Original Research Article

Cytopathological and histopathological evaluation of neck mass in a tertiary care hospital

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ABSTRACT

Background: Patients with neck swellings are commonly seen in ENT outpatient and leads to dilemma in diagnosis. To prevent unnecessary investigations and surgery a simple and sensitive diagnostic tool is needed. Fine needle aspiration cytology (FNAC) is a simple and sensitive diagnostic tool that can provide results in minutes.
Methods: This prospective study was done at the department of ENT, Mandya institute of medical sciences, Mandya, Karnataka, India from November 2017 to April 2019 including 100 cases of neck masses in patients aged above 18 years. FNAC was done for all neck masses and then these cases were subjected for biopsy. The cytological features was then reviewed with corresponding histopathology features.
Results: Out of the 100 neck masses under study 67 (67%) were males and 33 (33%) were females with male:female ratio (1:2.03). Thyroid aspirations (43%) were most common followed by lymph node (24%), salivary gland aspirations (18%), congenital swellings (8%) and others (7%). Out of the 100 cases 26% were neoplastic and 74% were non-neoplastic. Histopathological correlations were available in all the 100 cases with sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of 84.2%, 98.65%, 95.65% and 94.81% respectively. FNAC was in correlation with histopathology in 86% of cases and found to be statistically significant.
Conclusions: FNAC is safe, simple and minimally invasive first line investigation of choice for the patients presenting with palpable neck masses and can provide results rapidly and but histopathology remains the gold standard.

Keywords: Neck mass, FNAC, Histopathology

INTRODUCTION

Patients with neck mass are routinely seen in the outpatient department of otorhinolaryngology. Any abnormal growth or development from the level of skull base to the level of clavicle is defined as neck mass. The neck mass are generally categorized into inflammatory, neoplastic and congenital based on the cause.[1] It is difficult to give differential diagnosis for neck masses because of the composite anatomy of the neck. The age of the patient, duration of symptoms and location of the mass in the neck aid in the differential diagnosis. The most important factor to be considered in differential diagnosis of neck mass is the age of the patient as the risk of malignancy becomes higher as the age advances.[2] FNAC is an effortless, rapid and cost effective procedure which gives a clue to the possible nature of the swelling, congenital, inflammatory, infective, neoplastic. It can be done on outpatient basis. It helps to differentiate between a benign and malignant pathology and helps in the management. It can be both diagnostic as well as therapeutic in case of cystic swelling.[3] In addition, a

histopathological examination of a biopsy taken from suspected areas remains the gold standard in diagnosis.

Aims and objectives

The aims and objectives were to find the correlation between FNAC preoperatively and postoperative histopathology in operable neck masses and to know the sensitivity and specificity of FNAC in palpable neck mass.

METHODS

This prospective study was done in the department of otorhinolaryngology at Mandya institute of medical sciences from November 2017 to April 2019 involving 100 adult patients above 18 years of age who presented to the outpatient department with neck masses.

Inclusion criteria

Patients above 18 years of age with neck mass who gave consent and patients who underwent both FNAC and biopsy were included in the study.

Exclusion criteria

Patients with reactive lymphadenitis on FNAC and patients with neck abscess were excluded from the study.

Sample size

By purposive sampling a sample size of 100 was considered for study based on the inclusion and exclusion criteria (retrospectively per month on an average 15-20 patient with neck mass visit department of otorhinolaryngology, MIMS, Mandya).

Informed consent was obtained from all patients included in the study. The study was approved by institutional ethical committee. Patients with reactive lymphadenitis and neck abscess on FNAC were excluded from the study.

Detailed history was taken according to proforma, thorough clinical examination was carried out and basic relevant investigations were done in all the patients to arrive at a provisional diagnosis. FNAC was done for all neck masses. Based on the FNAC reports further investigations like ultrasonography, computed tomography with or without contrast and other relevant investigations were carried out wherever necessary. Then these cases were subjected for incisional or excisional biopsy and biopsy material was sent to department of pathology for histopathological examination. The cytological features were reviewed with corresponding histopathology features.

Method of data analysis

All the data collected was entered in an excel sheet and data was statistically analysed by SPSS software version 16. Descriptive statistics like mean, median and standard deviation are calculated. Diagnostic statistics like sensitivity, specificity, positive predictive value, negative predictive value and accuracy are calculated to find the correlation between FNAC and histopathology. Inferential statistics like chi square test/Fischer exact test have been calculated to know the significance of study parameters.

RESULTS

The present study was conducted on patients attending ENT department in Mandya institute of medical sciences, Mandya from November 2017 to April 2019. During the study, by purposive sampling a sample size of 100 was involved in the study based on inclusion and exclusion criteria.

Among the 100 patients studied, 33 were and male and 67 were female, with a male to female ratio of 1:2.03. In the present study females outnumbered the males.

The age of the patients in our study range from 18 years to 70 years. The highest incidence of neck mass was noted in the age group 41-50 years. Oldest patient in this study was 70 years (Table 1). Mean age in this study was 43.74 and SD was ±13.789 years. Of the 100 patients studied maximum number of patients were seen in fifth decade constituting 26%.

Out of the 100 patients presented with neck mass 68 patients (68%) presented with only neck mass as the chief complaints. 10 patients presented with neck mass and fever as chief complaints. 9 patients presented with neck mass associated with change in voice. 4 patients presented with neck mass and difficulty in breathing. 8 patients presented with neck mass associated with difficulty in swallowing. Loss of weight and loss of appetite was present in 11 and 9 patients respectively (Table 2). Few patients presented with multiple symptoms.

Central or anterior compartment constituted the most common site of neck mass that accounted for 45% of cases. 4% of cases had swelling in submental region. 15% of cases had swelling in submandibular region. Upper jugular, mid jugular and lower jugular neck mass constituted for about 21%, 7% and 5% cases respectively. 3% of cases had swelling in the posterior triangle.

Thyroid swelling was the most common (43%) neck mass found among the study group on FNAC. Lymph node enlargement (24%) was the second most common swelling followed by salivary gland swellings (18%). Congenital mass and miscellaneous neck mass constituted about 8% and 7% respectively (Table 3).

Table 1: Age distribution of patients with neck masses.

Age group (in years)	Number of patients	%
18-30	24	24
31-40	20	20
41-50	26	26
51-60	21	21
61-70	9	9
>71	0	0

Table 2: Clinical symptoms in patients with neck masses.

Clinical symptoms	Number of patients
Neck mass only	68
Neck mass with fever	10
Neck mass with change in voice	9
Neck mass with difficulty in breathing	4
Neck mass with difficulty in swallowing	8
Neck mass with loss of weight	11
Neck mass with loss of appetite	9

Table 3: Differential diagnosis of neck mass.

Clinical diagnosis	Number of patients
Thyroid swelling	43
Salivary gland swelling	18
Lymph node enlargement	24
Congenital neck masses	8
Others	7
Total	100

Table 4: Correlation between FNAC and HPE.

Neck mass	FNAC		Histopathology	
	No.	%	No.	%
Thyroid swelling				
Multinodular goitre	8	8	10	10
Solitary nodule thyroid	0	0	0	0
Diffuse goitre	0	0	0	0
Colloid goitre	14	14	12	12
Thyroid malignancy	0	0	0	0
Nodular goitre	5	5	4	4
Nodular colloid goitre	2	2	2	2
Cystic nodule thyroid	4	4	4	4
Adenomatous hyperplasia	1	1	2	2
Hashimoto's thyroiditis	1	1	1	1
Follicular adenoma	0	0	2	2
Follicular carcinoma	0	0	2	2
Follicular neoplasm	5	5	0	0
Papillary carcinoma	3	3	4	4
Salivary gland				
Chronic sialadenitis	3	3	2	2
Benign parotid tumour	0	0	0	0
Pleomorphic adenoma of parotid	8	8	8	8
Pleomorphic adenoma of submandibular salivary gland	1	1	1	1
Mucoepidermoid carcinoma of parotid	2	2	2	2

Neck mass	FNAC		Histopathology	
Mucoepidermoid carcinoma of submandibular salivary gland	1	1	1	1
Warthin's tumour	1	1	1	1
Malignancy submandibular salivary gland	0	0	0	0
Malignancy parotid	0	0	0	0
Carcinoma ex pleomorphic adenoma	1	1	0	0
Undifferentiated large cell tumour	0	0	1	1
Adenoidcystic carcinoma	1	1	0	0
Basal cell adenoma	0	0	1	1
Adenocarcinoma	0	0	1	1
Lymph nodes				
Chronic lymphadenitis	0	0	0	0
Tubercular lymphadenitis	9	9	9	9
Granulomatous lymphadenitis	0	0	0	0
Lymphoma	0	0	0	0
Metastatic malignancy	10	10	10	10
Hodgkin's lymphoma	2	2	2	2
Non-Hodgkin's lymphoma	3	3	3	3
Congenital neck mass				
Thyroglossal cyst	2	2	2	2
Branchial cyst	2	2	2	2
Lymphangioma	2	2	2	2
Dermoid cyst	2	2	2	2
Others				
Spindle cell tumour	2	2	2	2
Sebaceous cyst	2	2	2	2
Lipoma	3	3	3	3

Table 5: Sensitivity and efficiency of FNAC in detecting malignancy.

Sensitivity and efficiency		HPE		Total
		Malignant	Benign	
FNAC	Malignant	22	1	23
	Benign	4	73	77
Total		26	74	100

Table 6: Comparison between sensitivity, specificity and accuracy of our study and other study.

Comparison	Present study (%)	Fernandes et al (%)	Poorvey et al (%)	Kapoor et al (%)	Basista et al (%)
Sensitivity	84.2	87.5	81.8	90.4	78.03
Specificity	98.6	100	95.0	98.3	100
Accuracy	95	98.4	92.10	97	89.57

Colloid goitre was most common among FNAC of thyroid swelling and constituted 14 cases out of 43 cases. Metastatic lymphadenopathy (N=10) was the second most common finding on FNAC. Tubercular lymphadenitis was seen in nine patients followed by pleomorphic adenoma of the salivary gland and multinodular goitre in eight patients each. Among eight congenital neck masses, branchial cyst, thyroglossal cyst, dermoid cyst and lymphangioma were diagnosed in two patients each.

Among the 43 thyroid mass, FNAC reports of 32 cases were similar to HPE and the diagnostic accuracy of FNAC in detecting thyroid mass was 74.41%. Out of the 18 salivary gland mass 15 cases had a positive correlation of FNAC with HPE and the diagnostic accuracy was 83.33%. Out of the 24 lymph node mass FNAC had a positive correlation in all the 24 cases, with a diagnostic accuracy of 100%. FNAC reports were similar to HPE reports in all the 8 cases of congenital neck mass and all the 7 cases of miscellaneous neck mass with diagnostic efficacy was 100% (Table 4).

The sensitivity, specificity and accuracy of FNAC in detecting malignant lesions in our study were 84.2%, 98.65% and 95% respectively. PPV and NPV of FNAC in diagnosing malignancy was 95.65% and 94.81% respectively (Table 5).

Chi square statistic was 75.32 and p<0.05 and it was statistically significant.

DISCUSSION

The study included 100 cases aged above 18 years with palpable neck mass, out of which 33 (33%) were male patients and 67 (67%) were female patients (M:F ratio 1:2.03). Similar findings were seen in studies by Kapoor et al and Shariff et al.[4,5]

Out of the 100 cases clinically evaluated neck masses, 43 were from thyroid, 18 were from salivary gland, 24 were from lymph nodes, 8 were congenital neck mass and 7 were miscellaneous mass. Majority of patients were in the age group 41- 50.

Thyroid mass was more common in our study and constituted 43% of cases. Study conducted by Fernandes et al 620 cases were included with histopathological correlation available in only 129 cases.[6] Among the 129 patients, thyroid mass constituted (71.31%), followed by lymph node (22.48%), salivary gland (3.87%) and soft tissue lesions (2.32%). Thyroid mass were most common which is in accordance with our study. The diagnostic accuracy of FNAC in their study was 83.33%, which was similar to this study (86%).

Salivary gland mass accounted for 18% of total number of cases in the present study. Among the salivary gland mass, pleomorphic adenoma of parotid gland was most common and which was in accordance to study conducted by Shariff et al, Tilak et al and Fernandes et al.[5-7] Similar studies conducted by Suryawanshi et al and Cristallini et al had sialadenitis as the most common salivary gland mass which is in contrast to our study.[8,9]

Out of the 18 cases of salivary gland mass FNAC and histopathology were similar in 15 cases and in 3 cases FNAC and HPE reports were different. Similar study conducted by Basista et al 6 out of 7 salivary gland mass was in correlation with histopathology and a diagnostic accuracy of 85% which was comparable to our study.[10]

In our study one case of carcinoma expleomorphic adenoma on cytology turned out to be undifferentiated large cell tumour on histopathology. One case reported as adenoidcystic carcinoma of parotid gland on FNAC was reported to be basal cell adenoma of parotid on HPE. One case of chronic submandibular sialadenitis on FNAC was found to be adenocarcinoma of salivary gland duct on histopathological examination.

In the present study lymph node aspirations were done in 24 cases which constituted 24% of cases. In a study conducted by Basista et al lymph node mass constituted 24% of cases which was similar to our study.[10] In another studies conducted by Tilak et al, Huq et al and Rajbhandari et al lymph node mass was most common.[7,11,12]

Metastatic neck nodes constituted 10 cases (10%) and all of which were correctly diagnosed by FNAC in our study with diagnostic accuracy of 100%. In a study conducted by Suryawanshi et al FNAC was done in 7 metastatic neck nodes out of which histopathological correlation was available in 6 cases and all the six cases were correctly diagnosed with a diagnostic accuracy of 100% which was comparable to our study.[8] Similar study conducted by Poorey et al included 20 cases of metastatic neck nodes had a diagnostic accuracy of 95% by FNAC, which was less compared to our study.[13]

All 9 cases of tubercular lymphadenitis were correctly diagnosed by FNAC in our study with a diagnostic accuracy of 100%. Our study was in accordance with study conducted by Rajbhandari et al who reported a diagnostic accuracy of 100% for tubercular lymphadenitis.[12] Similar study conducted by Shariff et al FNAC correctly diagnosed tubercular lymphadenitis in 18 out of 21 cases which accounts for sensitivity of 85.7% which was less compared to our study.[5]

All 5 lymphoma cases were correctly diagnosed by FNAC in our study with a diagnostic accuracy of 100%. Our study was in accordance with similar studies conducted by Schwarz et al, Suryawanshi et al and Tarantino et al who claimed a diagnostic accuracy of 100%.[8,14,15]

FNAC was done in 8 congenital swellings and all the 8 HPE reports were in correlation with FNAC reports. The diagnostic accuracy of FNAC was 100% in congenital swellings which is in accordance with study conducted by Shariff et al.[5]

Aspiration was done in 7 other cases of palpable neck mass and all the 7 HPE reports correlated to FNAC reports. The diagnostic accuracy of FNAC was 100% in other neck masses and specificity was 100%. Comparison was not possible in this group as the sample size was very small.

Sensitivity and efficiency of FNAC in detecting malignancy

In diagnosing malignancy sensitivity of FNAC in our study was 98.5% and specificity was 84.62% and efficiency was 95.2%. PPV and NPV was 94.81 and 95.65% respectively. Our study was in accordance with study conducted by Suryawanshi et al, Fernandes et al, Poorey et al and Tandon et al.[8,6,13,16] Suryawanshi et al in a similar study got a sensitivity, specificity, PPV and

NPV of 80%, 91.91%, 88.88% and 97.86% respectively (Table 6).[8]

Limitations

Limitations of FNAC were false positive and false negative results particularly with small and solid tumours. False positive results can be due to regenerative epithelial hyperplasia. False negative results can be due to improper techniques and haemorrhagic or necrotic areas devoid of diagnostic cells. Another important factor for false negative results were inadequate aspirate from the mass. Even though the accuracy of FNAC was high in diagnosing cervical lymphadenopathy, immune-phenotyping and genotyping was important to provide accurate diagnosis of malignant lymphoma. Another most important limitation of FNAC was its inability to distinguish between follicular neoplasms and malignant follicular lesions.

CONCLUSION

FNAC is an extremely good and minimally invasive first line investigation of choice for the patients with neck mass. FNAC is a safe and relatively atraumatic procedure, which can be done on an outpatient set up and is acceptable to most of the patients. There was almost a fair correlation between FNAC and histopathology. The diagnostic accuracy of FNAC in our study is 86%. The sensitivity and specificity of FNAC for detecting malignancy in our study is 84.2% and 98.5%. Hence from our study we conclude that FNAC is simple and safe first line of management for different neck masses, but histopathology remains gold standard.

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