



Case report

Severe monkeypox with superimposed bacterial infection in an immunocompetent patient: A case report

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ABSTRACT

Monkeypox, a member of the *Orthopoxvirus* genus, has been the center of global attention since it has been declared a public health emergency by the World Health Organization. Typically, it is a self-limiting disease; however, it can occasionally have severe presentations in patients with underlying conditions, such as HIV, malignancy, and transplantation. In this article, we will present a case of an immunocompetent patient with a severe presentation of monkeypox. The patient presented with facial pustules with superimposed bacterial infection; furthermore, he had painful vesicles in oral and nasal mucosa and the penis. Dermatologic conditions such as atopic dermatitis has been associated with severe monkeypox. While our patient does not have a history of atopic dermatitis, he does report contact dermatitis as well as a history of skin infections. Researchers have hypothesized that disruption of the skin barrier allows for proliferation of the monkeypox virus; therefore, it is important to take a thorough history of the patient's skin conditions. Lastly, we described the use of Tecovirimat in our patient. Although it is impossible to demonstrate the efficacy of this medication without a randomized clinical trial, our patient seemed to have a faster improvement of the lesions after initiating this antiviral.

Introduction

Monkeypox is a zoonotic infection caused by a brick-shaped virus of the *Orthopoxvirus* genus [1,2]. It was first identified as a cause of disease in humans in 1970 in the Democratic Republic of Congo [3] and has recently been declared a public health emergency of international concern by the World Health Organization (WHO) [4] due to the 2022 escalating global outbreak. Transmission occurs primarily through direct contact with infectious sores, scabs, or body fluids [5] but can occur through contact with fomites, respiratory secretions, infected animals, and vertical transmission [6,7]. Monkeypox typically presents as a systemic illness with febrile prodromes, lymphadenopathy, malaise,

headache, and muscle aches that later progress to a characteristic deep-seated, vesicular, or pustular skin rash with centrifugal distribution. However, during the 2022 outbreak, some patients have had an atypical presentation with genital, rectal, and/or oral lesions without the initial prodrome [8]. Possible complications include secondary infections, bronchopneumonia, sepsis, and encephalitis. One of the most serious complications is corneal infection which may result in corneal scarring and permanent vision loss [9]. In this paper, we discuss the case of an immunocompetent patient with a complicated presentation of monkeypox and possible superimposed bacterial infection.

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Case description

A 35-year-old man sought care at the emergency department of Jackson Memorial Hospital on July 28th, 2022, with a complaint of worsening facial rash and blurry vision for two days. A couple of days prior, he arrived at the emergency department with one week of lymphadenopathy, fever, and facial lesions. He was told he likely had monkeypox and was discharged home with instructions to quarantine. However, his rash continued to worsen. He had since developed intraoral lesions, penile lesions, a diffuse maculopapular rash, and blurry vision in the right eye. He endorsed fever, chills, night sweats, and diarrhea. He stated the rash was both itchy and painful. On presentation at the emergency department, the patient was afebrile, saturating well, and hemodynamically stable.

Past medical history was significant for an abscess in his right posterior thigh that he has been self-treating with sulfamethoxazole-trimethoprim DS BID for 6 weeks. He was taking this antibiotic intermittently upon admission to the hospital. Within the past year, he has had other skin infections in face and leg associated with trauma. Furthermore, he had history of multiple rashes that were triggered by contact with irritants. Based on his description, it was likely he was experiencing contact dermatitis. He endorsed marijuana and methamphetamine use. Lastly, he was sexually active with partners of the same sex. He typically engaged in penetrative anal sex. He stated that one week prior to the onset of his symptoms, he engaged in a sexual encounter with a partner who fell ill requiring emergency room care within the subsequent 24 h. He reported not having sex with the man, only kissing with clothing off, also known as outercourse.

On physical exam, the patient presented with several lesions. First, there was a diffuse erythematous maculopapular rash present across his abdomen and back (Fig. 1). On his face, there were multiple large pustular lesions with surrounding erythema. These were distributed across the mandible, bilateral cheeks, and forehead (Fig. 2). His facial lesions were swollen, with erythematous border. One pustular lesion located on the chin had yellow and black crusting with purulent discharge. Furthermore, there was a large raised umbilicated pustule present on the right eyelid with swelling and tearing. However, the cornea and sclera were clear. There were numerous small vesicles present on his neck, right arm, right palm, and back (Fig. 3). There was a singular small,

raised vesicle on the base of the penis (Fig. 3). Lastly, there were several small vesicular lesions on the tongue, base of the mouth, and intranasal surface.

He tested positive for the preliminary *Orthopoxvirus* PCR test done by Florida Department of Health. Later, he tested positive for the Monkeypox PCR test done by the Centers of Disease Control and Prevention (CDC). His RPR, HIV, gonorrhea, and chlamydia tests came back negative. Given the presence of lesions on his penis and mouth, and the proximity of a vesicle to his right eyeball, the patient was initiated on Tecovirimat 600 mg every 12 h. Vancomycin 1 g every 12 h was also started to treat presumptive bacterial superinfection on his chin due to the significant inflammation and purulent discharge noted in this lesion. Ophthalmology evaluated the patient due to complaints of blurry vision; however, no lesions were noted on the ocular surface. Lastly, trimethoprim - sulfamethoxazole was discontinued as the maculopapular rash on his torso was possibly attributed to a drug eruption. He was then discharged on Tecovirimat with instructions to complete a 14-day course. Vancomycin was switched to oral Doxycycline 100 mg for outpatient therapy. At 10-day follow-up, the patient reported that he has remained compliant on his outpatient regimen. He stated that most of his lesions have resolved. His large pustular lesions on his face were improving and had formed a crust. His smaller vesicular lesions on his penis, hands, back and torso resolved within a few days. He stated he did not notice an improvement in his symptoms until four doses of Tecovirimat were completed. He experienced dysuria, diarrhea, and burning sensation while defecating, which the patient attributed to Tecovirimat. However, he increased his fiber intake and all these symptoms resolved.

Discussion

There have been several risk factors that have been associated with severe presentations of Monkeypox virus. Based on the skin lesion severity score by World Health Organization (WHO), greater than 100 lesions is defined as severe based on smallpox studies. Studies have shown that children were associated with increased risk of hospitalization. Furthermore, symptoms such as nausea, vomiting and mouth sores were each independently associated with a hospital duration of > 48hrs and > 3 abnormal laboratory tests[10]. During the current monkeypox outbreak, the presence of rash on soles of the feet, head, and neck has

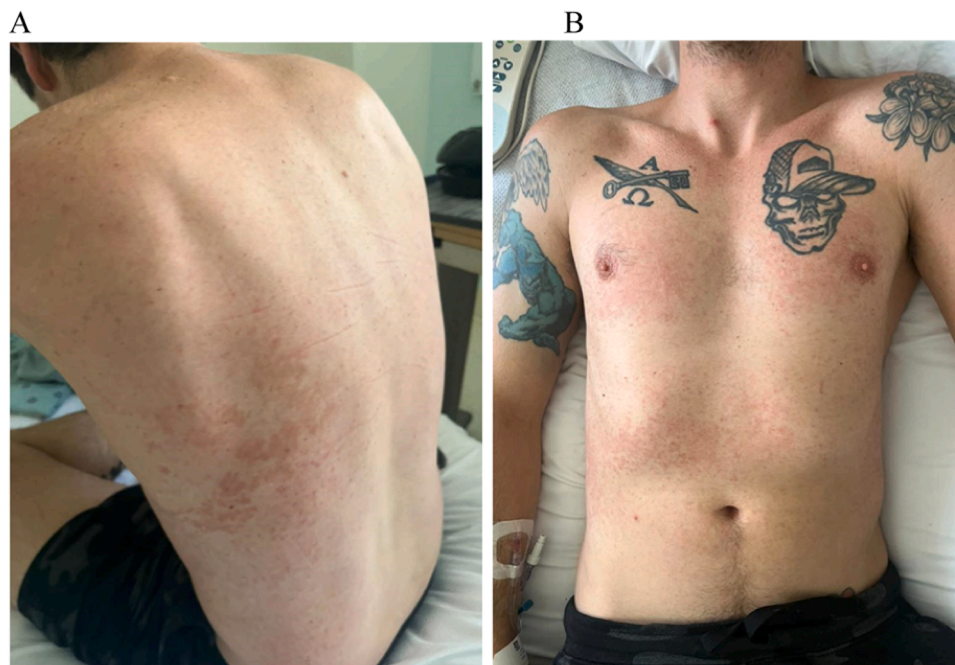


Fig. 1. Maculopapular rash on torso (A), chest, and abdomen (B).



Fig. 2. Pustular and crusted lesions across the mandible, bilateral cheeks, and forehead and eyelid (A, B).

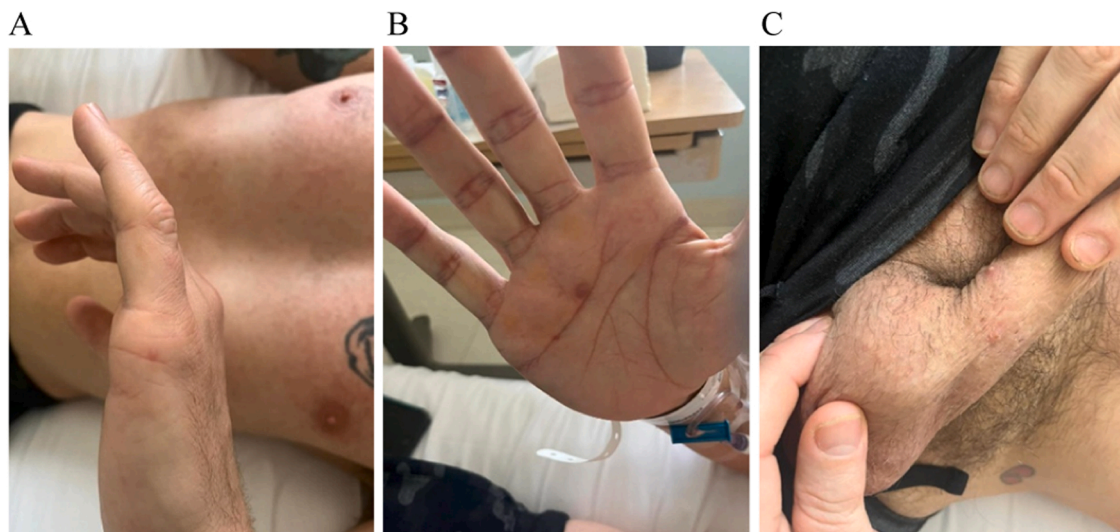


Fig. 3. Vesicles in left hand (A), right palm (B), and base of the penis (C).

been considered atypical locations with 10.7%, 13.5% and 18.1% prevalence, respectively, while mucosal lesions, such as the ones seen in this case are seen in 24.9% of cases [11]. It is worth mentioning that besides the classic skin lesions described in monkeypox (vesicles and pustules), our patient also presented a morbilliform rash in chest, abdomen, and torso. Although this rash was attributed initially to a drug reaction in the present case, there is a high probability that it was a manifestation of monkeypox. Of note, morbilliform rash has been documented uncommonly, occurring in up to 6% of cases according to a case series from Spain [12].

One of the most striking features of the present case was the widespread involvement of the skin and mucosa, a manifestation not commonly reported in immunocompetent patients. Our team hypothesized that his history of frequent rashes might be an underlying cause of his complicated presentation of Monkeypox. Atopic dermatitis has been associated with severe presentations of smallpox. Moreover, eczema

vaccinatum is a severe reaction to the smallpox virus documented among those who received the smallpox vaccine who have atopic dermatitis [13]. While the relationship between atopic dermatitis and *Orthopoxviruses* are incompletely understood, there is some evidence that vaccinia replicates well in injured or inflamed skin [14].

While the patient denied a history of atopic dermatitis, he described a history of sensitive skin which becomes erythematous upon contact with minor irritants. He stated that minor triggers such as sweat will result in a diffuse and erythematous rash across the regions of his skin that came in contact with the irritant. This description fits the picture of either contact dermatitis or heat rash. According to the CDC, patients with a history or presence of atopic dermatitis or other active exfoliative skin conditions are at higher risk for severe disease [15]. Therefore, the patient's history of undiagnosed exfoliative skin condition might have likely contributed to this severe presentation.

Superimposed bacterial infection in Monkeypox is one of the many

complications of Monkeypox. Our patient's lesions were swollen, erythematous with yellow and black crusting. The lesion on the chin had purulent discharge oozing out. All of which led us believe he had a superimposed bacterial infection. Although no cultures were obtained to confirm the infection, the patient had marked improvement with antibiotic therapy. Secondary bacterial infections of Monkeypox lesions were observed in 19% of unvaccinated monkeypox cases. This has been hypothesized that the protuberance of the lesion above the skin leads to increased risk of superimposed infection [9].

Regarding antiviral treatment for monkeypox, Tecovirimat is a medication that is being used under an expanded access/ investigational drug protocol in the USA [16]. At the moment of elaboration of this report, no randomized clinical trials have demonstrated the efficacy of Tecovirimat against monkeypox. The possible clinical benefit of Tecovirimat is based on microbiologic and animal studies, as well as observational data and anecdotal reports, suggesting a shorter duration of illness and viral shedding with this drug [17]. In this context, the CDC currently recommends considering the experimental use of Tecovirimat in certain circumstances, such as patients with or at risk of severe disease [16]. Other indications in which Tecovirimat may be beneficial are treatment of pediatric population, pregnant or breastfeeding women, presence of immunosuppression, history of atopic dermatitis and other chronic skin conditions, and severe disease presentations such as hemorrhagic disease, confluent lesions, sepsis, encephalitis, and other conditions requiring hospitalization [16].

In our patient, Tecovirimat was used due to the presence of lesions in hazardous locations, such as genitals and oral mucosa, and the close proximity of one pustule to the eyeball.

Conclusion

Monkeypox is usually a self-limited disease, with symptoms lasting 2–4 weeks, however, the course of the disease can be complicated by secondary infections. It is important to be aware that certain preexisting conditions can increase the risk of severe disease such as atopic dermatitis, and other exfoliative skin pathologies. The use of antiviral therapy may be considered for patients with severe disease or at risk of complications; however, the real clinical benefit of this medication is still unknown.

Ethical approval

IRB approval was not required for case reports in our institution.

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Informed consent statement

In order to publish the pictures, written informed consent was obtained from the patient.

CRedit authorship contribution statement

Conceptualization of the study: **Jose A. Gonzales-Zamora**. Writing the manuscript: **Ayuswarya Manoharan, Beatriz X. Braz, Jose A. Gonzales-Zamora**. Edition and critical review: **Andrew McBride, Salma Hernandez, Monica Balfour, Tanya Quiroz, Alexis Powell, Allan Rodriguez, Stephen Morris**. All authors contributed and approved the final version.

Conflict of Interest

The authors declare no competing conflict of interest.

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