



Original Research Article

Volume 3, Issue 6 -2017

DOI: <http://dx.doi.org/10.22192/ijcrms.2017.03.06.002>

Clinicopathological evaluation of lymphadenopathy by FNAC in children and adolescents

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Abstract

Introduction: Lymph nodes are commonly involved in both children and adolescents in local and systemic conditions such as infections, lymphomas and metastatic deposits. FNAC is simple procedure used to diagnose such lesions.

Material and Methods: The present study was conducted on 50 children and adolescents between the age group of 1-21 years that came in the pathology department of Govt. Medical College, Amritsar for FNAC of lymphadenopathy.

Results : Maximum cases i.e. 21 (42%) were found to occur in adolescents followed by school aged children 16 (32%) with male: female ratio of 1.7:1. Upper cervical lymph nodes were most commonly involved in 19 (38%) cases followed by 8 (16%) in middle cervical. Most common lesion was tubercular lymphadenopathy 21 (42%) followed by reactive lymphadenitis 20 (40%). ZN staining with modified bleach method was found to be more sensitive in diagnosing cases of tubercular lymphadenopathy.

Conclusion: FNAC provides an easy and reliable method for making the specific clinico-pathological diagnosis in majority of the cases of tuberculous and reactive lymphadenitis.

Keywords: Lymphadenopathy, children and adolescents, FNAC.

Introduction

Lymph nodes are described as nodules of lymphoid tissue located at anatomically constant points along the course of lymphatic vessels. A typical lymph node varies from 1mm to 25mm in size. The lymph node is one of the major anatomic components of immune system.¹

Lymph node enlargement may occur from minor antigenic stimulation leading to reactive hyperplasia to diseases as grave as lymphomas or secondary carcinomatous deposits. Any enlarged lymph node or group of lymph nodes may at times pose a serious challenge in the management of a patient. The proper examination of a lymph node may require the performance of a variety of

specialized procedures depending upon the nature of the case. Fine needle aspiration biopsy (FNAC) is safe, simple, cost effective technique providing rapid information and directing further approach to a patient. FNAC is a study of cells obtained through a small gauge needle, under a vacuum system provided by air tight syringe. It was first done by Kun in year 1847.²

Lymphadenopathy in children is a common problem that clinicians face. FNAC provides a useful tool in the management of young patients with lymphadenopathy.

Materials and Methods

The present study included a total of 50 children and adolescents between the age group of 1-21 years that came in for FNAC of lymphadenopathy in the Pathology Department, GMC, Amritsar. The relevant history and biodata of the patients were recorded. Materials used in the study were:

1. Cameco syringe pistol
2. 20cc syringe, 22-25 gauge needle , 5 cc syringe
3. Clean glass slides
4. Antiseptic solution, sterile cotton swabs
5. Fixative solution (90% ethanol)
6. Stains : Haematoxylin and eosin, May-Grunwald-Giemsa

7. For ZN staining by modified bleach method: carbol fuchsin, 20% H₂SO₄, Loeffler’s Methylene Blue, normal saline, 5% NaOCl, distilled water, incubator, conical tubes
8. Disposable gloves

FNAC and ZN staining with modified bleach method were done according to the instructions given in the literature.

Results

1. Distribution according to age

Some age-related development periods are:

- 1) Newborn (ages 0–1 month)
- 2) Infant (1 month – 1 year)
- 3) Toddler (1–3 years)
- 4) Preschooler (4–6years);
- 5) School-Aged Child (6–13 years)
- 6) Adolescent(13–21years)

The age range of patients with lymphadenopathy in the present study was 1 to 21 years with a mean of 12 years. Maximum number of cases i.e. 21 (42%) were found to occur in adolescents followed by school aged children having 16 (32%) cases.

Table 1 Distribution according to age

Age	No. of cases	Percentage (%)
I month-1year	1	2
1-3year	3	6
3-6 year	9	18
6-13year	16	32
13-21 year	21	42
TOTAL	50	100

2. Distribution according to site

In 19 (38%) cases, lymphadenopathy was present in upper cervical region, followed by 8 (16%)

cases in middle cervical. Least commonly affected were the submental and inguinal lymph nodes in which involvement was seen in only 1 (2%) case each.

Table 2 Showing distribution according to site

Site	No. of cases	Percentage (%)
Upper cervical	19	38
Middle cervical	8	16
Lower cervical	5	10
Submandibular	7	14
Submental	1	2
Supraclavicular	2	4
Posterior triangle	4	8
Axillary	3	6
Inguinal	1	2

3. Diagnosis on FNAC

Out of 50, maximum cases were of tubercular lymphadenopathy (42%) followed by reactive

lymphadenitis (40%) and lymphoproliferative (10%). There were 2 cases (4%) each of necrotizing lymphadenitis and granulomatous pathology.

Table 3 Showing the diagnosis on FNAC (n=50)

Cytology diagnosis	No. of cases	Percentage
Reactive LAP	20	40
Necrotizing lymphadenitis	2	4
Tubercular LAP	21	42
Lymphoproliferative	5	10
Granulomatous	2	4
Total	50	100

4. Distribution according to sex

75% of cases of reactive lymphadenopathy and 57.14% of cases of tubercular lymphadenopathy were seen in males (57.14%). Only 5 cases were diagnosed as lymphoproliferative disorders and all of them were found to occur in males.

Female preponderance was seen in necrotizing lymphadenitis and granulomatous lymphadenopathy in which all the cases were found in females.

Table 4 Showing distribution according to sex

Diagnosis	Male	Female
Reactive LAP	15	5
Tuberculous LAP	12	9
Necrotizing lymphadenitis	0	2
Lymphoproliferative	5	0
Granulomatous	0	2

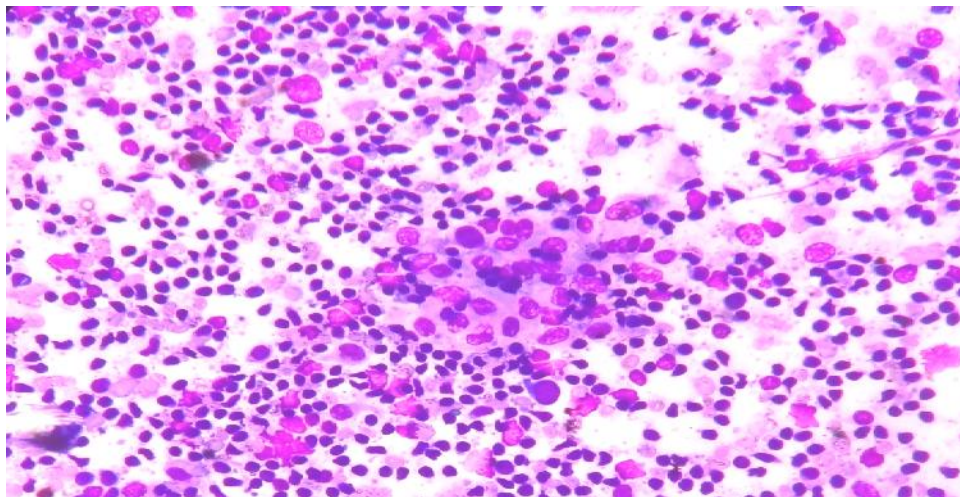
5. ZN Staining vs modified bleach in pus aspirate

ZN staining by Modified Bleach Method was done in 6 cases in which pus was aspirated.

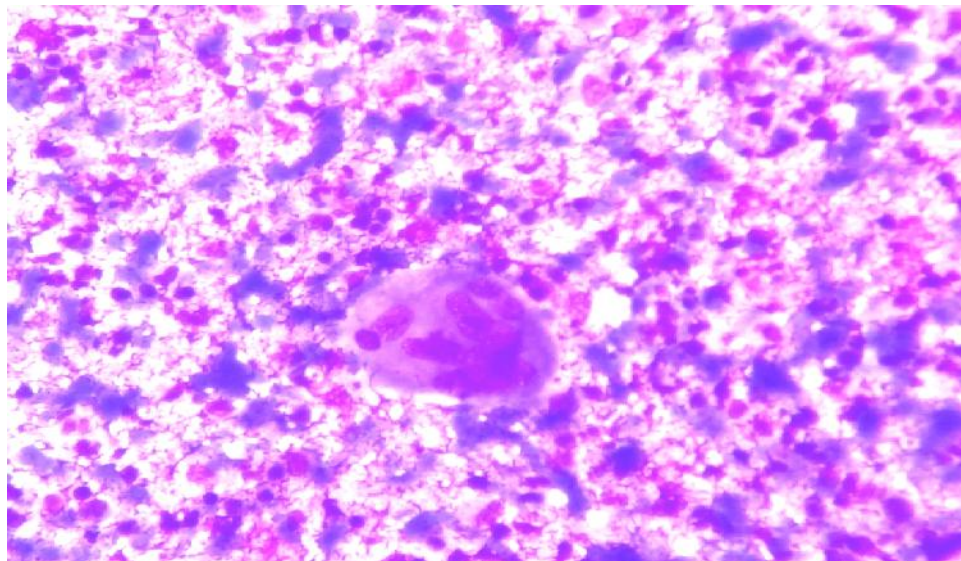
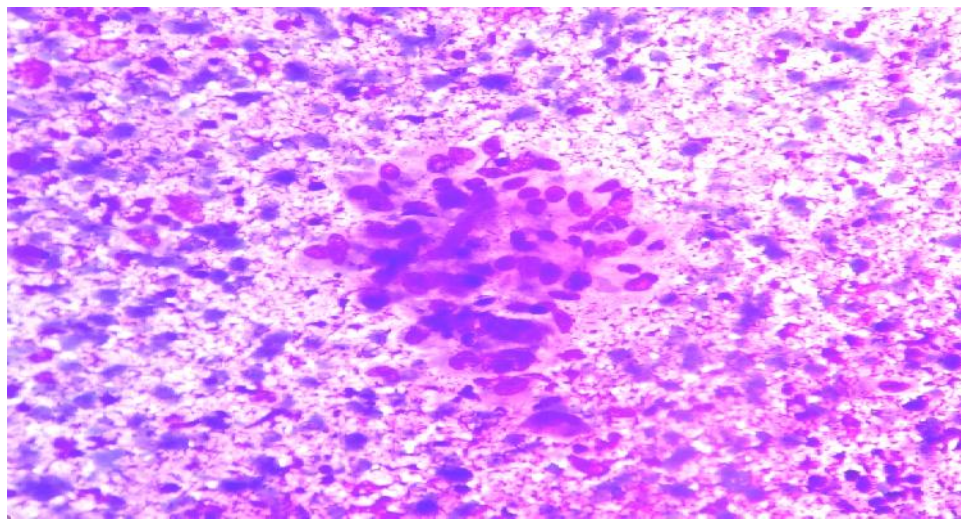
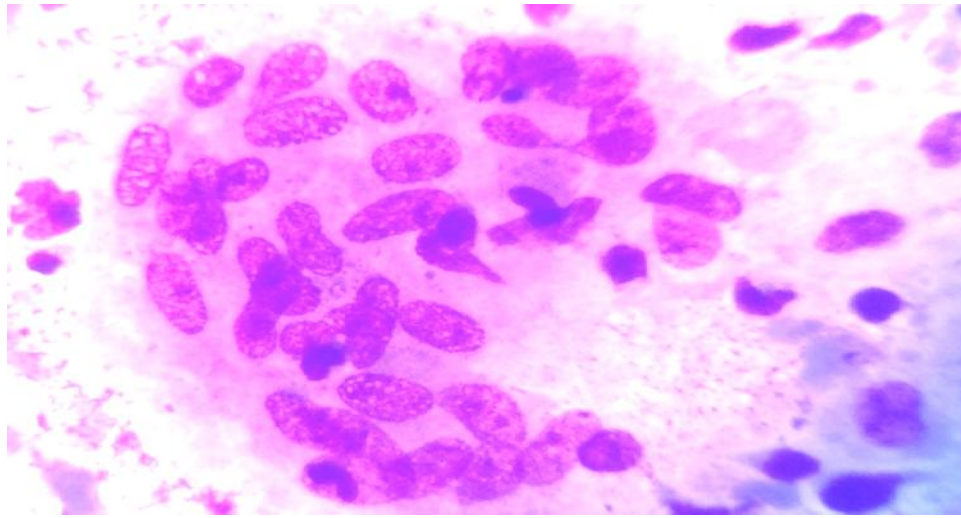
Concordant results were seen in 5 cases (83.3%). Modified Bleach proved to be a better method in 1 (20%) case only in which Modified Bleach was positive and AFB was negative.

Table 5 ZN Staining vs modified bleach

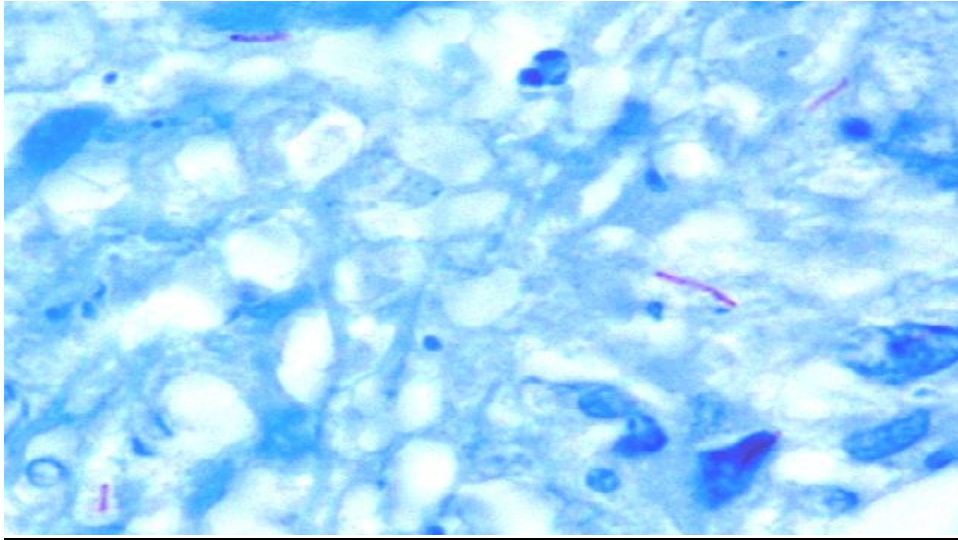
Case	ZN Staining	Modified bleach
112/11	Negative	Negative
732/11	Negative	Negative
733/11	Negative	Positive
829/11	Positive	Positive
917/11	Negative	Negative
1180/11	Negative	Negative



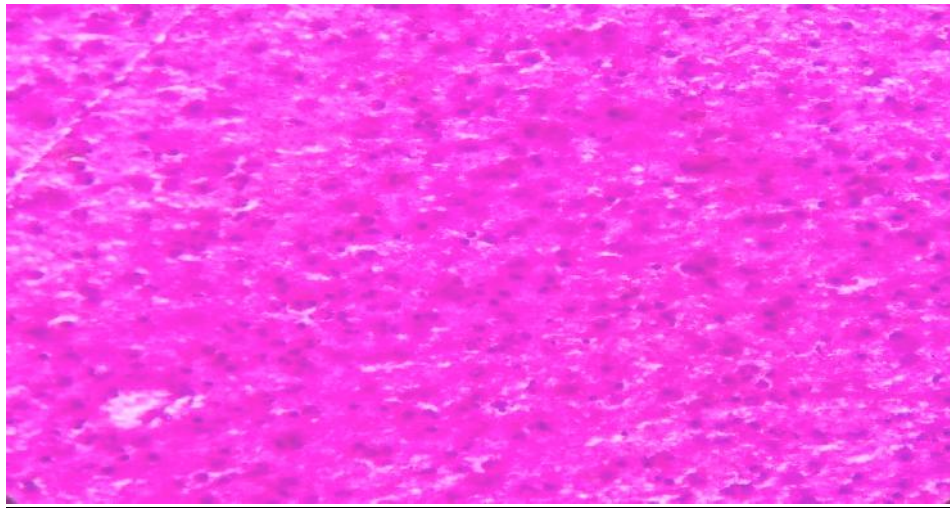
Reactive lymphadenopathy. Smear showing centroblasts, centrocytes, lymphocytes and lymphohistiocytic aggregates. 400X



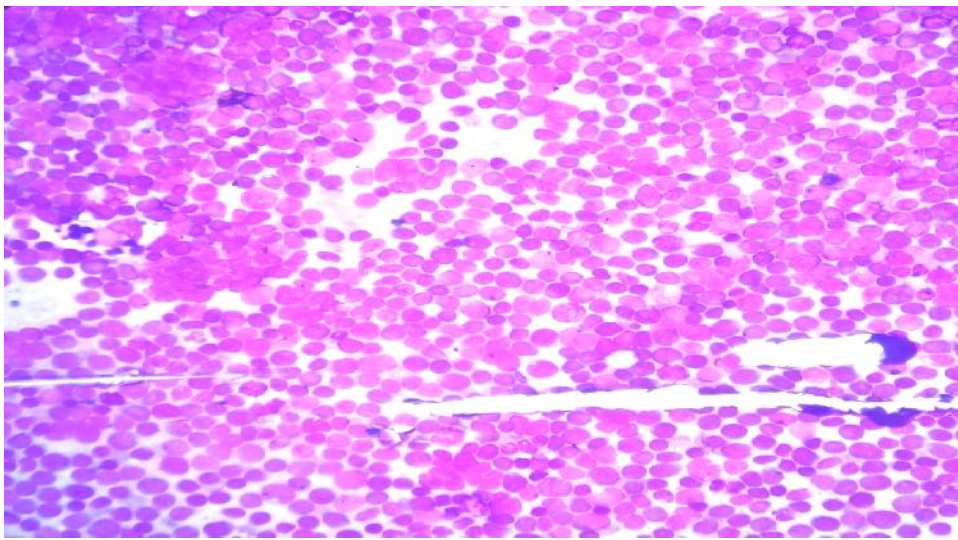
Granulomatous lymphadenopathy: smears showing epithelioid cell granulomas and giant cells

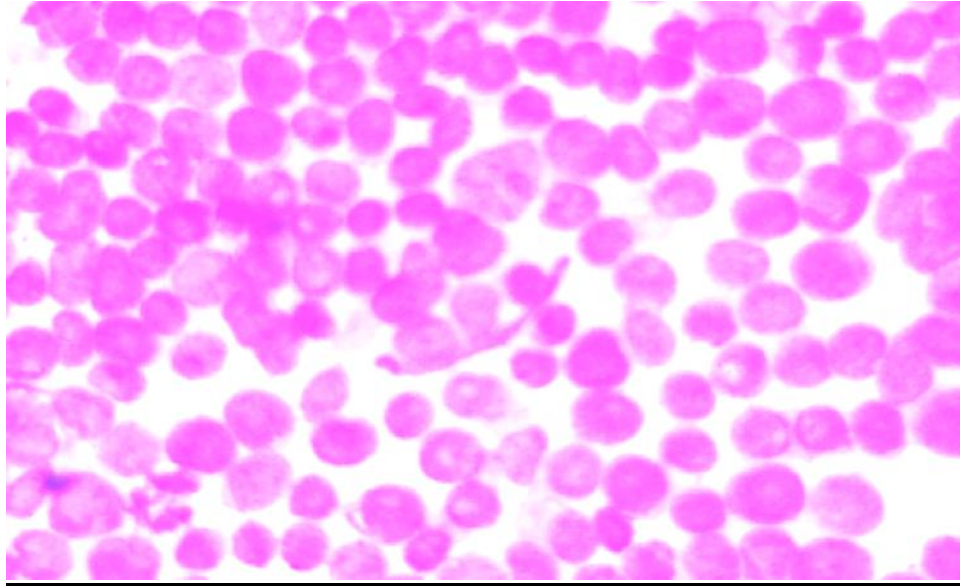


Tubercular lymphadenopathy: ZN staining for AFB positive



Necrotizing lymphadenitis showing necrosis





Lymphoproliferative disorder: monomorphic cells having large nucleus, scanty cell cytoplasm and prominent nucleoli

Discussion

Keeping in view the overlapping spectrum of clinical presentation and various other factors like age at the time of presentation, type of lesion, aim of the present study was to do FNAC in children and adolescents to evaluate various types of infectious, non infectious, granulomatous and neoplastic lesions and to compare the pattern of disease between them. The study was also done to know the accuracy of ZN staining with modified bleach method over simple ZN staining.

Distribution according to age:

The age range of patients with lymphadenopathy in the present study was 1-21 years with a mean of 12 years. Maximum number of cases i.e. 21 (42%) were found to occur in adolescents

(13-21years) followed by school aged children (6-13years) having 16 (32%) cases. However in the

study of Oh YJ et al, the most common age group affected was 16-20 years of age (35.8%).³

So, there is a slight disparity between the results of the present study and above mentioned study.

Distribution according to site:

In 19 (38%) cases, lymphadenopathy was present in upper cervical region, followed by 8 (16%) cases in middle cervical and 7 cases (14%) in submandibular. Least commonly affected were the submental and inguinal lymph nodes in which involvement was seen in only 1 (2%) case each.

Similarly in the study conducted by Twist CJ, the most commonly affected nodes were high anterior cervical and submandibular.⁴

Polesky A also reported that lymphadenopathy occurred most frequently in the neck in 57% children.⁵

Comparative studies of site of lesion:

Table 13

Author	Results
Twist CJ et al	Anterior cervical & submandibular
Polesky et al	Cervical
Present study	Upper, middle cervical & submandibular

So the results of present study are consistent with the studies Twist and Polesky.

Diagnosis on FNAC:

Out of 50 cases, maximum number were of tubercular lymphadenopathy (42%) followed by reactive lymphadenitis (40%) and lymphoproliferative (10%). There were 2 cases (4%) each of necrotizing lymphadenitis and granulomatous pathology. Most of the patients

had lymphadenopathy of benign etiology with 10% reported as lymphoproliferative disorders.

Reddy M in their study of the clinico-pathological profile of significant pediatric peripheral lymphadenopathy also found that the commonest aetiology diagnosed was tubercular lymphadenitis in 35% cases, followed by chronic tonsillopharyngitis in 15% cases. Lymphomas, AIDS and infectious mononucleosis constituted 3%, 2% and 1% cases respectively.⁶

Comparative studies of diagnosis on FNAC:

TABLE 15

Author & year	Reactive lap	TB Lap	Lymphoproliferative
Reddy MP et al (2002)	15	35	3
Present study	40	42	10

In one retrospective study done by van de Schoot L, analysis of 39 cases of de novo lymphadenopathy in pediatric patients was done in which FNAC was performed. Benign diagnosis were made in 25 cases, malignant in 13, and the result was inconclusive in 1.⁷

In the present study also, aspirated material was not sufficient in 4% cases due to which categorization into various lesions was not possible and they were simply diagnosed as granulomatous. In the study conducted by Buchino JJ, aspirated material in 13 cases (10.6%) was deemed inadequate for cytologic diagnosis and in the remaining 110 cases, five aspirates revealed malignancy.⁸

So the results of present study are comparable to above mentioned studies.

However in the study conducted by Singh N it was found that the largest group of lesions comprised of non-neoplastic lesions 456/498 (91.57%) cases. Only 8/498 (1.61%) cases were in the neoplastic category, whereas in 34/498

(6.82%) cases, material was inadequate for diagnosis. Among the non-neoplastic lesions, diagnoses in order of frequency were:- Non-specific reactive lymphadenitis (324 cases)- 71.05%, Tuberculous lymphadenitis (78 cases) – 17.11%, Granulomatous lymphadenitis (38 cases) – 8.33% and Acute suppurative lymphadenitis (16 cases)- 3.51%.⁹

Also in the study conducted by Shilpa G, more number of cases of reactive hyperplasia were seen. Reactive hyperplasia, tuberculous lymphadenitis, metastatic carcinoma and lymphoma were seen in 53.2%, 30.20%, 10.68%, 0.2% and 1.8% respectively. Cervical group pf lymph nodes were most frequently affected nodes.¹⁰

Ruchi A in their study also found that the most common cause of lymphadenopathy was non-specific reactive hyperplasia 118 (54.88%) followed by granulomatous lymphadenitis 79 (36.74%), acute suppurative lymphadenitis 14(6.51%), and neoplastic 4 (1.86%).¹¹

	Reactive LAP	Necrotizing LAP	Tubercular LAP	Lymphoproliferative	Granulomatous	Metastatic
Singh N	71.05%	3.15%	17.11%	1.61%	8.33%	-
Shilpa G	53.2%	10.68%	30.20%	1.8%	-	0.2%
Ruchi A	118 (54.88%)	14 (6.51%)		4 (1.86%)	79 (36.74%)	-
Present study	20(40%)	2(4%)	21(42%)	5(10%)	2(4%)	-

So variation is seen in the above mentioned studies and the present study,

Distribution according to sex:

75% of cases of reactive lymphadenopathy were seen in males. Overall the incidence of lymphadenopathy was more common in males (64%) than females (36%) with male: female ratio of 1.7:1.

Cases of tubercular lymphadenopathy were seen more commonly in males (57.14%). Also in the study done by Mustafa T in children of age group 5-12 years, the affected males were 100 (71%) and females were 40.¹²

Another study done by Bezabih M, in patients of tubercular lymphadenitis **the male to female ratio was found to be 1.3: 1.**¹³

Comparative studies of distribution according to sex:

Table 16

Author & year	Male: female ratio
Mustafa T (2007)	2.5:1
Bezabih M (2002)	1.3:1
Present study	1.3:1

So the results of the present study are comparable with the above mentioned studies.

did not miss any AFB positivity detected on routine ZN staining.¹⁴

ZN Staining vs modified bleach method:

ZN staining by Modified Bleach Method was done in 6 cases in which pus was aspirated. Concordant results were seen in 5 cases (83.3%). Modified Bleach proved to be a better method in 1 (20%) case only in which Modified Bleach was positive and AFB was negative.

Also Annam V in their study found that among the 93 aspirates of patients with clinical suspicion of tuberculosis (TB) presenting with lymphadenopathy, 33.33% (31/93) were positive for AFB on conventional ZN method, 41.94% (39/93) were indicative of TB on cytology and the smear positivity increased to 63.44% (59/93) on bleach method.¹⁵

Gangane N in their study also found that routine ZN staining detected AFB in 27% of cases and the modified bleach method in 72% of tubercular lymphadenitis. In 58 cases the modified bleach method had a higher grade of AFB positivity than the routine method. The modified bleach method

In the study of Dwivedi G, among the 200 aspirates, 52% (104/200) were indicative of tuberculous lymphadenitis cytologically, conventional ZN method detected AFB in 35.5% (71/200) and the smear positivity increased to 68% (136/200) when modified bleach method was used.¹⁶

Routine ZN staining detected AFB in 12.5% of cases and the modified bleach method in 60.7% in the study conducted by Chandrasekhar B. Modified bleach method showed AFB positivity in additional 54 cases where routine AFB staining was negative. The modified bleach method showed AFB positivity in all cases where routine ZN staining was positive.¹⁷

So the results of present study are consistent with the above mentioned studies.

The observations recorded in the present study in the children and adolescent though consistent with the findings documented by others in their research work. But histopathology is mandatory in suspicious cases of lymphoproliferative disorders which in our study no case was available for histopathological confirmation.

ZN staining for AFB is confirmatory in making the diagnosis of tuberculosis but in negative cases, cytological morphology is sufficient to make the diagnosis.

Conclusion

FNA cytology has become an integral part of the initial diagnosis and management of patients presenting with lymphadenopathy. This simple technique has recently gained wide acceptance since it offers a high degree of accuracy, lending itself to outpatient diagnosis, and thus making considerable savings in the cost of hospitalization. When used in the proper setting it will provide a definitive diagnosis in the majority of cases, especially relating to recurrent malignancy or metastatic disease. Patients with a reactive cytological picture and no clinically suspicious symptoms could be spared unnecessary surgery and reviewed through follow up.

Source of funding: Nil

Conflict of interest: None declared

References

1. Delves PJ, Roitt IM. The immune system. First of two parts. *N Engl J Med.* 2000; 343: 37-49.
2. Patra DK, Nath S, Biswas K, De J, Sarkar R. Diagnostic evaluation of childhood cervical lymphadenopathy by fine needle aspiration cytology. *J Ind Med Association.* 2007; 105: 649.
3. Oh YJ, Jun YH, Hong YJ, Son BK, Kim SK, Han JY, Chu YC. Fine needle aspiration cytology of enlarged lymph nodes in children and adolescents. *Korean J Pediatr* 2006; 49(2): 167-72.
4. Twist CJ, Michael P. Assessment of lymphadenopathy in children. *Pediatr Clin N Am* 2002; 49: 1009-25.
5. Polesky A, Grove W, Bhatia G. Peripheral Tuberculous Lymphadenitis: Epidemiology, Diagnosis, Treatment, and Outcome. *Medicine* 2005 Nov; 84(6): 350-62.
6. Reddy MP, Moorchung N, Chaudhary A. Clinico-pathological profile of pediatric lymphadenopathy. *Indian J Pediatr* 2002 Dec; 69(12): 1047-51.
7. Van de Schoot L, Aronson DC, Behrendt H, Bras J. The role of fine-needle aspiration cytology in children with persistent or suspicious lymphadenopathy. *J Pediatr Surg* 2001; 36: 7-11.
8. Buchino JJ, Jones VF. Fine Needle Aspiration in the Evaluation of Children with Lymphadenopathy. *Arch Pediatr Adolesc Med* 1994; 148(12): 1327-30.
9. Singh N, Singh A, Chauhan R, Singh P, Verma N. Fine Needle Aspiration Cytology in Evaluation of Lymphadenopathy in Pediatric Age Group: Our Experience at Tertiary Care Centre. *IJCMR* May 2016; 3(1): 1347-51.
10. Shilpa G, CSBR Prasad. An insight on pediatric Lymphadenopathy: A two year cytological study in a tertiary care hospital. *Int J Pediatr Res* 2016; 3(6): 385-89.
11. Ruchi A, Amrita D, Parveen KR, Hemlata K, Sanjay V, Kalpana B. Diagnostic utility of fine needle aspiration cytology in superficial lymphadenopathy in pediatric patients. *Int J of Allied Med Sci and Clin Res* 2016; 4(1):17-23.

12. Mustafa T, Wiker HG Morkve O, Sviland L. Educated apoptosis and increased inflammatory cytokines in granulomas caused by tuberculous compared to non-tuberculous mycobacteria: role of MPT 64 antigen in apoptosis and immune response. Clin Exp Immunol 2007 Oct; 150(1): 105-13.
13. Bezabih M, Mariam DW, Selassie SG. Fine needle aspiration cytology of suspected tuberculous lymphadenitis. Cytopathol 2002 Nov; 13(5): 284-90.
14. Gangane N, Anshu, Singh R. Role of modified bleach method in staining of acid-fast bacilli in lymph node aspirates. Acta Cytol 2008 May-Jun; 52(3):325-8.
15. Annam V, Karigoudar MH, Yelikar BR. Improved microscopical detection of acid-fast bacilli by the modified bleach method in lymphnode aspirates. Indian J Pathol Microbiol 2009 Jul-Sep; 52(3): 349-52.
16. Dwivedi G, Mathur C. Modified Bleach Method – Improving Microscopic Detection of Acid Fast Bacilli in Fine Needle Aspiration Smears of Lymph Nodes. JMSCR 2013 Nov; 1(4): 176-83.
17. Chandrasekhar B, Prayaga AK. Utility of concentration method by modified bleach technique for the demonstration of acid-fast bacilli in the diagnosis of tuberculous lymphadenopathy. J Cytol 2012 Jul-Sep; 29(3): 165-68.

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How to cite this article:

Sofia, Amandeep Singh, Neeraj Bisht, N.S.Neki. (2017). Clinicopathological evaluation of lymphadenopathy by FNAC in children and adolescents. Int. J. Curr. Res. Med. Sci. 3(6): 9-19.
DOI: <http://dx.doi.org/10.22192/ijcrms.2017.03.06.002>