

A rare case of cellulitis after tetanus toxoid (TT) vaccination

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ABSTRACT

Cellulitis is a bacterial infection of the deeper layers of the skin, namely, the dermis and the subcutaneous tissue. The most common organisms involved in causing cellulitis are group A β -hemolytic streptococci and *Staphylococcus* organisms. Rare causes include *Pseudomonas aeruginosa* in case of puncture wounds, anaerobes, *Eikenella*, *Viridans streptococci* in human bites. Cellulitis is mainly a clinical diagnosis but blood counts and ESR can be done to confirm its occurrence. Risk factors for cellulitis include breaks in the skin which allows an entry point for the bacteria, other risk factors include immune deficient states such as HIV/leukemia, conditions that affect the vascular system, and skin conditions such as eczema and psoriasis. Vaccination is an extremely rare cause of cellulitis with no cases of cellulitis reported since 1998 due to complication of vaccination. In our case, patients presented signs and symptoms of cellulitis 2 days after receiving the tetanus prophylaxis vaccine. He was treated with broad-spectrum antibiotics after admission and discharged once the condition settled.

Keywords: Case report, cellulitis, complication, TT, vaccination

Introduction

Bacterial cellulitis is defined as an infection of cutaneous and subcutaneous tissues. Gram-positive cocci such as *Streptococcus* and *Staphylococcus aureus* are the most prominent causes of cellulitis.^[1] Serological studies suggest group A streptococcal infection as an important factor for culture-negative cellulitis.^[2] Redness, swelling, and hotness are the hallmark of cellulitis with severity ranging from localized erythema to sepsis. Diagnosis is mainly clinical but blood counts and erythrocytes sedimentation rate (ESR) can be done for confirmation. Risk factors for cellulitis include breaks in the skin which allow bacteria at the entry point, other

causes include immune deficient states such as HIV/leukemia, conditions that affect the vascular system and skin conditions. Several cases reported in the literature of cellulitis post-anesthesia, needle break, and fine-needle aspiration in thyroid patients.^[3,4] In 1993, a study reported nine cases of children with pyogenic abscesses after tetanus toxoid (TT) and pertussis vaccine, where the main reason was needle contamination.^[5] Even though the DTaP vaccine is known to cause large local inflammatory reactions there are no identified cases reported of bacterial cellulitis due to complication of vaccination since 1998.^[6] Herein, we report a case of 9-year-old boy who developed cellulitis after prophylactic administration of TT vaccination.

Case History

A 9-year-old boy had open wound injury secondary to fall on a sharp object while playing. He had a 7 cm laceration on the

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Received: 20-12-2019

Revised: 27-01-2020

Accepted: 06-02-2020

Published: 26-03-2020

Access this article online

Quick Response Code:



Website:
www.jfmipc.com

DOI:
10.4103/jfmipc.jfmipc_1194_19

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How to cite this article: AlBassri TK, AlShaibi S, Khan F, Masud N. A rare case of cellulitis after tetanus toxoid (TT) vaccination. J Family Med Prim Care 2020;9:1762-4.

upper lateral leg and another 5 × 3 cm wound on the lower lateral leg with no active bleeding. The wound was cleaned and sutured followed by TT given as prophylaxis in the left deltoid. However, 48 h later the patient returned to the hospital with a chief complaint of pain at the injection site and redness. The patient denied any history of scratching, insect bite, animal contact, or trauma to the injection site. Examination showed the patient's left arm was red, warm to touch, and swollen measuring 7 × 5 cm approximately on the left upper arm [Image 1]. Blood and discharge were noticed when pressure was applied to the area. The skin at the site of injection had a raised induration. The nervous and vascular supply of the limb was intact. The patient was a known case of attention deficit hyperactivity disorder (ADHD) but not on any medications.

Intervention and Management

The patient was admitted for further diagnosis. Full blood count showed mild leukocytosis ($14 \times 10^3/\mu\text{L}$) with high neutrophils count ($10 \times 10^3/\mu\text{L}$). ESR was slightly high (17 mm/h). Ultrasound of the left arm showed soft tissue thickening measuring around 2.2 cm with no drainable abscess. Blood cultures were reported as negative. The patient was started on intravenous clindamycin 400 mg IV for 5 days with immediate improvement of pain and swelling. The antibiotics were switched to cephalexin oral suspension 750 mg PO for 7 days as per recommendation. The patient was discharged after 5 days in good health.

Discussion

Cellulitis is the bacterial infection of the dermis and deeper layers of the skin. Cellulitis most commonly affects the lower limb but it can occur anywhere on the body if there is a break in the skin. Herein, we presented a case of a 9-year-old boy who developed cellulitis 2 days after administration of TT vaccine. While at times it is difficult to differentiate between bacterial cellulitis and immune response to vaccine administration at the injection site, bacterial cellulitis can be differentiated based on its



Image 1: Redness and swelling at the injection site of the left deltoid

onset after vaccine administration, systemic signs/symptoms, and response to antibiotics. Our case presented 2 days post vaccine administration with complaints pertaining to pain, redness, warmth, swelling and a raised induration around the site of injection. There was the aspiration of blood and discharge on the application of pressure. The signs and symptoms responded to antibiotic therapy which indicates that it was a bacterial infection rather than an immunological response to vaccine components. Some of the causes for the development of cellulitis, in this case, could be poor hygiene, scratching of the injection site, the poor technique of injection during vaccine administration, and the use of an alcohol swab exposed to air for too long. In our case lack of hygiene was identified as the most probable cause of development of bacterial cellulitis.

Among the routinely used vaccines in children, DTaP causes a large inflammatory reaction that can be sometimes confused with bacterial cellulitis. Studies found that booster doses of IPV/DTaP in preschool children caused a large reaction with redness greater than 50 mm in 19.3% to 33% of children who received the vaccine and rate of recipients developing extensive limb swelling was 1% to 2% with whole celled pertussis vaccine causing more reactions than acellular pertussis vaccine.^[7] A study conducted in DuPont Hospital for children found Pneumococcal vaccine PS-23 to cause a local inflammatory reaction in 50% and a systemic reaction in 1% of children who received the vaccine with higher rates in those who had previously received a dose.^[8] Among the vaccines not routinely administered to children Herpes Zoster vaccine-Zostavax was found to cause bacterial cellulitis in 0.7% to 1.2% of its recipients.^[9]

In conclusion, cellulitis was observed in a 9-year-old child after TT vaccination at the injection site. The incidence of cellulitis in children caused by vaccination has decreased dramatically with few cases reported in recent times due to advancements in medicine and better techniques of vaccination and counseling of the parents on cleanliness and proper hygiene of the child.

Implications for primary health care

As vaccinations are done mostly at primary healthcare level, aseptic preparation of injection site and proper injection technique on part of vaccine administrators are crucial to avoid such cases. Although the efficacy of alcohol swabs is under debate, we still recommend using them.^[10] Since, it is difficult to differentiate cellulitis from the immunological skin reaction caused by some vaccines, physicians should have it in their list of differentials when encountered with post vaccinations cases of skin reactions or rashes not to miss a diagnosis of cellulitis.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical findings to be reported in the journal. The patient understands that their names and initials will not be published.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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