



The Varicella Vaccine: Understanding its Role in Preventing Chickenpox and Complications in Children

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INTRODUCTION

The varicella vaccine, commonly known as the chickenpox vaccine, represents a significant advancement in public health, providing robust protection against a once-common childhood illness. Chickenpox, caused by the Varicella-Zoster Virus (VZV), was a ubiquitous disease before the introduction of the vaccine, affecting nearly every child in the pre-vaccine era. Understanding the role of the varicella vaccine involves examining its development, effectiveness and impact on public health, as well as addressing concerns about vaccine safety and long-term benefits.

DESCRIPTION

Development and introduction of the varicella vaccine

The varicella vaccine was developed in the 1970's by Dr. Michiaki Takahashi in Japan. It gained approval for use in the United States in 1995. The vaccine contains a live attenuated virus, which means the virus is weakened so it cannot cause disease in healthy individuals. By stimulating the immune system, the vaccine provides immunity without causing the severe symptoms associated with the natural infection.

Effectiveness of the varicella vaccine

The varicella vaccine is highly effective in preventing chickenpox. Studies show that a single dose of the vaccine is about 85% effective at preventing any form of chickenpox and nearly 100% effective at preventing severe cases of the disease. In 2006, a second dose was added to the immunization schedule to improve effectiveness, particularly against mild cases. This two-dose regimen has proven to be approximately 90-95% effective at preventing chickenpox and significantly reduces the incidence of breakthrough cases, where vaccinated individuals still contract a milder form of the disease.

Public health impact

The introduction of the varicella vaccine has led to a dramatic decline in chickenpox cases, hospitalizations and associated complications. Before the vaccine's availability, the United States saw about 4 million cases of chickenpox annually, resulting in 10,500-13,000 hospitalizations and 100-150 deaths. Since the vaccine's introduction, there has been a more than 90% reduction in chickenpox cases and a similar decrease in hospitalizations and deaths.

The vaccine's impact extends beyond reducing chickenpox cases. It also decreases the incidence of shingles (Herpes zoster) in vaccinated individuals. Shingles is caused by the reactivation of VZV later in life, typically in those who have had chickenpox. While shingles can still occur in vaccinated individuals, studies indicate the risk is lower compared to those who acquired immunity through natural infection.

Preventing complications

Chickenpox can lead to several severe complications, particularly in infants, adolescents, adults, pregnant women and immunocompromised individuals. Complications include bacterial infections of the skin, pneumonia, encephalitis (inflammation of the brain) and sepsis. By preventing chickenpox, the varicella vaccine also prevents these potentially life-threatening complications. For pregnant women, vaccination before pregnancy is crucial as chickenpox can cause congenital varicella syndrome, leading to birth defects.

Safety and concerns

Like all vaccines, the varicella vaccine has been extensively studied for safety. The most common side effects are mild and include pain at the injection site, fever and mild rash. Serious side effects are rare. Concerns about vaccines, in general, often center around misinformation about potential links to conditions such as autism, which extensive research has disproven.

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One specific concern with the varicella vaccine is the possibility of vaccine-strain virus reactivation causing shingles. However, this risk is significantly lower than the risk of shingles from the wild-type virus. Furthermore, vaccinated individuals who do develop shingles tend to experience milder cases compared to those who had chickenpox.

Long-term benefits and community immunity

The varicella vaccine also contributes to herd immunity, protecting those who cannot be vaccinated, such as infants and individuals with certain medical conditions. Herd immunity occurs when a high percentage of the population is immune to a disease, reducing its spread and providing indirect protection to unvaccinated individuals.

Additionally, long-term studies have shown that immunity from the varicella vaccine is long-lasting, with protection persisting for at least 10-20 years post-vaccination. Booster doses may be

considered in the future if long-term immunity wanes, but current data suggest that the two-dose regimen provides sustained protection.

CONCLUSION

The varicella vaccine is a crucial tool in preventing chickenpox and its complications in children. Its introduction has led to a significant reduction in the incidence of the disease, hospitalizations and deaths. The vaccine's effectiveness, coupled with its safety profile, underscores its importance in public health. By preventing chickenpox, the varicella vaccine also reduces the risk of severe complications and contributes to community immunity, protecting vulnerable populations. Continued vaccination efforts are essential to maintain these public health gains and protect future generations from chickenpox and its associated risks.