Section: Respiratory Medicine

Original Research Article

ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN EXTRA PULMONARY TUBERCULOSIS: AN OBSERVATIONAL STUDY

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ABSTRACT

Background: Tuberculosis is one of the leading infectious causes of death worldwide, extra pulmonary tuberculosis is infection by M. tuberculosis which affects tissues and organs outside the lung. EPTB most frequently presented as lymphadenopathy. Among various methods used to diagnose EPTB, FNAC and ZN staining widely used diagnostic test. Fine Needle Aspiration Cytology (FNAC) is a rapid, simple, reliable and inexpensive methed to diagnose EPTB. This study aimed to assess early diagnosis of TB lymphadenopathy with FNAC. This cross sectional observational study was conducted in the Department of Pathology in collaboration with the Department of Respiratory Medicine carried out on 144 patients suspected with EPTB in the, Punyashloka Lokmata Devi Ahilyabai Holkar A.S.M.C, Auraiya. During the period of 1year duration (Jun. 2024 to May. 2025). Detailed history and clinical details were noted. FNAC procedure was carried out with 23-gauge needle Under aseptic conditions. Of the cases observed, 66 were males and 78 were females. All age group patients were included, maximum patients belong to age group 21-30years. Site wise distribution in area of Cervical, Axillary, Inguinal, Supraclavicular and Submendibular was seen in 105,10,03,11and 15 number of cases respectively, FNAC aspirated material obtained were Purulent in 33, Cheesy in 19, Blood mixed in 92 cases. Different Cytological finding on FNAC was Well defined granulomas without necrosis, well defined granulomas with necrosis, Occasional epitheliod with necrosis, only caseous necrosis, Reactive and Suppurative pattern obtained in 45,23,08,15,35 and 18 cases respectively.

INTRODUCTION

Tuberculosis (TB) is a deadly, communicable disease caused by an acid-fast bacillus, Mycobacterium tuberculosis which was discovered by Robert Koch. Tuberculosis (TB) remains one of the most common chronic granulomatous Infectious diseases in the developing country. Globally, the prevalence of TB was estimated to be10.5 million, out of which about 1.8 million new cases arise annually in India, explaining for nearly 40% of India's population being infected with the Tuberculosis.[1] which commonly affects lungs (pulmonary TB) and other organs (extra pulmonary TB).

Extra pulmonary tuberculosis (EPTB) is defined according to WHO classification criteria as an infection by M. tuberculosis which affects tissues and organs outside the pulmonary parenchyma.[2] Out of total TB cases globally, 15% are Extrapulmonary Tuberculosis (EPTB), out of this 15% EPTB cases, 20% cases are reported to be in India.[3] In some settings, in India, EPTB accounts for about 50% of TB cases especially in people living with HIV/AIDS.[4,5,6] Hence Extra pulmonary tuberculosis (EPTB) is an equally important manifestation of TB which remains undiagnosed due to diagnostic challenges specially in developing countries. Extra pulmonary tuberculosis (EPTB) most commonly manifests as peripheral lymphadenopathy, it can involve any organ of the body including brain, skin, soft tissues, small and large intestine, appendix and genitourinary tract.[7] Tuberculous lymphadenopathy is the most common type of EPTB, accounting 35% of all cases.[8] The extrapulmonary TB sites are mostly smear negative and these cases are commonly

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less contagious and hence need early diagnosis and timely treatment to prevent further spread and reduce mortality.[9] Fine Needle Aspiration Cytology (FNAC) is a rapid, simple, and inexpensive methed, widely used diagnostic test in evaluating lymphadenopathy. Although it is widely used diagnostic test, it has very low Sensitivity to detect Mycobecterium Tuberculosis in EPTB due to its paucicellular nature.[10] Ancillary tests like ZN stain, Auramine and Rhodamine stain on FNA material aid in diagnosis.

MATERIALS AND METHODS

A total of 144 Patients who were suspected for extra pulmonary TB were included in this cross-sectional study conducted in the Dept. of Pathology in collaboration with the Department of Respiratory Medicine, Punyashloka Lokmata Devi Ahilyabai Holkar A.S.M.C, Auraiya., Uttar Pradesh, India over a period of 12 months from June 2024 to May 2025. All procedures in this study were following the ethical standards committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee of the college was obtained for the study.

Inclusion Criteria

1. Both male and female patients were included.
2. The patients of all age group were included.
3. All clinically suspected, new cases were included in this study.
4. Informed written consent taken, in case of minor consent taken from patient's attendant.
5. Patients who agreed to participate in the study were included.

Exclusion Criteria

1. Uncooperative patients.
2. Patients with inaccessible sites, i.e; deep seated lesion.
3. Locations from where FNA could not be done without ultrasonographic or computed tomographic guidance.
4. Patients who were already diagnosed with EPTB.
5. Patients on anti-tubercular treatment for EPTB.
6. Patients who are not willing to participate.
7. Patients who were not given written informed consent.

A detailed history was taken from the patients, including duration of mass swelling, associate weight loss, fever etc., clinical details were noted from the patient's clinical records.

Before starting the procedure, patients were explained about FNAC procedure and its related complications. Under aseptic precautions, the FNAC was done by passing a 23-gauge needle attached to a 20 ml syringe into lymph node under two finger guidance, with suction applied, needle was moved back and fro around 10-15 times. Procedure was repeated from same node or other node if material obtained was unsatisfactory. The obtained aspirated material were smeared on microscopic slides and immediately fixed in 95% alcohol and stained using Giemsa stain, Papanicoula, Hematoxylin and Eosin and Ziehl Neelsen stains specific for acid-fast bacilli (AFB) of Mycobacterium tuberculosis and the gross appearance of the aspirate of FNAC specimens were collected.

RESULTS

Total of 144 patients were undergone FNAC procedure, in pathology department.

Table 1: Age wise distribution

Age group (years)	No. of cases	Percentage (%)
<1-10	15	10.4
11-20	11	7.6
21-30	52	36
31-40	19	13.2
41-50	23	16
51-60	12	8.4
61-70	7	4.9
>70	5	3.5
	144	100

In our study, youngest patient was 8 months and oldest was 72 years old. Maximum no. of cases were belong to the age group between 21-30 years.

Table 2: Sex wise distribution

Sex	Number of cases	Percentage (%)
Male	66	45.8
Female	78	54.2
Total	144	100

There is Female predominance in our study. Female (54.2%) and male (45.8%).

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Table 3: Location wise distribution

Site	Number of cases	Percentage (%)
Cervical	105	73
Axillary	10	07
Inguinal	03	02
Supraclavicular	11	7.6
Submandibular	15	10.4
	144	100

In our study, maximum no. of cases (105) were presented with cervical lymphadenopathy (73%), Submandibular (15; 10.4%), Supraclavicular (11; 7.6%), Axillary (10; 07%), Inguinal (03;02%).

Table 4: Type of FNA aspirates aspirated

Type of aspirate	Number of cases	Percentage (%)
Purulent	33	22.9
Cheesy	19	13.2
Blood mixed	92	63.9
Total	144	100

Most common aspirate obtained while doing FNAC was blood mixed 63.9%.

Table 5: Cytological pattern on FNAC

FNAC pattern	Number of cases	Percentage (%)
Well defined granulomas without necrosis	45	31.2
Well defined granulomas with necrosis	23	16
Occasional epithelioid with necrosis	8	5.6
Only caseous necrosis	15	10.4
Reactive	35	24.3
Suppurative	18	12.5
Total	144	100

In our study, most common cytological pattern obtained on FNAC was Well defined granulomas without necrosis (31.2%), followed by Reactive (24.3%), Well defined granulomas with necrosis (16%), Suppurative (12.5%), Only caseous necrosis (10.4%), Occasional epithelioid with necrosis (5.6%).

Figure 1 **Figure 2(100X)**

Figure 1: Male, 25 Year Age, Upper Cervical Lymph Node Swelling

Figure 2: Well Defined Granuloma Without Necrosis of Same Patient on Giemsa Stain

DISCUSSION

The present study is a hospital based cross-sectional observational study for the diagnosis of suspected Tubercular lymphadenopathy by FNAC results. This study aimed to assess early diagnosis of TB lymphadenopathy with FNAC.

In our study Maximum no. of cases 36% were belong to age group between 21-30 years. Our results were consistent with the finding of other studies; Yassin et al,[11] Aroravk et al,[12] Patil SB et al.[13]

In our study female (54.2%) compared to males (45.8%), was proportionately higher in number, concordant with the study Chaudhari et al,[14] Kalyani Gouda et al,[15] Akova et al,[16] Ben Jmaa et al,[17] ABM Ali Hasan,[18] Patil SB et al,[13]

In the distribution of various sites of presentation, cervical sites was the most common region in our study, similar results with Shilpa et al,[19] Begum et al.[20] ABM Ali Hasan,[18] Patil SB et al.[13] Majed et al,[21] and Lavanya et al.[22]

Most common aspirate obtained while doing FNAC was blood mixed 63.9% which is concordant with result in. Shobija et al.[23]

In this study, Well defined granulomas without necrosis cytological pattern was most common finding on FNAC.study which is concordant with Shilpa et al,[19] Sreenivasulu et al.[24]

Limitations

1. Sample size was small.
2. This was a single centre study.

CONCLUSION

FNAC is an inexpensive, easily accessible, nonhazardous, and reliable investigation in the diagnosis of extra pulmonary tuberculosis. Hence early diagnosis of extra pulmonary tuberculosis in a

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resource limited setting like in developing country can be easily achieved with FNAC technique. As it provides high degree of accuracy in diagnosing tubercular lymphadenopathy and hence reducing morbidity and mortality of the disease. FNAC coupled with AFB staining should be the 1st line of investigation in cases with lymphadenopathy

REFERENCES

1. Gupta S, Srivastava A, Kumar A, Mohan N. Relevance of CBNAAT in the early diagnosis of suspected tubercular swelling. MGM J Med Sci 2023; 10:500-4. Manju M D, Madhu sudhan A V.
2. Global TB Report 2020: Chap.4 TB disease burden. Page No-23
3. S. Huddart et al. Tuberculosis: a persistent health challenge for India Curr Epidemiol Rep (2018)
4. India TB Report 2022, Ministry of health and family welfare, government of India....
5. A. Shamseeda et al. Epidemiological profile of extrapulmonary tuberculosis and its association with diabetes in tertiary care center in Northern Kerala Int J Community Med Public Health (2022)
6. A.K. Shrivastava et al. Clinico-epidemiological profile of extra-pulmonary tuberculosis in Central India Int J Med Res Rev (2015)
7. Shetty and Vyas Surgical and Experimental Pathology (2022) 5:11 https://doi.org/ 10.1186/s42047-022-00111-z
8. Diagnostic validity of CBNAAT in detecting tubercular cervical lymphadenitis: an observational prospective study in western Maharashtra. (2022). Journal of Pharmaceutical Negative Results, 9345-9355. https://doi.org/10.47750/pnr.2022.13.S09.1092
9. World Health Organization. Tuberculosis programme: Framework for effective tuberculosis control. Geneva, Switzerland: WHO;1994:179.
10. Manju Kumari et.al. CBNAAT vs. ZN Staining on FNAC. International Journal of Health Sciences and Research (www.ijhsr.org) 18 Vol.10; Issue: 7; July 20202.
11. Yassin, M.A.; Datiko, D.G.; Shargie, E.B.Ten-year experiences of the tuberculosis control program in the southern region of Ethiopia. Int J Lung Dis. 2006; 10: 1166-1171.
12. Arora, V.K.; Gupta, R. Trends of extrapulmonary tuberculosis under revised national tuberculosis control program: A study from South Delhi. Ind J Tuberc. 2006; 53: 77-83.
13. Patil SB, Dhage SM, Umap PS, Ghorpade SV, Patharwat S. Cartridge based nucleic acid amplification test: a sensitive diagnostic tool for tuberculosis on fine needle aspirates samples. Int J Community Med Public Health 2020;7:1511-5
14. Choudhary et al. Comparative Study of Fine needle Aspiration Cytology, Acid Fast Bacilli Staining and Cartridge Based Nucleic Acid Amplification test in the Diagnosis of Extrapulmonary Tuberculosis: International Journal of Pharmaceutical and Clinical Research 2022; 14(12); 307-314.
15. Gouda, K., Das, U., & Dhangadamajhi, G. Utility of Fine Needle Aspiration Cytology (FNAC) in the diagnosis of tuberculous lymphadenitis compared to GeneXpert in a tertiary health care center in Northern Odisha, India.Indian Journal of Tuberculosis, 2021; 68(4): 437–444.
16. Akova İ, Kılıç E. Evaluation of tuberculosis clinical characteristics by gender. Cumhuriyet Medical Journal. 2021;43(1).
17. Jmaa B, Ayed B, Koubaa M, Hammami F, Damak J, Jemaa B. Is there gender inequality in the epidemiological profile of tuberculosis?. La Tunisie medicale. 2020 Mar 1;98(3):232-40.
18. Hasan ABMA, Uddin J, Bhowmick S, Meheboba S, Rahman T, Islam KR. Age and Gender Specific Pulmonary and ExtrapulmonaryTuberculosis in a Rural Area of Bangladesh.J Rang Med Col.2025 Mar;10(1):87-92. doi: https://doi.org/10.3329/jrpmc.v10i1.81569
19. R SA, G Shilpa, HA Mohamed, B E Chaitra, Francis R, Role of fine needle aspiration cytology as a diagnostic tool in lymphadenopathy with utility of CBNAAT in tuberculous lymphadenopathy. Arch Cytol Histopathol Res 2019;4(1):
20. Begum A, Baten MA, Begum Z, Alam MM, Ahsan MM, Ansari NP, Zahan S, Khan MK, Nesa F, Huq MM. A RetrospectiveHistopathological Study on Extra-pulmonaryTuberculosis in Mymensingh. Mymensingh Medical Journal: MMJ. 2017 Jan 1;26(1): 104-8.
21. Majed M, Amitha G, Anamika A, Sandeep S.Comparative Analysis of Gene Expert Assay In Addition To Z-N Microscopy for Detection of Extra -Pulmonary TB in A Fine Needle Aspiration Samples. Sch J App Med Sci. 2017;5(7D):2803-8.
22. Lavanya G, Sujatha C, Faheem K, Anuradha B. Comparison of GeneXpert with ZN Stainin FNA samples of suspectedextrapulmonary tuberculosis. IOSR J Dent Med Sci. 2019;18(7):25-30.
23. R. Shobija1, G. Sangamithra2, Arasi Rajesh3 Utility of CBNAAT as an Adjunct to Conventional Fine Needle Aspiration Cytology in Presumptive Diagnosis of Tuberculous Lymphadenitis at a Tertiary Care Hospital in South India: An Observational Study International Journal of Pharmaceutical and Clinical Research 2024; 16(8); 617-624
24. M. Sreenivasulu1, TRSN Lakshmi2*, B. Aneela3, V. Sivasankara Naik4 Reliability of FNAC as A Diagnostic Tool in Cases of Tuberculous Lymphadenopathy in Comparison with CBNAAT: Study Done at A Tertiary Care Center International Journal of Pharmaceutical and Clinical Research 2024; 16(3); 979-984.

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