

## **CYTOMORPHOLOGICAL SPECTRUM OF NECK SWELLINGS IN PEDIATRIC POPULATION AT A TERTIARY CARE CENTER**

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### **ABSTRACT:**

Neck swellings are frequently encountered in clinical practice in a country like India. They can prove to be an important reason of significant morbidity and mortality. The etiology of neck masses ranges from benign or congenital lesions to acquired or neoplastic lesions which may also present in late childhood.

A Retrospective study was undertaken in the Department of pathology, Government medical college, Anantapuramu, Andhrapradesh, India between the period of November 2021 to October 2023. All the paediatric patients whose age is less than or equal to 16 years and presented with neck swellings were included in the study to know the spectrum of various cytomorphological patterns of head and neck lesions in paediatric age group.

A total of 204 FNACs of head and neck lesions were studied in cases falling in the age group <16 years. Maximum numbers of aspirates were found in 06–11 year old (44.12%). There is a little male predominance with male to female ratio of 1.83:1. Lymphnode was the most common site involved seen in 150 (73.53%) cases and the most common cytological diagnosis was reactive lymphadenitis accounting for 60% of lymphnode lesions followed by granulomatous lymphadenitis. In the thyroid lesion hashimotos thyroiditis was the commonest diagnosis seen in 16 cases.

As Previous reports have suggested utility of FNAC in only a small series of paediatric populations the present study was designed to find out the incidence of various lesions in head

and neck region and to study the role of fine needle aspiration cytology, cytomorphological spectra of different lesions in the head and neck region and its utility in paediatric lesions

**Key words:** reactive -granulomatous –hashimotos.

## INTRODUCTION

Neck lesions are frequently encountered in clinical practice and found responsible for significant morbidity and mortality[1]. Palpable lesions in the region of the head and neck include a wide differential diagnosis, including inflammatory lesions and neoplasms, both benign and malignant. The presentation of a paediatric patient with such a lesion is not an exception. In many instances, fine-needle aspiration (FNA) plays a major role in the evaluation and surgical planning of these lesions[2]. Aspiration cytology, a well-established diagnostic tool in adult oncology, is recently gaining acceptance in the paediatric population as clinicians add this technique to their diagnostic repertoire. FNA in children, apart from being accurate, safe, and minimally invasive, has also added the benefit of a lack of need for sedation or general anaesthesia, except in selected cases[3].

The head and neck region's FNAC is a widely recognised, very specific approach. There are clear financial and psychological benefits to a diagnosis received right away at an outpatient clinic. An additional diagnostic tool has been added by ancillary cytology techniques such as flow cytometry, cytogenetics, electron microscopy, cell block preparation, and immunocytochemistry[4]. Only few studies were done on paediatric FNAC in the regions of head and neck. The present study was conducted to study the spectrum of various cytomorphological patterns of head and neck lesions in paediatric age group and to assess the role of FNAC as a diagnostic tool in paediatric head and neck lesions.

## AIMS & OBJECTIVES:

1. To know the demographic profile of various head and neck lesions in the paediatric age group.
2. To study the spectrum of various cytomorphological patterns of paediatric head and neck lesions.
3. To assess the role of FNAC as a diagnostic tool in paediatric head and neck lesions.

## MATERIAL AND METHODS :

After getting ethical approval from the Institutional Ethical Committee, this observational retrospective study was carried out in a tertiary care center. During a two-year period from November 2021 to October 2023, all paediatric patients who were sent to the Department of Pathology, Government medical college for FNAC of any neck mass and had an age of less than or equal to 16 years were included in the study. The paediatric patients who were not cooperative for the procedure were excluded from the study. Information was gathered about age, gender, clinical presentation, imaging, systemic and local examination findings, and family history from the hospital records. After the data was numerically coded and input into Microsoft Excel 2010, it was moved to SPSS version 17. Aspirations were

performed by cytopathologists using 25-gauge or 27-gauge needles. The aspirated material was expelled on to glass slides and smeared. After being instantly fixed in 95% ethanol, the smears were stained with hematoxylin and eosin. A tentative diagnosis was made after evaluating the specimens' sufficiency using these smears. Age, gender, site of FNAC and cytomorphological patterns were expressed as frequency and percentage. The data was analyzed and logical conclusions were drawn.

## RESULTS:

A total of 204 FNACs of head and neck lesions were studied in cases falling in the age group <16 years. Their ages ranged from 4 months to 16 years. Subdivision of age range was done in to three groups: 0–5 years, 6–11 years, and 12–16 years. Maximum numbers of aspirates were found in 06–11 year old (44.12%). [Table 1]

**Table 1: Age group of patients.**

| Age in years | Total cases | Percentage |
|--------------|-------------|------------|
| 0-5          | 58          | 28.43%     |
| 6-11         | 90          | 44.12%     |
| 12-16        | 56          | 27.45%     |
| <b>Total</b> | 204         | 100%       |

In our study, there is a little male predominance (a ratio of 1.83:1). The proportion of males was 64.71%, while that of females was 35.29%. [Table 2]

**Table 2: Sex wise distribution of FNAC cases**

| Sex          | Cases | Percentage |
|--------------|-------|------------|
| Males        | 132   | 64.71%     |
| Females      | 72    | 35.29%     |
| <b>Total</b> | 204   | 100%       |

Anatomic site-specific FNA subdivision showed that lymph nodes predominated over other locations, i.e., 150 /204 (73.53%). The distribution of cases by FNAC site is shown in Table 3.

**Table 3: Site of FNAC.**

| Site           | No. of cases | Percentage |
|----------------|--------------|------------|
| Lymph node     | 150          | 73.53%     |
| Salivary gland | 22           | 10.78%     |
| Thyroid        | 20           | 09.81%     |

|                          |     |        |
|--------------------------|-----|--------|
| Congenital malformations | 08  | 03.92% |
| Vascular lesions         | 04  | 01.96% |
| Total                    | 204 | 100%   |

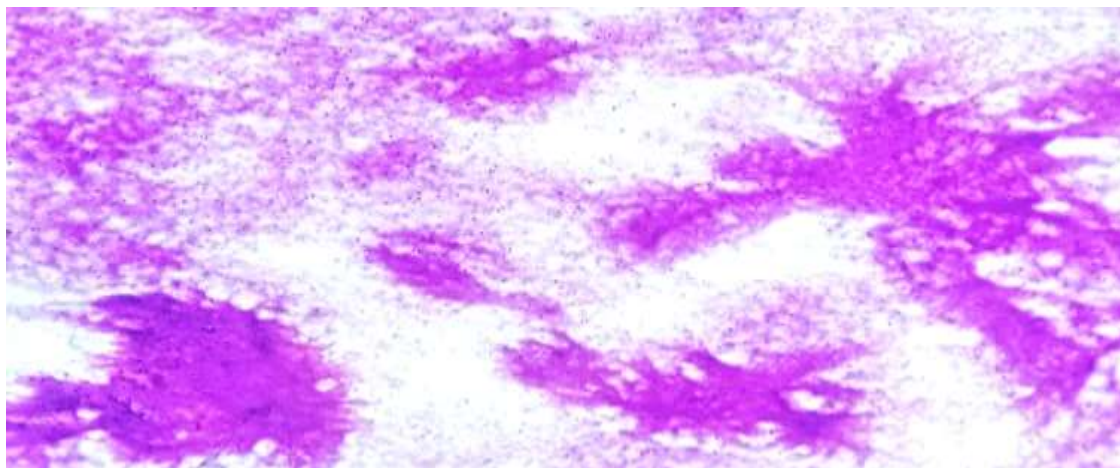
The different lymph node lesions that have been diagnosed by FNAC are shown in Table 4.

**Table 4: FNAC diagnosis of lymphnodal lesions**

| Diagnosis                       | No. of cases | Percentage |
|---------------------------------|--------------|------------|
| Reactive Lymphadenitis          | 90           | 60%        |
| Granulomatous Lymphadenitis     | 50           | 33.33%     |
| Necrotizing Lymphadenitis       | 06           | 04%        |
| Acute suppurative Lymphadenitis | 04           | 02.67%     |
| Total                           | 150          | 100%       |

Nonspecific reactive lymphadenitis was the most common diagnosis, accounting for 90 cases, followed by granulomatous lymphadenitis in 50 instances, necrotizing lymphadenitis in 6 cases, and acute suppurative lymphadenitis in 4 cases. Granulomatous lymphadenitis include both caseating (shown in figure 1) and non caseating granulomatous lesions consisting of epitheloid cells as shown in figure 2.

**Figure 1: Caseating granulomatous lymphadenitis(H&E, 10X).**



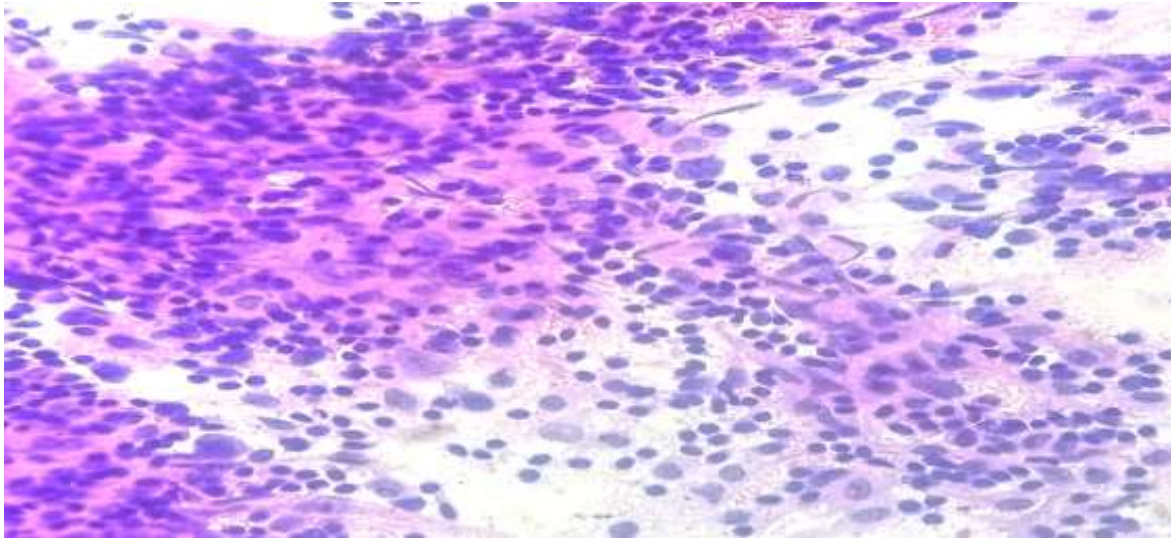
**Figure 2: Epithelioid cell granuloma (H&E, 40X).**

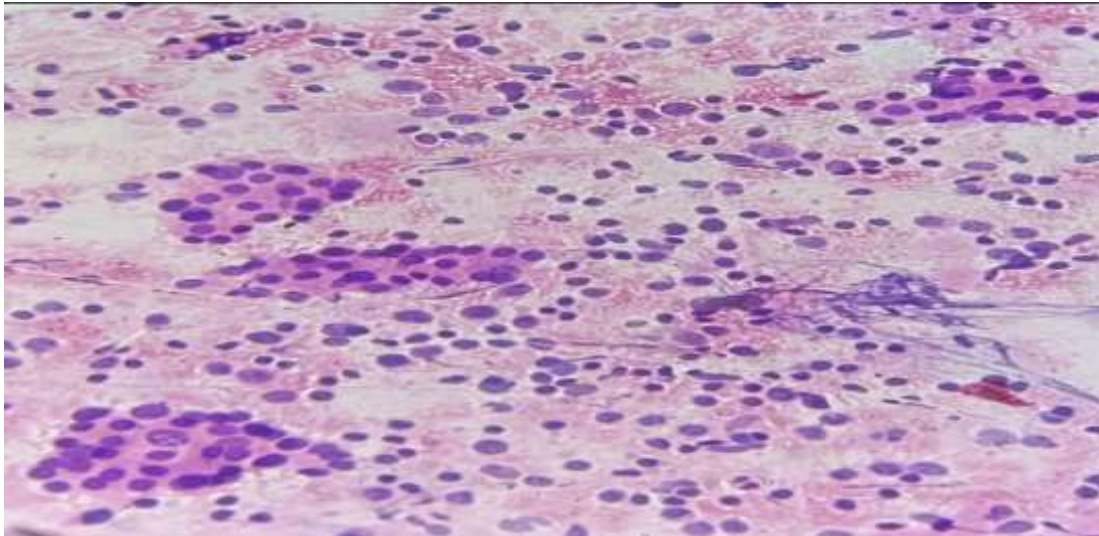
Table 5 demonstrates various diagnosis made in salivary gland, thyroid, congenital malformations and vascular lesions. In salivary glands the most common was sialadenitis seen in 18 cases, followed by retention cyst in 04 cases. Most common diagnosis in thyroid was Hashimotos thyroiditis 16 cases as shown in figure 3, followed by 04 cases of Adenomatous Goiter.

**Table 5: FNAC diagnosis in salivary gland, breast and thyroid.**

| Site                    | Diagnosis              | No. of cases |
|-------------------------|------------------------|--------------|
| Salivary gland          | Sialadenitis           | 18           |
|                         | Retention cyst         | 04           |
|                         | <b>Total</b>           | <b>22</b>    |
| Thyroid                 | Hashimotos thyroiditis | 16           |
|                         | Adenomatous Goiter     | 04           |
|                         | <b>Total</b>           | <b>20</b>    |
| Congenital malformation | Thyroglossal cyst      | 04           |
|                         | Bronchial cyst         | 04           |
|                         | <b>Total</b>           | <b>08</b>    |
| Vascular lesions        | Haemangioma            | 04           |



**Figure 3: Hashimoto's thyroiditis (H&E, 40X).**



## **DISCUSSION:**

The head and neck lesions in children are mostly benign in nature, with a small percentage of malignant lesions which usually present as head and neck masses. A majority of the head and neck masses in children are inflammatory in nature, but other aetiologies include congenital, inflammatory, and euplastic lesions. [5] Although excision biopsy is the most accurate method of diagnosis, the use of FNA biopsy is becoming popular as the first diagnostic step in the evaluation of head and neck masses, especially in adults. As reported by Howell, the use of FNA for superficial palpable lesions is gaining momentum in the pediatric patient population. [6]

The utility of FNAC in children has been demonstrated in many studies. However, till date, reports detailing the application of FNAC to lesions of the head and neck in the pediatric population are very limited. It is now considered as the first diagnostic step in the evaluation of head and neck masses in pediatric population. FNAC helps in triaging the mass lesions based on cytomorphological features, so that the patients can be treated or further investigations can be sought.[7]

A total of 204 FNACs of head and neck lesions were studied in cases falling in the age group <16 years. In this study maximum number of patients i.e., 44.12% were in the age group of 06-11 years which was different to the study done by Wadone et al [7] and Bhagat R et al [8], as shown in table 6. This difference might be because of low socioeconomic and poor hygienic conditions in our area because of which the younger age group where the immune status is low are most commonly affected.

In our study, male preponderance was observed with a male to female ratio of 1.83:1 which is in concordance with the study done by Wadone et al [7] Bhagat R et al [8]. The

increased male to female ratio i.e.,4:1 as observed in the study done by Agarwal et al [6] can be because of their increased sample size.

**Table 6 : Comparison of age group,sex and site involved with different studies**

|                              |                 | Present study        | Agarwal et al[6] | Wadone et al [7]    | Bhagat R et al [8] |
|------------------------------|-----------------|----------------------|------------------|---------------------|--------------------|
| No.of cases                  |                 | 204                  | 662              | 238                 | 200                |
| Commonest age group involved |                 | 06-11 years [44.12%] | -                | 13-18 years [52.1%] | 11-17 years [59%]  |
| Male to female ratio         |                 | 1.83:1               | 4:1              | 1.35:1              | 1.7:1              |
| Site involved                | Lymphnode       | 73.53%               | 89.2%            | 70.2%               | 64.5%              |
|                              | Salivary glands | 10.78%               | 01.8%            | 04.2%               | 06.5%              |
|                              | Thyroid         | 09.81%               | 02.8%            | 15.9%               | 03.5%              |
|                              | Others          | 05.88%               | 06.2%            | 09.7%               | 25.5%              |

As observed in studies done by Agarwal et al[6] and Bhagat R et al[8] we also found that the most common lesions involving the pediatric head and neck region are of lymph nodes 73.53%, the most common being reactive lymphoid proliferations (60%, n =90 ), followed by granulomatous lymphadenitis(33.33%, n =50 ) as shown table 7. The present study did not make any attempt to categorize the type of reactive lymphadenopathy. The diagnosis of reactive lymphadenopathy was made by presence of a polymorphic cell population and tingible body macrophages. As the study was done in a tertiary care center and not a referral center, lymphoma cases were not reported in our study which is in contrast to the other studies[6-8].

**Table 7: Comparison of cytomorphological patterns of lymphnode in different studies with the present study**

| Cytological diagnosis           | Present study | Agarwal et al[6] | Wadone et al [7] | Bhagat R et al [8] |
|---------------------------------|---------------|------------------|------------------|--------------------|
| No.of .cases of lymphnode       | 150           | 570              | 165              | 129                |
| Reactive lymphadenitis          | 90            | 412              | 85               | 78                 |
| Tubeculous lymphadenitis        | -             | 91               | 21               | 11                 |
| Granumatous lymphadenitis       | 50            | 30               | 27               | 20                 |
| Necrotizing lymphadenitis       | 06            | 04               | 20               | -                  |
| Acute suppurative lymphadenitis | 04            | 24               | 03               | 18                 |
| Malignant(Lymphomas)            | 00            | 09               | 09               | 02                 |

In our study after the lymphnodes, salivary glands is the next common site involved in which sialadenitis was the most common cytological diagnosis which is similar to the study done by Bhagat R et al [8] but in the studies done by Agarwal et al[6] and by Wadone et al [7] thyroid involvement is more common than salivary glands. The reason might be because of topographical variations of the place of study.

### CONCLUSION:

We conclude that FNA biopsy is a simple and rapid procedure which can be carried out with ease in children, and with minimal problems. From our study it was evident that there was widespread use of FNAC in children with head and neck lesions. Most of them were reactive lymph nodes which does not need further investigation. FNAC has helped to avoid unnecessary excision biopsy and its complications.

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