



FNAC AS A TOOL IN THE DIAGNOSIS OF BCG INDUCED LYMPHADENITIS-AN INSTITUTIONAL EXPERIENCE.

Pathology

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ABSTRACT

BACKGROUND: Tuberculosis is a major cause of morbidity and mortality in developing countries including India. BCG vaccine has been in use since 1921 and is considered to be one of the safest vaccines with self limited regional Lymphadenopathy being the most common complication.

OBJECTIVES: The present study aims to evaluate the efficacy and cytomorphological patterns of BCG lymphadenitis. **MATERIALS & METHODS:** This cross-sectional study was conducted in the Department of Pathology of Government Medical College / Government General Hospital, Anantapuramu, during the period January 2017 to December 2019. Patients with suspected ipsilaterallymphnodal enlargement after BCG vaccination and age ranging from two months to two years, who were referred for FNAC, were included in this study. FNAs of 17 patients were studied in the present study. FNAC was performed by using a 10 mL syringe with a 23 g needle. Smears were stained with H& E stain (Haematoxylin and Eosin) and ZN (Ziehl – nelson) stain. The data collected was entered into an Excel sheet and analyzed. **RESULTS:** Cytology slides prepared were studied, interpreted, and the diagnosis made was analyzed. A total of 17 cases were studied with the mean age of 6.24 months. Majority of the patients were males seen in 64.71% of cases. Ipsilateral Axillary lymphnode was the most common site involved seen in 82.35% cases. Pus was aspirated in 76.47% of cases. On microscopic examination diffuse necrosis with degenerated cells was the predominant cytological pattern seen in nine (52.94%) cases. ZN stain showed Acid fast bacilli positivity in 15 cases. **CONCLUSION:** FNA cytology combined with clinical correlation is useful for diagnosis and management of BCG lymphadenitis.

KEYWORDS

Tuberculosis, BCG Vaccine, lymphadenopathy.

INTRODUCTION:

Bacillus – Calmette– Guerin (BCG) is a live attenuated vaccine and used to prevent tuberculosis since 1921. The world health organization has recommended BCG vaccination as a part of the global expanded program for immunization (EPI) in developing countries.⁽¹⁾ Vaccination with Mycobacterium bovis bacilli calmette – Guerin strain affords protection against TB in children, especially against the severe forms, such as military TB and Tuberculous meningitis.⁽²⁾ Efficacies of BCG vaccines ranges from 0 to 80% in studies of different populations throughout the world.⁽³⁾ BCG vaccine is usually a safe vaccine, a number of complications can occur, such as adverse local reactions, regional lymphadenitis, osteomyelitis and disseminated infection in immunocompromised children with lymphadenitis being the most common.⁽⁴⁾ The presentation rate of BCG lymphadenitis is <1 per 1000 vaccinated children.⁽⁵⁾ Its incidence differs depending on the particular vaccine, the age of the child at the time of vaccination and probably some other factors.⁽⁶⁾ BCG lymphadenitis is defined as the development of ipsilateral regional lymphnode enlargement after BCG vaccination.⁽⁷⁾

MATERIALS & METHODS:

An institution-based cross-sectional study was carried out for a period of 36 months from Jan. 2017 to Dec. 2019 in the Department of Pathology, Government Medical College and Government General Hospital, Anantapuramu. The study included children between the age group of two months to two years who presented with suspected ipsilaterallymphnodal enlargement after BCG vaccination and referred for FNAC. The study design and methodology were started after obtaining the Institutional Ethics Committee approval and permission from the superintendent of Government General Hospital. Demographic information was recorded from the requisition sent along with the patients.

The patient attenders were explained about the procedure, complications and benefits of FNAC. After obtaining the consent from the patient attenders, demographic and relevant clinical details were collected. A local examination of the lymphnodal swelling was performed in all patients before the procedure.

The following criteria were used for identifying a case as BCG Adenitis:

(1) Isolated left Axillary, Supraclavicular (or) cervical lymphnode

enlargement.

(2) History of BCG vaccination on the same side.

(3) Absence of local and systemic signs of inflammation

In a sterile environment and under aseptic precautions, using a 10 mL syringe with 23 G needle, aspiration was done as per the standard methods described in books. The characters of aspirates were noted, and immediately aspirated fluid / tissue was transferred on to the slides, smears were prepared and stained with H & E (Haematoxylin and Eosin) and ZN (Ziehl – nelson) stains as per the standard protocols. Smears were studied under a microscope and interpreted. The cytological interpretation was made as it has been described in standard textbooks of cytology. All the details were entered in a Microsoft Excel sheet, and a descriptive type of statistics was used to analyse the data. The results were expressed in percentages.

RESULTS:

A total of 17 cases with BCG lymphadenitis presented between January 2017 – December 2019. Among 17 cases, 11 (64.71%) were males and six (35.29%) were females and the mean age was 6.24 months (range from two months to two years) as shown in **Table-1**. In majority of cases (15) most common site involved was ipsilateral left Axillary node. Other sites of involvement included the left Supraclavicular lymphnode in one (05.88%) case, left Axillary and Supraclavicular lymphnode in two (11.77%) cases. (**Table 2**). The lymphnodes were < 1cm in size in one (05.88%) case, 1-3 cm in 12 (70.59%) cases, 4-6cm in three (17.65%) cases and more than 6cm in only one case. (**Table 3**).

The type of aspirate was pus in 13 cases (76.47%) and in four cases (23.53%) blood mixed aspirate was obtained. On microscopic examination only diffuse necrosis with degenerated cells (**Figure 1**) was seen in nine (52.94%) cases, epithelioid granulomas along with necrosis (**Figure 2**) was seen in six (35.29%) cases, and granulomas in a reactive background were seen in two (11.77%) cases. In 88.23% (15) cases ZN stain showed AFB positivity.

Table-1: Demographic data of the studied group:

SEX	No. of Cases	%
Male	11	64.71 %
Female	06	35.29 %

Total	17	100%
Age (Months)		
2-6	12	70.59 %
6-12	04	23.53 %
12-24	01	05.88%
Total	17	100%

Table-2: Distribution of the involved lymphnode groups in the studied patients.

Lymphnode Involved	No. of cases	%
Left Axillary Lymphnode	14	82.35 %
Left Supraclavicular Lymphnode	01	05.88 %
Left Axillary & Supraclavicular Lymphnode	02	11.77 %
Total	17	100 %

Table-3: Distribution of the cases according to the size of the lymphnode involved.

Size of the Lymphnode	Frequency	%
<1cm	1	05.88 %
1-3cm	12	70.59 %
4-6cm	3	17.65%
>6cm	1	05.88%
Total	17	100%

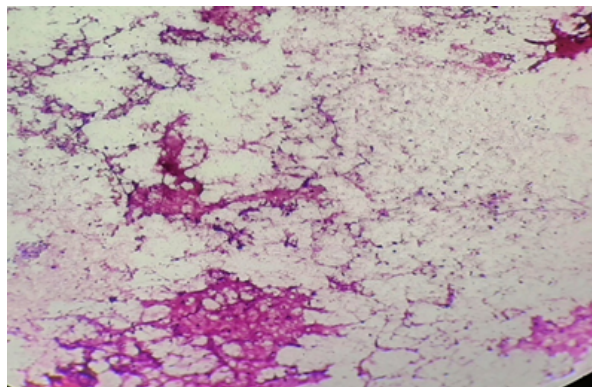


Figure 1: 10x H&E stain showing diffuse necrosis with degenerated cells.

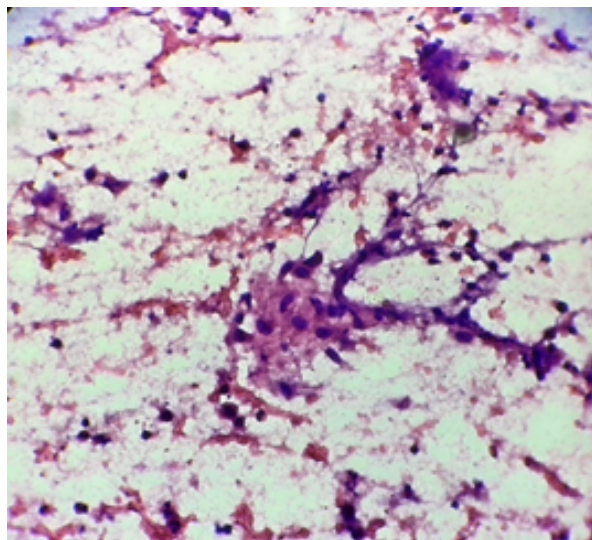


Figure 2: 10x H&E stain showing Epithelioid granulomas along with necrosis

DISCUSSION:

The live attenuated Bacillus – Calmette– Guerin (BCG) vaccine is the oldest vaccine that continues to be used widely nowadays. It is derived by invitro attenuation of an isolate of mycobacterium bovis specially cultured in an artificial medium for years and named after its discoverers the French bacteriologist Albert Calmette and Veterinarian

Camille Guerin.⁽⁸⁾

Four main BCG vaccine strains namely Pasteur strain 1173, Danish strain 1331m, Glaxo strain 1077 and Tokyo strain 172 account for almost 90% vaccination worldwide.⁽⁹⁾

Intradermal vaccinations with BCG give rise to a classic primary complex that consists of cutaneous nodule at the site of injection and swelling of the regional lymphnodes. This is usually self limiting and requires no treatment.⁽¹⁰⁾ The term BCG “Lymphadenitis” is usually coined when ipsilateral Axillary, supraclavicular or lower cervical lymphnode enlargement developing after BCG vaccination is severe enough to arouse significant concern from the child care provider to seek medical attention.⁽¹¹⁾ The following features are in favor of regional BCG related lymphadenitis rather than other pathology.^(3,7,8)

- (1) BCG vaccination at the ipsilateral arm.
- (2) Onset between 2 weeks and 6 months, most patients present within 2-4 months after BCG vaccination.
- (3) Child age not more than 2 years.
- (4) Absence of systemic manifestations such as fever and weight loss.
- (5) Absence of tenderness over the lymphnode.
- (6) Axillary lymphnode is mostly involved, although Supraclavicular or cervical may be involved in isolation association with Axillary Lymphadenopathy.
- (7) Unremarkable physical examination, e.g. no distant Lymphadenopathy or organomegaly.

There are two forms of BCG lymphadenitis. The Non-suppurative form (Simple form) is characterized by a benign clinical course and the lesion resolves spontaneously without any sequelae over a period of weeks.⁽⁸⁾ The Suppurative form is marked by the progressive enlargement of regional lymphnodes leading to a collection of Suppurative material with recognizable fluctuation in the swelling.⁽¹¹⁾

In our study the male gender predominated in 64.71% of cases. This finding is similar to Bukhari, et al⁽⁴⁾ and M. DaeiParizi, et al⁽¹²⁾ studies. BCG lymphadenitis presented at the age of 2-6 months in 70.59% of our patients, although there is delayed presentation upto 24 months, as found in our study, which is similar to the study conducted by Hassan et al⁽¹⁰⁾ and Bukhari, et al.⁽⁴⁾

The Mean age at presentation was 6.24 months which is in concordance with Hassan et al⁽¹⁰⁾ and Devyanipendharkar et al study.⁽¹⁾

In our study ipsilateral left Axillary lymphnode was the most common site involved seen in 82.35% of cases. This is in similar to other studies conducted by Hassan et al⁽¹⁰⁾ and Bukhari et al.⁽⁴⁾

In our study the lymphnode size was mostly 1-3cm seen in 70.59% of cases, 4-6 cm in three cases (17.65%) and < 1cm and <6cm in one case each. This distribution was similar to the study conducted by Bukhari et al.⁽⁴⁾

FNAC of the swelling yielded pus in 76.47% of cases which is slightly more than the study conducted by Devyanipendharkar et al⁽¹⁾ where it was 50%. The reason for this disparity could be because of increased sample size in our study.

Three distinct cytomorphological patterns were seen in 17 cases. They were diffuse necrosis with degenerated cells seen in 52.94% of cases, epithelioid granulomas along with necrosis seen in 35.29% cases and granulomas in a reactive background seen in two cases (11.77%). Similar findings were noted by Gupta et al study.⁽¹³⁾

In 88.2% of cases ZN stain showed positivity which is in concordance with the study conducted by Devyanipendharkar et al.⁽¹⁾

CONCLUSION:

A high index of suspicion for BCG lymphadenitis should be kept in mind for patients who are recently vaccinated with BCG and presenting with ipsilaterallymphnodal enlargement. Diffuse necrosis with degenerated cells and high acid fast bacillus positivity is the predominant cytological pattern in BCG adenitis. Hence FNA cytology combined with clinical correlation is useful for diagnosis and management of BCG lymphadenitis.

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