



2022 Monkeypox Case Report: Beyond Borders and Expectations

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Abstract

Monkeypox is a zoonotic virus that is in the same family as smallpox. It is primarily spread through various forms of close contact with an infected individual, including direct contact with an infected person's bodily fluids or surfaces and fabrics that have been contaminated. Its symptoms are generally characterized by rashes or lesions that are firm or supple, restricted to its area, and raised in its center. Vaccines for this disease were actually developed for smallpox. There are two main types of vaccinations: ACAM2000 and Jynneos. ACAM2000 uses a live vaccine virus while Jynneos uses a non-replicating virus. Due to the similarity between smallpox and monkeypox, Tpoxx is being researched as a potential treatment. FDA approved Tpoxx - or Tecovirimat - in 2018 as an effective treatment for smallpox after extensive animal trials and safety studies. Currently, the drug is not FDA-approved for monkeypox; however, under an expanded access protocol, it is clinically available. There are two cases presented in this article. The first case was a heterosexual male in his 30s who contracted monkeypox while having multiple sexual encounters with women while moving from tent to tent as an unhoused resident. He also shared pipes with others for recreational marijuana use. This case illustrates that monkeypox is a virus that isn't restricted to sexuality, especially that of the LGBTQ+ community. To clarify, this virus is not an STI/STD, it's spread by skin-to-skin contact, contact with an object that was in contact with an infected individual, or contact with respiratory secretions. However, there are fears of singling out the LGBTQ+ community and using the monkeypox virus to stigmatize these communities, much like the AIDS pandemic in the 1980s. In this case, a large proportion of those infected identifies as non-heterosexual, which may just be a result of the nature of a viral illness. Tightly knit groups and communities that spend a lot of time with each other create many opportunities for contact and facilitate disease spread. Second case is a homosexual male in his 60s who received childhood vaccination for smallpox, and yet contracted the monkeyvirus during his travels to Germany and Switzerland, where he had encountered multiple sex partners. This case presents how previous vaccination for smallpox may not be effective against monkeypox virus. Thus, prior smallpox vaccines in the distant past offered no protection against monkeypox and are capable of spreading to people outside of the borders of LGBTQ+ community.

Keywords

Monkeypox, Monkeyvirus, Zoonotic Virus, Smallpox, Case Report

Introduction

The increasingly prevalent viral disease monkeypox is a zoonotic virus that is part of the Poxviridae family, Chordopoxvirinae subfamily, and Orthopoxvirus genus, which also results in the variola virus, colloquially known as smallpox [1]. While monkeypox is homogeneous to smallpox, demonstrating similar symptoms, monkeypox is rarer and is far less deadly [2]. Originating in the Democratic Republic of Congo (DRC), with the first human case in 1970, there are a total of 41,358 reported cases of Monkeypox worldwide following an outbreak as of May 2022 [3]. The first reported case of monkeypox outside of its endemic African region was in 2003, when forty-seven individuals were infected in the United States after having come into contact with pet prairie dogs that were contained with Gambian pouched rats [4]. Monkeypox is primarily spread through various forms of close contact with an infected person, including direct contact with an infected person's bodily fluids or surfaces and fabrics that have been contaminated [3]. Likewise, smallpox can also be transmitted via contaminated fabrics. Historically, Native Americans have been thought to have contracted the smallpox virus through blankets provided by colonizers [5]. Moreover, monkeypox can be transmitted from a pregnant mother to her fetus as well as from an infected animal via a scratch or bite [3]. Monkeypox is generally characterized by rashes or lesions, which can be painful up until the healing phase, that are firm or supple, restricted to its area, and raised in its center, that can develop in a series of four of the following stages: macular, papular, vesicular, to pustular [3]. Areas on the body that the lesions can occur in are in the genital region, mouth, and palms and soles [3]. Other signs and symptoms of Monkeypox include flu-like symptoms like fever, chills, swollen lymph nodes, exhaustion, body and muscle aches, and headaches [3].

On August 9, 2022, the Food and Drug Administration (FDA) authorized the emergency use of JYENNOS vaccine, a two-dose vaccine aimed to prevent monkeypox and smallpox, in high risk individuals who are at least 18 years old [6].

Vaccines for monkeypox are actually developed for smallpox [7]. Historically, smallpox vaccines were

developed using cowpox virus by Dr. Edward Jenner in 1796 [8]. Jenner noticed that milkmaids who had gotten cowpox were then protected from smallpox. So Dr. Jenner created smallpox immunity by infecting people with cowpox viruses, which are less virulent than smallpox for human beings [9]. Later on in the 1920s, Dr. Qi Changqing was able to eradicate smallpox in China using attenuated smallpox viruses that are derived by passing from one animal host to another, including monkeys, rabbits, and cows [10]. This vaccine is called the Tian Tan vaccine.

According to The Centers for Disease Control and Prevention (CDC), the "Monkeypox virus is closely related to the virus that causes smallpox; the smallpox vaccine can protect people from getting monkeypox" [10]. The vaccination process for monkeypox uses the same vaccines as for smallpox. There are 2 main types of vaccinations: ACAM2000 and Jynneos (also known as Imvamune or Imvanex). The ACAM2000 vaccine uses a live vaccine virus, while Jynneos uses a non-replicating virus. The Jynneos is currently widely used but the number of vaccines is limited [10]. The US government has a stockpile of the ACAM2000 vaccine that has more contraindications, a greater risk for side effects, and is not recommended for people with HIV, immunocompromised, or infants [10]. The benefit is that ACAM200 is given in a single dose while Jynneos is 2 doses, 4 weeks apart.

Although eradicated in most parts of the world, the virus that causes smallpox still exists. As a result, the FDA approved Tpoxx - or Tecovirimat - in 2018 as an effective treatment after extensive animal trials and a study examining the side effects of the medication on humans [11]. Due to the similarity between smallpox and monkeypox, Tpoxx is being researched as a potential treatment. Currently, the drug is not FDA-approved for monkeypox; however, under an expanded access protocol, it is clinically available. The prior use of Tpoxx and its clinical availability may help expedite the FDA's approval process for the treatment of monkeypox.

Currently, the National Institute of Health (NIH) is undergoing a randomized clinical trial to study the efficacy and safety of Tpoxx for monkeypox [12]. In

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theory, the drug should prove effective as the original studies performed on primates for smallpox used the monkeypox virus as the infectious agent. It should be noted, however, that monkeypox in primates may behave differently than monkeypox in humans. Further research is required, leading to the FDA's decision to allow the use of Tpoxx under the current protocol.

Currently, the CDC states that Tpoxx is accessible through the Strategic National Stockpile, and can be obtained by contacting the CDC's Emergency Operations Center and requesting a clinical evaluation [10]. As the NIH studies progress, these accessibility programs will likely change to reflect the efficacy of Tpoxx.

In this report we will be introducing two patients recently infected with monkeypox.

Case Summaries

Patient-1:

Male in early 30s with history of methamphetamine use, present to the emergency department (ED) in summer 2022 for leg pain that has been going on for 3 days. He has erythema on bilateral legs with a rash in the groin / buttock area and torso. (**Fig-1, Fig-2** and **Fig-3**) Patient was seen earlier in the emergency room the day prior for similar concern and was discharged with oral doxycycline with the diagnosis of cellulitis. Returned to the ED the following day due to worsening symptoms with fever 101.4 and severe pain. Monkeypox diagnosis was considered. Test done in the ED. Patient stated he had unprotected sexual encounters with women, and lives from tent to tent as an unhoused resident (homeless). He shares pipes with others for recreational marijuana use and denies any sick contacts. On hospital day 2, the test came back positive for both orthopox viral Deoxyribonucleic acid (DNA) qualitative Polymerase chain reaction (PCR) and monkeypox virus DNA qualitative PCR. TPOXX was ordered for monkeypox treatment, but was not available. Serum drug screen was also positive for amphetamine and tetrahydrocannabinol (THC, main psychoactive constituent of cannabis / marijuana) and was also incidentally asymptotically COVID19 positive. Bebtelovimab was given for COVID19

treatment. On hospital day 3, his pain improved and left lower extremity cellulitis appeared to be resolved. Pain resolved by day 4 and the patient left against medical advice on day 5 (See **Fig-1, Fig-2** and **Fig-3** for reported lesions).



Fig-1: Torso



Fig-2: Right Buttock



Fig-3: Groin area

Patient-2:

Male in early 60's who was vaccinated with smallpox vaccine during childhood and has past medical history of syphilis and human immunodeficiency virus (HIV) well controlled with

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CD-4 of 554/uL, CD8 of 289/uL, undetectable HIV viral Ribonucleic acid (RNA), came in during spring 2022 with a chief complaint of rash in the rectal area. Work up was positive for Monkeypox. He had a recent travel history of visiting Germany and Switzerland and had multiple sex partners there. He started to feel uncomfortable in the perineal region a day or two before returning to America. He experienced some malaise but no fever, constipation, nausea, vomiting, diarrhea, chest pain, shortness of breath nor lymphadenopathy. Patient was treated with TPOXX, and also treated with nystatin and lidocaine for comfort. Pt was suspicious about the lesion and said



Fig-4: Annus lesions



Fig-5: Left hand



Fig-6: Left knee



Fig-7: Right Shoulder

he kept out of physical contact with others out of abundance of caution (See **Fig-4**, **Fig-5**, **Fig-6** and **Fig-7** for reported lesions).

Discussion

Patient in case one most likely contracted monkeypox by sharing blankets and / or having unprotected heterosexual relationship with infected host. He may also have contracted the virus from sharing marijuana pipe with others in the community. This case illustrates that monkeypox is a virus that isn't restricted to sexuality, especially that of the lesbian, gay, bisexual, transgender, queer/ questioning, and more (LGBTQ+) community. To clarify, this virus is not a sexual transmitted disease (STD); it's spread by skin-to-skin contact, contact with an object that was in contact with an infected individual, or contact with respiratory secretions. However, there are fears of singling out the LGBTQ+ community and using the monkeypox virus to stigmatize these communities,

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much like the acquired immunodeficiency syndrome (AIDS) pandemic in the 1980s. In this case, a large proportion of those infected identifies as non-heterosexual, which may just be a result of the nature of a viral illness. Tightly knit groups and communities that spend a lot of time with each other create many opportunities for contact and facilitate disease spread. According to a report from the United States Center for Disease Control, the disease is prevalent among certain members of the LGBTQ+ community and disproportionately affects minorities. In that report, it was found that 28% of infected individuals identified as Hispanic and Latinx and 26% of the individuals identified as African American [13].

Patient in case two, despite being vaccinated for small pox, has contracted monkeypox from having multiple sexual encounters while traveling in Europe. This case illustrates how previous smallpox vaccines given to many of those who are older than age 49 may be ineffective for current monkeypox. The US stopped vaccinating smallpox in 1972 [14].

Conclusion

Monkeypox is one of the latest infectious diseases to garner great interest and concern from the public and health care officials. Controlling its spread may ultimately involve the use of vaccines. Unfortunately, there is currently a lot of resentment against vaccines, especially with regards to COVID-19 [15,16]. We are also learning that prior smallpox vaccines in a patient's childhood now offer no protection against monkeypox (patient number 2). Therefore, it is unclear how receptive the public will be with the monkeypox/smallpox vaccine. Currently, there is a lot of bias and misconception about monkeypox spreading only among the LGBTQ+ community, creating unnecessary stigma to the community. As case one illustrates, monkeypox is capable of spreading to people outside the borders of the LGBTQ+ community. Overall, monkeypox, which was once endemic, is now an increasingly global virus that is creating new havoc in our society.

Conflicts of Interest

The authors have read and approved the final version of the manuscript. The authors have no

conflicts of interest to declare.

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