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Clinico-pathological evaluation of neck swellings at our tertiary care hospital.

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Abstract-Introduction: Neck swelling can be a cause of major concern to the patients as well as the doctor in respect to the diagnosis and treatment. The neck contains a substantial amount of lymph nodes that is 35-50% of all total lymph nodes. The main causes of a neck mass are classified as congenital, inflammatory and neoplastic. FNAC is a cost-effective method and quick for sampling superficial masses found in the neck. The technique can be done in outpatient basis. Aim and Objective of the study: purpose of this study is to evaluate the various causes of Neck masses, their incidence and to correlate diagnosis with various diagnostic modalities. Materials and Methods: A detailed history-taking including age, sex, community, ethnicity, complaints and duration of symptoms, site, side etc. and with thorough clinical examination relevant investigations for consistency, diagnosis, benign or malignant was done and appropriate management has been done for these patients. Results: The correlation between FNAC and histopathology in our study was 88% (out of 100 cases, 86 cases had a positive correlation of fine needle aspiration cytology with histopathological examination). Therefore, the diagnostic accuracy of fine needle aspiration cytology in our study was 89.91%. Discussion and Conclusion: From this study, it can be concluded that a myriad of lesions causing neck swellings can be

successfully identified on FNAC. It is relatively atraumatic, well tolerated, safe procedure which can be readily performed as OPD basis with high diagnostic accuracy. This technique is an excellent first line method for investigating the patients presenting with neck masses. Both, FNAC procedure and interpretation are quick and is a cost-contained procedure. Fine needle aspiration cytology offers a simple method of diagnosis of neoplastic and non-neoplastic lesions in the neck. It is also important to take into consideration clinical symptoms and biochemical tests. Histopathological examination is the gold standard for diagnosing lesions, though FNAC can play a major role in giving a provisional diagnosis for planning treatment protocols. The two have to complement each other, along with the other diagnostic techniques for accurate management.

Keywords---neck swelling, fine needle aspiration cytology, histopathology, neoplastic, non-neoplastic.

Introduction

A neck mass is defined as a development of an abnormal growth extending from the skull base to the level of clavicle.¹ Neck swelling can be a cause of major concern to the patients as well as the doctor in respect to the diagnosis and treatment. The neck contains a substantial amount of lymph nodes that is 35-50% of all total lymph nodes and around 75 on either side in its lymphatic chain together with vital organs of the body. The main causes of a neck mass are classified as congenital, inflammatory and neoplastic.² Surgical biopsy and the histopathological study of the specimen has remained the mainstay for the diagnosis and management of the neck mass. Here the whole tissue is available for examination under microscope. Nowadays, a separate discipline and clinical approach has arisen for the diagnosis of neck masses and is known as Fine Needle Aspiration Cytology (FNAC). The FNAC involves study of cells obtained by fine needle under vacuum. Unlike biopsy, the whole tissue is not available for microscopic examination. Only cells are available for microscopic examination. It also does provide a high diagnostic accuracy.

FNAC is a cost-effective method and quick for sampling superficial masses found in the neck. The technique can be done in outpatient basis. There is minimal trauma to the patient and carries no risk of complication. Masses located within the region of head and neck including enlarged lymph nodes, thyroid enlargements and salivary glands can be readily diagnosed using this technique.^{3, 4} FNAC is clearly no substitute for histology, especially in determination of nodal architecture in lymphoma, the malignant pattern of follicular thyroid tumor, intracapsular spread in squamous carcinoma or in the distinction of pleomorphic from monomorphic adenoma.⁵ Ultrasonography (USG), computed tomography (CT) and magnetic resonance imaging (MRI) are still the mainstay for imaging of head and neck tumors. USG is particularly useful in examining superficial masses whereas CT and MRI are used to identify the deeper lesions, particularly involving the skull base and CNS. Plain radiographs have a very limited role.

Hence, we have taken up this study to evaluate various causes of Neck Swellings and their incidence and to correlate diagnosis with various diagnostic modalities.

Aim and objectives of the study

The purpose of this study is to evaluate the various causes of Neck masses, their incidence and to correlate diagnosis with various diagnostic modalities.

Materials and Methods

Source of data: "Clinico-Pathological Evaluation of Neck Swellings at Our Tertiary Care Hospital" was conducted at our tertiary care hospital.

Study population: we included the subjects aged more than one year and <80 years who presented with neck swelling to OPD of various departments which include ENT, Surgery and Pediatrics.

Study Design: We conducted a hospital based cross-sectional study conducted on a total number of 100 patients both males and females attending the departments of ENT, Surgery, Pediatrics, of Prasad Institute of Medical Sciences, Lucknow.

Inclusion criteria: We included the subjects presented to our OPD with neck swelling who were willing to give consent.

Exclusion Criteria: We excluded the children less than <1 year and >80 years, suspected neck masses that appeared to be of vascular origin on clinical examination, patients of neck abscess or neck swelling or pus aspirated swellings and those patients who were not willing to undergo fine needle aspiration cytology and/or histopathological examination.

Data Collection: A detailed history-taking including age, sex, community, ethnicity, complaints and duration of symptoms, site, side etc. and with thorough clinical examination relevant investigations for consistency, diagnosis, benign or malignant was done and appropriate management has been done for these patients.

Results

We included a total of 100 subjects based on inclusion and exclusion criteria in the age group more than one year and less than 80 years, who presented with neck swelling to our OPD.

Table 1: Baseline Characteristics of Subjects

VARIABLES	Number= 100	Percentage
GENDER		
Male	42	42
Female	58	58
AGE GROUP		
1 – 10 yrs.	8	8%
11 – 20 yrs.	20	20%
21 – 30 yrs.	30	30%
31 – 40 yrs.	18	18%
41 – 50 yrs.	10	10%

51 – 60 yrs.	10	10%
>61yrs	4	4%
COMMUNITY		
Rural	54	54%
Urban	46	46%

It is evident from the table 1 that 58 (58%) patients were female, 42 (42%) were males of which the majority cases belonged to the 3rd decade of life, a total of 30 (30%) patients. In our study, majority of the cases were from rural area 54 (54%).

Table No. 2 Clinical presentation of Neck Swellings

Clinical presentation of neck swelling	Number of Cases=100	Percentage
PRESENTING SYMPTOMS		
Only neck mass	64	64%
Fever	16	16%
Change in voice	2	2%
Epistaxis	2	2%
Pain	14	14%
Weight loss	12	12%
Palpitation	6	6%
DURATION		
Less than 1 month	14	14%
1 – 6 months	22	22%
7 – 12 months	24	24%
More than 12 months	40	40%
LATERALITY		
Right	36	36%
Left	28	28%
Bilateral	2	2%
Midline	34	34%
SITE		
Submental triangle	2	2%
Submandibular triangle	16	16%
Upper cervical	16	16%
Middle cervical	10	10%
Lower cervical	4	4%
Posterior triangle	8	8%
Anterior neck midline	30	30%
Supraclavicular	6	6%
Parotid swelling involving neck	8	8%
CONSISTENCY		
Firm	84	84%
Hard	4	4%
Cystic	10	10%
Rubbery	2	2%

LESION		
Benign	88	88%
Malignant	12	12%
CLINICAL DIAGNOSIS		
Lymph node masses		
Cervical tuberculous lymphadenitis	20	20%
Reactive cervical lymphadenitis	12	12%
Lymphoma	2	2%
Acute Suppurative Lymphadenitis	2	2%
Metastatic lymphadenopathy	4	4%
Thyroid masses		
Goitre	24	24%
Salivary gland masses		
Benign tumour parotid gland	6	6%
Submandibular sialadenitis	2	2%
Benign tumour submandibular	4	4%
Ranula	4	4%
Congenital neck masses		
Thyroglossal cyst	6	6%
Branchial cyst	2	2%
Others		
Lipoma	6	6%
Leiomyosarcoma	2	2%
Epidermoid cyst	4	4%

It is evident from the table 2 that majority of the patients (64%) presented with neck swelling followed by other symptoms, 40% of the patients had neck swelling of duration more than 12 months, 34% of patients had midline laterality, 30% patients had anterior neck midline swelling, 84% patients had firm neck swelling, 24% patients were clinically diagnosed with Goitre followed by tubercular lymphadenitis.

Table 3: Shows Clinico-Pathological Correlation of Neck Swellings

FNAC Report	Clinical Diagnosis	FNAC Report	HPE Report
Thyroid swelling			
Multinodular goitre	-	12	10
Colloid goitre	24	12	10
Papillary carcinoma	-	-	2
Follicular carcinoma	-	-	2
Salivary gland			

Chronic sialadenitis	2	2	2
Pleomorphic Adenoma	10	10	10
Ranula	4	4	4
Lymph nodes			
Non-Specific lymphadenitis	12	12	10
TB lymphadenitis	20	18	20
Metastasis	4	4	4
Suppurative lymphadenitis	2	2	2
Non Hogdkin's lymphoma	2	2	2
Others			
Lipoma	6	6	6
Thyroglossal cyst	6	6	6
Brachial Cyst	2	2	2
Dermatofibroma	-	2	-
Dermoid Cyst	-	2	-
Epidermoid Cyst	4	2	4
Shwanoma	-	-	2
Leiomyosarcoma	2	-	-
Malignant Peripheral Nerve Sheath Tumour	-	-	2
Inconclusive FNAC report	-	2	-

Table No 3 depicts the clinical and pathological correlation of the neck masses. The correlation between FNAC and histopathology in our study was 88% (out of 100 cases, 86 cases had a positive correlation of fine needle aspiration cytology with histopathological examination). Therefore, the diagnostic accuracy of fine needle aspiration cytology in our study was 89.91%.

Discussion

In our study, the age incidence of neck masses ranged from 1 year to 67 years, incidence of neck masses was highest in 21-30 years age group. This is in accordance with the studies by Narang RK, Surapaneni SL, Maheshwari A, Shariff M A et al^{6, 7, 8, 9} highest age incidence of neck masses in their study was in 3rd decade of life. Neck masses can occur in any age group, though its incidence tends to be common in younger age group because of relatively high occurrence of infective conditions like tuberculosis and reactive lymphadenitis in our country. In general, the incidence of neck masses tends to be higher in males because of habits like tobacco chewing, smoking and alcoholism which are aetiological factors for malignancies of the aerodigestive tract. In our study males constituted 42% of the patients and females constituted 58% of the patients in the ratio of 1:1.38. Similar results were also obtained by Fernandes H et al¹⁰ and Soni S. et al¹¹ with ratios of 1:4.41 and 1:1.51 respectively

In our study 54% (54 patients) of the patients were of rural community and urban community constituted 46% (46 patients). The rural patients presented to us relatively late, most of them presenting to us after 6 months of symptoms. Along with lack of education and ignorance, poverty and belief in local remedies for treatment are the factors which are responsible for delayed presentation in our

country. This was the case in our study also. In our study, most of the patients had only neck mass as the presenting symptom. Few others had pain in the mass, fever as other presenting symptoms. Apart from these, other symptoms like loss of weight were narrated only on asking questions based on clinical suspicion of a disease. Because of lack of education and ignorance, lack of awareness about the minor symptoms is common in our country.

In our study, 58 cases (58%) had unilateral neck mass which is in accordance with the study by Ragesh KP et al¹² where 66% of the cases had unilateral neck mass. In our study, anterior part of the neck was involved in majority of cases which is similar to the studies conducted by Surapaneni SL et al, Soni S et al.^{7,11} On basis of etiology, lymph node masses constituted the majority of neck masses in 38 cases (38%) and amongst them tuberculous lymphadenitis was the most common cause. Tubercular lymphadenitis cases were 20 forming 20% of total cases and 52.8% of all lymph node masses. Tuberculous lymphadenitis had a female predisposition with majority belonging to rural communities. Incidence of tuberculous lymphadenitis was seen in 21-30 years age group. Our findings have similarity to other studies Narang RK⁶ had 51.6%, Ragesh KP et al¹² had 54% that majority cases are of tubercular lymphadenitis.

Unilateral involvement of lymph node (84.22%) is more commonly noted than bilateral involvement (15.78%). It was also seen that right side (63.5%) was more commonly affected than the left side (37.5%). Similar results have been highlighted by other researchers. Vedi et al¹³ reported unilateral (right side – 42.85% and left side – 35.71%) and bilateral involvement in 83.56% and 21.42% cases. The high incidence of TB in the study may be due to the endemicity of the disease in India.

Amongst the 24 cases with thyroid masses, goitre constituted 20 cases (83.33%) which is in accordance with the studies conducted by Fernandes H et al¹⁰ which had 65.8% of the thyroid masses as goiter. The majority of cases belonged to rural community 70 % (7 patients). In our study, all patients were females with maximum patients with thyroid swelling presenting to us after the 4rd decade with mean age of presentation being 31yrs of age which is probably due most patients being illiterate and unaware of their health problems until they are at an advanced stage. There is also belief in local remedies for treatment are the factors which are responsible for delayed presentation in our country. Also, the patients are not willing for surgical interventions.

Amongst the salivary gland lesions, the parotid was the most commonly involved gland. Pleomorphic adenomas were 62.5 % of the cases in the present study similar to the study done by Surapaneni SL⁷, with 50 % cases of all salivary gland lesions. Pleomorphic adenomas were common in the 20-30 age group with female predisposition. In this study, 16 out of 16 salivary gland masses were correctly diagnosed using fine needle aspiration cytology giving a diagnostic accuracy of 100%. This is in accordance with the studies done by Huq M M. et al¹⁴ who got a diagnostic accuracy of 100% for the diagnosis of salivary gland masses using fine needle aspiration cytology.

Ten cases of pleomorphic adenoma were correctly diagnosed using fine needle aspiration cytology with 100% accuracy in this study. This is in accordance with the studies done by Fernandes H et al¹⁰ and Shariff M A et al⁹ who got a diagnostic accuracy of 100% each for the diagnosis of pleomorphic adenoma of parotid gland using fine needle aspiration cytology. As far as incidence of benign and malignant lesions are concerned, we had 88 benign neck masses and 12 malignant neck masses. This is in accordance with the studies conducted by Ragesh KP et al¹². The diagnostic accuracy of Fine Needle Aspiration Cytology in our study is 89.91 % which is in accordance with the studies conducted. The sensitivity of Fine Needle Aspiration Cytology for the detection of malignancy in our study is 50 %, the specificity (accuracy for absence of malignancy) is 100%.

The diagnostic accuracy of Fine Needle Aspiration Cytology for lymph nodes in our study is 89%. This is in accordance with the studies by Soni S et al¹¹, who got a diagnostic accuracy of 94.4% for lymph nodes. Tuberculosis was correctly diagnosed in 18 out of 20 cases in our study with a diagnostic accuracy of 90%. The sensitivity of FNAC for lymph nodes for tuberculosis has been 90%, whereas the specificity has been found to be 100%. Tuberculosis was only reported when ZN stain for AFB were positive. Most of our patients in this category were young females and were in their first three decades of life. Lack of outdoor activity, poor nutrition and ignorance of female health in our country could be contributing factors.

Four cases of secondaries in the neck were correctly diagnosed and the primary site was identified in both the cases, in our study with 100% accuracy. This is in accordance with the studies by Narang RK⁶, who got a diagnostic accuracy of 100% in their studies. Fine needle aspiration cytology has an important role in the identification of metastatic disease. We had two cases of lymphoma in this study which was correctly diagnosed, giving a diagnostic accuracy of 100%.

The diagnostic accuracy of FNAC for thyroid masses in this study is 83.3% i.e. 20 out of 24 thyroid masses were correctly diagnosed. In our study, two cytological diagnosed case of colloid goitre turned out to be papillary carcinoma on HPE. The slides on review revealed follicular cells in clusters and singles in a background of thick colloid. However, no papillary fragments/ nuclear grooves/intranuclear cytoplasmic inclusions were seen. The causes for false negative results include acellular/ poorly cellular sample as encountered in large cystic papillary CA, in marked desmoplasia and in cases of thick fibrous or calcified capsule. Sampling error – in case of small scar carcinoma. Two cases in our study were cytologically diagnosed as colloid goitre turned out to be follicular carcinoma on HPE. The cytological appearance in colloid goitre form continuum which merges with those of follicular adenoma, and in this grey area, cytological criteria alone cannot reliably distinguish between the two.

All the congenital neck masses were correctly diagnosed in this study with 100% diagnostic accuracy using fine needle aspiration cytology. This is in accordance with the study by Fernandes H et al¹⁰ and Shariff M A et al⁹. The mean age of presentation with congenital neck mass was 18 yrs. Among cystic lesions, thyroglossal cysts are the most common congenital midline cystic mass and

usually present in the first decade, but now are more common in young adults. Thyroglossal cyst comprised 37.7 % of all cystic lesions in the present study.

The most common benign neoplastic mass was a lipoma. All the cases of lipoma were correctly diagnosed in this study using Fine needle aspiration cytology with a diagnostic accuracy of 100%. This is in accordance with the study by Fernandes H et al¹⁰ who got a diagnostic accuracy of 100% for the diagnosis of lipoma using fine needle aspiration cytology. Two cases of malignant peripheral nerve sheath tumour was seen in our study. The FNAC was inconclusive even after repeated aspirations. The diagnosis is based on histology and confirmed by a positive reaction to immunohistochemical markers.

Conclusion

Patients presenting with neck swellings are not uncommon in clinical practice. Enlargement of lymph nodes, thyroid gland, parotid glands, submandibular glands are commonly responsible for these neck masses. It is concluded from the present study that patients presenting with neck swellings in our set-up, the commonest cause is cervical lymphadenopathy due to tubercular involvement, followed by thyroid swelling. Few cases like plunging ranula, lipoma, thyroglossal cysts and two cases of schwannoma, malignant peripheral nerve sheath tumours, brachial cyst etc. have also been observed.

From this study, it can be concluded that a myriad of lesions causing neck swellings can be successfully identified on FNAC. It is relatively atraumatic, well tolerated, safe procedure which can be readily performed as OPD basis with high diagnostic accuracy. This technique is an excellent first line method for investigating the patients presenting with neck masses. Both, FNAC procedure and interpretation are quick and is a cost-contained procedure. Fine needle aspiration cytology offers a simple method of diagnosis of neoplastic and non-neoplastic lesions in the neck. It is also important to take into consideration clinical symptoms and biochemical tests. Histopathological examination is the gold standard for diagnosing lesions, though FNAC can play a major role in giving a provisional diagnosis for planning treatment protocols. The two have to complement each other, along with the other diagnostic techniques for accurate management.

References

1. Alpysbaev, K. S., Djuraev, A. M., & Tapilov, E. A. (2021). Reconstructive and restorative interventions at the proximal end of the thigh and pelvic bones in destructive pathological dislocation of the hip in children after hematogenous osteomyelitis. *International Journal of Health & Medical Sciences*, 4(4), 367-372. <https://doi.org/10.21744/ijhms.v4n4.1779>
2. Batsakis JG. *Tumors of the Head and Neck: Clinical and Pathological Considerations* 2nd ed, Baltimore, London, Williams and Wilcons, 1999: 47-49
3. Celeste NP, Williams JF. *Fine needle aspiration biopsy of the head and neck. USA: Butterworth Heinemann; 1996. P 1-13.*

4. Fernandes H, D'souza CRS, Thejaswini BN. The role of fine needle aspiration cytology in palpable head and neck masses. 2009 Oct.; 3(5):1719-1715.
5. Gamba PG, Messineo A, Antonello LM, Boccato P, Blandamura S, Cecchetto G, Dall'Igna P, Guglielmi M. A simple exam to screen superficial masses: fine-needle aspiration cytology. *Med Pediatr Oncol*. 1995 Feb; 24(2):97-9.
6. Huq MM et al Evaluation of neck swelling by cytological and histopathological examination *Bangladesh J Otorhinolaryngol* Vol. 18, No. 1, April 2012: 23-29
7. Maheshwari A, Padhy KR, Dash KB. A Clinicopathological Study of Cervical Lymphadenopathy. *Journal of Evolution of Medical and Dental Sciences* 2015; Vol. 4, Issue 20, March 09; Page: 3497-3507
8. McGuirt WF: Differential Diagnosis of Neck Masses. In: Cummings CW, Flint PW, Harker LA, Haughey BH, Richardson MA, Robbins KT, et al (Eds): *Cummings Otolaryngology; Head and Neck Surgery*. Vol. 3, 4th ed, Philadelphia, Elsevier Mosby, 2004, 2540-2553
9. Narang RK. Place of fine needle aspiration cytology in the diagnosis of lymphadenopathy. *Indian J Tubercul*. 1990; 37:29-31.
10. Ragesh KP, Chana RS, Vashnney PK, Naim M. Head and neck masses in children: a clinicopathological study. *Indian J Otolaryngol Head Neck Surg*. 2002 Oct.-Dec.; 54(4):268-271.
11. Shariff MA, Srinivasa V, Elangovan S, Manikandan D, Jarvis Raju. Accuracy of Fine Needle Aspiration Cytology in the Diagnosis of Neck Masses. *Journal of Evolution of Medical and Dental Sciences* 2014; Vol. 3, Issue 09, March 3; Page: 2087-2093,
12. Soni S, Pippal S K, Yashveer B, Srivastava P, Efficacy of fine needle aspiration in diagnosis of neck masses. *World articles of Ear Nose and Throat*. September 2010 volume 3-1:28-34
13. Surapaneni SL, Gangadharan V, Kuppili VMM. A histopathological spectrum of neck lesions in a rural hospital. *J. Evid. Based Med. Healthc*. 2016; 3(60), 3233-3237.
14. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). Get vaccinated when it is your turn and follow the local guidelines. *International Journal of Health Sciences*, 5(3), x-xv. <https://doi.org/10.53730/ijhs.v5n3.2938>
15. Vedi J.N, Patel Seema, Ghormare Ajay, clinicopathological study in patients of cervical lymphadenopathy. *Odisha journal of Otorhinolaryngology and HNS* Vol.-6 , Issue-1, Jan - June – 2012 pages 14 to 17.
16. Watkinson JC, Wilson JA, Gaze M, Stell PM, Maran AGD. *Stell and Maran's Head & neck surgery*, Butterworth-Heinemann, Oxford, 4th edition, chapter 2; 2000. p 20-21