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Original Research Article

Role of Fine Needle Aspiration Cytology (FNAC) of Palpable Head and Neck Lesions in Tertiary Care Centre

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Abstract:

Background: Fine Needle Aspiration Cytology (FNAC) of neck masses is a fast, simple, inexpensive method that has been widely used to diagnose a variety of swellings. FNAC is frequently utilized in the head and neck, including for tumors of the thyroid, salivary glands, lymph nodes, and other organs. This study's objective is to assess the value of FNAC in the diagnosis of palpable head and neck lesions.

Methods: In the current study, 353 cases of palpable head and neck swelling that occurred in the JLNMCH, Bhagalpur, Bihar, from October 2022 to March 2023 are included. A cytological diagnosis was made after aspiration. Everywhere possible, cyto-histopathological correlations were conducted.

Result: A total of 353 patients with palpable head and neck lesions were evaluated; of these, lymph nodes (33.00%) and thyroid lesions (30.31%) were the most frequent sites, followed by other (22.80%) and salivary glands (13.88%). Reactive lymphadenitis, colloid goiter of the thyroid, and lymph node metastases of squamous cell carcinoma are the most frequent nonneoplastic, benign neoplastic, and malignant neoplastic lesions, respectively. In 35 cases where the results of a histological investigation were correlated, the accuracy rate of FNAC was 95.71%, with sensitivity and specificity of 78.57% and 100%, respectively.

Conclusion: With a 95.71% accuracy rate, fine needle aspiration cytology is a quick, easy, and safe diagnostic method for identifying cancerous from non-cancerous lesions in the palpable head and neck region.

Keywords: FNAC, Head and neck, Lymphnode, Thyroid.

Introduction

The diagnosis of neck masses with fine needle aspiration cytology (FNAC) is quick, simple, safe, and affordable, and it is a widely used method for identifying different swellings.[1] Due to its rapidity, ease of use, minimal trauma, and lack of complications in cases involving the thyroid, lymph nodes, primary salivary glands, and other neoplasms, fine needle aspiration cytology (FNAC) is now recognized as a useful diagnostic tool. Due to the variety of accessible organs and diverse diseases found in the head and neck, FNAC is quite valuable in these areas.[2] This site is one of the most interesting and difficult to diagnose in FNAC due to the close proximity of different tissue types and the large variety of primary and metastatic neoplasms present. This method, which is performed in the outpatient department, provides little trauma and has little risk of complications. It can be done while under local anesthesia, which is especially helpful if a neck mass is suspected to be cancerous.[3] The differential diagnosis of head and neck swelling includes a wide range of illnesses with various therapeutic implications. A good and practical way of evaluating these lesions is provided by FNAC.[4] FNA has a low risk of complications, a quick turnaround, and is a painless surgery, making it ideal for patients who are severely disabled.

Material and Methods

The present study includes outdoor and indoor cases of palpable head and neck swelling in department of pathology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar from October 2022 to March 2023. With the appropriate clinical history, people of every age and sex were enrolled. The patient was placed in the most advantageous posture for a digital palpation of the tumor. The mass was repaired with the left hand after taking every aseptic precaution. A 22 to 26 gauge needle attached to a 5cc or 10cc plastic disposable syringe was inserted inside the bulk. After performing many quick, short strokes in various directions and

aspirating the area, the needle was removed, and a gauze pad was used to establish haemostasis. With the use of another slide, aspirated needle material was smeared on a clean glass slide. As a result, two to four smears were made, air dried, stained with May Grunwald Giemsa, and then stained with Papanicolaou stain after being fixed in ethyl alcohol. Ziehl-Neelsen (ZN) stain for acid fast bacilli was one of the special stains employed. The stained slides were mounted by DPX for examination and reporting using a light microscope.

Result

A total of 353 cases of palpable head and neck swellings underwent fine needle aspiration cytology. According to the site-wise distribution of head and neck FNAC, lesions in the lymph nodes (33.14%) were more common than thyroid (30.31%), other (22.66%), and salivary gland (13.88%) lesions.

The study's patients ranged in age from 2 years old to 80 years old, with a mean age of 37.95 years and a median of 35 years. The third decade saw the highest prevalence of age groups. The ratio of male to female was 1:1.42, with females predominating.

Table 1: Site wise distribution of head and neck masses

Site	No. of cases	Percentage%
Lymphnode	117	33.14%
Thyroid	107	30.31%
Salivary gland	49	13.88%
Miscellaneous	80	22.66%
Total	353	100.0%

Cytologically, head and neck lesions were divided into nonneoplastic (52.12) and neoplastic (45.89%) categories. The remaining lesions (1.98%) were insufficient due to limited cellularity and hemorrhagic aspirate.(Table 2)

Table 2: Cytological category wise distribution ofhead and neck lesions

Cytologicalcategory	No. of cases	Percentage%
Non neoplastic	184	52.12%
Neoplastic	162	45.89%
Inadequate	7	1.98%
Total	353	100.0%

Reactive lymphadenitis was the most common non-neoplastic lesion, and it was followed by epidermal cysts, granulomatous lymphadenitis, and tuberculous lymphadenitis. Malignant and benign neoplastic tumors were further divided into categories. Colloid goiter, which occurred in 76 cases, was the most often discovered benign neoplastic lesion, followed by lipomas and pleomorphic adenomas of the salivary gland. In the current study's overall FNAC of head and neck lesions, colloid goiter cases were more prevalent. The most common malignant neoplastic lesion was squamous cell carcinoma lymph node metastases, which was followed by thyroid papillary carcinoma and salivary gland mucoepidermoid carcinoma.

The third decade was dominated by lymph node lesions, and the M: F ratio was 1.24:1. Reactive lymphadenitis was the most prevalent lymphnode lesion among 117 (33.14%) patients, followed by granulomatous lymphadenitis (23.93%). The most common finding in malignant lesions was metastasis from squamous cell carcinoma (13.67%), followed by metastasis from non-Hodgkin's lymphoma (1.70%), and metastasis from adenocarcinoma (0.85%). [Table 3].

Table 3: Distribution of cytological diagnosis of lymphnode swellings

Cytological diagnosis	No. of ases	Percentage %
Inflammatory		
Nonspecific lymphadenitis	15	12.82%
Reactive lymphadenitis	38	32.47%
Tuberculous lymphadenitis	16	13.67%
Granulomatous lymphadenitis	28	23.93%
Malignant		
Non Hodgkin’s lymphoma	2	1.70%
Secondary from squamous cell carcinoma Secondary	16	13.67%
from adenocarcinoma	1	0.85
Inadequate	1	0.85
Total	117	100

All head and neck lesions, including 107 cases (30.31%) of thyroid gland lesions, were found in the third decade, with a M:F ratio of 1:6.92 and a predominance in females. Colloid goiter, which accounted for 75 cases (70.09%) of all lesions, was the most prevalent, followed by Hashimoto's thyroiditis (14.01%), follicular neoplasm (7.48%), thyroglossal cyst (2.80%), and subacute thyroiditis (0.93%). Papillary carcinoma (1.87%) and thyroid medullary carcinoma (0.93%) were the two types of malignant lesions that were most prevalent. Insufficient in 1 case (0.93%). Colloid goiter was more prevalent in the 75 cases of head and neck lesions included in the current investigation, which had a female predominance and a M:F ratio of 1:5.90 [Table 4].

Table 4: Distribution of cytological diagnosis of thyroid lesions

Cytological diagnosis	No. of cases	Percentage %
Inflammatory Hashimotos thyroiditisSubacute thyroiditis Thyroglossal cyst	 15 1 3	 14.01% 0.93% 2.80%
Benign Colloid goiter Follicular neoplasm Hurthle cell neoplasm	 75 8 1	 70.09% 7.48% 0.93%
Malignant Papillary carcinoma Medullary carcinoma	 2 1	 1.87% 0.93%
Inadequate	1	0.93%
Total	107	100

In the third decades, there were a total of 49 cases of salivary gland lesions (13.88%), with a little male predominance and a male to female ratio of 1.17:1. Sialadenitis was the most prevalent salivary gland lesion found, occurring in 22 cases (44.9%), of which 13 (26.53%) cases were chronic and 9 (18.37%) cases were acute. One instance of lymphoepithelial lesions made up of 1 (2.04%) cases was followed by 11 (22.45%) cases of pleomorphic adenoma, which were all salivary gland lesions with a female predominance. There were five malignant salivary gland lesions in all, of which three (4.08%) were mucoepidermoid carcinomas, one (2.04%) was an acinic cell carcinoma, one (2.04%) was an adenoid cystic carcinoma, and one (2.04%) was a carcinoma ex pleomorphic adenoma.(Table 5)

Table 5: Distribution of cytological diagnosis of salivary gland lesions

Cytological diagnosis	No. of cases	Percentage %
Inflammatory Sialadenitis Simple cystic lesions	 22 8	 44.90% 16.33%
Benign Pleomorphic adenoma Lymphoepithelial lesions	 11 1	 22.45% 2.04%
Malignant Mucoepidermoid carcinoma Acinic cell carcinoma Adenoid cystic carcinoma Carcinoma ex Pleomorphic adenoma	 2 1 1 1	 4.08% 2.04% 2.04% 2.04%
Inadequate	2	4.08%
Total	49	100.0%

80 (22.66%) of the patients were categorized as other lesions, with epidermal cysts making up 37 (46.25%) of these instances. The most frequent benign lesion, including 36 (45.0%) instances, was a lipoma, which was followed by 3 (3.75%) cases of benign adnexal tumor. There were two cases of malignant miscellaneous lesions: one was a sarcoma, and the other was a porocarcinoma. [Table 6].

Table 6: Distribution of cytological diagnosis of miscellaneous lesions.

Cytological diagnosis	No. of cases	Percentage%
Epidermal cyst	37	46.25%
Benign		
Lipoma	36	45.0%
Benign adnexal tumor	3	3.75%
Malignant		
Sarcoma	1	1.25%
Positive for epithelial malignancy	1	1.25%
Inadequate	2	2.50
Total	80	100.0%

In 35 cases, cytohistopathological correlation was available. Two cases of reactive lymphadenitis underwent histopathological testing, and one of those cases resulted in the diagnosis being confirmed. Hodgkin's lymphoma and non-Hodgkin's lymphoma were both diagnosed in the other case. Three cases of follicular neoplasms underwent histological testing; two of the cases had the diagnostic confirmed; the third case had the diagnosis of follicular carcinoma. The remaining 33 instances' histopathological examinations were consistent. Thus, there were a total of 5 true positive instances, 27 true negative cases, and 1 false negative case in the current study. In the current investigation, the FNAC's diagnostic efficacy, sensitivity, and specificity were 95.71%, 78.57%, and 100%, respectively.

Discussion

The most frequent lesions in this study were lymph node lesions, followed by thyroid, other, and salivary gland abnormalities. Other research, including those by Lalji Valiya et al6, Deval N Patel et al,[7], Yogesh Pawade et al,[8], and Bhagat VM et al, made similar observations.9 There are 353 cases in total, ranging in age from 2 to 80 years. The median age was 35 years, with a total mean age of 37.95. Age 21 to 30 saw the highest occurrence. Gogoi Geetanjali,[10] Singal P et al.,[11] study similarly reported a similar observation of the peak incidence of age group. The male to female ratio was 1:1.42, with women predominating. This result was also reported by other studies such as Kishor H et al, Muddegowda et al,[12] Valiya L et al [6] and Shaan et al.[13]

In our analysis, reactive lymphadenitis (32.47%) was the most frequent lymphnode lesion. Other research, including those by Pradeep Tendon et al., Gogoi Geetanjali, and Sreedevi P et al., produced results that were comparable. The second decade saw the most patients, followed by the first. There were a total of 38 cases of reactive lymph nodes, and two of those cases got histological examinations, which confirmed reactive lymphadenitis in one case while indicating a different diagnosis in the other. Out of these cases, one was determined to have Hodgkin lymphoma and the other did not. Due to aspiration from an unrepresentative area or the needle's failure to reach the exact location of the lesion, the diagnosis of lymphoma may have gone unnoticed in the majority of cases.

Shaan et al had also similar example where two cases of reactive lymphnode misdiagnose as Hodgkin's and non Hodgkin's lymphoma reported reason for misdiagnosis was presence of atypical mononuclear cells, background infiltrated with eosinophils and hypocellularity of aspirate disproportionate to lymphnode size which must alerts the cytopathologist to the possibility of Hodgkin's lymphoma. Hodgkin's lymphoma may begin in one location in the lymph node, according to Tilak et al.[16], yet the needle may miss that location entirely. Sometimes Hodgkin's lymphoma will only affect one or two lymph nodes in a group. However, sampling through non-involved lymph nodes could lead to a false-positive reactive lymphadenopathy diagnosis.

On cytology, granulomatous lymphadenitis is the second most frequent cause of lymph node lesions, showing granuloma without acid-fast bacilli. 14.16% of all instances of lymph nodes had lesions caused by tuberculous lymphadenitis. Different writers employed distinct criteria for diagnosing tuberculosis on FNAC. Regardless of AFB positivity, Tilak et al. make the diagnosis of tubercular lymphadenitis based on the presence of live and degenerating polymorphs, degenerating granulomas, and a caseous necrotic backdrop with openly purulent aspirate. AFB is indicative of a tuberculous lesion, according to Das et al., when it is positive in a smear with epitheloid cell granuloma and/or necrosis. In a developing nation like India, epitheloid granulomas with negative AFB results are thought to be of tuberculous nature and are classified as granulomatous lesions.

In the current analysis, metastatic deposits accounted for 14.59% of all lymph node cases and were the most frequent reason for lymphoma. Other investigations, like Tandon et al. and Hirachand et al.,[14] where metastatic lymphadenopathy accounted for 10.34% and 12.3%, respectively, also

made similar observations. Two cases of metastatic lymph nodes underwent histopathological testing, which supported the diagnosis of metastasis from squamous cell carcinoma and established it as a common cause of metastasis. These results are in line with other research that have been conducted. The second most frequent metastatic malignant lymphnode lesions, with one incidence, were metastatic adenocarcinomas. Two cases of non-Hodgkin lymphoma, or 0.86%, were reported.

With 107 cases, thyroid lesions are the second most frequent site in head and neck cancer. Females made up the majority of instances, and the third decade was the most common. Out of 107 thyroid lesions in our study, 13 were in males and 94 were in females. Thyroid lesions primarily affected females with a M: F ratio of 1: 6.93. Afroz N. et al.[17] and Jain D. et al.[18] reported similar findings of female dominance.

Most thyroid lesions in the current study were benign, which was comparable to other studies as those by Kishor H et al,[19], M Kate et al,[20], and R Goswami et al,[21]. Colloid goiter made up the majority of thyroid lesions (70.09%), including 7 cases of multinodular goiter and the remaining 68 cases of colloid goiter. The most common thyroid lesion in the current study was colloid goiter, which was followed by inflammatory lesions that included cases of Hashimoto's thyroiditis (14.01%) and sub-acute thyroiditis (0.93%), then follicular neoplasm. Papillary thyroid carcinoma and thyroid medullary carcinoma made up the majority of cases of malignant lesions.

19 out of 20 thyroid lesions had consistent histopathological investigations, with the exception of one follicular neoplasm case, which exhibited follicular carcinoma, a known source of negativity. A histological investigation is necessary to distinguish between an adenoma and a cancer. The most prevalent benign neoplasm in the current study was colloidal goiter; the M: F ratio was 1:5.90, with females being affected more frequently than males. In the fourth decade, colloidal goiter was more frequently observed.

Of the 353 head and neck masses, salivary gland lesions made up 13.88% of the cases. Sialadenitis accounted for the most cases, or 44.90% of all salivary gland lesions. Similar findings are reported in the Kishor H et al [19] investigation. Pleomorphic adenoma was the most frequent cancerous lesion found in salivary glands. These results are consistent with research by Solanki P et al, M Kate et al, and Bhagat VM et al [9]. Pleomorphic adenoma instances totaled 23, or 23.47 percent, with females in the 60–70 age range being the majority.

22.66% of all palpable head and neck lesions are other lesions. Older males were observed to have these lesions more frequently. Epidermal cysts were the most frequent discovery, accounting for 46.25 percent, which was comparable to findings in investigations by Valiya L et al.[6] and Kishor H et al.[19].

The histological investigation of 35 instances resulted in 29 benign cases, including inflammatory lesions, cystic lesions, and benign neoplastic lesions, and 5 cases of malignant neoplasms. 29 benign lesions had their histological diagnosis confirmed in 28 instances, while 2 instances had erroneous negative results. In cases of reactive lymphadenitis, the first cases developed into Hodgkin's lymphoma and the second cases became non-Hodgkin's lymphoma. The aspirate from a non-representative region of the lesion contains a mixed population of plasma cells and lymphoid cells, which led to the incorrect interpretation. Follicular neoplasm is the third case, and this is the acknowledged restriction of FNAC in thyroid tumors.

It is necessary to perform a histological investigation to determine whether an adenoma or a cancer has vascular or capsular invasion. There were 5 malignant instances, and the histological diagnosis was 100% accurate. There were no false positive cases; all 5 cases were real positives. The accuracy of the current study was 95.71 percent, which was comparable to studies by Fernandes H et al [23] and Kishor H et al [19]. More negativity is the cause of the difference in sensitivity. By taking several desires from a representative location with sufficient cellularity, false negativity was countered. Diagnostic accuracy was 95.71%, specificity was 100%, and sensitivity was 78.57% in the current study, which is comparable to values seen in earlier investigations.

Conclusion

In our study, reactive lymphadenitis, colloid goiter of the thyroid, and lymph node metastases of squamous cell carcinoma are the most frequent benign, malignant, and neoplastic lesions. 70 instances had histopathological correlation, and the corresponding diagnostic accuracy, sensitivity, and specificity were 95.71%, 78.57%, and 100%. According to research, FNAC is the most accurate and reliable inquiry one could hope for. Therefore, we draw the conclusion that fine needle aspiration cytology is a straightforward, quick, safe diagnostic method with a 95.71% accuracy rate for identifying benign from malignant lesions in the palpable head and neck region.

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