Monkeys are a common source of infection in Brazil. During the nurse's follow-up, blood and skin lesion samples tested MPXV-positive by reverse transcription PCR using the QIAamp Viral DNA Mini Kit (QIAGEN, https://www.qiagen.com) for DNA extraction and TaqMan Monkeypox Virus Microbe Detection Assay (Thermo Fisher Scientific, https://www.thermofisher.com) for amplification. MPXV also was detectable in oropharyngeal samples despite the absence of respiratory symptoms. Of note, all collected specimens had detectable MPXV DNA throughout hospitalization. The nurse was discharged to outpatient care before complete lesion resolution (Figure).

In nonendemic settings, needlestick injury is an unusual form of patient-to-HCW MPXV transmission. Before 2022, fewer human-to-human than animal-to-human MPXV transmission cases were reported during outbreaks in Africa (5). In nonendemic countries, sporadic zoonotic or travel-associated monkeypox outbreaks have occurred (5,6), but during May–September 2022, >50,000 cases were reported worldwide (https://www.cdc.gov/poxvirus/monkeypox/response/2022/world-map.html), mainly through sexual or intimate contact transmission (7). HCWs are at risk, but a recent review of MPXV transmission in healthcare facilities in nonendemic countries found only 1 documented case of nosocomial monkeypox in a HCW, probably through contact with contaminated bedding (4,8).
Our case enabled observation of the natural progression of monkeypox through longitudinal clinical and laboratory monitoring of disease stages. The incubation period was 5 days. A cutaneous lesion and pain and inflammation at the inoculation site preceded generalized symptoms of fever and lymphadenopathy. The transmission route might have influenced the absence of a prodromal phase in the nurse because needlestick transmission parallels bite or scratch transmission from MPXV-infected animals to humans; in those cases, a febrile prodrome is uncommon (5). In addition, the nurse experienced severe injury site pain, which coincides with a series of cases in the current outbreak in which most patients who acquired MPXV by sexual or intimate contact were hospitalized for severe anorectal pain (2). The pain similarity suggests that the primary MPXV inoculation site is associated with painful lesions and possible neural impairment, as implied by the nurse’s magnetic resonance images.

MPXV DNA detected in the nurse’s blood on day 8, before skin lesions appeared at distant sites, suggests hematogenous virus dissemination. Few reports describe MPXV DNA in blood, but a retrospective study of monkeypox antiviral treatment found detectable MPXV DNA in blood after 14 days, even after skin lesions resolved (8). How detectable MPXV DNA corresponds to true viremia is unknown, but persistent DNA suggests bloodborne transmission could be possible through needlesticks, blood transfusions, and organ transplants. Persistent MPXV DNA in the nurse’s oropharyngeal samples aligns with another report (9), but efficiency for droplet or airborne transmission remains unknown.

Because few documented needlestick monkeypox cases are available (9), we could not estimate transmission risk, but instruments used on cutaneous lesions likely pose a high risk. The World Health Organization recommends postexposure prophylaxis with second- or third-generation vaccine, if available, up to 4 days after exposure (10). The state of São Paulo, Brazil, discontinued smallpox vaccination after 1979, and no smallpox or monkeypox vaccine is available in Brazil. However, HCWs should be considered for vaccination as soon as it is available.

Our report describes clinical features of monkeypox, including extreme pain at the inoculation site and prolonged DNAemia, after needlestick transmission in a HCW. Preexposure and postexposure prophylaxis, including vaccination, should be provided for HCWs in Brazil.
Monkeypox in Patient Immunized with ACAM2000 Smallpox Vaccine During 2022 Outbreak

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References

1. World Health Organization. WHO Director-General’s statement at the press conference following IHR Emergency Committee regarding the multi-country outbreak of monkeypox – 23 July 2022 [cited 2022 Aug 22]. https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-the-press-conference-following-IHR-emergency-committee-regarding-the-multi-country-outbreak-of-monkeypox–23-july-2022

2. Thornhill JP, Barkati S, Walmsley S, Rockstroh J, Antinori A, Harrison LB, et al.; SHARE-net Clinical Group. Monkeypox virus infection in humans across 16 countries—April–June 2022. N Engl J Med. 2022;387:679-91. https://doi.org/10.1056/NEJMoA2207323

3. Beer EM, Rao VR. A systematic review of the epidemiology of human monkeypox outbreaks and implications for outbreak strategy. PLoS Negl Trop Dis. 2019;13:e0007791. https://doi.org/10.1371/journal.pntd.0007791

4. Vaughan A, Aarons E, Astbury J, Brooks T, Chand M, Flegg P, et al. Human-to-human transmission of monkeypox virus, United Kingdom, October 2018. Emerg Infect Dis. 2020;26:782-5. https://doi.org/10.3201/eid2604.191164

5. Reynolds MG, Yerita KL, Kuehnhert MJ, Davidson WB, Huhn GD, Holman RC, et al. Clinical manifestations of human monkeypox influenced by route of infection. J Infect Dis. 2006;194:773–80. https://doi.org/10.1086/505880

6. Angelo KM, Petersen BW, Hamer DH, Schwartz E, Brunette G. Monkeypox transmission among international travellers—serious monkey business? J Travel Med. 2019;26:taz002. https://doi.org/10.1093/jtm/taz002

7. Adler H, Gould S, Hine P, Snell LB, Wong W, Houlihan CF, et al.; NHS England High Consequence Infectious Diseases (Airborne) Network. Clinical features and management of human monkeypox: a retrospective observational study in the UK. Lancet Infect Dis. 2022;22:1153–62. https://doi.org/10.1016/S1473-3099(22)00228-6

8. Zachary KC, Shenoy ES. Monkeypox transmission following exposure in healthcare facilities in nonendemic settings: low risk but limited literature. Infect Control Hosp Epidemiol. 2022;43:920-4. https://doi.org/10.1017/ice.2022.152

9. Loeb M, Zando I, Orvidas MC, Bialachowski A, Groves D, Mahoney J. Laboratory-acquired vaccinia infection. Can Commun Dis Rep. 2003;29:134-6.

10. WHO Emergency Response Team. Vaccines and immunization for monkeypox: interim guidance, 14 June 2022 [cited 2022 Aug 22]. https://www.who.int/publications/i/item/who-mpx-immunization-2022-1

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Monkeypox Virus Transmission to Healthcare Worker through Needlestick Injury, Brazil

Appendix

Appendix Figure 1. Site of needlestick in a case of monkeypox virus transmission to healthcare worker through needlestick injury, Brazil. Images show right thumb of the healthcare worker on day 0 (A), day 1 (B), day 4 (C), day 6 (D), day 8 (E), day 10 (F), day 12 (G), day 14 (H), and day 18 (I). Panel 2: New skin lesions (black arrows) and their development. Figures J, K, L show the same lesion over time. Figures M, N, O show the same lesion over time. Figures P and Q indicate new lesions on the thigh and the face, respectively.
Appendix Figure 2. Additional skin lesions in a case of monkeypox virus transmission to healthcare worker through needlestick injury, Brazil. Black arrows indicate lesions on the palmar base of middle finger on the right hand (A–C) and on dorsal middle finger of left hand (D–F) over time: A) day 8; B,E) day 14; C,F) day 18; and D) day 10.
Appendix Figure 3. Additional skin lesions in a case of monkeypox virus transmission to healthcare worker through needlestick injury, Brazil. A) Thigh lesion; B) facial lesions.