Q & A: Patient to Physician FAQs: Answers to Common Patient Questions About Vaccinations

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KEYWORDS

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Q: WHAT ARE SOME OF THE ADVERSE EVENTS ASSOCIATED WITH VACCINATIONS AND WHAT ARE THE ABSOLUTE CONTRAINDICATIONS FOR VACCINE ADMINISTRATION?

A: Large-scale vaccination programs have changed the face of health care in the last few decades. In 1980, the World Health Organization declared that smallpox had been eradicated and polio eradication was an achievable goal. Immunizations have reduced the incidence of many diseases, including measles, mumps, rubella, tetanus, and polio, in the United Stated by more than 95% compared with the prevaccine era.[1] However, now that these diseases are less prevalent, attention has shifted from the consequences of the disease to vaccine-associated adverse events. Because vaccines are often mandated and administered to healthy people, and in part because of the way vaccinations are portrayed in the media, there is a widespread public lack of understanding and trust in vaccinations.[2] As clinicians navigate the continuously evolving complexities of vaccine administration, managing individual patient risk factors and educating the public about adverse reactions are critical to obtaining public confidence in vaccine safety.

Adverse events from vaccines range from minor to life threatening. Minor, expected reactions include irritation at the site of injection (swelling, redness, and soreness), low-grade fever, and malaise. These reactions usually last for a few days or less

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and resolve without sequelae.[3] A later finding associated with vaccine administration that often prompts patients to visit a physician is a delayed-type hypersensitivity reaction that results in an injection site nodule. These patients should be counseled that most of these nodules resolve over time, although it can take several months, and that nodules are not a contraindication for future vaccination.[4]

More serious reactions include severe hypersensitivity reactions and anaphylaxis. These reactions may be caused by the vaccine antigen itself or components used in the manufacturing of the vaccine (eg, residual animal protein, gelatin, preservatives, or stabilizers). Egg protein is used in the preparation of influenza and yellow fever vaccines; however, most patients with egg allergies are able to tolerate these vaccines without difficulty. Although measles, mumps, and rabies vaccines are grown in chick embryos, they contain no egg protein and can be administered to patients with egg allergies.[5]

Gelatin is used by some manufacturers in the production of the Japanese encephalitis, varicella, and measles, mumps, rubella (MMR) vaccines. It is often identified as the culprit in hypersensitivity reactions to the MMR vaccine.[6] Thimerosal, a preservative that contains mercury, has been a source of great controversy. Even although the amount of mercury is minimal, most manufacturers have removed thimerosal from the vaccine production process.[7] Aluminum and phenoxyethanol are 2 other preservatives used in vaccines that can cause hypersensitivity reactions. Residual yeast proteins may be found in the hepatitis B and human papillomavirus (HPV) vaccines.[1]

Contrary to popular belief, most patients with suspected allergies or even anaphylaxis to vaccines or their components may receive vaccines safely. Patients who report an allergy to vaccine components should be referred to an allergist for immediate-skin type testing to determine if vaccine administration is appropriate.[8] For patients who have experienced anaphylactic reactions to vaccines or their components, evaluation with skin testing is warranted in an attempt to determine the culprit allergen.[9] Despite positive skin testing, the vaccine may still be administered in graded doses with 15-minute intervals under direct medical supervision.[10]

In patients who experience an adverse reaction to a vaccine with recommended subsequent doses, IgG antibody levels should be measured to determine the presence or absence of seroprotection. If the levels are appropriate, additional doses may be withheld despite the fact that the magnitude and duration of immunity may be decreased.[11]

Besides anaphylactic reactions, specific serious adverse reactions associated with certain vaccines may be absolute contraindications for the administration of future doses. For example, encephalopathy has been associated with MMR and pertussis vaccines.

Live vaccines may cause vaccine-induced illness and special attention needs to be given to each patient's immune and pregnancy status. The live vaccines include bacillus Calmette-Guérin (BCG), intranasal influenza, oral polio, MMR, rotavirus, oral typhoid smallpox, varicella, and yellow fever. These vaccines are contraindicated in patients with immunosuppression, either from humoral or cellular immune deficiency or immunosuppression caused by medications such as steroids.[1] The duration and dose of steroid treatment considered to be a contraindication to vaccination with live viruses is controversial, and the risks and benefits of such vaccinations should be reviewed on an individual case basis.[1] The only live vaccine that cannot be administered to close contacts of immunocompromised individuals is oral polio.[12]

Live vaccinations are contraindicated in pregnancy and women should be counseled to avoid becoming pregnant for at least 1 month after receiving a live vaccine because of the theoretic risk of transmitting the live agent to the fetus (see **Table 1** for a general overview of the Advisory Committee on Immunization Practices [ACIP] guidelines for vaccination of pregnant women).[13] If a live-virus vaccine is inadvertently