Role of Fine Needle Aspiration Cytology in Extrapulmonary Tuberculosis

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ABSTRACT

Introduction: Extrapulmonary tuberculosis is equally important as that of pulmonary tuberculosis. Fine needle aspiration cytology (FNAC) is accurate, cost effective, minimal invasive outpatient procedure and aids in prompt diagnosis of extrapulmonary tuberculosis. **Aims:** To determine the role of fine needle aspiration cytology for diagnosis of extra pulmonary tuberculosis. **Methods:** This is a hospital based descriptive study done over a period of one and half year April 2019 to October 2020 at Nepalgunj Medical College Teaching Hospital, Nepalgunj, Nepal. All the 80 patients who were clinically suspected for tuberculosis had undergone fine needle aspiration cytology and diagnosed as tuberculosis in cytology were included in study. Cytological diagnosis was made with microscopic features and positive acid fast bacilli staining. Microscopy showed epithelioid histiocytes, granulomas, multinucleated giant cells, caseous necrosis, neutrophils and mature lymphocytes. **Results:** Out of 930 cases received, 80 cases were diagnosed as tuberculosis in cytology. 33 cases were diagnosed with acid fast bacilli positive. Rest was diagnosed with cytological features. Among 80 aspirated samples, a portion of purulent specimen was evaluated with Genexpert test in 11 cases for Mycobacterium Tuberculosis detection and rifampicin sensitivity/ resistant. Out of 11 positive patients in Genexpert tests; 10 were rifampicin sensitive and one was rifampicin resistant. **Conclusion:** Common presentation of extrapulmonary tuberculosis is in lymph nodes with increased frequency in age group of 21 to 30 years. Therefore, lymph nodes in this age group should be prioritized more for investigation of extrapulmonary tuberculosis.

***Keywords*:** Extrapulmonary tuberculosis, fine needle aspiration cytology

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INTRODUCTION

Mycobacterium Tuberculosis (MTB) is a major health problem in developing countries including Nepal.[1] Fine needle aspiration cytology (FNAC) is being commonly used and usually contributes for diagnosis of extrapulmonary tuberculosis.[2] Extrapulmonary tuberculosis remains diagnostic challenges in developing countries and could be easily diagnosed with cytology.[3] Fine needle aspiration cytology (FNAC) is simple and minimally invasive procedure for obtaining aspirated material which can be processed for smear microscopy.[4] Although culture is gold standard diagnosis for extrapulmonary tuberculosis cytology can aid in diagnosis of extrapulmonary tuberculosis.[5] Common presentation of extrapulmonary tuberculosis reveals with peripheral lymph node enlargement and can be evaluated with fine needle aspiration cytological diagnosis.[6]

METHODS

This is a hospital based descriptive study done over a period of one and half year April 2019 to October 2020 at Nepalgunj Medical College Teaching Hospital, Nepalgunj, Nepal. Among 930 cases aspirated at department of Pathology in one and half years; 80 cases were clinically suspected for extrapulmonary tuberculosis. While performing FNAC procedure; relevant clinical history from patient was taken and found to be gradually increasing painless nodular swelling at cervical, axillary, inguinal and skin region associated with on and off history of fever for duration of more than a week. Aspiration was done as an outpatient procedure in supine posture. Aspiration was done with 22 to 23 G needle attached to five ml. syringe. Two to three passes of needle were made per cases. The smears were air dried for Giemsa stain and wet fixed in 95% alcohol for rapid Pap stain. Special stain as Ziehl Neelsen stain was done for acid fast bacilli in aspirated smear. All the

80 cases were diagnosed as extrapulmonary tuberculosis in cytology and were included in study. Cytological diagnosis was made with microscopic features and positive acid fast bacilli staining. Microscopic features in cytology showed collection of epithelioid histiocytes forming granulomas, multinucleated giant cells, caseous necrotic material, lymphocytes and neutrophils.

Inclusion criteria: All age group patient undergone fine needle aspiration cytology followed by diagnosis of extrapulmonary tuberculosis in cytology was included in the study.

Exclusion criteria: Cytological diagnoses other than extrapulmonary tuberculosis were excluded from study. The data were analyzed using Statistical packages in social sciences (SPSS) version18.

RESULTS

Of 930 patients, only a total of 80 patients fulfilled the inclusion criteria for this study. Out of 80 cases, 51 cases (63.7%) were of female as shown in figure 1. Among 80 patients, 33 cases were diagnosed with acid fast bacilli positive in aspirated material and rest was diagnosed with cytological features under microscope. Male to female ratio was of 1:1.76. Age of the patient ranged from 5 month to 75 years as shown in figure 2. Distribution of cases were equal in right and left cervical region of neck as 33, four in submental region of neck, two were of bilateral cervical region of neck, left axilla and left inguinal region; one in right axilla, sternal angle, left foot, and left scapular region. A portion of purulent aspirated sample was kept for Genexpert test in 11 cases. Out of 11 positive patients in Genexpert tests; 10 were rifampicin sensitive and one was rifampicin resistant.

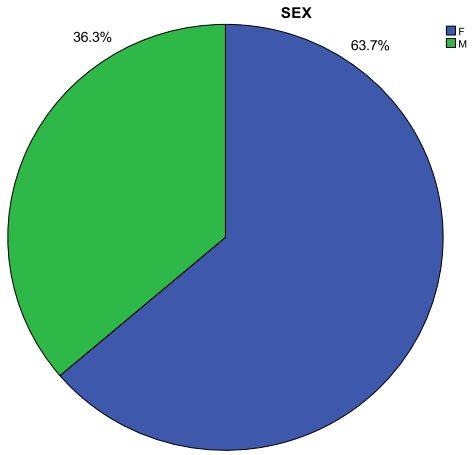

Figure 1: Distribution of patients according to gender.

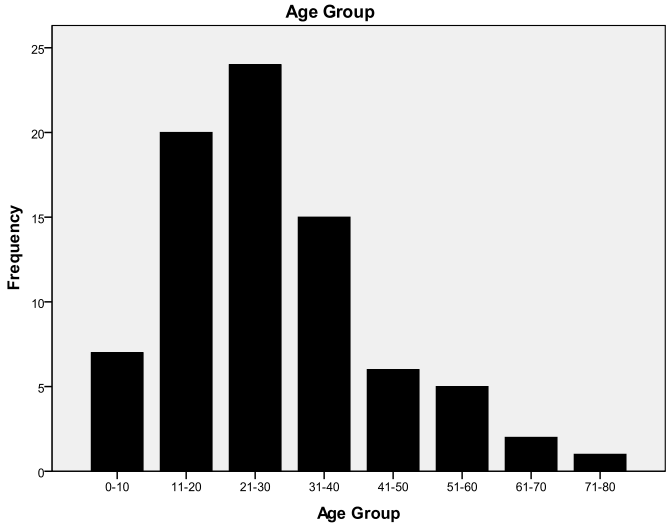

Figure 2: Distribution of patients according to age groups.

One case of tuberculous abscess in right supraclavicular region was diagnosed as acid fast bacilli positive smear with rifampicin resistant in Genexpert test.Out of 80 cases, 77 cases diagnosed as extrapulmonary tuberculosis in cytology were from lymph nodes and only 3 cases diagnosed as extrapulmonary tuberculosis each were from sternal angle region, left foot region and left scapular region.

Cutaneous tuberculosis is one of the rare presentations of extrapulmonary tuberculosis.[7] and three cases of cutaneous tuberculosis were identified in sternal angle, left foot, and left scapular region.

In comparison of fine needle aspiration cytology diagnosis in extrapulmonary tuberculosis with acid fast bacilli (AFB) staining and Genexpert test (as shown in Figure 3); one case of tuberculous abscess in right cervical region of neck was diagnosed only in cytological findings with negative result of Ziehl Neelsen stain for acid fast bacilli revealing past history of antitubercular treatment.

		AFB - TB MTB - DETECTED; RIFAMPICIN - RESISTANT MTB - DETECTED; RIFAMPICIN - SENSITIVE	Genexpert Test NOT DONE			Total
NEGATIVE	FNAC DIAGNOSIS	Suggestive of granulomatous lesion - tuberculous abscess			2	2
		Suggestive of granulomatous lesion - tuberculous lymphadenitis			37	37
		Suggestive of tuberculous abscess			5	5
		Suggestive of tuberculous lymphadenitis			2	2
		Tuberculous abscess			1	1
	Total				**47**	**47**
POSITIVE	FNAC DIAGNOSIS	Cutaneous tuberculosis	0	0	1	1
		Tuberculous abscess	1	10	13	24
		Tuberculous lymphadenitis	0	0	8	8
		Total	**1**	**10**	**22**	**33**

Table I: Fine needle aspiration cytology (FNAC), acid fast bacilli (AFB – TB) and Genexpert test.

DISCUSSION

Involvement of tuberculosis other than lung is considered as extrapulmonary tuberculosis.[8] Although gold standard diagnosis for tuberculosis is culture with Lowenstein Jensen media its major limitation is time consuming of two to four weeks; cytological diagnosis and Genexpert examination are quick and reliable method of diagnosis for tuberculosis.[9] In present study female predominance was found for extrapulmonary tuberculosis and similar finding in fine needle aspiration cytology diagnosis of extrapulmonary tuberculosis were observed by Narang S et al, Rajshekeran et al and Vimal S et al.[10, 11,12]

Present case shows maximum number of extrapulmonary tuberculosis in cervical lymph nodes and similar observation were seen in study done by Samaila MO et al.[2] At a regional hospital in Thailand, study showed lymph nodes as a common location for extrapulmonary tuberculosis (29.6%) [13] and study by Makaju R et al also showed lymph node as common presentation for extrapulmonary tuberculosis (69.1%).[14]

Genexpert can identify bacterial DNA by polymerase chain reaction (PCR) and also aid in treatment of multidrug resistance by identifying rifampicin sensitivity or resistivity to patient.[15] From December 2010, World Health organization (WHO) had validate the use of a new technology as GeneXpert Mycobacterium Tuberculosis/ Rifampicin assay as a replacement over conventional techniques.[16] During October 2013, WHO updated its policy and endorsed the use of newer technique for the rapid detection of TB infection among extra-pulmonary cases.[17] GeneXpert test is semi-automated real-time polymerase chain reaction (PCR) nucleic acid amplification technology, which could concurrently identify mycobacterium tuberculosis and Rifampicin (RIF) resistance in less than three hours.Molecular beacon technology of polymerase chain reaction is the mechanism and principle of GeneXpert system.[18] In this study GeneXpert has advantage of diagnosing rifampicin resistance in one case out of eleven cases and similar findings were obtained in study done by Mechal Y et al.[19] Rifampicin resistance was of 1.25% in Genexpert test and 5.9% was identified in study done by Masenga SK et al.[20] One case of tuberculous abscess in present study was diagnosed only in cytological morphology with absence of acid fast bacilli in Ziehl Neelsen stain and past history of antitubercular therapy. Similar finding was observed in study done by Pandit S et al.[21]

LIMITATIONS

Limitation of this study for diagnosis of extrapulmonary tuberculosis is small sample size in cytology. Another limitation is lack of previous studies in the research area.

CONCLUSION

Common presentation of extrapulmonary tuberculosis is in lymph nodes with increase frequency in age group of 21 to 30 years. Therefore, this age group and lymph nodes should be prioritized more for investigation of extrapulmonary tuberculosis. It is recommended to frequently step up and augment for aspiration cytology with acid fast bacilli stain for the diagnosis of extrapulmonary tuberculosis, which will help in reducing not only the disease burden, but also the cost of diagnosis. This will facilitate the timely management and appropriate treatment of patients to reduce the mortality and morbidity.

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