Original Research Article

A clinico-pathological and clinico-radiological study of anterior neck swellings

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ABSTRACT

Introduction

Swelling in anterior neck is a common cause of visit to ENT OPD. Most of the times it is easy to diagnose an anterior neck swelling by clinical, radiological, cytological and histo-pathological examinations. However, if there is any discrepancy or doubt, then there should be a clinico-pathological and clinico-radiological inter-departmental discussion to finalize a diagnosis.

Methodology

The present study was a prospective longitudinal study conducted in ENT Department of a teaching hospital of western India, from October 2018 to September 2020. The evaluation of patients included clinical, radiological, cytological and histo-pathological examinations. All the data was tabulated in Microsoft excel sheet and analyzed using descriptive statistics.

Results

In our study, the youngest patient was 4 years old and the eldest patient was of 84 years. The mean age of patients was 40±18.4 years. Out of 150 patients studied, there were 46 males (31%) and 104 females (69%), with female to male ratio of 2.2: 1. Out of 150 cases, 87 (58%) cases were thyroid swellings. Considering histopathology data as gold standard, we found that sensitivity of USG was 79.48 %, that of FNAC was 92.31% and clinical examination was 92.31% with respect to diagnosis of thyroid swellings, while for non-thyroid swellings, the sensitivity of USG was 50 %, FNAC was 62.5% and clinical was 50%.

Conclusions

In our study, thyroid swelling was the most common anterior neck swelling, more common in females. Discrepancy in clinico-radio-cyto-histological diagnosis was higher in cases of malignant anterior neck swellings.

Keywords: Anterior neck swelling, cytology, histopathology, thyroid swelling, ultrasonography.

INTRODUCTION

Swelling in neck is a condition which an ENT clinician routinely encounters. The common neck swellings are lymphadenopathies (specific and non-specific, acute and chronic), metastatic carcinoma, lymphoma, thyroid swellings (goiter, nodules and cysts) and salivary gland swellings (sialadenitis, cysts, adenomas and carcinomas). The less common causes of neck swellings are carotid body tumor, branchial cyst, thyroglossal cyst, cystic hygroma, pharyngeal pouch and lumps arising from skin appendages.[1] Most thyroid swellings though benign, carry a 5% risk of malignancy.[2]

Fine needle aspiration cytology (FNAC) is a simple, quick and cost-effective method to sample superficial masses found in the neck. Masses located within the region of head and neck including salivary glands and thyroid masses can be readily diagnosed using this technique.[3,4] Early differentiation of benign from malignant pathology greatly influences the planned treatment.[4] There is no evidence that the tumor spreads through the skin track created by the fine hypodermic needle used in this technique.[5] FNAC can be both diagnostic and therapeutic in cystic swellings.[6]

Ultrasonography (USG) is the single most valuable imaging modality in the evaluation of the neck swellings. In patients with neck swellings, gray scale and color doppler USG are used to evaluate its sonographic features, including size, shape, echogenicity (hypoechoic or hyperechoic), and composition (cystic, solid, hard or soft) and to determine the presence of coarse or fine calcification, a halo and margins, and internal blood flow.[7]

Many times, there is discrepancy between clinical, radiological and pathological findings resulting in delay in management. By this study we can know the incidences when the clinical, radiological and pathological findings do not match. Such discrepancies can be solved by inter-departmental meetings and case discussions to correlate these factors in order to make diagnosis of neck swellings in patients more accurate. The present study was conducted with the objectives to study and correlate the clinical, radiological and pathological findings of anterior neck swellings.

MATERIAL AND METHODS

The present study was a prospective longitudinal study conducted in ENT Department of a teaching hospital of western India, from October 2018 to September 2020, with the objective to correlate clinical, pathological and radiological findings of anterior neck swellings.

Inclusion Criteria: All patients presenting with anterior neck swelling in ENT Department.

Exclusion Criteria

1) Patient with debilitating disorder/ terminally ill.
2) Patient not willing to get enrolled in study.

Institutional Ethics Committee approval was taken before starting study (GAIMS/ IEC/ APPROVAL/ 13/ 2018, dated 24.10.2018). Initially, clinical evaluation of all patients included complete ENT and Head & Neck examination. Ultrasonography (USG) of neck was the initial radiological investigation done followed by Computed Tomography (CT scan) if required. FNAC was done for all swellings and histo-pathological examination (HPE) was done for the surgical specimens. All the data was tabulated in Microsoft excel sheet and analyzed using descriptive statistics.

RESULTS

Table-1: Age and Gender distribution

Age Group (years)	Female (n)	Male (n)	Grand Total
< 10	3	3	6
10-19	10	4	14
20-29	13	11	24
30-39	26	4	30
40-49	19	5	24
50-59	14	3	17
60-69	17	13	30
70-79	2	2	4
> 80	0	1	1
Total	**104**	**46**	**150**

In our study, the youngest patient was 4 years old and the eldest patient was of 84 years. The mean age of patients was 40±18.4 years. Out of 150 patients studied, there were 46 (31%) males and 104 (69%) females, with female to male ratio of 2.2: 1. So, in our study anterior neck swellings were more common in females (Table-1). In our study, 123 cases (82%) presented with single swelling while 27 cases (18 %) had more than one swelling. 117 patients (78%) had midline swelling. 18 (12%) patients had a swelling on the right side, 11 (7%) on left side of neck, 3 (2%) had bilateral while 1 patient had a disuse swelling. So, in our study most common were midline neck swellings. 86 (58%) swellings in this study were solid in consistency while 41 swellings (27%) were cystic in consistency. 13 swellings were of hard consistency, 4 swellings were of soft consistency and 6 swellings were of matted consistency.

In our study, out of 150 cases, 87 (58%) cases were thyroid swellings. 50 cases were lymph node swellings, 4 cases were of abscess, 3 cases were of thyroglossal cyst, 3 cases were of vascular swellings and 3 cases found to be inconclusive on clinical examination. According to cytological diagnosis, out of 150 cases, thyroid swellings were found in 87 cases, out of which 3 were adenomatous, 56 colloid nodules, 13 inflammatory changes, 9 malignant and 6 cases were found to be inconclusive thyroid swellings.

Table-2: Distribution of cases according to clinical, radiological and pathological diagnosis

	Clinical n=150	Radiological n=150	FNAC n=150	Histopathology n=47
Thyroid				
Inflammatory	16	9	13	5
Non-Inflammatory	62	69	59	28
Malignant	9	7	9	6
Inconclusive	0	2	6	-
	87			39
Lymph node				
Reactive	19	29	24	1
Tuberculous	6	8	15	-
Metastatic	1	6	9	2
Inconclusive	24	7	2	-
	50			3
Others				
Thyroglossal Cyst	3	2	3	3
Abscess	4	2	5	-
Vascular	3	3	2	2
Sialadenitis	-	-	2	-
Inconclusive/ Others	3	6	1	-
	13			5

According to cytology of 50 cases of lymph node swellings, 24 cases were of reactive type of lymph node, 15 cases were of tuberculous, 2 cases of indeterminate lymph nodes, while 9 cases were of metastatic swellings.

In our study, out of 150 cases, 47 cases underwent surgical excision and histopathological examination (HPE). In HPE, 39 cases were found to be thyroid swellings of which 24 cases were of colloid goiter, 6 cases were of malignant changes, 5 cases were of thyroiditis, 3 cases were of multinodular goiter, while 1 case was of adenomatous thyroid lesion (Table-2).

Table-3: Sensitivity for clinical, cytological and radiological diagnosis with HPE as gold standard for thyroid neck swellings.

	HPE N=39	Clinical		Radiology		FNAC	
		True positive	Sensitivity	True positive	Sensitivity	True positive	Sensitivity
Benign	**33**	33	100.00%	28	84.84%	33	100.00%
Malignant	**6**	3	50.00%	3	50%	3	50%
Overall Sensitivity		36	92.31%	31	79.48%	36	92.31%

Considering histopathology data as gold standard, comparing the results of USG and FNAC with the same, we found that sensitivity of USG was 79.48 %, that of FNAC was 92.31% and clinical was 92.31% with respect to thyroid swellings (Table-3).

Table-4: Sensitivity for clinical, cytological and radiological diagnosis with HPE as gold standard for non-thyroid anterior neck swellings.

	HPE N=8	Clinical		FNAC		Radiology	
		True positive	Sensitivity	True positive	Sensitivity	True positive	Sensitivity
Inflammatory	**1**	0	00%	1	100%	0	00%
Malignant	**2**	0	00%	1	50%	1	50%
Thyroglossal Cyst	**3**	2	66%	2	66.66%	1	33.33%
Vascular Malformation	**2**	2	100%	1	50%	2	100%
Overall Sensitivity		**4**	**50%**	**5**	**62.5%**	**4**	**50%**

Considering histopathology data as standard, comparing the results of USG and FNAC with the same, we found that sensitivity of USG was 50 %, FNAC was 62.5% and clinical was 50% for non-thyroid swellings (Table-4). However, since histopathology was done in only 8 cases (non-thyroid), the sensitivity should be interpreted with caution.

DISCUSSION

A total of 150 patients with anterior neck swellings were included in this study. Clinical examination, USG and FNAC was done for all patients. The diagnosis according to USG and FNAC was correlated in our study. Out of 150 patients, 46 patients were males and 104 patients were females. So, in our study anterior neck swelling was more common in females. Our observation regarding the gender

preponderance matches with the majority of studies that have been conducted earlier. Table-5 shows previous studies that have shown thyroid swelling preponderance in females.

Table-5: Sex distribution of thyroid swellings in various studies

S. No.	Authors	Total Cases	Male	Female	Male: Female
1	Silverman JF et al[8] (1986)	295	25	270	1:10.8
2	Sekhri T et al[9] (2001)	300	44	256	1:6
3	Kamal et al[10] (2002)	200	27	173	1:6.4
4	Jain S et al[11] (2014)	110	18	92	1:5.1
5	**Present study**	**87**	**13**	**74**	**1:5.6**

Thyroid lesions are more common in females. The possible reason for this is due to the presence of estrogen receptors in thyroid gland in females. For the same reason, the level of thyroid hormones also changes according to the phase of menstruation. In our study, the youngest patient was 4 years old and the eldest patient was 84 years. The mean age of patients in our study was 40±18.4 years. Silverman et al, Jain et al and Ankush et al reported average age of patients as 44.80, 38.5 and 39 years respectively.[8,11,12] Table-6 shows the most common neck swellings in various previous studies. In our study the most common anterior neck swelling was thyroid swelling followed by lymph nodes.

Table-6: Type of neck swellings in various studies

	Present study	Basista[13]	Tariq et al[14]	El hag et al[15]	Kamal et al[16]	Irfana A et al.[17]
Place of study	Bhuj	Rajasthan	Peshawar	Saudi Arabia	Mangalore	Lahore
No. of patients	150	55	50	225	160	845
Most common neck swelling	Thyroid	Thyroid	TB lymphadenitis	Reactive lymphadenitis	Thyroid	TB lymphadenitis
2nd most common swelling	Lymph node	Lymph node	Reactive lymphadenitis	TB lymphadenitis	Cervical lymphadenitis	Malignancy

In our study, out of the 39 thyroid swelling aspirates, 36 cytological reports were similar to HPE reports and 3 reports did not match with HPE reports (2 colloid goitre with cystic degenerative changes turned out to be malignant on HPE). In 1 case of malignant thyroid lesion on HPE, USG was inconclusive so CT scan was done which was suggestive of hyper dense right lobe thyroid with displacement of trachea.

Table-7: Sensitivity of FNAC for neck swellings in different studies

	Present study	Soni et al[18]	Howlett De et al[19]	Richard Schwarz et al[20]	James Edward M et al[21]	Tilak V Dhaded et al[22]
Total no of patients	150	68	712	182	500	550
Duration of study	2 years	1 year	1 year	6 years	-	1.5 years
Sensitivity	92.31 (only thyroid swellings)	83.01	89	-	94.5	90.91

In our study, sensitivity of FNAC for diagnosis of benign thyroid lesion was 100 % but for malignant lesion was 50 % with an overall sensitivity of 92.31% (Table-7). In a study by Richard Schwarz et al., the authors evaluated 182 patients.[20] In their study, the sensitivity of FNAC for metastatic carcinoma was 92% and for lymphoma was 100%. In their study, the accuracy was highest for the malignant salivary group and lowest for the benign salivary gland group. In our study sensitivity of FNAC for benign thyroid swelling was 100% but for malignant thyroid swellings was 50%. Similarly, James Edward M., et al, observed an overall accuracy for FNAC of 94.5% and accuracy for thyroid swellings was 95%.[21] The diagnosis of lymphomatous lesion had a lower accuracy of 75%.

CONCLUSIONS

In our study, thyroid swelling was the most common anterior neck swelling, more common in females. Discrepancy in clinico-radio-cyto-histological diagnosis was higher in cases of malignant anterior neck swellings. None of the pre-operative investigations in isolation is 100% specific for differentiating a benign from a malignant lesion in the neck. Most of the times it is easy to diagnose an anterior neck swelling by clinical, radiological, cytological and histo-pathological examinations. However, if there is any discrepancy or doubt, then there should be a clinico-pathological and clinico-radiological inter-departmental discussion to finalize a diagnosis.

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