

Local reactions to fourth and fifth dose DaPT-containing vaccine: Distinguishing normal from cellulitis

Since whole-cell pertussis vaccine was replaced with acellular pertussis (aP) vaccine in BC in 1997, systemic adverse events in infants such as febrile seizures and hypotonic hyporesponsive episodes have decreased significantly. However, practitioners and parents alike have reported an increased incidence of local reactions following the booster doses. The routine childhood immunization schedule in BC includes a fourth and fifth dose of a diphtheria, acellular pertussis, and tetanus (DaPT) containing vaccine at 18 months and 4 to 6 years of age, respectively. These are commonly known as the toddler and kindergarten booster doses. In this article we will review the recognition of common local reactions to these boosters and provide recommendations for practice.

Prominent local reactions are more common in the cohort of children who received exclusively acellular pertussis vaccine as priming doses, with one-quarter of such children experiencing an Oreo cookie or larger sized area of redness and swelling.¹ While redness and swelling are prominent, they are typically not accompanied by pain, severe tenderness, or reduced mobility.^{1,2} Reasons for the reactions are unclear; however, they are thought to be related to Arthus-type reactions^{1,3} or to greater cell-mediated immunity stimulated by acellular pertussis products.⁴ Regardless of the reason, these reactions are self-limited, often resolving spontaneously within 4 days.^{1,3,5} Children who experience such large local reactions after the fourth dose tolerate

the fifth dose well.³ At least one study found that even those reactions with extensive swelling do not appear to affect parental attitudes toward vaccines or result in concerns about vaccine safety.¹

Immunization technique may also have an effect on local reactions. It is important to ensure that the vaccine is administered intramuscularly with

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the needle at a 90-degree angle to the skin.⁵ The aluminum adjuvant contained in DaPT vaccines may increase irritation or lead to lumps or nodules if the vaccine is injected subcutaneously, which is more likely to occur if using a short needle.^{6,7} Various studies have demonstrated that using a 25 mm long needle as compared to a 16 mm long needle resulted in fewer local reactions and that the reactions that did occur were less severe.

Severe local reactions to vaccines may be difficult to distinguish from cellulitis, and if misdiagnosed may lead to unnecessary hospitalization and antibiotic use. Cellulitis at the injection site is defined “as an acute infectious and expanding inflammatory condition of the skin.”⁸ Cellulitis is associated with more intense erythema, tenderness to even light touch, at least moderate induration as opposed to mere swelling, and significant local warmth.⁸ Cellulitis can be laboratory confirmed by culturing an aspirate from the affected area or, if associated with bacteremia, by blood

culture. It may be accompanied by fever and, unlike the local reactions described above, it usually does not resolve spontaneously.

In conclusion, the BCCDC Immunization Program recommends the following practices to minimize local discomfort and reactions:

- Ensure that the injection is administered intramuscularly by using a 25 mm long needle placed at a 90-degree angle to the skin. In most children aged 18 months and 4 to 6 years, the deltoid is the preferred site.
- Rapidly inject the vaccine without aspirating. There is no evidence to support aspiration prior to intramuscular injection; it may increase the time it takes to immunize and is painful for the child.⁹
- Include information in the informed consent process about the expected reaction of redness, swelling, and discomfort lasting up to 4 days. Reassure parents that this is normal and usually resolves without medical intervention. A cold compress to the injection site or use of acetaminophen may help to alleviate discomfort.

For more information see the BC Immunization Manual at www.bccdc.ca/dis-cond/comm-manual/CDManualChap2.htm.

—Christine Halpert, RN, BSN, MA
Senior Practice Leader, Immunization Programs and Vaccine Preventable Diseases Service, BC Centre for Disease Control
—Monika Naus, MD, MHSc
Medical Director, Immunization Programs and Vaccine Preventable Diseases Service, BC Centre for Disease Control

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References

Available at bcmj.org.