



CLINICAL PROFILE, ETIOPATHOGENESIS AND MANAGEMENT OUTCOMES OF BCG-ASSOCIATED LYMPHADENITIS IN CHILDREN: A PROSPECTIVE OBSERVATIONAL STUDY FROM A TERTIARY CARE CENTRE IN CENTRAL INDIA

General Surgery

Dr. Nitesh Mangla* MS General Surgery Department of General Surgery, Index Medical College Hospital and Research Centre, Indore, Madhya Pradesh, India*Corresponding Author

Dr. Mayor Maheshwari MS Department of General Surgery, Index Medical College Hospital and Research Centre, Indore, Madhya Pradesh, India

ABSTRACT

Background Bacillus Calmette–Guérin (BCG) vaccination remains the cornerstone of prevention against severe childhood tuberculosis. Although considered safe, BCG vaccination may occasionally result in regional lymphadenitis. The optimal management of BCG-associated lymphadenitis remains controversial. **Aim** To study the etiopathogenesis, clinical presentation, management, and outcomes of BCG-associated lymphadenitis in children presenting to a tertiary care centre. **Methods** A prospective observational study was conducted in the Department of General Surgery, Index Medical College Hospital and Research Centre, Indore. Fifty-two children diagnosed with BCG-associated lymphadenitis were enrolled. Clinical presentation, cytological findings, microbiological investigations, treatment modalities, and outcomes were analysed. **Results** Among 52 patients, males constituted 57.7% and females 42.3%. The mean duration of symptoms was 42.02 ± 16.46 days. Ipsilateral axillary lymphadenopathy was the most common presentation (94.2%). Non-suppurative lymphadenitis was observed in 53.8% of patients, whereas 46.2% had suppurative disease. FNAC revealed granulomatous lymphadenitis in 46.2% and suppurative granulomatous lymphadenitis in 53.8% of cases. AFB positivity was observed in 51.9% of patients. Observation achieved a success rate of 93.8%, medical treatment 91.7%, incision and drainage 63.2%, and surgical excision 100%. Overall treatment success was 96.2%. **Conclusion** BCG-associated lymphadenitis is predominantly a benign and self-limiting condition. Observation is effective in non-suppurative disease, while surgical intervention should be reserved for selected complicated cases. Individualized treatment based on clinical presentation yields excellent outcomes.

KEYWORDS

Bcg Vaccine, Bcg Adenitis, Lymphadenitis, FNAC, Needle Aspiration, Childhood Tuberculosis

INTRODUCTION

Tuberculosis continues to be a major public health problem worldwide, particularly in developing countries. Bacillus Calmette–Guérin (BCG) vaccine, derived from an attenuated strain of *Mycobacterium bovis*, remains the only licensed vaccine available against tuberculosis and is routinely administered at birth in India.

Although BCG vaccination effectively protects against severe childhood tuberculosis, adverse reactions occasionally occur. Among these, regional lymphadenitis represents the most frequently encountered complication. BCG-associated lymphadenitis usually involves ipsilateral axillary lymph nodes and may present as either non-suppurative or suppurative disease.

The pathogenesis involves migration of vaccine bacilli through regional lymphatics with subsequent immune-mediated lymph node enlargement. While most cases resolve spontaneously, some progress to suppuration, sinus formation, and cosmetic deformity.

The absence of universally accepted treatment guidelines continues to create uncertainty regarding optimal management. Therefore, understanding the clinical spectrum and outcomes of various treatment modalities remains important.

Aim and Objectives

Aim

To study BCG-associated lymphadenitis in children along with its etiopathogenesis, management, and associated complications.

Objectives

1. To evaluate the clinical profile of BCG-associated lymphadenitis.
2. To study its etiopathogenesis.
3. To assess different management strategies.
4. To compare outcomes with previously published studies.

Materials and Methods

This prospective observational study was conducted in the Department of General Surgery, Index Medical College Hospital and Research Centre, Indore.

A total of 52 children diagnosed with BCG-associated lymphadenitis were included during the study period.

Inclusion Criteria

- History of BCG vaccination.

- Ipsilateral regional lymphadenopathy.
- Clinical diagnosis of BCG adenitis.

Exclusion Criteria

- Tuberculous lymphadenitis unrelated to BCG vaccination.
- Generalized lymphadenopathy.
- Proven immunodeficiency disorders.

Detailed clinical history, examination findings, FNAC reports, microbiological investigations, treatment details, and outcomes were recorded.

Data were analysed using appropriate statistical methods. Results were expressed as frequency, percentage, mean, and standard deviation.

RESULTS

Demographic Characteristics

Among 52 patients, 30 (57.7%) were males and 22 (42.3%) were females.

Table 1. Distribution According to Sex

Sex	Number (%)
Male	30 (57.7)
Female	22 (42.3)
Total	52 (100)

The mean duration of symptoms was 42.02 ± 16.46 days.

Table 2. Duration of Symptoms

Duration	Number (%)
<30 days	15 (28.8)
31–40 days	12 (23.1)
41–50 days	10 (19.2)
51–60 days	7 (13.5)
>60 days	8 (15.4)

Clinical Presentation

Ipsilateral axillary lymphadenopathy was the most common presentation.

Table 3. Site of Lymph Node Involvement

Site	Number (%)
Ipsilateral Axillary	49 (94.2)
Supraclavicular	2 (3.8)
Cervical	1 (1.9)

Table 4. Type of Lymphadenitis

Type	Number (%)
Non-suppurative	28 (53.8)
Suppurative	24 (46.2)

Cytological Findings**Table 5. FNAC Findings**

Finding	Number (%)
Granulomatous lymphadenitis	24 (46.2)
Suppurative granulomatous lymphadenitis	28 (53.8)

Table 6. AFB Status

AFB Status	Number (%)
Positive	27 (51.9)
Negative	25 (48.1)

Treatment Outcomes**Table 7. Treatment Outcomes**

Treatment	Total Cases	Complete Resolution	Success Rate (%)
Observation	16	15	93.8
Medical Treatment	12	11	91.7
Needle Aspiration	24	5	20.8
Incision & Drainage	19	12	63.2
Surgical Excision	7	7	100
Overall	52	50	96.2

Overall treatment success was achieved in 96.2% of patients.

DISCUSSION

The present study demonstrated a slight male predominance, consistent with previous reports. The majority of patients presented with ipsilateral axillary lymphadenopathy, reflecting expected lymphatic drainage from the standard BCG vaccination site.

Non-suppurative lymphadenitis was slightly more common than suppurative disease. Similar findings have been reported by Shamsizadeh et al. and Ko et al., who described the predominance of localized disease with favorable outcomes.

FNAC proved useful in confirming granulomatous pathology. AFB positivity was demonstrated in approximately half the patients, highlighting the value of cytological and microbiological evaluation.

Observation achieved excellent results in uncomplicated cases, supporting current recommendations for conservative management. Surgical excision achieved complete resolution in all treated patients and remains an effective option for persistent or recurrent disease. Incision and drainage demonstrated lower success rates and higher risk of scar formation.

Our findings support an individualized treatment strategy based on disease severity and progression.

CONCLUSION

BCG-associated lymphadenitis is predominantly a benign and self-limiting condition occurring after neonatal vaccination.

Ipsilateral axillary lymphadenopathy remains the commonest presentation. Non-suppurative disease generally resolves with observation alone, while suppurative disease may require intervention. Surgical excision provides definitive treatment for persistent or recurrent cases. Routine antitubercular therapy is not recommended in uncomplicated localized disease.

Appropriate clinical assessment and individualized management ensure excellent outcomes with minimal morbidity.

Limitations

1. Single-centre study.
2. Relatively small sample size.
3. Limited long-term follow-up.
4. Molecular confirmation was unavailable in all patients.
5. Immunological evaluation was not performed in every case.

Conflict of Interest

None.

Funding

None.

Ethical Approval

Institutional Ethics Committee approval obtained.