Monkeypox in an immunocompromised patient with underlying human immunodeficiency virus and syphilis infections in Southern Florida of the United States: A Case Report

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Case Report

Keywords: monkeypox, acquired immunodeficiency syndrome, human immunodeficiency virus infection, syphilis

Posted Date: September 13th, 2022

DOI: https://doi.org/10.21203/rs.3.rs-2046790/v1

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Abstract

**Background:** The monkeypox virus causes the rare disease monkeypox, and underlying immune deficiencies might lead to worse outcomes. In this report, we described a rare case of monkeypox with an underlying immune deficiency that was combined with human immunodeficiency virus and syphilis infection and discussed differences in initial clinical presentation and clinical course compared to typical monkeypox cases.

**Case presentation:** We report the case of a 32-year-old male with human immunodeficiency virus infection who was admitted to a hospital in Southern Florida. The patient presented to the emergency department with shortness of breath associated with fever, cough and left sided chest wall pain. Upon arrival, he was found to have left sided pneumothorax and minimal atelectasis in left mid lung with a small pleural effusion at left lung base in chest radiograph. A pustular skin rash consisting of generalized exanthema with small white and red papules was also noticed. The patient was found to be in a state of sepsis with lactic acidosis. An infectious disease specialist raised the possibility of monkeypox, and the sample of the lesion was finally positive for monkeypox deoxyribonucleic acid. In this case, possible diagnosis of skin lesions varied because the patient was positive for syphilis and human immunodeficiency virus, and the differential diagnosis of monkeypox infection was prolonged due to the initial atypical clinical features.

**Conclusions:** Monkeypox with immunocompromised patient who has human immunodeficiency virus and syphilis infections can present with atypical clinical features and delay a proper diagnosis, which can increase the risk of spreading monkeypox in the hospital. Thus, patients with rash and risky sexual behavior should be screened with monkeypox, and an easily available, rapid, and accurate test is required to stop the transmission of monkeypox in the hospital.

**Background**

The orthopoxvirus known as monkeypox belongs to the same genus as the variola virus, which causes smallpox, and the vaccinia virus, which is the virus used in smallpox vaccines [1, 2]. A rash resembling smallpox is caused by the zoonotic viral infection known as monkeypox. However, compared to smallpox, monkeypox infections had much lower mortality rates and less person-to-person dissemination beyond the household [1, 2]. Additionally, the monkeypox rash might resemble other infectious rashes that are seen more frequently, such as those caused by secondary syphilis, herpes simplex infection, and varicella-zoster virus infection [2].

The majority of monkeypox patients during the global outbreak in 2022 have been symptomatic, and infections without symptoms seem to be uncommon [3, 4]. The first case of monkeypox in 2022 was discovered in Europe in May 2022, and cases connected to this outbreak have persisted in being recorded in nonendemic nations worldwide, providing proof of community dissemination [2, 5]. The first incidence of monkeypox in the United States was discovered on May 17, 2022, despite the patient's symptoms have...
been present for approximately two weeks before being confirmed with monkeypox [6, 7]. Numerous countries in the United States have reported thousands of verified cases of monkeypox as of July 2022 [1].

In this report, we present a rare case of monkeypox with an underlying immune deficiency that was combined with human immunodeficiency virus (HIV) infection and syphilis in Southern Florida in the United States. This report aims to discuss differences in initial clinical presentation and clinical course, including symptoms, skin findings, and laboratory findings compared to typical monkeypox cases.

Case Presentation

We report the case of a 32-year-old male who was admitted to a hospital in Southern Florida in July 2022. He was a known HIV positive case with cluster of differentiation 4 (CD4) level of 185, who was not compliant with his anti-HIV medication and had a drug abuse history positive for 3,4-methylenedioxymethamphetamine (MDMA) use. Patient had no travel history in the last 30 days before admission.

The patient presented to the emergency room with shortness of breath associated with fever, cough and left sided chest wall pain. Onset of symptoms was five days before, of mild degree and was constant in nature. Patient denied any sore throat, nausea, or vomiting. Upon arrival, he underwent a chest radiograph and was found to have 40% left sided pneumothorax. Chest radiograph also showed minimal atelectasis in left mid lung with a small pleural effusion at left lung base. A pustular skin rash consisting of generalized exanthema with small white and red papules was also noticed. He was found to be in a state of sepsis with lactic acidosis. The pneumothorax resolved upon immediate placement of a chest tube on the left side, confirmed by a repeat chest radiograph. Post chest tube placement, he was breathing on room air, and was in no acute distress. On arrival to the emergency room, he was in sinus tachycardia with heart rate of 101 beats/min which came back to sinus rhythm post resorption of pneumothorax. He was negative for SARS-CoV-2 antigen and for influenza A, B antigens. Patient was given one dose of azithromycin as an intravenous infusion, intravenous ceftriaxone empirically, guaifenesin for cough and intravenous maintenance fluids. He was admitted to the hospital for further management.

Physicians from the departments of internal medicine, family medicine, infectious diseases, pulmonology, and critical care were involved in this patient’s care. On Day 1 of admission, patient was afebrile. He was placed on a bilevel positive airway pressure (BiPAP) machine due to respiratory distress and insufficiency and had subjective weakness. Patient was shifted to the telemetry unit with contact and droplet precautions in view of the skin lesions. The skin lesions were located on his face, lips, posterior neck, right hand, left antecubital area, left elbow, left forearm, right upper chest, back, right, and left torso, abdominogenital region, buttocks, right posterior thigh, left thigh, bilateral lower legs, right inner ankle and left medial foot. The lesions were multiple and scattered, characterized by macules, vesicles, and papules with dry scabs in some areas, associated with moderate degree pain, without any drainage and with intact peri-wound areas (Fig. 1). The pain associated with the lesions resolved over the next four days. He was also found to have generalized progressive macular hypomelanosis of HIV. Wound care,
gastrointestinal, deep vein thrombosis prophylaxis and aspiration protocols were in place. Laboratory investigations conducted that day showed in Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>The significant laboratory findings regarding HIV infection and syphilis</th>
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<tr>
<td>Results</td>
<td></td>
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<tr>
<td>HIV-1 Antibodies</td>
<td>Reactive</td>
</tr>
<tr>
<td>HIV-2 Antibodies</td>
<td>Non- Reactive</td>
</tr>
<tr>
<td>HIV-1/2 Interpretation</td>
<td>HIV-1 Positive</td>
</tr>
<tr>
<td>HIV-1 RNA Quantitative viral load (copies/mL)</td>
<td>45,800</td>
</tr>
<tr>
<td>( \log_{10} ) HIV-1 RNA (log copies/mL)</td>
<td>4.661</td>
</tr>
<tr>
<td>CD4 Helper Absolute Value (cells/µL)</td>
<td>185</td>
</tr>
<tr>
<td>CD4:8 Ratio</td>
<td>0.27</td>
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<tr>
<td>RPR Qualitative Test</td>
<td>Reactive</td>
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<tr>
<td>RPR Titer</td>
<td>1:64</td>
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<tr>
<td>FTA-ABS</td>
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<tr>
<td>Cryptococcal antigen</td>
<td>Negative</td>
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Abbreviations: HIV, human immunodeficiency virus; RNA, ribonucleic acid; Log, logarithm; CD, cluster of differentiation; RPR, rapid plasma reagin; FTA-ABS, fluorescent treponemal antibody absorption

A new diagnosis of syphilis was made and an order for monkeypox polymerase chain reaction (PCR) test was placed. Patient was started on oral atenolol, oral anti-HIV drugs, including bictegravir, emtricitabine, tenofovir, intravenous maintenance fluids and acetaminophen-oxycodone for moderate degree pain; continued receiving azithromycin and ceftriaxone intravenously.

On Day 2 of admission, acyclovir intravenous injection was added to his treatment plan in view of the skin rash associated with moderate pain. Chest radiograph showed no interval change compared to prior exam. Over the next couple of days, patient was saturating well on room air and the left sided chest tube was accidentally removed by the patient. Repeat chest radiographs continued to show no interval changes. He was comfortable with no new acute symptoms, no shortness of breath and no pain. Patients skin lesions appeared to be more vesicular and some of them were crusting, hence was suspected to have shingles. Skin protective measures were in place. His vitals were stable, and patient’s blood and sputum cultures were negative for any pathological organism. One dose of benzathine penicillin G intramuscular injection was given for syphilis, the remaining medication was continued. Patient was encouraged to use incentive spirometer and was being monitored.
The next day, the result of the monkeypox PCR test was confirmed to be positive. Patient's skin lesions appeared to be fragile, characterized by papules and vesicles, with no associated pain (Fig. 2). Skin protective measures were in place and the infectious diseases department was notified. Patient's vitals continued to be stable and there was no respiratory distress. Patient was educated on hand hygiene and to avoid scratching lesion areas to prevent spread to other sites. Patient continued to be in isolation with airborne, contact and droplet precautions in place, and was being monitored for acute decompensation, abnormalities in comprehensive metabolic panel and electrolyte imbalance. An order was placed for tecovirimat which is a Food and Drug Administration (FDA) approved drug for treating monkeypox. He was additionally prescribed empirical oral sulfamethoxazole/trimethoprim. Azithromycin and acyclovir were discontinued.

Over the next few days, patient's skin lesions progressed to be multiple, disseminated with vesicular, pustulous character and crusting was noticed in some sites (Fig. 3, 4). Besides that, he reported feeling better and his physical examination continued to be unremarkable. Patient was saturating well on room air, with oxygen supplementation as needed to keep oxygen saturation level above 92%. Chest radiograph, laboratory investigations and blood culture results were being followed up, and he continued to be on the same medication and was being monitored for development of any acute events. Another dose of benzathine penicillin G intramuscular injection was given, and tecovirimat was yet to be received.

On Day 11, patient left the hospital against medical advice. Upon leaving, patient was educated on keeping himself covered up and to wear his mask. Patient’s vitals were stable, and no drainage was noted from any of the lesions. Infectious diseases department and the government were notified.

**Discussion**

This report described an immunocompromised patient diagnosed with human monkeypox disease. The patient initially presented with respiratory symptoms and skin lesions. However, the differential diagnosis of monkeypox infection was prolonged due to the initial atypical clinical features. Possible diagnosis of skin lesions varied because the patient was positive for syphilis and HIV. An infectious disease specialist raised the possibility of monkeypox, and the sample of the lesion was finally positive for monkeypox deoxyribonucleic acid (DNA), which was detected by PCR. Monkeypox is currently spreading quickly in the USA and Western Europe, and the majority of cases have been caused by sexual transmission between men who have sex with men [8]. As a result, it is anticipated that some individuals with monkeypox would also have other sexually transmitted infections, making diagnosing the condition challenging. Moreover, the likelihood of sexual transmission is evidenced by findings of primary genital and anal mucosal lesions, which might be the site of inoculation.

This clinical presentation is unique as the patient also presented with respiratory manifestations suggestive of pneumothorax along with skin lesions. The patient also has concomitant HIV and syphilis, and the patient’s atypical presentation might be misdiagnosed as HIV-associated respiratory infection or sexually transmitted diseases. In a previous study comparing the outcomes of monkeypox between HIV-
negative cases and HIV-1 infected cases in Nigeria, significantly more HIV-1-positive individuals had secondary bacterial skin infections, genital ulcers, skin rashes $\geq 2$ cm, and prolonged illness, and a higher mortality rate was found in HIV-1 infected group [9]. Therefore, consideration of monkeypox should be performed in patients at risk.

There were no clear guidelines for the treatment of an immunocompromised patient with monkeypox. In a previous retrospective observational study regarding the management of human monkeypox in the United Kingdom, one patient received tecovirimat 600 mg twice daily orally for two weeks, experienced no side effects, and had a shorter length of illness and virus shedding than the other six patients who did not get tecovirimat [10]. Tecovirimat was prescribed for this patient; however, the patient could not get the proper treatment for monkeypox. The current CDC guidelines suggest that there is no specific treatment available for monkeypox infection. Tecovirimat, an antiviral drug, might be recommended in patients with severe immunocompromised state. A smallpox vaccine has shown to provide protection against monkeypox, but its use is limited to few clinical trials. Reports suggest that some of the cases however are self-limiting [11].

According to the Centers for Disease Control and Prevention (CDC), Florida has the fifth highest number of cases in the United States as of August 2022 [12]. Therefore, it is imperative that health care workers be educated regarding the clinical presentation and management of these cases. In addition, follow-up of patients is essential to prevent transmission. Preventive strategies, including but not restricted to the isolation of cases and usage of personal protective equipment (PPE), can go a long way in this battle against this disease.

Conclusions

Monkeypox with underlying immune deficiency patient who has human immunodeficiency virus infection and syphilis can present with atypical clinical features and delay a proper diagnosis, which can increase the risk of spreading monkeypox in the hospital. Thus, patients with rash and risky sexual behavior should be screened with monkeypox, and a readily available, rapid, and accurate test is necessary to stop the spread of the disease.

Abbreviations

HIV, human immunodeficiency virus; CD4, cluster of differentiation 4; MDMA, methylenedioxy-methamphetamine; BiPAP, bilevel positive airway pressure; PCR, polymerase chain reaction; FDA, Food and Drug Administration; DNA, deoxyribonucleic acid; CDC, The Centers for Disease Control and Prevention; PPE, personal protective equipment

Declarations
**Ethics approval and consent to participate**

This study was approved by the Ethics Committee of Hialeah Hospital.

**Consent for publication**

Written informed consent was obtained from the patient for the publication of this Case Report.

**Availability of data and materials**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing Interests**

The authors declare that they have no competing interests.

**Funding**

All authors have declared that no financial support was received from any organization for the submitted work.

**Authors’ contributions**

Conceptualization: WJ, LK, and SR. Data curation: WJ and SR. Formal analysis: WJ and LK. Investigation: WJ, LK, and SR. Methodology: WJ, LK, and SR. Project administration: WJ. Resources: RA and JEC. Software: WJ, LK, and SR. Supervision: RA and JEC. Validation: RA and JEC. Visualization: WJ. Writing – original draft: WJ, LK, and SR. Writing – review & editing: WJ. All authors read and approved the final manuscript.

**Acknowledgements**

We would like to acknowledge all the medical staff of Hialeah Hospital for their generous contribution.

**References**


Figures
Figure 1

Skin lesions at admission day 1. (A) Face. (B) Bilateral lip. (C) Upper chest. (D) Right upper chest. (E) Right arm. (F) Right forearm. (G) Abdomen. (H) Right leg. (I) Left leg.

Figure 2

Skin lesions at admission day 3. (A, B) Face. (C) Nose. (D) Bilateral hands. (E) Right forearm. (F) Left foot.

Figure 2

Skin lesions at admission day 3. (A, B) Face. (C) Nose. (D) Bilateral hands. (E) Right forearm. (F) Left foot.
Figure 3

Skin lesions at admission day 5. (A) Face. (B) Posterior neck. (C) Right upper chest. (D, E, F) Back. (G) Right torso. (H) Left torso. (I) Sacrum and buttocks.

Figure 4

Skin lesions at admission day 5. (A) Left forearm. (B) Right hand. (C) Right thigh. (D) Left thigh. (E) Left lateral thigh. (F) Right leg. (G) Right inner ankle. (H) Left leg. (I) Left foot.