

# BCG Induced Lymphadenitis: A Prerequisite in Parental Counseling during Pre and Post Vaccination Program

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## Abstract

Bacillus-Calmette-Guerin (BCG) is a live attenuated vaccine and used to prevent tuberculosis since 1921. BCG vaccination is performed as a part of expanded program of immunization (EPI). BCG vaccine is considered as a safe technique of tuberculosis prevention because there are only local adverse reactions seen with this and serious adverse reactions are rare. Lymphadenitis is the most frequent side effect of BCG vaccination. Intradermal BCG vaccination gives rise to erythematous formation that consists of a cutaneous nodule at the site of injection and subclinical involvement of the regional lymph nodes, which is self limiting and requires no treatment. Lymphadenitis is the most frequent side effect of BCG vaccination. Fine needle aspiration is the quick, safe, and cost effective technique for diagnosis in addition to the management of BCG lymphadenitis. Here we report a case of 10- months' healthy male patient with left axillary lymphadenitis post BCG vaccination.

**Keywords:** BCG vaccination, Patient counseling, AEFI, Lymphadenitis, tuberculosis, FNAC.

## INTRODUCTION

Tuberculosis (TB) remains a major, worldwide public health problem, especially in developing countries. The most serious complication of tuberculosis in children is meningoencephalitis, which is associated with high mortality and morbidity rates.<sup>[1]</sup> There are a few ways to prevent TB namely BCG vaccination, treatment of a patient with latent tuberculosis and other epidemiological measures like prevention of overcrowding, contact tracing and screening in addition to chemoprophylaxis.<sup>[2]</sup> The Bacillus Calmette-Guérin (BCG) vaccine is the oldest vaccine that continues to be widely used these days. It is derived by *in vitro* attenuation of an isolate of *Mycobacterium bovis* mainly cultured in an artificial medium for years and named after its discoverers, the French bacteriologist Albert Calmette and veterinarian Camille Guérin. The product was subsequently distributed to many laboratories, which continue to propagate the vaccine strain under different conditions. The commercial forms of BCG from different pharmaceutical companies are now bacteriologically different. BCG vaccine was first used in 1921 to prevent TB in humans. It is now being used worldwide in childhood immunization programs.<sup>[3,4]</sup> The efficacy of BCG vaccine towards tuberculosis is unsure, this vaccine is defensive towards the meningeal/miliary TB in childhood tuberculosis and not for adult tuberculosis.<sup>[5]</sup> BCG vaccine induces delayed type of hypersensitivity (DTH) reaction and cell-mediated immunity in the host 4-8 weeks after vaccination.<sup>[6]</sup> BCG vaccine is taken into consideration as a safe method of tuberculosis prevention due to the fact usually there are local adverse reactions seen and serious complications are rare. Lymphadenitis is the most common adverse reaction of BCG vaccination.<sup>[7,8]</sup> There are two types of BCG induced lymphadenitis in natural course of lymphadenopathy. First is simple or non-suppurative lymphadenitis which generally resolves instinctively within only some weeks, and second is suppurative lymphadenitis, which illustrated by appearance of variation with erythema and edema of the overlying skin.<sup>[7]</sup>

## CASE REPORT

A 10-month old male patient weighing 6.64 Kgs presented with swelling over left axillary region for 3 weeks, post BCG Vaccination. On examination, he had a swelling of size 3 × 3 cm firm mobile and non-tender in nature (Figure a). No other lymphadenopathy or hepatosplenomegaly was noted. No family history or TB contact history was present. Systemic examination was normal. He had a history of BCG vaccination in left arm. The FNAC showed BCG induced necrotizing lesion wherein the Erythrocyte sedimentation rate was 44. Ultrasonography showed a small part-well defined heterogeneous hypo echoic soft tissue lesion 2.88 x 1.72 cm in left axilla. Chest X-Ray finding was bilateral mildly prominent bronchovascular markings. Montoux test was positive. Hemoglobin (Hb) was 11.1 mg/dl and Total Leucocytes count (TLC) was 16.8 × 10<sup>9</sup> per liter.

The Treatment advised by pediatrician in hospital O.P.D. was- oral suspension- Cefuroxime (125 mg/5ml) - 3 ml 12 hourly for 10 days and oral suspension- Ibuprofen (100 mg/5ml) - 2 ml, 8 hourly for 5 days then SOS. Post 10 days treatment with antibiotics, the swelling increased 4 × 3 cm, Fluctuant, Erythematous, Non Tender on Left Axilla but the Weight Gain was Positive. Eventually the ESR dropped down to 10 and spontaneous rupture of the lesion happened under the antibiotic cover. The patient recovered after 3 months of initial complaint (Figure b).

## DISCUSSION

BCG is prepared from live attenuated strain of *Mycobacterium bovis*, it is only available vaccine against tuberculosis.<sup>[1]</sup> BCG vaccine is considered to be safe and has a low prevalence of serious complications.<sup>[3]</sup> BCG induced lymphadenitis is the most common complication.<sup>[4]</sup> BCG vaccination is given by intradermal injection of 0.05 ml vaccine at left deltoid region



(In India). BCG vaccination can result various complications such as erythematous formation occurred after vaccination at the site of inoculation, which result pustule formation after 2–3 weeks; ulceration, drainage, and crusting at 4–6 weeks post vaccination. After 10–12 weeks of vaccination, healing occurs with small residual scar. BCG vaccine related complications vary from 0.1% to 17% in different studies worldwide have been reported.<sup>[9]</sup> All types of BCG vaccine induced lymphadenitis have occurred due to basic reasons such as: (a) host related factors, i.e., very early age of the patient, congenital or acquired immunodeficiency; (b) factors related to administration, i.e., subcutaneous instead of intra-dermal, higher dose; or (c) related to vaccine strain, i.e., residual virulence of the BCG sub strain, type of vaccine, and viability of final vaccine product. Immunologically, normal newborn has double the incidence of BCG adenitis compared with older infants and children.<sup>[3]</sup>

## CONCLUSION

Awareness about BCG induced lymphadenitis as a possible complication following BCG vaccination is necessary among parents, paramedical staff and medical practitioners and is of paramount importance so that early diagnosis and effective management is done for such cases. Simple

BCG lymphadenitis is managed conservatively and usually resolves on its own. Aspiration for Suppurative lymphadenitis prevents sinus formation and enhances the recovery. In children developing severe complications following BCG vaccination, apart from medical/surgical management, screening for immunodeficiency disorders should also be undertaken.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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