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Case Report

The first case of Mpox infection in Iran during the 2022 outbreak

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Abstract

Introduction: The unexpected outbreak of human Mpox infection beginning in some European countries that were non-endemic for Mpox stunned the world during the Coronavirus Disease 2019 (COVID-19) pandemic in May 2022. The re-emerging Mpox outbreak, which has a greater capacity for human-to-human transmission, was mainly due to traveling. In this paper, we describe the first case of the disease was observed in an Iranian woman infected by her husband who had a history of traveling to Canada.

Case Report: The 34-year-old woman had flu-like syndrome with some skin rashes on her hand, finger, and arm. No antivirals were prescribed in this case, and supportive care was used to help her recover. RT-PCR and Sanger sequencing were used to analyze the sample from the oropharyngeal swab and the rash, and the results confirmed the Mpox infection.

Conclusions: The risk of infectious disease outbreaks after COVID-19, such as Mpox, is of great importance, and health systems should be vigilant for timely identification and preparedness.

Key words: Mpox; MPXV; Iran.

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Introduction

Mpox is an infectious disease caused by MPXV. MPXV (formerly known as monkeypox virus) is a DNA virus belonging to the *Orthopoxvirus* genus in the *Poxviridae* family [1]. The first case of Mpox in humans was reported in 1970 in Nigeria, and from that date until early 2022, all endemic cases of the disease were limited to West and Central African countries [2]. Since May 2022, numerous outbreaks of Mpox have been reported in non-endemic regions, especially European and American countries [3]. Due to the rapid increase in Mpox cases, on July 23, 2022, the World Health Organization (WHO) declared the current outbreak of Mpox a Public Health Emergency of International Concern (PHEIC) [4]. As of March 31, 2024, a total of 95,226 laboratory-confirmed Mpox cases and 185 related deaths in 117 countries (areas or territories) had been registered [5]. Human transmission of MPXV occurs through direct contact with rash, scabs, and saliva of infected patients, as well as during intimate contact with Mpox cases such as sex (anal, oral, or vaginal), kissing, and touching the genitals [6]. Additionally, MPXV may transmit to human via a bite or close contact with blood, bodily fluids, tissues, and mucosal or cutaneous elisions of infected animals [7]. The incubation period is approximately 7-14 days, and common symptoms include a skin rash that may persist for 14-28 days, along with fever, headache, myalgia, malaise, lymphadenopathy, and chills [8].

Here we report the first confirmed case of Mpox in Iran.

Case Report

On August 11, 2022, a 34-year-old woman living in Ahvaz City, southwest of Iran, was referred to the West Ahvaz Health Center due to the occurrence of maculopapular rashes on her hands, arms, back, legs, and genital organs (Figure 1). The prodromal

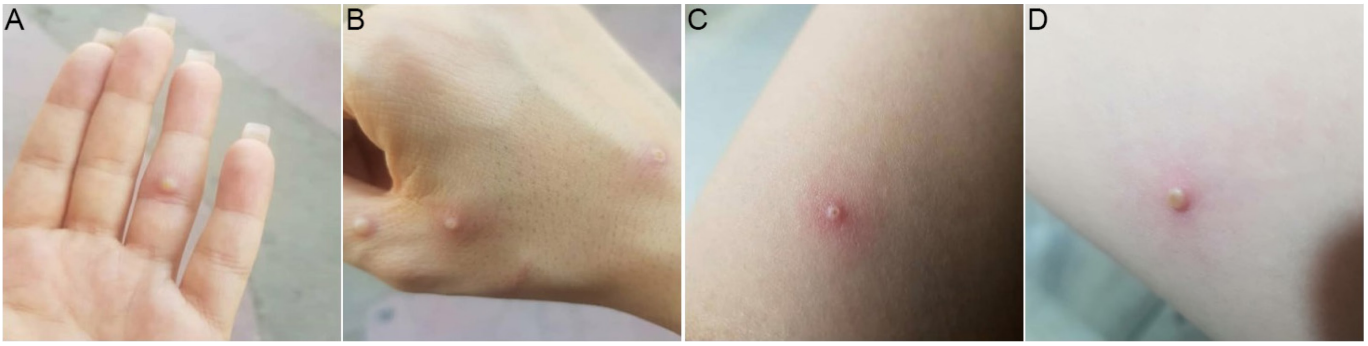
symptoms, including fever and headache, started 5 days before the onset of the rash (on August 6, 2022). Due to the skin rash and the coincidence of the patient's visit with the outbreak of Mpox in the world, her physician suspected Mpox, and swab samples from maculopapular lesions and oropharynx were obtained from the case. It is worth mentioning that the patient's husband had a history of recent travel to Canada. He came back to Iran on July 23, 2022, and after eight days, on August 1, 2022, several skin rashes were observed on his face and hands. Despite the history of travel and having skin rashes, the case's husband did not refer to any healthcare center, and the clinical symptoms recovered at the time our case's sample was sent to the Pasteur Institute of Iran. Therefore, no sample from the acute phase of the disease was available for laboratory investigations of Mpox. Indeed, because this patient suffered from flu-like symptoms during her illness without any special treatment measures, her illness was improved only with supportive treatments.

Routine laboratory detection of MPXV is performed using nucleic acid amplification testing [9]. Viral nucleic acid was extracted from both rash and oropharyngeal swabs using Nucleic Acid Isolation System EXM3000 (Zybio, China) and subjected to two different Real-Time PCR assays. In the first step, an Orthopox virus screening test was performed based on SYBR Green Real Time PCR using OrtoP-cF 5′-CGCATATTATCACGTTGGGG-3′ (forward primer) and OrtoP-cR 5′- TACCTTGTTGAGCCTCCATT-3′ (reverse primer) [10] with RealQ Plus 2X master mix green (Ampliqon, Denmak). After the screening test result was positive, the results were confirmed using the LightMix® Modular Monkeypox Virus kit (TIB MOLBIOL, Germany) at the Pasteur Institute of Iran. The Ct values of the maculopapular swab sample in the first and second assays were 10.29 and 16, respectively. Then, a region of 1280 bp of the viral genome was amplified using OrPoSeq-F 5′-GAAAAAGATTGTTGGACATTGGA-3′ (forward primer) and OrPoSeq-R 5′-GTGGTATGGGACACCACAAA-3′ (reverse primer) [11] with Taq DNA Polymerase 2x Master Mix RED (Amplicon, Denmark). The PCR product was subjected to sequencing using a 3500 genetic analyzer (thermo, USA). Raw sequencing data was trimmed by CLC Main Workbench software and submitted to GISAID with accession ID: EPI_ISL_14810460. Due to the short length of the sequence, phylogenetic analysis could not be performed, and therefore https://clades.nextstrain.org/ and https://nextstrain.org/monkeypox/ were used for sequence analysis. The 1280bp sequence, nucleotide (nt) 158718 to 159998, related to the reconstructed ancestral MPXV reference, had 7 nucleotide substitutions, including 3 amino acid substitutions in the OPG185 coding region, as follows: G158787T, G159351A, G159415A (A167T), A159447C (E177D), C159530T (T205I), T159741C, and G159780A. The Nextclade showed the IIb clade for this sequence; the sequenced region cannot determine the lineage virus.

Discussion

Most studies reported evidence of an association between sexual activity and the transmission of MPXV in non-endemic areas in 2022. In 60 to 100 percent of cases, direct contact with lesions, especially on the skin of the genital area, anus, anorectum, and throat of patients during sexual activities, has led to the transmission of infection [12]. Present epidemiological data suggest that men who have sex with men are more likely to be affected by Mpox. MPXV can spread through intimate contact, very close sexual or social contact, and aerosols. However, Iran launched its surveillance system for Mpox risk assessment in the early days of the recent Mpox outbreak, which started in May 2022. Immediate development of in-house SYBR green RT-PCR kit for Orthopoxvirus, and

Figure 1. The maculopapular Mpox lesions on the finger, hand, left arm, and right arm of the patient are demonstrated in A, B, C, and D section, respectively.



distribution of these detection kits as a screening assay among the provinces, help Iran's healthcare system be alerted and ready to monitor surveillance, and follow-up the Mpox. Inconclusive samples and samples with positive results from screening RT-PCR tests were sent to the Pasteur Institute of Iran to confirm the results. Because of the high stability of MPXV, we need to expand our surveillance to other hotspots such as swim spas, schools, childcare centers, etc.

Conclusions

In this paper, we reported and described the first confirmed case of Mpox in Iran, which emphasizes the strengthening of the infectious disease surveillance system for timely identification and preparedness.

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