3,4].

The clinical presentation of our patient was atypical because the lesions initially appeared on the hand and glans simultaneously followed by other sites, whereas in the current outbreak lesions are typically described as appearing first on the genitals and then spreading. In our case, we also observed a multiple bacterial superinfection of ulcerated skin lesions caused by monkeypox, along with significant edema, erythema, and pain in the affected areas, resembling cellulitis. Although dermal and subcutaneous infections, such as cellulitis, are not typically associated with MPX, the natural progression of skin lesions with ulceration may create an entry point for bacterial skin infections[6]. Seven precedent cases of bacterial superinfection of the skin were identified through a search of the literature[3,5,6,7,8]. All cases involved men, with a median age of 34 years (IQR 30-36);

of these, 4 were HIV positive and one was on PREP. The cases reported mainly cellulitis of the genitals. Nipple, nose, and inguinal area were also involved. In 3 cases, fever was reported but not was considered directly related to bacterial infection. An elevated value of C reactive protein was shown in 5 patients (from 12 mg/L to 80 mg/L) and antibiotic therapy (mostly amoxicillin clavulanate, flucloxacillin, and cephalosporins) was administered to all patients with hospitalization in 6. Only in one case, there was a positive bacterial culture for *Staphylococcus aureus* and *Streptococcus pyogenes*. Complete recovery was observed in all cases.

The research also showed a case of tonsillar abscess (Davido et al, 2022 [9]), in a patient with monkeypox infection after an oral sexual intercourse and a likely superimposed bacterial sepsis, in an HIV-patient with lymphoma who developed a multi-organ failure syndrome (Menezes et al, 2022 [10]).

In addition, 4 observational studies [4,11,12,13], concerned with the prevalence of monkeypox, identified bacterial skin superinfection as a potential complication. Patel et al (2022) [4] described two cases of perianal and groin abscess (one of which was an HIV-positive man), two patients with tonsillar abscess, two with genitals cellulitis (one of which had clinical suspicion of Fournier's gangrene while receiving meropenem and vancomycin), and a superimposed bacterial lower respiratory tract infection in the context of immunosuppression. In a retrospective study of MPXV cases between 2018 and 2021, Adler et al (2022) [11] reported what is likely the first case of monkeypox abscess with a non-excludable bacterial cause. Mailhe et al (2022) [12] reported cellulitis as complications in 10% (10/257) MPX cases and Girometti et al (2022) [13] in 24% (13/54). Of these last, 6 individuals had cellulitis on the penile site, 4 on anogenital and one had a disseminated presentation with severe facial cellulitis.

In conclusion, bacterial superinfections may be a significant complication of MPXV infections and, can determine hospitalization and more challenging patient management. Superinfections can occur at any stage of disease and prolong the illness. During the follow-up, clinicians must be vigilant and maintain a high index of suspicion, especially in immunocompromised patients.

Figure 1 (a) crusted scab lesion on the penis; **1 (b)** ulcerated crusted lesion of the dorsal hand lesion with swelling and erythema; **1 (c)** umbilicated pustule on the thigh with surrounded erythema; **1 (d)** umbilicated pustule on the buttock with surrounded erythema.

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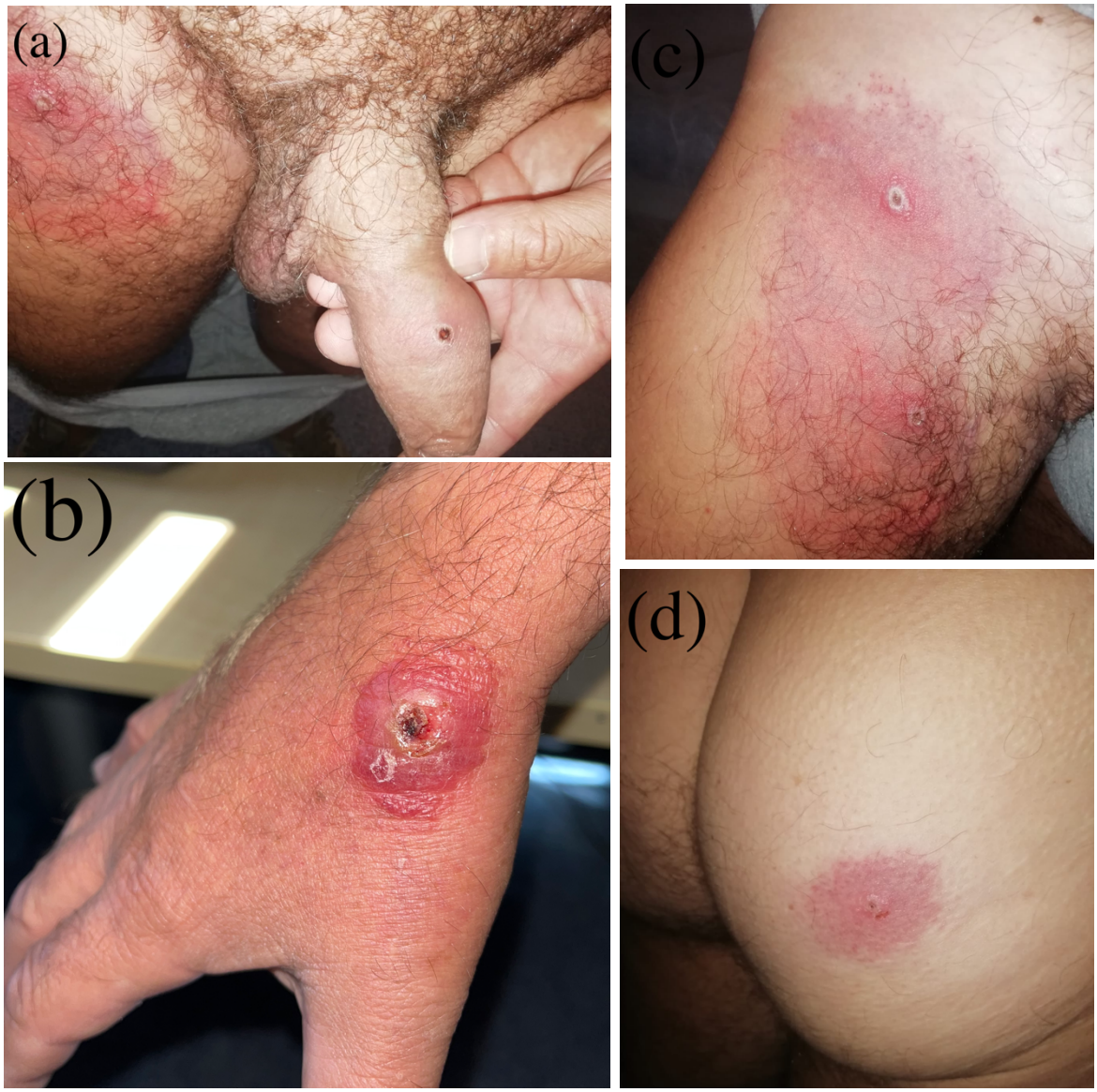
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