

CASE REPORT

Cervical Tuberculous Lymphadenitis in a BCG Vaccinated Child



UNIVERSIDAD AUTÓNOMA DE COAHUILA
FACULTAD DE MEDICINA U.S.
FACULTAD DE ENFERMERIA U.S.



The most common form of the infectious disease tuberculosis (TB) is pulmonary, but it also presents as extra-pulmonary tuberculous disease. In Mexico, extra-pulmonary TB is about 17.2% of all TB cases; in children aged 1-4 years, it represents 3% of TB cases. It is well documented that *Mycobacterium bovis* (BCG)

Background

We report the case of a 3-year-old Mexican boy initially diagnosed with a right submandibular abscess by non-specific pathogen and discharged with clindamycin oral treatment. After 3 days he returned, presenting a painful and enlarged lymph node on the right side. A submandibular lymph node was extirpated by surgical debridement. At 4 days post-operation, the presence of *Mycobacterium tuberculosis* was confirmed by microbiological exam from biopsy. After this result, therapy was initiated with DOTBAL (isoniazid 75mg, pyrazinamide 400mg, rifampicin 150mg, and ethambutol 300mg) everyday during 9 months and the patient improved. This particular case illustrates the need to develop new vaccines and enhanced control of TB patients in order to reduce TB transmission.

Introduction

Tuberculosis (TB) is an infectious disease affecting one third of the world's population. In 2011, there were an estimated 8.7 million new cases of TB (13% co-infected with HIV) and 1.4 million people died from TB. There were 2.6 million cases of sputum smear-positive pulmonary TB, 2.0 million cases of sputum smear-negative pulmonary TB (including cases for which smear status was unknown), and 0.8 million cases of extra-pulmonary TB[1].

Mycobacterium bovis (BCG) vaccine, the only vaccine currently available, generally induces high levels of protection against pulmonary and severe TB in children. Recent studies have shown that BCG vaccine induces Th1, Th2 and IL-17 immune responses, which is associated with protection [2, 3]. Children vaccinated with BCG, who were diagnosed with TB, had 94% lower risk of developing severe TB compared with BCG unvaccinated children [4].

It has been reported that less than 1% of vaccinated newborns in such households died as a result of TB. Therefore, vaccination with BCG has continued to be part of the World Health Organization Expanded Program on Immunization in many countries and it has an excellent safety record. However, this report describes a case of primary tuberculous lymphadenitis occurring apparently as a result of transmission from a previously infected person.

Case Report

A 3-year-old boy from Nuevo Leon, Mexico, attended the Emergency Service for a complete examination because he presented with night fever and painful enlarged lymph nodules of 14 days evolution on the right side of the neck. Otolaryngological examination showed a right side submandibular enlarged lymph node (approximate size 4.0 x 3.0 cm), indurate, immobile and painful on palpation. Thorax radiograph was normal without evidence of another alteration. This led to the diagnosis of non-specific lymphadenitis, the most common infection in children[5]. The condition usually resolves after drainage of the node and antibiotic treatment. The patient was discharged with pediatric solution clindamycin (75mg/ 5ml) oral treatment. However, he returned after 3 days, presenting with an enlarged lymph node (5.0 cm), mobile and painful on palpation, and local fever.

A CT scan showed necrosis adenopathy located in deep cervical nodes (Ila and Iib) of 2.3x1.3 cm in diameter on the right side. Ganglion wall was thickened (10 mm) with liquid density inside. Also, we observed adenopathy in pericervical lymph nodes, the specific regions were submental (Ia) and submandibular lymph nodes bilateral (Ib). Mucoperiosteal thickening of the maxillary sinuses was evident (fig. 1). The next day, drainage and surgical debridement were undertaken. During surgery caseous tissue with purulent fluid was observed and we made extirpation of 3 lymphadenopathy, draining a total volume of 8-10 ml. Later, resection of necrotic fatty tissue and hemostasis were performed. Washes with physiological solution and clindamycin were done before suture. The patient took only antibiotics clindamycin 75mg/5ml, dexamethasone 3mg, and ceftriaxone 75mg/kg to avoid infection after operation. The patient's health stabilized.

Fine needle aspiration from the lymph node abscess was taken for cultivation and microscopic tests and tissue was taken for histopathological examination. At 4 days post-operation, the laboratory result arrived. Microscopic examination from the drained abscess was negative for mycobacteria and fungus. At this time, the cultivation tests were in progress. Histopathological assessment from biopsy revealed positive mycobacteria by Ziehl-Neelsen technique (BAAR). Later, growth on Löwenstein-Jensen media was obtained at 6 weeks, positive niacin test, and nitrate reduction confirmed the previous result. Also, antimicrobial susceptibility tests were conducted on the basis of a 1963 WHO document[6]. In this case the *Mycobacterium tuberculosis* strain was susceptible to first-line drugs (isoniazid, rifampicin, ethambutol and streptomycin) and second-line drugs (cycloserin, capreomycin and para-aminosalicylic acid).

We initiated treatment with DOTBAL (isoniazid 75mg, pyrazinamide 400mg, rifampicin 150mg, and ethambutol 300mg). In routine follow up after 3 days post-operation, an ultrasound of the cervical right side revealed the presence of 3 lymph nodes slightly inflamed in zone II, with average size of 1.3 x 1.3 cm. The lymph nodes showed decrease of echogenicity and discrete acoustic enhancement related to necrosis. According to this result, the patient was not presenting reactive adenopathy (Fig.2). In the following days, the patient's health status was clinically improved and he was discharged for home care with DOTBAL treatment during 9 months.

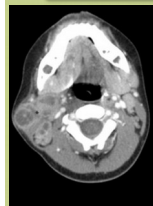


Figure Legends:

Figure 1. CT scan: showing numerous enlarged lymph nodes on the right side.



Figure 2. Ultrasound of cervical right side. Showing lymph nodes slightly inflammation

Discussion

• Tuberculosis (TB) is one of the most prevalent infectious diseases in adults and there are 8-9 million new cases and 2 million deaths from TB annually[7]. TB is divided into two categories according to the site of infection. TB involving only the lung is called pulmonary TB, while TB of organs other than the lungs is called extra-pulmonary TB.

• BCG vaccine generally induces high levels of protection against pulmonary and severe infection caused by *Mycobacterium tuberculosis* in children. However, studies recently have demonstrated that contacts of tuberculosis patients are a high-risk group for developing tuberculosis, particularly within the first 5 years[8].

• Our case report of a 3-year-old boy with tuberculous lymphadenitis accords with this finding. Initially, he was diagnosed with lymphadenopathy non-specific infection, the most common disease in children wherein draining and treatment with antibiotics (clindamycin) leads to resolution of symptoms.

• Novel diagnostics, for example by polymerase chain reaction (PCR), is thus an important part of diagnostic routine[9]. By allowing early and accurate diagnosis, this technique is important to keeping infection under control. But, PCR reaction always should be coupled with culture, which is considered as the gold standard in the diagnosis of *M. tuberculosis*.

• The drawback of culture is the long time required to obtain positive culture results, around 4-8 weeks. In our case, DNA evidence of *M. tuberculosis* from Löwenstein-Jensen media culture with the polymerase chain reaction (PCR) method showed the specific pattern previously described[10, 11]. It is important to identify which type of *Mycobacterium* caused the disease because another report describes lymphadenitis caused by *Mycobacterium bovis* as a result of BCG vaccine and possibly related with the type of BCG vaccine used[12, 13]. Another alternative recently evaluated to rapidly diagnose lymphadenitis TB in children is the liquid broth based automated culture (Bact/ALERT 3D) technique, which is more efficient than conventional culture[14].

Contact:

scceciliaesparza@gmail.com

1. WHO global tuberculosis control report 2010. Summary, *Cent Eur J Public Health*, 2010; 18(4): p. 237.
2. Buri, S., et al., Delaying bacillus Calmette-Guérin vaccination from birth to 4-12 months of age reduces postvaccination Th1 and IL-17 responses but leads to comparable mycobacterial responses at 18 months of age. *J Immunol*, 2010; 185(4): p. 2620-6.
3. Diuadi, Y., et al., A longitudinal study of BCG vaccination in early childhood: the development of innate and adaptive immune responses. *PLoS One*, 2010; 5(11): p. e14066.
4. Llanos-Tejada, F. and H. del Castillo, Association between severe tuberculosis in children and previous BCG immunization in a national referral hospital, Peru 1990-2000. *Rev Peru Med Exp Salud Publica*, 2012; 26(1): p. 87-91.
5. Goache, J. R. and L. Vick, Acute, subacute, and chronic cervical lymphadenitis in children. *Semin Pediatr Surg*, 2006; 15(2): p. 99-106.
6. Canetti, G., et al., *Mycobacteria: Laboratory Methods for Testing Drug Sensitivity and Resistance*. Bull World Health Organ, 1963; 28: p. 565-76.
7. Ravignone, M., Dr Mario Ravignone, director of the Stop TB Department World Health Organization. Interview by Christa Hall. *Pathog Glob Health*, 2013; 106(1): p. 3-4.
8. Fox, G. J., et al., Contact investigation for tuberculosis: a systematic review and meta-analysis. *Eur Respir J*, 2012.
9. Mehta, P. K., et al., Diagnosis of extrapulmonary tuberculosis by PCR. *FEMS Immunol Med Microbiol*, 2012; 66(1): p. 20-36.
10. Huard, R. C., et al., Novel genetic polymorphisms that further delineate the phylogeny of the *Mycobacterium tuberculosis* complex. *J Bacteriol*, 2006; 188(12): p. 4271-87.
11. Huard, R. C., et al., PCR-based method to differentiate the subspecies of the *Mycobacterium tuberculosis* complex on the basis of genomic deletions. *J Clin Microbiol*, 2003; 41(6): p. 1637-60.
12. Santos, A., et al., Severe axillary lymphadenitis after BCG vaccination: alert for primary immunodeficiencies. *J Microbiol Immunol Infect*, 2010; 43(6): p. 550-7.
13. Arabiiah, A. A., et al., Outbreak of Bacille Calmette-Guérin-related lymphadenitis in Saudi children at a university hospital after a change in the strain of vaccine. *Ann Saudi Med*, 2012; 32(1): p. 4-8.
14. Verma, J. B., et al., Rapid culture diagnosis of tuberculous lymphadenitis from a tertiary care centre in an endemic nation: potential and pitfalls. *Indian J Med Microbiol*, 2012; 50(3): p. 342-6.