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Original Research Article

A prospective study to assess clinicopathological correlation of head and neck masses

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ABSTRACT

Background: One of the most frequent clinical manifestations in the field of otorhinolaryngology is a mass in the head and neck area. A thorough history and good clinical examination including the findings of inspection and palpation are key factors for near accurate provisional diagnosis but histopathological is the gold standard for confirmation. FNAC is an easy, efficient, and affordable way to sample superficial neck masses.
Methods: The present research has been performed on 100 patients presenting with clinically palpable head and neck masses in the ENT OPD of Rajindra Hospital, Patiala for duration of 2 years (2021-2023). Clinical diagnosis was correlated with cytology and histopathology findings. The data was compiled and evaluated using adequate statistical tools.
Results: In this research, 100 cases of head and neck swellings were examined. Out of 100 swellings, 39 patients had lymph node swellings, 31 presented with thyroid swelling, 20 had salivary gland swelling and 10 were miscellaneous. In this study, most of the swellings found to be inflammatory in nature. Women were far more likely to be involved than men. Clinical and cytological diagnoses were made in all cases.
Conclusions: When compared to a biopsy, the procedure of fine needle aspiration cytology for head and neck swellings is not only less invasive but also more cost-effective, and causes far less pain. It is possible to execute the procedure successfully on elderly people and children without the need for anesthesia.

Keywords: Clinical diagnosis, FNAC, Head and neck masses, Histopathological examination

INTRODUCTION

Patients with head and neck mass are not uncommon in the practice of ENT.[1] The major number of disease manifest as a palpable and/or visible swelling in the neck. These swellings may be congenital/developmental, inflammatory/reactionary or neoplastic (primary/ secondary). Every disease may have different mode of presentation. Sometimes many diseases may present with similar symptoms due to this diagnosis in neck swelling often becomes difficult.[2] The patient's location, age, onset, size, and duration of the swelling are essential in making a particular differential diagnosis. Head and neck lesions constitute wide range of diseases encountered in the anatomically complex region extending from the frontal sinuses, orbits, roof of the sphenoidal sinuses and clivus proximally to the upper borders of the sterna manubrium, clavicles and first ribs distally. This includes eye, ears, Sino nasal tract, oropharyngeal, upper aerodigestive tract, salivary glands, dental apparatus, thyroid and parathyroid glands, epithelial, fibrous, fatty, muscular, vascular, lymphoid, cartilaginous, osseous and neural tissues or structures related to them. The head and neck masses are categorized as either congenital, inflammatory, or neoplastic.

Many cases of neck masses might be diagnosed after a comprehensive history and thorough detailed clinical evaluation of the head and neck region, though pathological studies like FNAB (fine needle aspiration biopsy), FNAC (fine needle aspiration cytology), and excision biopsy help us to establish the correct diagnosis, early differentiation between benign and malignant pathologies and appropriate surgical or medical treatment. The clinical examination of the neck produces a false-positive outcome among 20 and 30 percent of the time, and a false-negative rate between 30 and 40 percent of the time.[3-5]

When it comes to taking samples of superficial masses in the neck, FNAC is an approach that is simple, speedy, and economical. The patient experiences very little discomfort during this outpatient procedure, which is conducted at the clinic. However, the success of FNAC is dependent on many factors including aspirator experience, skilled cytological interpretation, and logical evaluation based on a formation of clinical and cytological examination findings are both required. It virtually carries no risk of complications.

Timely diagnosis of these masses especially metastatic malignant lesions is paramount because delayed diagnosis directly affects the stage of the tumor and degrades prognosis. [6-8]

Aims and objectives

The presents study was performed on100 cases with the following aims and objectives:

To study the incidence, etiology and clinical presentation of head and neck masses. To assess the clinicopathological aspect of type of masses. To compare and correlate the clinical findings with cytological and histopathological findings.

METHODS

Study design and population

The current research was performed on 100 patients presenting with head and neck masses in the ENT department, Rajindra Hospital, Patiala over duration of 2 years (2021 to 2023). The data of this prospective study was sourced from all the patients coming to the ENT department with chief complaints of clinically palpable head and neck masses. The examination was done and data regarding gender, age, anatomical location, and presenting complaints have been registered. Clinical examination of head and neck for any growth/swelling was done.

All patients were then subjected to FNAC and biopsy. Using a 22-27-gauge needle connected to a 10 ml disposable plastic syringe, the pathology department performed fine needle aspiration on each instance with neck swelling.

In every instance needle was inserted to the desired depth using strict aseptic precautions, 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

Inclusion criteria

Patients consenting to the study, age >10 years and either sex were included.

Exclusion criteria

Previous history of neck trauma. Patients who were not willing to consent.

Statistical analysis

The statistical analysis has been completed by utilizing SPSS version 26 software. The data was expressed in the form of frequency, percentages, and mean values. The categorial data was compared using a chi-square test and for comparing two diagnostic tools measures of agreement were used. The kappa factor was calculated and Kappa results have been “interpreted as follows: values ≤0 show no agreement 0.01-0.20 as none to slight, 0.21-0.40 as fair, 0.41-0.60 as moderate, 0.61-0.80 as substantial, and 0.81-1.00 as almost perfect agreement. The predictive value (sensitivity, specificity, PPV, NPC, and accuracy) was calculated for different” lesions. The p value <0.05 has been measured as significant.

RESULTS

In our study majority of patients were in the age group 11-30years (40%) followed by 31-50 (37%) and 51-70 years (23%). The mean age of the patients was (37.02±16) (Table 1).

Table 1: Age distribution.

Age group (years)	Number	Percentage
11-30	40	40.0
31-50	37	37.0
51-70	23	23.0
Total	100	100.0
Mean±SD	37.02±16.11	
Median	35.00	
Range	11-70	

In our study female predominance was observed with 52 (52%) females and 48 (48 %) males with female: male was 1.12:1.

Table 2: Anatomical location of swelling.

Site of swelling	Number	Percentage
Cervical lymph nodes	39	39.0
Thyroid	31	31.0
Salivary gland	20	20.0
Miscellaneous	10	10.0
Total	100	100.0

In our study the pathologies of head and neck were grossly classified into 4 broad categories. Majority of patients had swelling in cervical lymph node (39%) followed by thyroid (31%), salivary gland (20%), skin, soft tissue and miscellaneous (10%) (Table 2).

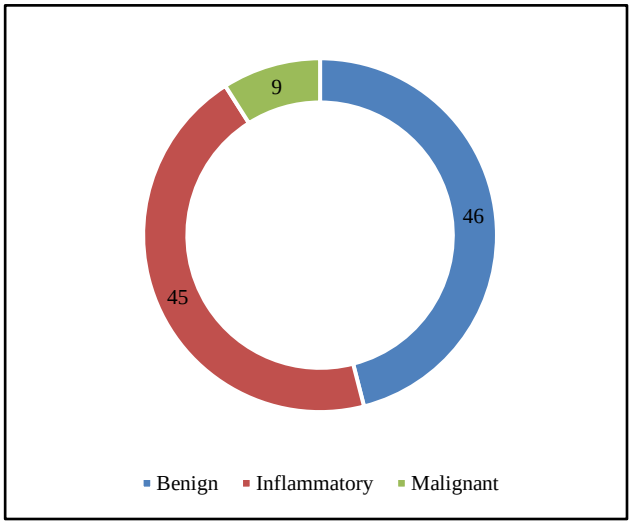

Figure 1: Nature of growth.

In our study 46% of the swellings were benign followed by inflammatory seen in 45 (45%) cases followed by malignant in 9 (9%) cases (Figure 1).

According to final diagnosis, among lymph node swellings (n=39) majority of patients had reactive lymphadenitis 21 (53.8%), tubercular lymphadenitis was seen in 11 (28.2%) while in 7 (17.90%) had SCC that had metastasized in to the lymph nodes (Figure 2). In the present study among lymph node swellings there was strong agreement observed between clinical and final diagnosis (kappa value =0.67) (Table 3).

Out of thyroid swelling (n=31), 18 (58.1%) patients were diagnosed with colloid goiter, 2 (6.5%) case with adenomatous goiter, 7 (22.6%) cases with multinodular goiter. Follicular carcinoma and benign thyroid nodule were reported in 1 (6.5%) case each while 2 patient was diagnosed with hyperplastic thyroid nodule. In the present study, we observed that there was strong agreement between FNAC and final diagnosis (kappa value =0.815). Also, statistically significant association was observed between FNAC and final diagnosis among thyroid swelling ($p<0.001$) (Table 3).

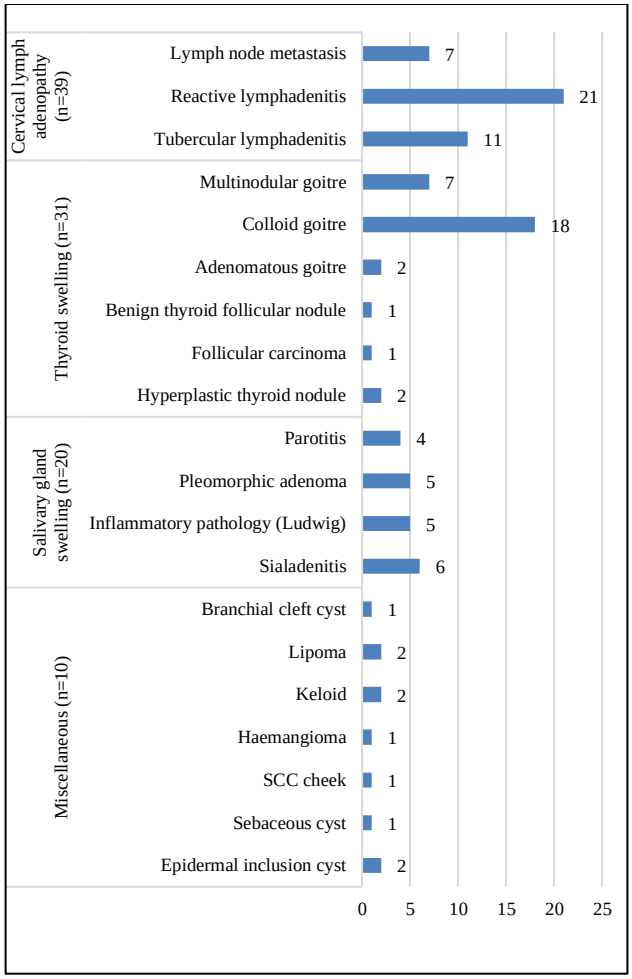

Figure 2: Final diagnosis.

According to FNAC the sensitivity specificity, PPV, and NPV for diagnosis of colloid goiter, multinodular goiter, adenomatous goiter, hyperplastic nodule was 100% with overall accuracy being 100%. For benign thyroid nodule sensitivity, specificity, PPV, and NPV was 100, 96.67% 50% and 100% and for follicular carcinoma the sensitivity was 0% specificity 100%, and NPV was 96.97% with overall accuracy being 96.97%

In cases of salivary gland swellings (n=20), sialadenitis was seen in 6 (30%) cases, Ludwig abscess in 5 (25%) patients, pleomorphic adenoma was seen in 5 (25%) while parotitis was present in 4 (20%) cases. In present study salivary gland lesions were more common in females (55%) than males (45%). The most commonly affected age group was 51-70 years.

In our study, among miscellaneous swellings (n=10), keloid was seen in 2 (20%) patients, hemangioma and sebaceous cyst was seen in 1 (10%) patient each, branchial cleft cyst in 1 (10%) case, epidermal inclusion cyst in 2 (20%) cases, lipoma in 2 cases (20%) and SCC right cheek in 1 case.

Table 3: Correlation of clinical diagnosis, FNAC, and HPE diagnosis.

Final diagnosis	Clinical=100	FNAC =100	HPEN=48
Lymph node metastasis	7	7	-
Reactive lymphadenitis	15	22	1
Tubercular lymphadenitis	17	10	1
Multinodular goiter	4	7	7
Colloid goiter	27	18	18
Adenomatous goiter	-	2	2
Benign thyroid follicular nodule	-	2	1
Follicular carcinoma	-	-	1
Hyperplastic thyroid nodule	-	2	2
Parotid swelling	5	-	-
Parotitis	4	4	-
Pleomorphic adenoma	-	5	5
Inflammatory pathology (Ludwig)	6	5	-
Sialadenitis	5	6	-
Branchial cleft cyst	1	1	1
Swelling postauricular region	1	-	-
Swelling cheek	1	-	-
Cystic swelling ear	1	-	-
Lipoma	2	2	2
Keloid	2	2	2
Hemangioma	-	1	1
SCC cheek	-	1	1
Sebaceous cyst ear	-	1	1
Epidermal inclusion cyst neck	2	2	2

DISCUSSION

ENT surgeons often encounter head and neck masses in their daily clinical practice. Swellings in head and neck area have serious implications due to the complex anatomy, as well as the physiological importance of the underlying structures. The presence of various structures in the neck results in a difference in the origin of the swelling, and each swelling have a distinct pathology and prognosis. The most frequently occurring form of swellings are infectious swellings, lymphadenopathies, and benign and malignant neoplasia. The anatomic location of the swelling offers valuable information about the etiology and type of swelling and helps in reaches clinical diagnosis.[9]

The current research has been performed on 100 patients with head and neck swellings with age more than 10 years. Age is a very important factor in head and neck mass diagnosis. As the age of the person increases the chances of malignancy also increase. Patients' majority of swellings have been in the age group of 11 to 30 years (40%) followed by 31-50 (37%). The mean age of presentation was 37.02±16.11 (Table 1).

In our study, female predominance was observed with 52% females and 48 % patients being males, and male: female ratio was 1:1.12. Khetrapal et al found that the peak occurrence of head and neck mass lesions was present between 21 to 30 years and female predominance was observed with 162 (56%) women and 128 (44%) men (1.3:1 F:M ratio) in their study. This was in accordance with current research.[10]

In present study, 46% swellings were benign in nature,45% were inflammatory, and 9% cases were malignant (Figure 1). In research by Modi et al conducted in 2018, it was observed that out of the 305 total lesions, 239 (78.36%) have been inflammatory and benign, 66 (21.64%) have been metastatic and malignant.[11]

Various swellings of the head and neck appear in different anatomical locations. In our study, lymph nodes (39%) were the site that was involved most frequently, followed by thyroid (31%), salivary gland (20%), soft tissue, skin, and miscellaneous (10%) (Table 2). As per Shiladaria et al the most predominant site was lymph nodes lesion (57.69%) followed by thyroid lesions (24.61%).[12]

In our study according to final diagnosis, among lymph node lesions majority of patients had reactive lymphadenitis in 21 (53.8%) cases, tubercular lymphadenitis was seen in 11 (28.2%) while 7 (17.9%) had SCC that got metastasized into the lymph nodes) (Figure 2). According to Shakya et al, reactive, tubercular, metastatic, and granuloma were present in 50.4%, 22.4%, 4.84%, and 10% of the lymph nodes, respectively.[13]

In the present study among lymph node swellings there was strong association observed between clinical and final diagnosis. (kappa value =0.67) (Table 3).

In the present study out of 31 patients with thyroid swellings, 18 (58.1%) patients were diagnosed with colloid goiter, 2 (6.5%) case with adenomatous goiter, 7 (22.6%) case with multinodular goiter. Follicular carcinoma and benign thyroid nodule were seen in 1 (6.5%) case each while 2 patient was diagnosed with hyperplastic thyroid nodule. In study conducted by Muddegowda et al and Rathod et al discovered that thyroid lesions were the most common location for FNAC, with colloid goiter being the most common finding. [14,15]

In the present study, we observed that there was strong agreement between FNAC and final diagnosis (kappa value =0.815). Also, statistically significant association was observed between FNAC and final diagnosis ($p<0.001$) (Table 3).

According to our study the FNAC sensitivity, specificity, NPV, and PPV for diagnosis of colloid goiter, multinodular goiter, adenomatous goiter, and hyperplastic nodule was 100% with an overall accuracy of 100%. For benign thyroid nodule sensitivity, specificity, PPV, and NPV were 100, 96.67% 50%, and 100%, and for follicular carcinoma, the sensitivity was 0% specificity 100%, and NPV was 96.77% with an overall accuracy of 96.77%.

The outcome of present research was in accordance to the study performed by Ali et al who showed that FNAC was highly sensitive (91.6%) and specific (100%) for nodular goiter.[16] However, in the case of thyroid cancer, it had a relatively poor sensitivity (60%) because it was unable to distinguish between follicular adenoma as well as follicular carcinoma. In our study also the sensitivity for follicular carcinoma was 0%. Hence, we came to the inference that the FNAC specificity and sensitivity has been represented a broad variation in various researches. A single goiter may include numerous nodules that simultaneously harvest benign and malignant disease, which might be the result of the doctor doing the FNAC process having performance bias.[17]

The FNAC role in the thyroid nodules assessment is now well established and has become the initial investigation as it is safe and cost-effective and has become a standard test.[18]

In 20 cases of swelling of the salivary gland, Sialadenitis was seen in 6 (30%) cases, Ludwig abscess in 5 (25%) patients, pleomorphic adenoma was seen in 5 (25%) while parotitis was present in 4 (20%) cases. Throughout the research period, there were no malignant lesions in the salivary gland.

In salivary gland swellings, there was a significant fair correlation between clinical and final diagnosis (k=0.63) and there was a significant correlation between FNAC and final diagnosis (k=1). This signifies the value of FNAC in diagnosing salivary gland pathologies ($p<0.001$) (Table 3).

In our study, among 10 miscellaneous swellings, keloid was seen in 2 (20%) patients, lipoma in 2 (20%), hemangioma and sebaceous cyst in 1(10%) patient each, branchial cleft cyst in 1 (10%) case, epidermal inclusion cyst in 2 (20%) cases, and SCC right cheek in 1 case. The predictive value of FNAC for skin and soft tissue swelling was 100%. Suryawanshi et al observed 21 soft tissue pathologies with lesions such as epidermal cysts (57.14%), lipoma (23.80%), benign adnexal tumor (4.67%) and malignant neoplasms involving metastatic epithelial neoplasm and squamous cell carcinoma.[19]

The limitation of our research has been a small sample size of 100 cases taken from patients attending OPD of Rajindra Hospital, Patiala. Hence, a study with a large sample size from different strata of the population is required for better clinicopathological correlation between head and neck masses.

CONCLUSION

Since fine needle aspiration cytology is safer, more affordable, and less painful than biopsy, it may be more beneficial in making diagnosis of head and neck swellings. Children and elderly individuals may have it done without the need for anesthesia. Hence, we conclude that every swelling in the head and neck region should not be ignored and should be thoroughly investigated for accurate diagnosis and early treatment.

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Ethical approval: The study was approved by the Institutional Ethics Committee of Government Medical College and Rajindra Hospital, Patiala

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