Questions and Answers on Vaccination

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Questions on Immunization and Vaccination and Short Answers

Bağışıklama ve Aşı ile İlgili Sorular ve Kısa Cevaplar

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Monkeypox Disease and Prevention with Vaccination

Following the emergence of COVID-19 in December 2019, which dramatically transformed our lives, concerns arose regarding the risk of a new infectious agent that may impact all of our lives, particularly after the emergence of monkeypox cases in 2022 in geographical locations where it is not supposed to be seen. We have noticed that pediatricians and all healthcare professionals working on children's health, in particular, need to refresh their knowledge of this zoonotic disease in greater depth due to information received that it may severely impact children and the fetus throughout the intrauterine period. Essentially a zoonotic infection, monkeypox is a disease caused by the pox virus and transferred from animals to humans. It can also spread from person to person through close contact. Typically, it has symptoms similar to a milder form of smallpox, and spontaneous recovery can be seen in two to four weeks (1). Vesicular rash, fever, weakness, severe fatigue, muscle pain, and generalized lymphadenopathy are the hallmark symptoms. As previously stated, children, fetuses, and people with immunodeficiency or immunosuppression may experience a more severe course of the disease (2). Monkeypox is endemic in 10 countries in Central Africa (especially the Democratic Republic of the Congo) and West Africa (especially Cameroon and Nigeria) (3). Its mortality rate is 3% in Central Africa and 1% in West Africa, based on the reports after the 1980s. It was first identified in monkeys in 1958 at the Statens Serum Institute in Copenhagen, Denmark, which is why it is also referred to as monkeypox. The first human case was reported in 1970 in the Democratic Republic of Congo. By 2022, cases were identified in all continents except Antarctica, and as of August 2022, a total of 28.219 cases were reported. According to the Ministry of Health, five cases have been reported in our country.

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Question 1: Are there effective vaccines against monkeypox?

As of July 2022, there are two vaccines available for clinical use. These vaccines are Jynneos, known as the Imvamune/

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Imvanez in Europe, and the classical smallpox vaccine in use under the name ACAM2000.

Jynneos, manufactured by a relatively small Danish company called Bavarian Nordic, was approved for use in adults over the age of 18 in Europe in 2013 and in the United States in 2019. It is not available for clinical use in our country. It contains live attenuated vaccinia virus and should be given in two doses four weeks apart. After attenuation, the virus loses its ability to replicate inside the cell. Vaccinia normally infects cattle. The vaccine is approved for clinical use in high-risk individuals and healthcare professionals. Although the protection rate is reported to be high, an exact rate cannot be provided. Furthermore, studies have shown that it improves the clinical course of the disease when used early after exposure.

The ACAM2000 vaccine was approved by the United States Food and Drug Administration (US-FDA) in 2007 for the prevention of smallpox. The ACAM2000 vaccine can also be vaccinia. Because of this, ACAM2000 has a higher adverse effect profile than Jynneos. Adverse effects include severe skin infections and potentially life-threatening cardiovascular problems (especially in those with underlying cardiac problems). Furthermore, administering the vaccine is more complicated because it involves inoculation with a special bifurcated needle (Figure 1).

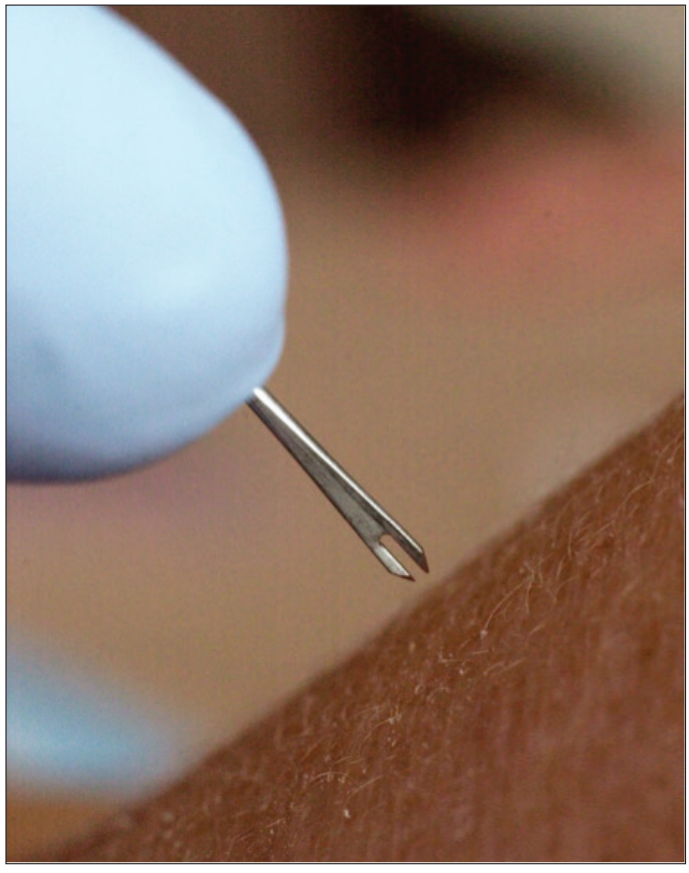

Figure 1. Administration of vaccinia virus with a bifurcated needle.

Question 2: How effective are the available vaccines against monkeypox?

Although Jynneos and ACAM2000 have been used clinically and are even approved by some authorities, no extensive research has been conducted to assess their efficacy against monkeypox. Jynneos registrational studies revealed that vaccinated individuals produce a stronger antibody response than ACAM2000. Furthermore, during virus challenge studies in primates, it was discovered that monkeys vaccinated with Jynneos had a survival rate of 80% to 100% when later exposed to/infected with monkeypox, whereas this rate was between 0 and 40% in unvaccinated monkeys. Since the incubation period in monkeypox is between six to fourteen days, there is limited data on Jynneos, which shows administration soon after exposure can be effective.

The ACAM2000 data are based on observational information gathered from vaccine administrations during the 1980s outbreak, particularly in Africa. Although data is very limited, researchers discovered that individuals who were not vaccinated with ACAM2000 had an 85% higher risk of infection than those who were.

Question 3: Are those previously vaccinated with the smallpox vaccine protected against monkeypox?

Despite the lack of a rigorous clinical trial, it is known that individuals who have previously been vaccinated for smallpox are protected against monkeypox to some extent. The smallpox vaccine is believed to be 85% protective against monkeypox, according to the US Centers for Disease Control and Prevention (CDC) and the World Health Organization. Given that the smallpox vaccine was delivered at the age of one in Türkiye and that the last immunization was in 1981, people born in 1980 and earlier can be assumed to have had smallpox vaccination. The presence of a vaccine scar, on the other hand, should be regarded as more reliable evidence. It should be noted, however, that vaccination protection diminishes over time. In the United States, where the vaccine is available for clinical use, the Centers for Disease Control and Prevention (CDC) recommends the monkeypox vaccine to those who are at high risk for monkeypox and have received the smallpox vaccine more than three years ago. It should be noted, however, that there has been no definitive research on these topics, and the recommendations are usually in the form of expert opinions.

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