

Pediatric Disseminated Bacillus Calmette-Guerin Infection (BCGitis): A Case Report

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ABSTRACT

Background: BCG is a live attenuated vaccine. It has been used to prevent tuberculosis since 1921. BCG is widely used, it is estimated that 100 million newborns are receiving it yearly. It also has a low incidence of serious adverse reactions and considered safe. However, few severe complications have been reported despite its wide use. Adverse reactions of BCG vaccination included suppurative lymphadenitis, localized abscess or a combination of both. In addition to them there was disseminated BCG-itis, which is life threatening, but very rare. **Aim of the work:** this study reported a case of a five-month-old child with BCG-itis which presented to us. **Patient and method:** left axillary swelling was increased in size with bloody discharge and associated fever. Family history of IL12 deficiency was also noted.

Results: diagnosis was made by AFB and PCR. The child responded well to anti-mycobacterial treatment. Because neonatal BCG vaccine is included in many standard vaccination schedules around the world, it is extremely difficult to avoid administering it to infants who might have PID. **Conclusion:** it is important to recognize BCG adverse reactions because they can be the first clue to diagnosing immunodeficiencies.

Keywords: BCG, Immunodeficiency.

INTRODUCTION

Bacille Calmette-Guérin (BCG) vaccine which is a live attenuated vaccine, has been used to prevent tuberculosis since 1921 and was incorporated in the World Health Organization's Expanded Program on Immunization in 1974 to enhance the fight regarding pediatric tuberculosis in developing countries⁽¹⁾. Although its efficacy is controversial, there is an agreement in the medical community about the role that it has in the fight against meningitis and disseminated disease in pediatric tuberculosis⁽²⁾.

The BCG vaccine is widely used, it is estimated that 100 million newborns are receiving it yearly. It also has a low incidence of serious adverse reactions and generally it is considered safe. However, few severe complications have been reported despite its wide use⁽³⁾. Adverse reactions and complications of BCG vaccination included suppurative lymphadenitis, localized abscess or a combination of both. In addition to them there is disseminated BCG-itis, which is very rare, but is considered the most serious adverse reaction related to BCG vaccination⁽⁴⁾. In this paper, we discussed a case BCG-itis in five months old boy who presented to our hospital with a left axillary swelling increasing

in size with bloody discharge for two months duration.

The study was done after approval of ethical board of King Saud Bin Abdulaziz university

CASE REPORT

Eight-month old boy was in his usual state of health until the age of five months when he started to have a deltoid swelling at the site of the BCG vaccine scar. The swelling was fluctuating in size with marked erythema and bloody discharge. There was also oozing with changing of clothes or upon touching the swelling on virtually daily basis as reported by the child's mother. The swelling was associated with intermittent Fever.

The family sought medial advice many times, but were always reassured, until the child was eight months old when he presented to our hospital complaining of a left axillary swelling that was increasing in size with bloody discharge. There was also associated erythema, pain and persistent crying. The patient's family denied any history of weight loss, night sweats or contact with TB patients. Remarkable family history of same complaint and infantile death from father's side. Family history of IL 12 deficiency was also

reported. Upon examination, there was a swelling at the BCG vaccine scar site measuring 4x5x6 cm, with associated tenderness and erythema. Abdomen was soft and lax with no organomegaly. Moreover, lymph node examination was unremarkable. Laboratory investigations showed that white blood cells (WBC) were high, erythrocyte sedimentation rate (ESR) was high, total protein was high as well and total bilirubin elevated also. After consulting the infectious disease department the patient was immediately started on ceftriaxone, vancomycin and underwent incision and drainage the next day. Laboratory investigations following surgery were: AFB gastric lavage which was positive (1-2 AFB in 3 specimens), AFB aspirate from lymph node was also positive, M.tuberculosis PCR was detected. Liver function tests, electrocardiogram, computed tomography(CT) and ophthalmological screening were done before starting treatment. All were normal except for CT of the chest and abdomen. Which showed multiple enlarged matted left axillary lymph nodes with extension to left chest wall. In addition, there were enlarged paratracheal and subcarinal lymph nodes. Lung parenchyma showed bilateral multifocal ground glass opacity in lower lobes giving the appearance of mosaic attenuation, most likely related to expiration more than airway disease cause. Abdominal CT showed multiple enlarged mesenteric lymph nodes most likely representing Lymphoma Vs. TB, for Biopsy. After discussing the diagnosis with the family, the patient was started on six anti-TB drugs: Isoniazid 100 mg once daily (OD), Rifampicin 120 mg OD, Azithromycin 80 mg OD, Moxifloxacin 80 mg OD, Ethambutol 200 mg OD, Pyridoxine 5 mg OD. Moreover, the patient was discharged home in good health condition and vitally stable with no spikes fever. The mother was instructed to continue anti-mycobacterial treatment for 18 months with regular outpatient follow up.

DISCUSSION

BCG vaccine can cause some very rare, but serious adverse effects nonetheless. Some of these adverse effects are lymphadenitis and osteomyelitis. The very serious life-threatening disseminated BCG infection is one example of the more severe adverse events. It has especially been seen in children with primary immunodeficiency (PID). Severe combined immunodeficiency (SCID), acquired immune deficiency syndrome (AIDS) and the Mendelian

susceptibility to mycobacterial disease (MSMD) are examples of PID⁽⁵⁾. Research has shown that the IL-12/IFN- γ signaling pathway has a role in immunity against mycobacterial infection, which is believed to be caused by molecular defects in the IL-12/IFN- γ signaling pathway. The defect in this pathway is known as MSMD. It is highly probable that our case has MSMD due too positive Family history of IL-12 deficiency, but genetic confirmation has yet to be made in our case⁽⁶⁾. Upon diagnosing BCG vaccine related complications, the underlying deficiencies should be carefully evaluated, especially when other signs and symptoms of immunodeficiency are reported. Failure to thrive and recurrent infections are two examples of some of the signs and symptoms. Unless functional immune response is restored by hematopoietic stem cell transplant, completed recovery from disseminated BCG is highly unlikely. Even the use of anti- mycobacterial drugs for prolonged periods usually leads to drug resistance and organ toxicity. Inflammatory complications that develop after immunoreconstitution post-hematopoietic stem cell transplant may pose the need for immunosuppression, which in turn this might increases susceptibility to opportunistic infections. In our case we started the patient on six anti-TB medications for the next 18 months. BCG reactivations can occur in patients with MSMD. Therefore, BCG can remain in a latent state until it reactivates later in life and manifest as a disease. It is important for pediatricians, family physicians and nurses working in primary care, maternal and child care centers to be aware of BCG-related complications and recognize the red flags. Because this might be the first clue to diagnosing an underlying immunodeficiency. One example of the need for early recognition is our case. Despite seeking medical attention on more than one occasion, nothing was done, and it went unnoticed for two months. Because neonatal BCG vaccine is included in many standard vaccination schedules around the world, it is extremely difficult to avoid administering it to infants who might have PID. It has been suggested that postponing the BCG vaccination to a later time could help us to avoid giving it to immunodeficient infants, since many immunodeficiencies are picked up with age

progression. However, no strategy has been determined to avoid this problem ⁽⁷⁾.

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