Innovations

Clinical Significance of FNAC in Diagnosis of Pediatric Cervical Lymphadenopathy

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Abstract

Problem: Cervical lymphadenopathy is common in pediatric age group by which the presence of one or more lymph nodes with or without abnormalities. Due to higher observation of congenital abnormalities, infections and malignancy, differential diagnosis of persistent nodular change in the neck is different among childhood. The objective of this study is to analyze the clinical and pathological diagnoses of cervical lymphadenopathy with special emphasize to Fine needle aspiration cytology (FNAC). Methodology: A detailed clinical examination and history is the initial approach to these children presenting with cervical lymphadenopathy. Majority of the children had focus in draining areas in throat, ear and scalp on clinical examination. These children were treated with appropriate antibiotics for 4 weeks. Non responders were subjected to FNAC for further evaluation. Children with strong suspicion of systemic illness like tuberculosis having positive contact history, Mantoux positivity, chest Xray abnormality and constitutional symptoms were subjected to FNAC. Based on cytological findings, granulomatous and caseating adenitis was treated with ATT under RNTCP guidelines. **Findings:** In this study, the age group from 5 to 8 recorded more (46.7%) and male predominated (53.3%). Swelling neck and fever are the prime clinical symptoms noted with 80% each followed by cough (72%). While comparing various groups of cervical lymphnodes, anterior cervical dominated with 41.3% followed by sub-mandibular (33.3%) and posterior cervical (12%). The FNAC findings of lymphnodes determined reactive hyperplasia (74.7%) among maximum patients followed by granulomatous lymphadenitis (13.3%). Overall, 88% of clinical diagnosis was correlated well with FNAC. **Conclusion:** Although FNAC is a reliable diagnostic tool with minimum complications when compared to other tests, its specificity remains high when it is correlated with other investigations in detecting granulomatous lesions especially tuberculosis.

Key words: Cervical lymphadenopathy, Children, FNAC, Granulomatous lymphadenitis, Tuberculosis

Introduction

Lymphadenopathy is a common problem in children which pose a clinical diagnostic dilemma very often[1]. Cervical lymphadenopathy is seen in about 80 – 90% of the children[2]. This condition most commonly represents a transient response to a benign local or generalised infection, but occasionally it might herald the presence of a more serious disorder. A lymph node is considered as abnormally enlarged if it measures more than 10mm in its longest diameter in cervical region. Palpable supraclavicular nodes are always considered abnormal[3].

Majority of these are due to benign self-limited disease process because self-limited viral or bacterial infections are the most common causes[4]. However, some children with underlying serious systemic disease or malignancy may present with lymphadenopathy. Sometimes it is difficult to determine whether adenopathy is simply a normal response to frequent viral or bacterial infections or, if it is significant enough to consider more serious underlying disease process.

As palpable lymphnodes are common in healthy children and was found up to 90%, the clinical evaluation of such cases can be difficult[5,6]. In pediatric population, the common cause for cervical lymphadenopathy is unknown viral infections, but reactivity is known for bacterial infections including tuberculosis, and the most concerning is malignancy[7].

The differential diagnosis of lymphadenopathy is broad. A thorough medical history and meticulous clinical examination is important in narrowing this differential[8]. While the child with obvious source of inflammation poses little diagnostic dilemma the chronic, non-inflamed node is more of a challenge[9]. Fine needle aspiration cytology has been advocated as a useful adjunct diagnostic technique especially in children. It is a simple, rapid, reliable, safe, cost effective technique with good diagnostic accuracy[10]. This study was undertaken to compare FNAC findings with other diagnosis and prevalence of etiologies of cervical lymphadenopathy.

Material and methods

The study was a cross sectional study conducted in Pediatric Department of a tertiary care hospital in Tamilnadu for a study period of 2 years. Children of 1- 12 years of age with significant cervical lymphadenopathy (node size of >1 cm) were included in the study. The sample size was 75 subjects.

The clinical and laboratory data of these patients were recorded on a structured proforma. A detailed history was taken, which included the duration and course of swelling, and associated general symptoms like fever, cough, weight loss, loss of appetite, history of respiratory tract infection, ear discharge, presence of wound or skin lesion. History of contact with pet animals at home was also enquired. Immunization status, socioeconomic history, antibiotic therapy received was also recorded.

Thorough general physical examination was carried out. Palpable peripheral lymphnodes were examined noting their size, location, consistency, number, mobility, presence of matting and presence of any local changes like redness, discharge or sinus formation. The area drained by enlarged lymphnodes was examined for presence of features

of infection or inflammation like tonsillitis, pharyngitis, ear infection, dental infection, and wound or pyoderma lesions over the skin. For better comparison with existing studies, the site of lymphadenopathy was described by following the conventional system (jugulodigastric, submental etc.), corresponding to American Academy of Otolaryngology and Head Neck Surgery (AAO-HNS) classification (level-I to VI)[11,12]. Systemic examination was done including respiratory, cardiovascular, abdominal and central nervous system. Significant findings were recorded.

For all patients, complete hemogram with ESR, Mantoux test and Fine Needle aspiration cytology (FNAC) were done. In patients with source of infection, swab was taken for culture and sensitivity. In patients with suspected systemic infection or malignancy following tests were done - Chest X-ray, Serological tests for HIV, *Brucella*, bone marrow examination, Acid fast bacilli staining and lymph node biopsy.

Results

Analysis revealed that 26.6% (20), 47% (35) and 26.6% (20) of the study subjects were in the age group of 1 to 4, 4 to 8 and 8 to 12 years respectively and were depicted in the Table 1. The gender description was interpreted in figure 1.

The cases were further analyzed for the clinical symptoms thereby swelling neck and fever (80%) observed in various cases followed by cough (72%) and weight loss (32%). The detailed description of the symptomatic analysis was interpreted in table 2.

Various clinical presentations of the lymphnodes and its sites were recorded thereby anterior cervical lymphadenopathy found maximum, followed by sub-mandibular nodes. No cases of Supra clavicular lymphadenopathy noted. The summative data of cervical lymphnodes were depicted in figure 2.

Further, the lymph node diseases were clubbed broadly into three groups namely Non-specific inflammation/ Reactive hyperplasia, granulomatous lymphadenitis and Cancer (malignancy) based on FNAC findings. In this study, reactive hyperplasia (74.7%) was found in maximum patients. The comparative evaluation of the FNAC findings was summarized in figure 3 and the microscopic views were depicted in figure 4 to 7.

While compare and correlate the clinical diagnosis with FNAC, all infectious cases, Kawasaki disease and Chronic granulomatous disease (CGD) were correlated. The laboratory data supported the clinical diagnosis of infections. Typhoid and scrub typhus were confirmed with specific diagnostic tests. Simultaneously, eight among 18 suspected tuberculosis cases were not correlated with FNAC, thus excluded tuberculous etiology. The FNAC correlated tuberculous cases were also confirmed with chest X-ray, Mantoux test and Gene Xpert for TB. Among two cases of suspicious Non-Hodgkin's Lymphoma, one case correlated and was confirmed later with biopsy. Collectively, 88% of clinical diagnosis was correlated well with FNAC. The detailed correlative analysis of clinical diagnosis and FNAC was impregnated in table 3.

Discussion

Cervical lymphadenopathy is a common clinical problem in paediatric patients. In childhood, increase in peripheral lymphnode is most often caused by a local inflammatory process with viral upper respiratory tract infection or Streptococcal pharyngitis. In developing countries, children with chronic cervical lymphadenopathy having firm, raised and painless lymphnodes were found to have a high incidence of infectious etiology including significant incidence of *Mycobacterium tuberculosis* and require detailed diagnostic evaluation[13-16].

Among infectious etiology, tuberculosis pace a major health problem with huge social and economic implications. Moreover, it has shown resurgence in developed countries, due to high incidence of HIV. In India, about 1.5% of the population is affected by tuberculosis. Tuberculosis lymphadenitis is the most common manifestation of extrapulmonary tuberculosis accounting for 30.4% cases in a series report[17-19].

In the present study, significant lymphadenopathy was common in 4 to 8 years with 47% incidence with slightly higher frequency in males (53.3%). Bedi et al found male preponderance with male to female ratio of 3:1[20]. Nield et al. reported that males showed a preponderance of reactive hyperplasia, lymphoma, and metastasis while TB lymph nodes had female preponderance[21]. In this study, majority of symptoms were neck swelling (80%), followed by fever (75%) and cough (72%). Naz et al observed history of neck swelling in 100% of cases and fever in 86.5% of cases[22].

In the current study, upper anterior cervical group was commonly involved (41.3%) followed by posterior cervical nodes (35.3%). Oguz et al observed that out of 239 children, 47% have upper anterior cervical group of nodes[16]. Schaller et al described that posterior group of lymph node was most commonly affected (75% patients) submandibular was the 2nd common affected site[23]. It was found that Jugulo-omohyoid (level III) and Supraclavicular (level VB) groups of lymph node were found to be involved mostly by malignancy and it was significant. In contrast, Jugulo-digastric (level II), Post-auricular, Submandibular (level IB) groups were found to be involved frequently by tuberculosis. However, involvement of the submental (level IA) group of lymph node was not significantly associated with any particular disease[17]. In this study, systemic examination revealed hepatosplenomegaly in 8% of cases. Bazemore et al observed 7% of hepatosplenomegaly with cervical lymphadenopathy[24].

In this study, FNAC analysis showed that the cytological picture of reactive hyperplasia ranked on the top (74.7%) followed by tubercular lymphadenitis (13.3%), suppurative adenitis (6.7%) and Non Hodgkin's lymphoma (1.3%). Mansor et al observed reactive hyperplasia of 71.8%, granulomatous adenitis (17.5%), suppurative adenitis (6.6%) and malignancy (3.6%)[25].

Kline et al studied with 175 cases found reactive hyperplasia in 57.5%, granulomatous adenitis (28.2%) and malignancy in 17.9%[25]. Gupta et al analyzed that tubercular lymphadenitis was more common (45.4%) followed by secondary metastasis (21.2%), reactive hyperplasia (19.9%), lymphoma (7.0%), chronic granulomatous lesion (3.5%) and non-specific inflammatory involvement of lymph nodes (2.8%)[10]. Among the secondary deposits, Squamous cell carcinoma (8.5%) topped the list, followed by Adeno-carcinoma

(7.8%). Various studies have recorded the sensitivity of FNAC in diagnosing tuberculosis as 16.5, 77, 80.7, 84.4, and 95%[27-31].

Bhatt et al observed 51.9, 27.6, 9, 6.4, 2 and 2.3% lymph node involvement by tuberculosis, reactive hyperplasia, abscess, metastatic deposits, cystic degeneration of lymph node and lymphoma respectively[15]. Shakya et al described that the most common cause was tuberculous lymphadenitis (49.5%), 2nd most common cause being reactive change (18%) followed by chronic non-specific lymphadenitis (12%), Non-Hodgkin's lymphoma (8%) and Hodgkin's lymphoma (5%)[32].

In developing countries where tuberculosis infection is common and other granulomatous diseases are rare, the presence of granulomatous features on FNAC is highly suggestive of tuberculosis. It eliminates the need for excisional biopsy in most patients. The Mantoux test is a useful adjunct in the diagnosis. Location, size, consistency and mobility of lymphnodes provide clues for diagnosis[27,28,31].

Ferrer et al reported, reactive hyperplasia was most common (74.5%) in first two decades of life and tuberculosis of lymphnodes in second and third decades (58.9%)[33]. Cheung et al observed that tubercular lymphadenitis involved mostly the Jugulo digastric group (33.3%) followed by posterior triangle (20.0%) and multiple sites[34].

Conclusion

FNAC remains basic tool for evaluating children with cervical lymphadenopathy. Although the sensitivity of detecting granulomatous and non-granulomatous lesions are similar, the specificity in detecting tuberculosis is based on correlation with clinical and laboratory investigations. Immediate and effective diagnosis of tuberculosis can lead to reduced mortality and morbidity. There was a definite change in clinical patterns, mainly due to non specific and irregular treatment before diagnosis.

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Table 1: Age group comparison of cases

Age in years	No. of cases (n=75)	Percentage
1 to 4	20	26.7
5 to 8	35	46.7
9 to 12	20	26.7

Table 2: Comparison of various symptoms

Clinical Symptoms	No. of cases (n=75)
Swelling Neck	60 (80)
Pain	15 (20)
Fever	60 (80)
Cough	54 (72)
Weight Loss	24 (32)
Loss of Appetite	20 (27)
Hepatosplenomegaly	6 (8)
Sore Throat	8 (11)
Ear discharge	8 (11)
Oro-Dental Pain	4 (5)
>1 Symptoms	18 (24)

[Figure in parenthesis denoted percentages]

Table 3: Correlation of clinical diagnosis with FNAC

Clinical diagnosis	No. of cases (n=75)	FNAC Diagnosis	Correlated	
			Yes	No
Infections	52 (69.3)	Reactive Hyperplasia/ Suppurative lymphadenitis	52	-
Tuberculosis	18 (24)	Granulomatous/ Caseating granulomatous Lymphadenitis	10	8
Kawasaki Disease	2 (2.7)	Granulomatous Lymphadenitis	2	-
Chronic Granulomatous disease	1 (1.3)	Granulomatous Lymphadenitis	1	-
Non-Hodgkin's Lymphoma	2 (2.7)	Non Hodgkin's Lymphoma	1	1

Figure 1: Gender analysis

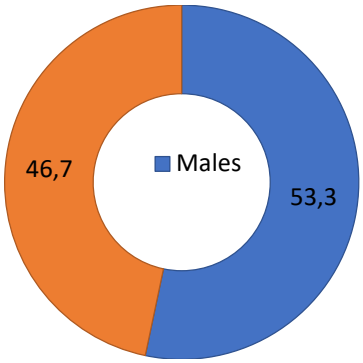

Figure 2: Comparison of various groups of cervical lymphnodes

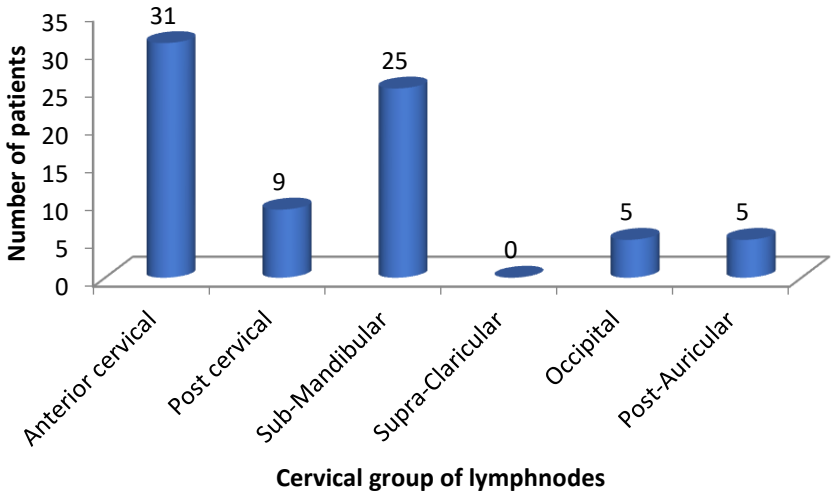

Figure 3: Comparison of FNAC findings of lymphnodes

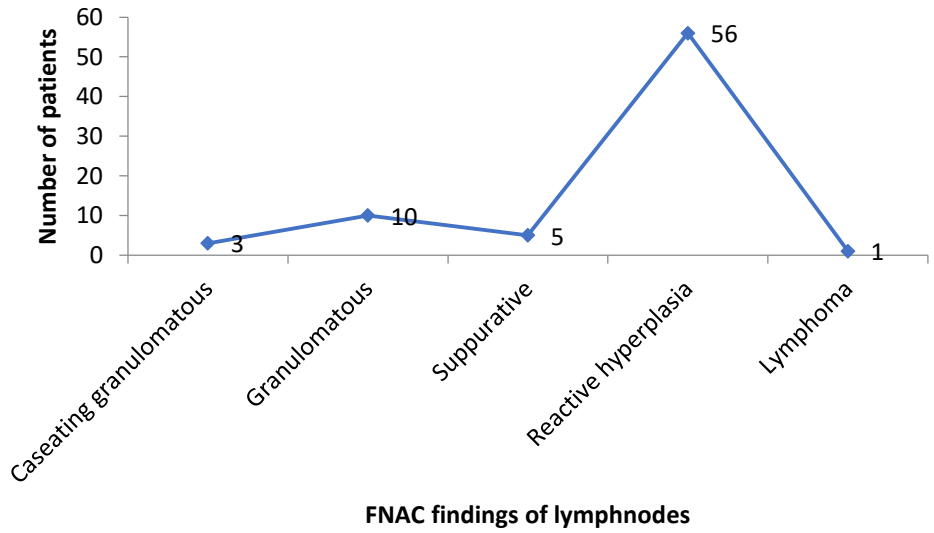

Figure 4: Granulomatous lymphadenitis (Giemsa 10X)

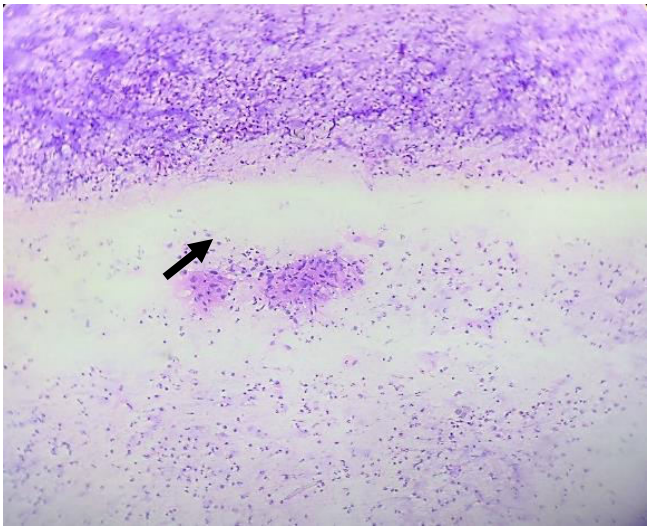

Figure 5: Granulomatous lymphadenitis (Giemsa 40X)

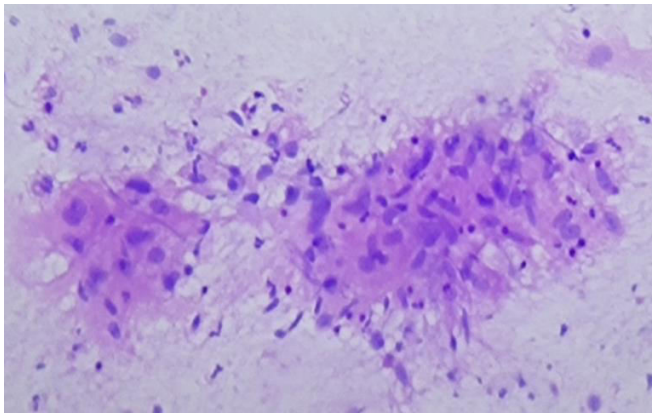

Figure 6: Suppurative lymphadenitis (Giemsa 40X)

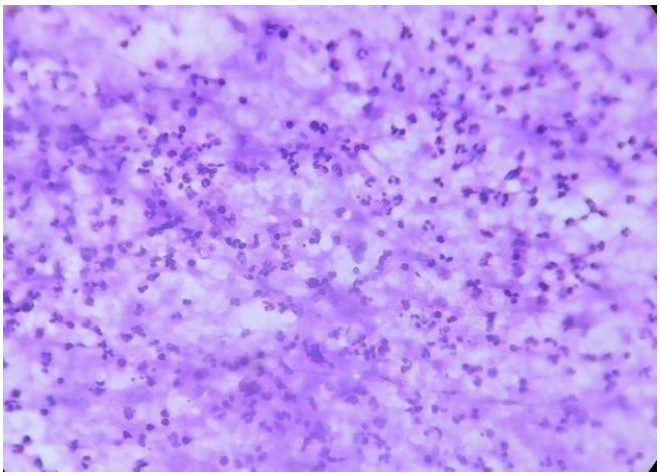

Figure 7: Non Hodgkin's Lymphoma (Giemsa 40X)