

Role of needle aspiration and surgical excision in management of suppurative *Bacillus Calmette Guerin* lymphadenitis

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Abstract

The aim was to determine the role of needle aspiration and surgical excision in the management of suppurative *Bacillus Calmette Guerin* (BCG) lymphadenitis. This prospective study was done in Rafha Central Hospital, over 1.5 years. Thirty two patients were enrolled after informed consent. Needle aspiration was done if size of lymphadenitis was up to 3cm. Surgical excision was done primarily for size more than 3cm or in cases of failed aspiration. Eighteen were males and 14 were females. Median age was 3.75 months (IQR 2-7). All were full term with normal birth weight and vaccinated in first 2 days of life. Predominantly single region of lymphadenitis was involved in 75% cases; with left axilla being mainly affected (56.3% cases). Needle aspiration was done in 18 cases and surgical excision was carried out in 14 cases. Resolution of lymphadenopathy was 7 days in cases of surgical excision, while within 60 days in cases of aspiration. Failure of aspiration was noted in cases of multiple, matted suppurative lymph nodes.

Keywords: Suppurative *Bacillus Calmette Guerin* lymphadenitis, needle aspiration, surgical excision, *Bacillus Calmette Guerin* vaccine.

Introduction

Bacillus Calmette Guerin (BCG) vaccine is World Health Organization's approved vaccine for tuberculosis immunization.¹⁻⁴ Normally it does not cause any adverse effects, but some complications reported are osteomyelitis, vasculitis and disseminated tuberculosis. The incidence of the adverse effects associated with BCG vaccine is up to 3.8%.^{3,5}

Post BCG lymphadenitis is one of the most common side effect of the vaccine.^{1,3} Most of the cases of post BCG lymphadenitis are suppurative and defined as "palpable lymph nodes after BCG vaccine with fluctuation,

erythema and oedema of overlying skin with absence of fever and tenderness".¹ Suppurative BCG lymphadenitis is primarily treated by needle aspiration surgical excision is done in cases of failed needle aspiration. If no treatment is given, then in patients with good immunity; discharging sinus with scar is formed. In immunocompromised patients; it can develop disseminated Tuberculosis.^{1,2,6-8}

Objective of the study was to determine the role of needle aspiration and surgical excision in management of suppurative BCG lymphadenitis. Our study emphasizes the treatment of suppurative BCG lymphadenitis in accordance with the guidelines of the Saudi Paediatric Infection Disease Society.⁹

Material and Methods

This prospective study was done in Rafha Central Hospital, Saudi Arabia from December 2010 to May 2011. Thirty two cases were enrolled after Ethical permission. Inclusion criteria was all children, up to 3 years, presenting with BCG lymphadenitis who had been given 0.05 ml of BCG vaccine intradermally at birth. Exclusion criteria was when there was no sonographic evidence of collection, presence of generalized lymphadenopathy or patient was immunocompromised or receiving ATT. Informed consent was taken from patients' parents. Demographic variables like age in months, sex, weight in kilograms (kg) were taken. Variables as age in days at time of vaccination, gestational age, birth weight (in kg), Total Leucocyte count (TLC), erythrocyte sedimentation rate (ESR), Chest X ray (CXR) findings were recorded and parents were asked about duration of symptoms in months. Size and site of lymphadenitis were noted before starting treatment.

Aspiration was done if size of suppurative lymph nodes were up to 3 cm. After aseptic measures, needle was introduced about 0.5 cm away from lymph node and aspiration was done. Pus was sent to the laboratory for gram staining and acid fast bacilli (AFB) staining and was cultured using blood agar and Lowenstein Jensen agar. Aspiration was repeated after 3 weeks. If after two attempts, if the size of the lymph nodes failed to reduce and more than 3cms or a discharging sinus was noted, then surgical excision was planned. Both procedures were

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performed by on call paediatric surgeon.

Surgical excision was done under general anaesthesia. All suppurative lymph nodes were excised and wound closed after planning a drain. Drain was removed only when there was no discharge. Excised lymph nodes were sent for histopathology. Stitches were removed after 7 days.

Time for complete resolution of lymphadenopathy was noted. In case of surgical excision it was achieved in 7 days. Cases of aspiration were followed up till complete resolution was achieved. Data was analyzed using SPSS23 and median and standard error with range, of all quantitative variables, were noted.

Results

Total number of patients were 32. Eighteen (56.3%) were male and fourteen (43.8%) were female. Median age was 3.75 months (inter quartile range IQR 2-7,

standard error SE 0.52). Median weight at time of presentation was 7 kilograms (IQR 5-8, SE 0.36). Median birth weight was 3.1 kg (IQR 3-3.55, SE 0.07). Age at time of vaccination was 1.41 ± 0.66 days (min 1 day, max 3 days). Mean duration of symptoms was 3.58 ± 2.43 months (median 3 months with IQR 1.5-6.0). Mean TLC was $13,396.88 \pm 5259.55$ per microliter of blood (min 4500, max 25000 with IQR 9250-17500). Mean size of lymphadenitis was 3.53 ± 1.83 cm. All patients (100%) were born full term. In twenty four (75%) patients single region was involved, while two (6.25%) had two regions involved and six (18.75%) had lymphadenitis and severe local reaction at site of inoculation of BCG vaccination. The distribution of patients according to involvement of different regions of lymphadenitis is summarized in Figure-1.

Needle aspiration was done in eighteen (56.3%) patients and surgical excision in fourteen (43.7%) patients,

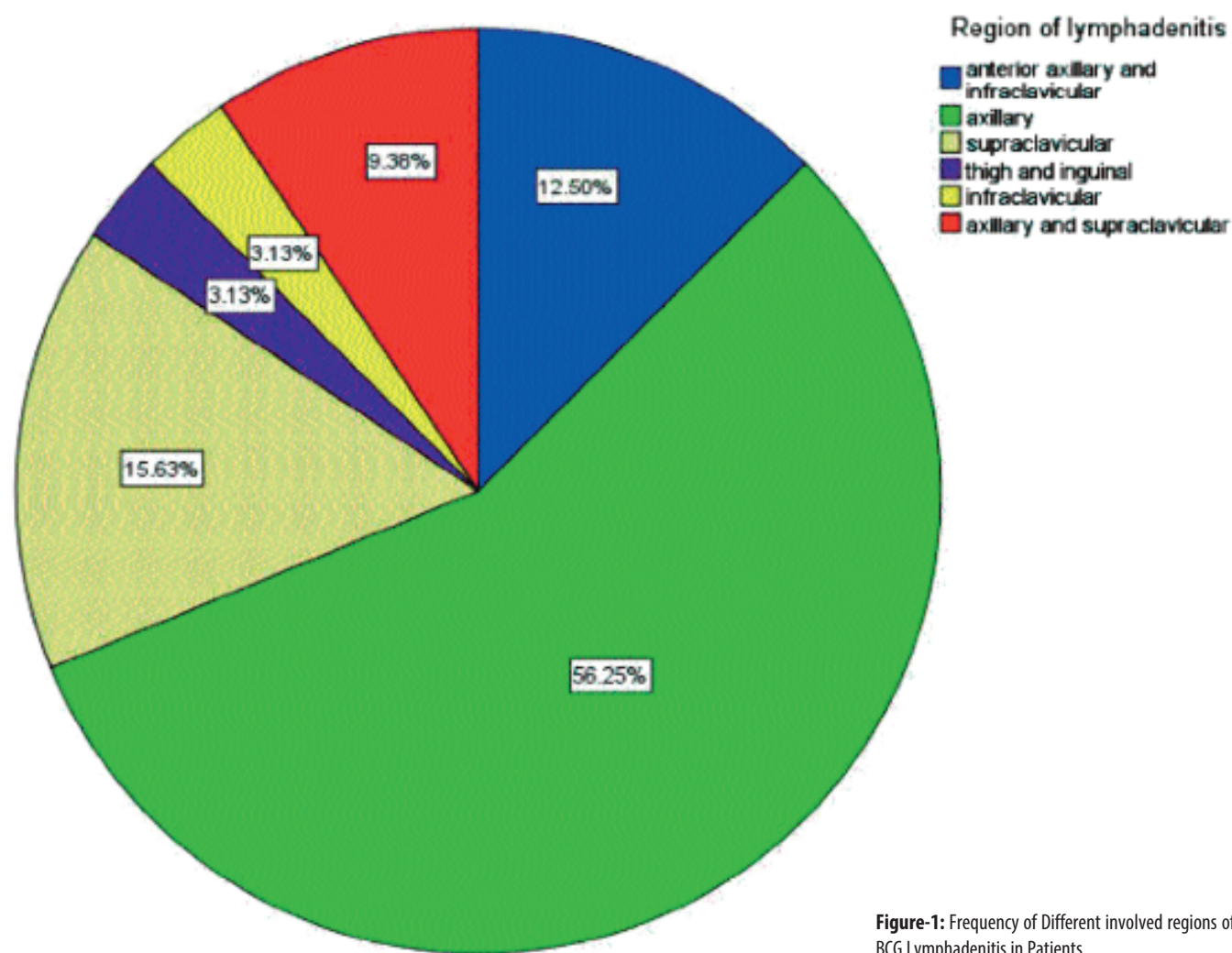


Figure-1: Frequency of Different involved regions of BCG Lymphadenitis in Patients.

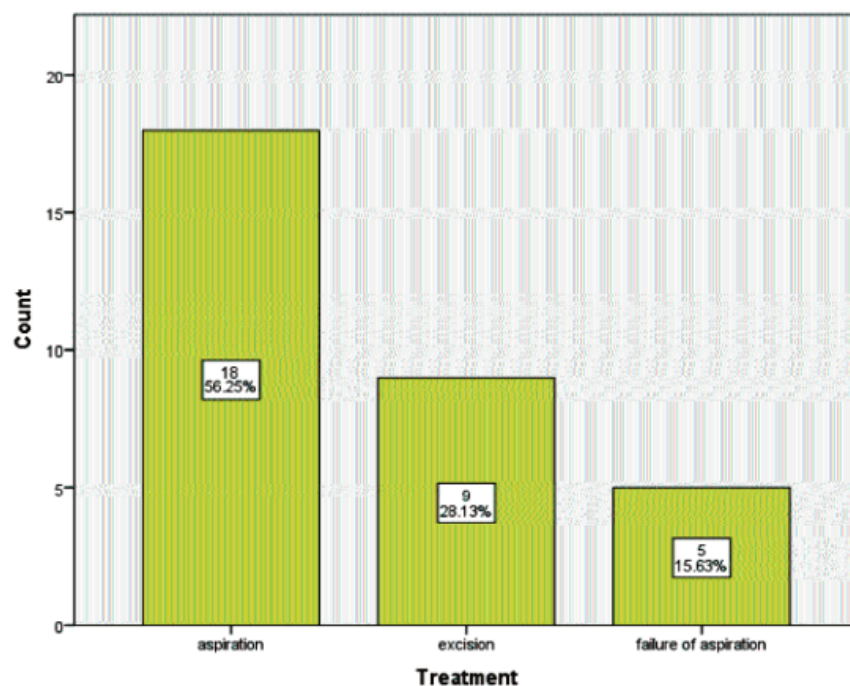


Figure-2: Treatment of BCG Lymphadenitis in Patients.

primarily or after failed aspiration (Figure-2).

Duration of resolution of lymphadenopathy was 7 days in case of excision and 60 days in case of aspiration, while five cases who had failed aspiration were not included. The only complication noted was sinus formation in 10 cases (31.3%). On Culture and sensitivity of the aspirate, twenty six patients (81.3%) had no growth and six (18.7%) had growth of staphylococcus aureus. Twenty two patients (68.7%) had aspirate positive for AFB staining. Histopathology of the excised lymph nodes showed granulomatous lymphadenopathy post BCG vaccination in all 14 cases (100%). Pulmonary tuberculosis developed in one patient (3.1%) and only this patient was given ATT.

Discussion

Incidence of post BCG lymphadenitis is 0.1 to 3.8 cases per 1000 vaccinations but higher incidence is noted in Saudi Arabia (up to 10.4 per 1000 vaccinations).⁹ This fact is mainly contributed to the vaccine strain (Danish) and factors like lack of training of medical staff and improper storage also contribute.¹⁻³

In our study, BCG lymphadenitis was more in male infants (56.3%) with a mean age of 4.64 ± 2.95 months. These findings correlate with other studies showing male preponderance.^{2,6} It is reported that almost all cases presented in first 2 years of life.^{1,3}

All patients were full term with average birth weight. Mean weight at presentation was 6.84 ± 2.05 kg with no immunodeficiency. Literature suggest that lymphadenitis mainly occurs in healthy neonates.^{1,2,8} In cases of preterm and low birth weight babies, inoculation is delayed to avoid severe side effects; as in cases of immunodeficiency or in patients with HIV, BCG vaccination can lead to dissemination and in these cases, definitive diagnosis can be made by gene therapy.^{2,8} Only cases of dissemination need ATT and studies giving ATT in all cases of BCG lymphadenitis,^{8,10} fail to show earlier resolution.

All newborns were vaccinated in first 2 days of life. Some studies suggest that immune response is same but incidence of adverse effects markedly reduce if vaccinated a little late, recommending that newborns should be vaccinated after a few weeks.⁵ This recommendation needs future trials.

Commonest site of lymphadenitis was left axilla (56.25%) followed by left supraclavicular region (15.63%) as site of inoculation was left arm. One patient had inoculation at left thigh and developed discharging sinus and inguinal lymphadenopathy. All studies suggest the same.^{1-3,6-8}

In our study, one patient developed pulmonary tuberculosis. Although TLC, ESR, CXR were done but these parameters failed to point out which patient may develop dissemination. Only immunological workup may help even when no signs of immunodeficiency are noted.⁹

In our study, failed aspiration was noted in cases of multiple, matted lymph nodes. Some studies suggest surgical excision as only treatment option to avoid formation of discharging sinus,⁷ while others advocate needle aspiration for suppuration^{1,2} with or without instillation of isoniazid or rifampicin.¹⁰ But latest published guidelines of SPIDS suggest aspiration twice before surgical excision and excision primarily in cases of multiple, matted suppurative lymph nodes.⁹

Complete resolution was noted in 60 days in cases of aspiration. Other studies also suggest resolution after aspiration within 4 months.^{2,7,8}

Culture and sensitivity of aspirate predominantly showed

no growth (81.3%) which suggests mycobacteria. Rest of cases showed growth of *Staphylococcus aureus*, suggesting super added infection.

In cases of surgical excision, resolution was achieved in 7 days and drain was removed only when there was no output for 48 hours in order to avoid seroma formation. Histopathology suggested post BCG lymphadenitis. Although earlier resolution is achieved and parents' satisfaction was more in surgical excision,^{7,8} general anaesthesia is involved.

Limitations of this study are that these cases were from one region only and study was carried out about 6 years back with no randomization due to ethical issues. The treatment plan followed is in accordance with the latest published guidelines provided by SPIDS.⁹

We conclude that needle aspiration is effective in cases of suppurative BCG lymphadenitis when size is up to 3cm; but in cases of multiple and matted lymph nodes, failure of needle aspiration is more likely.

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Conflict of Interest: None.

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