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Role of Fine Needle Aspiration Cytology (FNAC) in diagnosis of Breast Tuberculosis (TB): A Cross-sectional Study

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Abstract

Background: It is reported that the incidence of tuberculosis (TB) of the breast ranges from 3.5% to 4.5% in poor nations like India. According to several Indian series, the incidence of breast TB among all mammary diseases ranged from 0.64 to 3.59%. **Objectives**: To emphasize the utility of fine-needle aspiration cytology (FNAC) in diagnosis of Breast Tuberculosis. **Methods:** The present study was an observational cross-sectional study conducted in the department of Pathology, Government Medical College, Bettiah, Bihar. Total duration of the study was 20 months (January 2021 – October 2022). A total of 96 patients of breast lesions were taken over the entire study period using total consecutive sampling. All the patients underwent triple assessment by Acid Fast Bacilli (AFB) - Ziehl Neelsen staining (ZN Staining), AFB Culture & Fine Needle Aspiration Cytology (FNAC). All the findings obtained were entered in the MS-excel sheet for further analysis and inference. Descriptive analysis was done for demographic details along with obstetric, lactational and family history of TB along with other diagnostic techniques. Frequency and percentage of the variables were expressed for descriptive statistics whereas sensitivity, specificity, PPV and NPV were expressed for diagnostic techniques. Data analysis was done using MS-Excel. **Results:** After analysis of all the 96 participants, it was observed that most common age group in study participants were from 18 to 30 years and mostly married. Most of the participants do not have family history of tuberculosis and also do not have any co-morbidity. FNAC was found to be more sensitive than AFB-ZN staining and AFB Culture. **Conclusion:** The study's findings led to the conclusion that there are numerous diagnostic techniques for breast TB. It is evident that Fine Needle Aspiration Cytology, as opposed to

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AFB-ZN staining and AFB culture taken in the study, has a higher sensitivity in diagnosing breast tuberculosis.

Keywords: Breast Tuberculosis, Fine Needle Aspiration Cytology (FNAC), Extrapulmonary TB,

Introduction

It is reported that the incidence of tuberculosis (TB) of the breast ranges from 3.5% to 4.5% in poor nations like India. [1] The prevalence of extrapulmonary TB is increasing globally. Breast TB lacks any recognised clinical characteristics. Both clinically and radiographically, the multifarious presentation of this disease is frequently mistaken for either a breast abscess or a breast cancer. [2] According to several Indian series, the incidence of breast TB among all mammary diseases ranged from 0.64 to 3.59%. [3] Up until 1987, there were only 100 cases of breast TB documented from India. [4] And in 1982, Hamit and Ragsdale documented only 500 cases from the international medical literature. [5] Chaudhary reported the first 13 cases of breast TB in India in 1957 from all the 433 breast lesions studiedby her.[6] With an incidence of 0.1% of all breast lesions in Western nations and 3%–4% in tuberculosis-endemic areas, such India and Africa, breast tuberculosis is an uncommon disease. [7] A "great masquerade" has been used to describe breast tuberculosis in acknowledgement of its complex presentation. [8] The clinical symptoms of mammary tuberculosis can be sneaky and vague, and they frequently resemble those of breast cancer. [9]

The fine needle aspiration procedure is crucial in this regard because it aids in the ongoing case management. Whether a straightforward excision treatment or a mastectomy is necessary in that particular circumstance. Breast lesion diagnosis via fine-needle aspiration (FNA) biopsy is well-established and extremely accurate. Compared to a FNA technique, a core biopsy (CB) is more expensive and time-consuming. [10,11,12]

The main aim of this study was to emphasize the utility of fine-needle aspiration cytology (FNAC) in diagnosis of Breast Tuberculosis.

Methodology

The present study was an observational cross-sectional study conducted in the department of Pathology, Government Medical College, Bettiah, Bihar. Total duration of the study was 20 months (January 2021 – October 2022). A total of 96 patients of breast lesions were taken over the entire study period using total consecutive sampling. All the patients underwent triple assessment by Acid Fast Bacilli (AFB) - Ziehl Neelsen staining (ZN Staining), AFB Culture & Fine Needle Aspiration Cytology (FNAC). FNAC was done as a usual procedure using 23 gauge needle. Slides were fixed in ethanol and stained with heamotoxylin and eosin stain and air dried smears were stained with giemsa and papa stain. After fixing the slides, they were assessed for tuberculosis bacilli. The demographic details along with obstetric, lactational, family history of TB and other co-morbidities were also asked from the study participants using a pre-tested semi-structured questionnaire. All the findings obtained were entered in the MS-excel sheet for further analysis and inference.

Descriptive analysis was done for demographic details along with obstetric, lactational and family history of TB along with other diagnostic techniques. Frequency and percentage of the variables were expressed for descriptive statistics whereas sensitivity, specificity, PPV and NPV were expressed for diagnostic techniques. Data analysis was done using MS-Excel.

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Results & Observations

A total of 96 patients were selected as study participants and analysed for observations. Distribution of study participants on the basis of risk factors has been demonstrated in table no 01. The sensitivity, specificity, PPV & NPV has been shown in Table no 02.

Table No. 01 – Distribution of study participants on the basis of Risk factors (n=96)

Risk Factors	Risk factors	Frequency (n=96)	Percentage (%)
Age	18-30 yrs	52	54.1%
	31-40 yrs	29	30.2%
	41-50 yrs	8	8.3%
	>50 yrs	7	7.4%
Residence	Urban	27	28.1%
	Rural	69	71.9%
Socio-economic status	BPL*	58	60.4%
	APL*	38	39.6%
Marital status	Unmarried	3	3.2%
	Married	93	96.8%
Obstetric history	Pregnancy	1	1.04%
	Nulliparous	14	14.5%
	Multiparous	81	84.4%
Lactation history	Lactating	15	15.6%
	Non-lactating	81	84.4%
Associated Tubercular lesion	Absent	83	86.4%
	Present	13	13.6%
Family h/o TB	Absent	91	94.7%
	Present	5	5.3%
Type of breast TB	Primary	89	92.7%
	Secondary	6	6.3%
Co-morbidities	Diabetes	2	2.08%
	Carcinoma	1	1.04%
	HIV	1	1.04%
	None	92	95.8%

***BPL –** Below Poverty Line as per ration card**, APL –** Above Poverty Line

Table No. 02 – Pathological investigations

Specimen (n=96)	Positive	Negative	Sensitivity	Specificity	PPV*	NPV*
AFB-ZN Staining	12 (12.5%)	84 (87.5%)	21.5%	100%	100%	31%
AFB Culture	3 (3.2%)	93 (96.8%)	9.7%	100%	100%	10.4%
FNAC	72	24	78.4%	23.8%	73.25	28%

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	(75%)	(25%)				

***PPV –** Positive Predictive Value**, NPV –** Negative Predictive Value

Discussion

The purpose of the proposed study is to highlight the value of fine-needle aspiration cytology (FNAC) in the detection of breast tb. Following research of all 96 participants, it was shown that the majority of study participants were married and between the ages of 18 and 30. The majority of participants have no co-morbid conditions and no history of tuberculosis in their families. In comparison to AFB-ZN staining and AFB Culture, FNAC was discovered to be more sensitive.

According to a case study by Hemlata Panwar et al., FNAC diagnosis of tubercular mastitis is a helpful tool for the patient's right management and therapy, preventing the need for unnecessary surgery. [13] A case of breast tuberculosis was initially misdiagnosed as a breast abscess and was clearly detected by minimally invasive fine-needle aspiration cytology, according to yet another instance reported by Yethindra Vityala. We were able to stop a widespread infection thanks to this conclusive diagnosis and the quick start of the recommended anti-tuberculosis medication. The patient recovered, and further check-ups revealed no signs of the condition recurring.[14]

The cytopathological analysis of these lesions prior to operation or treatment acts as a crucial diagnostic modality, and a study by Shobha SN and her colleague demonstrated that FNAC serves as a quick, affordable, and trustworthy method for the detection of palpable breast lesions.[15] It was determined in a different study by Swagata Brahmachari et al. that CBNAAT should be utilised in addition to standard smear microscopy, culture, FNAC, and cytology. [16] In their work, Sukumar C. et al. discovered that FNAC can be a reliable tool for separating tuberculous mastitis from granulomatous mastitis based on cytomorphological findings and confirmed by the presence of acid-fast bacilli. [17]

Conclusion

It was concluded from the study that various modalities are available for diagnosis of breast tuberculosis. It is clear that Fine Needle Aspiration Cytology has more sensitivity in diagnosis the breast tuberculosis as compared to AFB-ZN staining and AFB culture taken in the study.

Conflict of Interest: None

Financial Support: Nil

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