

CLINICOPATHOLOGICAL STUDY OF NECK MASSES IN PATIENTS ATTENDING ENT OUT PATIENT DEPARTMENT

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Abstract

Aim: to evaluate the efficacy and precision of FNAC in the diagnosis of neck masses in this study.

Materials and Methods: The present prospective study was carried out among 46 patients attended the ENT OPD reported with the history of neck swelling. Study was conducted over a period of two years from JUNE 2021 to OCTOBER 2022. Sample size was achieved by using the randomization table obtained from the WINPEPI Software. To arrive at a tentative diagnosis, a thorough examination, full history taking, and basic pertinent investigations were completed on all 46 patients in accordance with the proforma.

Results: Mean age of the study population was 37.67 ± 15.04 . Out of 46 patients, 31 were women and 15 were men. The anterior region of the neck was affected in 43.48% of patients, according to the table above. 15.22% of patients had neck involvement in the submental region. Out all, 58.70 % of swelling in our study were firm, followed by 13 % of swelling were soft and cystic in consistency. 20 thyroid swellings in total, 1 of which was equivocal on FNAC but was later diagnosed as colloid goitre by HPE. There were 11 lymph nodes swelling FNAC reports that were similar to HPE out of a total of 21, whereas the remaining 10 reports were not. Out of total 21 lymph node swelling 1 was inconclusive on FNAC which on HPE turned out to be reactive lymphadenopathy.

Conclusion: We draw the conclusion that fine needle aspiration cytology is easy and safe approach for diagnosing a variety of neck swellings.

Keywords: HPE, neck swelling, FNAC.

Introduction

Examining a neck tumor is a substantial clinical challenge that an ENT doctor commonly encounters.

Thyroid, parotid, and other salivary gland cancers are frequently observed, as well as neck lymph nodes. Less common conditions that cause neck swellings include pharyngeal pouch abnormalities, cystic hygromas, carotid

body tumors, branchial cleft cysts, thyroglossal cysts, and lumps of cutaneous appendages.¹ To sample superficial neck masses, Fine needle aspiration cytology is rapid, easy, and much affordable procedure. The procedure can be done at the outpatient clinic.

This method makes it simple to diagnose head and neck-regional masses, such as thyroid and salivary gland masses.^{2,3} Due of the large range of disorders found in the head and neck region and the number of accessible organs, FNAC is particularly beneficial. Early detection of benign from malignant pathology has a significant impact on the intended course of treatment.⁴ If a neck mass is suspected to be cancerous, A local anesthetic can be used during fine needle aspiration. There is no proof that the thin hypodermic needle used in this procedure causes the tumor to spread through the skin track.⁵ FNAC can be used to treat and diagnose cystic swellings.⁶

When used to diagnose salivary gland tumors, 90% of the time, benign and malignant tumours can be distinguished using fine needle aspiration cytology.⁷ Because cervical adenopathy shouldn't be identified until all other diagnostic possibilities have been explored, FNAC is especially useful in the examination of cervical nodules and masses.⁸ It is obvious that FNAC does not replace histology, particularly when evaluating lymphoma nodal architecture, the malignant pattern of follicular thyroid tumors, the distinction between pleomorphic and monomorphic adenomas, and intracapsular spread in squamous carcinomas.⁴

We aimed to evaluate the efficacy and precision of FNAC in the diagnosis of neck masses in this study.

Materials and methods

The present prospective study was carried out among 46 patients attended the ENT OPD reported with the history of neck swelling. Study was conducted over a period of two years from JUNE 2021 to OCTOBER 2022.

Institutional Ethics Committee's approval was taken before the research could begin. All patients gave their verbal, fully informed consent in writing.

Sample size was achieved by using the randomization table obtained from the WINPEPI Software.

Inclusion Criteria

1. Age above of 2 years and below the age of 75 years
2. Any Lymph node swelling in neck

Exclusion Criteria

1. Patients below the age of 2 yrs. and above the age of 75 yrs.
2. Patients with history of previous neck surgery
3. The patient who underwent FNAC but did not receive a subsequent histological evaluation.

Methodology

To arrive at a tentative diagnosis, a thorough examination, full history taking, and basic pertinent investigations were completed on all 46 patients in accordance with the proforma.

Using a 23-27-gauge needle connected to a 10ml disposable plastic syringe, the pathology department performed fine needle aspiration biopsies on each instance with neck swelling

In every instance, needle was inserted to the desired depth using strict aseptic precautions. From the needle, the aspirate was injected onto the slide.

Smears that had air dried were stained with MAY-GRUNWALD-GIEMSA stain and Hematoxylin and Eosin., whereas Papanicolaou stain was applied to 95% ethyl alcohol fixed smears.

All of the cases had incisional or excisional biopsy surgery. Of The HPE pathology department received the biopsy specimen.

All instances' cytological characteristics and related histopathological characteristics were evaluated.

Statistical Methods

In the current study, descriptive statistical analysis has been done. Results are reported as Mean SD for continuous measurements and as Number (%) for categorical data. (Min-Max). Sensitivity, specificity, PPV, NPV, and accuracy diagnostic statistics have been performed to determine the relationship between FNAC and diagnosis with HPE results.

Results

Table 1: demographic details

| Age group | No. of Patients | Percentage |
|-----------|-----------------|------------|
| 11 to 20 | 10 | 21.74% |
| 21 to 30 | 6 | 13.04% |
| 31 to 40 | 9 | 19.57% |
| 41 to 50 | 13 | 28.26% |
| 51 to 60 | 7 | 15.22% |
| 60 to 70 | 1 | 2.17% |
| Gender | | |
| Male | 31 | 67.39% |
| Female | 15 | 32.61% |
| Total | 46 | 100.00% |

Most people in this age range are between 41 and 50. years old. Mean age of the study population was 37.67 ± 15.04 Out of 46 patients, 31 were women and 15 were men.

Table 2: Anatomical Site Distribution

| Location | No. Of Patient | Percentage |
|------------------------------|----------------|------------|
| Anterior Part of Neck | 20 | 43.48% |
| Lateral Part of Neck | 4 | 8.70% |
| Lower Cervical Part of Neck | 3 | 6.52% |
| Middle Cervical Part of Neck | 1 | 2.17% |
| Midline of Neck | 4 | 8.70% |
| Posterior Part of Neck | 1 | 2.17% |
| Submandibular Region of Neck | 2 | 4.35% |
| Submental Part of Neck | 7 | 15.22% |
| Upper Cervical Part of Neck | 4 | 8.70% |
| Total | 46 | 100.00% |

The anterior region of the neck was affected in 43.48% of patients, according to the table above. 15.22% of patients had neck involvement in the submental region.

Table 3: Consistency of Swelling

| Consistency | No. Of Patient | Percentage |
|-------------|----------------|------------|
| Cystic | 6 | 13.04% |
| Firm | 27 | 58.70% |
| Fluctuant | 3 | 6.52% |
| Hard | 4 | 8.70% |
| Soft | 6 | 13.04% |
| Total | 46 | 100.00% |

Out all, 58.70 % of swelling in our study were firm, followed by 13 % of swelling were soft and cystic in consistency.

Table 4: Clinical Diagnosis of Studied Patients

| On Clinical Diagnosis | No. Of Patients | Percentage |
|---------------------------------|-----------------|------------|
| Acute Suppurative Lymphadenitis | 10 | 21.74% |
| Branchial Cyst | 1 | 2.17% |
| Chronic Lymphadenitis | 9 | 19.57% |

| | | |
|----------------------------|----|---------|
| Chronic Sialadenitis | 2 | 4.35% |
| Lipoma | 1 | 2.17% |
| Malignant Lesion of Larynx | 1 | 2.17% |
| Multinodular Goiter | 14 | 30.43% |
| Solitary Thyroid Nodule | 6 | 13.04% |
| Tubercular Lymphadenitis | 2 | 4.35% |
| Total | 46 | 100.00% |

Total 14 patients were diagnosed with multinodular goiter, 10 with acute suppurative lymphadenitis, 9 with chronic lymphadenitis, 6 with a solitary thyroid nodule, 2 with tubercular lymphadenitis, 1 with a malignant lesion of the larynx.

Table 5: Correlation of clinical diagnosis, FNAC report and HPE final diagnosis

| | Clinical Diagnosis (n=46) | | FNAC (n=46) | | HPE (n=46) | |
|--|---------------------------|--------|-------------|--------|------------|--------|
| FNAC report | Number | % | Number | % | Number | % |
| Thyroid Swelling | | | | | | |
| Colloid goitre | - | - | 15 | 32.61% | - | - |
| Multinodular goitre | 14 | 30.43% | - | - | - | - |
| Solitary thyroid nodule | 6 | 13.04% | - | - | - | - |
| Papillary cancer of thyroid | - | - | 2 | 4.35% | 2 | 4.35% |
| Follicular neoplasm of thyroid | - | - | 2 | 4.35% | 2 | 4.35% |
| Follicular cells with crushed artifact | - | - | 2 | 4.35% | - | - |
| Salivary Gland Swelling | | | | | | |
| chronic sialadenitis | 2 | 4.35% | - | - | - | - |
| Pleomorphic adenoma | - | - | 2 | 4.35% | 2 | 4.35% |
| Lymph node Swelling | | | | | | |
| Acute suppurative lymphadenitis | 10 | 21.74% | - | - | - | - |
| Chronic lymphadenitis | 9 | 19.57% | - | - | - | - |
| Tubercular lymphadenitis | 2 | 4.35% | - | - | 9 | 19.57% |
| Reactive Lymphadenopathy | - | - | 20 | 43.48% | 12 | 26.0% |
| Other Swellings | | | | | | |
| Lipoma | - | - | 1 | 2.17% | 1 | 2.17% |
| Branchial Cyst | 1 | 2.17% | 1 | 2.17% | 1 | 2.17% |
| Malignant lesion Larynx | - | - | 1 | 2.17% | 1 | 2.17% |
| Inconclusive | - | - | 2 | 4.35% | - | - |

In above table we conclude that in case of thyroid swelling FNAC report similar to HPE were total 17 in number and 3 FNAC were not similar to HPE. 20 thyroid swellings in total, 1 of which was equivocal on FNAC but was later diagnosed as colloid goitre by HPE. There were 11 lymph nodes swelling FNAC reports that were similar to HPE out of a total of 21, whereas the remaining 10 reports were not. Out of total 21 lymph node swelling 1 was inconclusive on FNAC which on HPE turned out to be reactive lymphadenopathy. Out of total 2 salivary gland

swelling both were similar to HPE on diagnosis. In total inconclusive FNAC report were found in 2 out of 46 sample size. Other neck swelling with respect to FNAC report were in total 3 and all were matching with HPE report.

Discussion

The statement made by Stewart in 1933 that "diagnosis by aspiration is as reliable as the combined intelligence of the clinician and the pathologist make it" (needle aspiration) still remains true today.⁹

Within particular age groups, the majority of head and neck masses with distinct sources can appear in predetermined sites. The patient's age is a very crucial factor in making the diagnosis. The relative occurrence of pathologic illnesses varies with age, and this information might help the doctor make additional differential diagnoses.

According to a "rule of seven" stated in the literature, the typical duration of clinical symptoms for neoplasms, developmental disorders, and infections that produce neck swellings was seven years, seven months, and seven days, respectively. A study that lasted 10 years and was released a few decades ago cited the rule of seven.¹⁰

Of the 46 instances that underwent clinical investigation, there were 21 lymph node swellings, 20 thyroid swellings, 2 salivary gland swellings, and 3 other swellings.

Lymph nodes were involved in the majority of the palpable head and neck tumours that were aspirated. Similarly, as observed by other studies published in past.^{11,12}

Both adults and children frequently suffer with cervical lymphadenopathy, which typically results from a variety of etiological reasons whose occurrence varies on geographic distribution and socioeconomic circumstances.

In this study, there were 46 patients in total, with 31 of them being female and 15 being male.

In our study 42 cases were benign in nature and 4 cases were malignant in nature

In their study, Steel et al.¹³ noted 34% cases of benign pathology and 59% cases of malignant pathology.

This might be explained by the observation that while malignant and congenital disorders predominate in western nations, reactive, tuberculous, and granulomatous pathology is more common in developing nations like India.

Fine needle aspiration cytology is a quick, easy, and affordable diagnostic method that is a helpful addition to preoperative screening for thyroid masses and a crucial management tool.

Colloid goitre was the most prevalent pathology in our investigation, with 17 instances, while follicular carcinoma was the most frequent thyroid cancer.

When aspirating from mixed, solid-cystic, or smaller lesions, ultrasound guidance is more efficient than palpation-guided aspiration. In FNAC, it is challenging to differentiate between follicular adenoma and cancer since capsular/vascular invasion cannot be clearly detected in the smears. To prevent inaccurate results and because more than one pathogenic process may be present in the thyroid at once, it is essential to do multiple aspirations on each palpable mass in a thyroid swelling and on each quickly changing widespread thyroid lesion.

Because it can be used to treat some thyroid lesions, including thyroiditis and colloid goitre, FNAC is significant in the context of thyroid lesions. conservatively, while treating other lesions, using radiotherapy or chemotherapy to treat conditions like lymphoma and undifferentiated thyroid cancer, hence reducing the necessity for surgical intervention in such circumstances

In Our Series The majority of patients were between the ages of 41 and 50, a total 13 patients were present between 41 to 50 years of age

In 21 cases, lymph node aspiration was done, out of which acute suppurative lymphadenitis was the commonest

In our study, the anterior portion of the neck was where neck swelling was most prevalent. and the most common type of consistency of swelling in our study was Firm followed by cystic and soft

Out of total sample size studied only 12 patients presented with tender neck swelling

Out of total sample size studied, 1 swelling came to be as squamous cell carcinoma of larynx ,1 came out to be as lipoma and 1 came out to be as branchial cyst

20 thyroid swelling aspirates produced 17 cytological results that were comparable to HPE reports, whereas 3 FNAC reports were not.

Three FNAC reports were insufficient to determine the cause of neck swelling, which an HPE examination later determined to be colloid goiter.

Of the 2 salivary glands swellings both were benign in nature and both cases matched with the HPE reporting of respective swellings

In our study, 9 FNAC cases diagnosed with reactive lymphadenopathy these on HPE turned out to be Tubercular Lymphadenopathy

One instance of an unclear neck swelling detected by FNAC in our study was later shown to be a colloid goiter on HPE.

One FNAC diagnosed case of neck swelling suggestive of follicular cells with crushed artifacts turned out to be Follicular carcinoma of thyroid

False negative results have the following causes:

Acellular or poorly cellular sample, as evidenced by the presence of extensive cystic papillary neoplasm, thick fibrous or calcified capsule, and substantial desmoplasia. Statistical inaccuracy in the case of tiny scar cancer. On FNAC, thyroid tumours can produce a substantial quantity of colloid and have macrofollicular regions. Because of this grey area where the cytological characteristics of colloid goitre and follicular adenoma combine, cytological criteria by themselves are unable to consistently distinguish between the two.

Three kinds of tubercular lymphadenitis are distinguished by their cytological appearances:

- Smears that contain parent lymphoid cell milieu and epithelial granuloma with or without giant cells.
- Smears in the background of cheesy material with degenerating epithelioid granuloma.
- Smears with granulomas of degenerating epithelioid cells on occasion and smears of live and deteriorating neutrophils in a necrotic background.

In the smears with the first two patterns, TB lymphadenitis can be definitively diagnosed cytologically, however the third pattern would be ruled out in the absence of ZN staining as acute suppurative lymphadenitis.

Compared to standard lymph node biopsy and empirical anti-tubercular therapy, FNAC is a useful substitute. For the diagnosis of TB, it is less sensitive than open biopsy, but if a diagnosis is obtained, its predictive value is good.

Sensitivity rather than specificity should be prioritized when assessing a test's capacity to detect cancer patients because erroneous negative results could put off further research or treatment.

Both in our study and in other instances, the sensitivity of needle aspiration is marginally lower than the accuracy. Therefore, exercise extreme caution, give preference to clinical suspicion whenever possible, and ignore negative cytology results if a clinical suspicion is quite strong. We have to Remember that a negative fine needle aspiration test does not exclude the possibility of cancer.

A negative aspiration just suggests that another aspiration might be required and/or that another test, like a biopsy, endoscopy, or CT scan, would be beneficial. The fact that fine needle aspiration is always a step in the diagnostic process and never the conclusion cannot be emphasised enough.

The capacity of fine needle cytology to diagnose a tumour in the neck without first determining whether it is a malignant or benign growth is a useful feature of the procedure. This is especially helpful for patients who have a neck lump as their lone finding when they first appear.

For example, determination that lesion consists of lymphoid tissue effectively rules out Squamous cell carcinoma as a possibility. In such an instance, early open biopsy of the lesion, under local anesthesia would be pursued rather than an extensive search for an occult primary tumor.

The problems with fine needle aspiration are that technique is difficult when small lesions are present so they tend to slip away from needle

When treating head and neck swellings, the limitations of fine needle aspiration cytology that were emphasized by Tilak et al.⁹ should be considered.

The following are some FNAC process restrictions that have been observed in the neck region:

1. The challenge of diagnosing and subclassifying lymphomas
2. Differentiating follicular adenoma from colloid goitre.
3. Distinguishing macrofollicular papillary cancer from colloid goitre.
4. Differentiating early follicular cancer from thyroid adenoma.

In our investigation, 46 patients were assessed, and the total FNAC sensitivity and specificity were 100% and 75%, respectively, for the identification of neck masses.

Soni et al study exhibited a sensitivity of 83.11% and a specificity of 78.94 percent. Of the 59 patients, 14 had thyroid disease, 13 had salivary gland tumours, and 4 had additional types of neck tumours. Of the 59 patients, 28 had neck nodes.¹⁴

Howlett, D.C., et al. investigated 276 patients in total and discovered that FNAC demonstrated a sensitivity of 89% and a specificity of 57% for neck nodes, a sensitivity of 62% and a specificity of 86% for thyroid masses, and a sensitivity of 64% and a specificity of 100% for salivary glands.⁸ In their study of 550 patients, Tilak, Dhaded, et al. discovered that the Overall FNAC sensitivity and specificity for neck masses in that research were 90.91% and 93.18%, respectively.¹⁵

Different approaches to aspirating the neck tumour may account for the discrepancies in specifics between our study and others. In our investigation, various technicians carried out blind FNAC without the use of ultrasound. In the Howlett, D.C., et al. trial, A few parotid patients and fifty percent of the thyroid group got ultrasound-guided FNAC. The variations could also be attributed to variations in the patient population.

Most patients in our nation are illiterate and unaware of health issues. Most patients arrive with a large neck tumour, which the cytopathologist may quickly and easily find with FNAC without the aid of ultrasound assistance.

Furthermore, because these lesions are so large, there could be sampling error within the mass itself, with different areas of the mass displaying variable levels of disease.

Richard Schwarz et al. reported on a different study in which they assessed 165 patients. In their investigation, FNAC had a 92% sensitivity for metastatic cancer and a 100% sensitivity for lymphoma. In their investigation, the accuracy was best for the group of salivary glands that were cancerous and lowest for the group that were benign.¹⁶

Finally, James Edward M., et al. found that FNAC had a 94.5% overall accuracy. The accuracy for thyroid metastasis or benign node lesion was about 95%. The accuracy of the lymphomatous lesion diagnosis was lower at 75%.¹⁶

Although histological subtyping is absent from fine needle aspiration cytology, it provides information on cellular architecture. Aspiration cytology's accuracy is influenced by the patient's age, pathologic kind of the mass, expertise, the suitability of the sample, endemicity, and the tools employed to aid in diagnosis.¹⁷

When treating head and neck swellings, the limitations of fine needle aspiration cytology that were emphasized by Tilak et al.⁹ should be considered.

Conclusion

It is evident that with increasing experience and expertise, fine needle aspiration cytology is the one of the best investigations one could hope for with optimum decent accuracy. The most helpful information for the surgeon to decide on the next course of treatment is provided by fine needle aspiration cytology of neck masses with clinical correlation. Additionally, it is crucial to examine biochemical tests and clinical signs. Therefore, we draw the conclusion that fine needle aspiration cytology is easy and safe approach for diagnosing a variety of neck swellings.

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