

RETROSPECTIVE STUDY OF THYROID SWELLING- ROLE OF FNAC AND HISTOPATHOLOGY IN DIAGNOSIS

V. Bhanumathi¹, S. Venkata Ramana Rao²

¹Associate Professor, Department of Surgery, Medici Institute of Medical Sciences, Ghanpur, Telangana.

²Professor, Department of ENT, Medici Institute of Medical Sciences, Ghanpur, Telangana.

ABSTRACT

BACKGROUND

The human neck is so designed that a swelling of normal structure or produce of abnormal one is readily apparent. Neck swellings may arise from any one of the 300 lymph nodes, skin and soft tissue structures which are essentially lateral neck swelling.

MATERIALS AND METHODS

We have conducted a retrospective study of 215 cases of neck masses admitted in MIMS under surgical wards from 2011 - 2016. Among these, 104 cases are of thyroid origin and 111 cases are of non-thyroid origin. In the present study, age and sex distribution incidence and diagnostic accuracy of FNAC and histopathology for thyroid swellings is done. Study design is a descriptive study.

RESULTS

In our study, out of 1,82,587 OPD patients who attended the surgical and ENT from 2011 - 2016, 104 swellings are of thyroid origin with an incidence of 0.057%. Thyroid nodules are common in women; 80% - 90% of thyroid swellings are benign and around 10% - 20% are malignant. Male-to-female ratio ranges from 1:16 (Adenoma of thyroid) to 1:1 (thyroglossal cyst). The common presentation of thyroid swelling is multinodular goitre and adenoma of thyroid. The accuracy of FNAC in our study is 95.16%.

CONCLUSION

Early detection of a goitre will lead to different clinical approach from detection of follicular adenoma or papillary carcinoma. Although, the technique of FNAC is simple and cheap and cost-effective, it is an effective screening test for selecting cases for surgery.

KEYWORDS

Thyroid Swelling, Adenoma Thyroid, Fine Needle Aspiration Cytology, Papillary Carcinoma Thyroid, Follicular Carcinoma Thyroid.

HOW TO CITE THIS ARTICLE: Bhanumathi V, Rao SVR. Retrospective study of thyroid swelling- role of FNAC and histopathology in diagnosis. J. Evolution Med. Dent. Sci. 2017;6(77):5502-5504, DOI: 10.14260/Jemds/2017/1194

BACKGROUND

In general, surgical practise of various types of neck swellings are encountered. Thyroid swellings account for significant number of cases. In addition to cosmetic deformity, thyroid swellings may also cause pressure symptoms on trachea and oesophagus depending upon the size and type of swelling. Sometimes, the swelling of the thyroid may be due to underlying malignancy, in which case prior FNAC will help to decide whether to go for hemi-thyroidectomy or total thyroidectomy depending upon the type of carcinoma, for example follicular or papillary carcinoma.

Rugu and Joham Vent¹ in 1870 advocated surgical biopsy as an essential diagnostic tool. Presently, this technique is practised throughout the world. A comparative study between FNAC and histopathology was done by Blosch² and found the accuracy of FNAC was around 91.6%.

A similar study was conducted by Mundasad et al³ and found sensitivity of FNAC around 52.6% and specificity around 86.6% and accuracy of 79.1% for thyroid malignancy.

Financial or Other, Competing Interest: None.

Submission 14-08-2017, Peer Review 14-09-2017,

Acceptance 19-09-2017, Published 25-09-2017.

Corresponding Author:

Dr. S. Venkata Ramana Rao,

8-53/2,

North Kamalanagar,

ECIL Post, Hyderabad-500062,

E-mail: syamjivenkat19@gmail.com

DOI: 10.14260/jemds/2017/1194



Another study was conducted by Handa et al,⁴ which revealed FNAC sensitivity of around 97%.

Objectives

To study the incidence of thyroid swellings attending in our tertiary hospital, to analyse the incidence of thyroid swellings for different pathological entities and to study the role of FNAC in comparison with histopathology in diagnosis of thyroid swelling.

MATERIALS AND METHODS

A descriptive study of thyroid swelling is carried out between 2011 - 2016. Source of data is from the records during the study period. Various thyroid swellings are studied for the history and clinical presentation. All cases are investigated with FNAC, ultrasound, thyroid function tests etc. and underwent surgery and specimen is sent for histopathological examination. The results of FNAC are compared with histopathological reports and analysed.

RESULTS

In our study, out of 1,82,587 OPD patients who attended the surgical and ENT from 2011 - 2016, 104 swellings were of thyroid origin with an incidence of 0.057%. Among 215 cases, 104 cases were of thyroid origin and remaining 111 cases were neck swellings of other than thyroid. The incidence of neck swellings of thyroid is 48.37% and incidence of neck swellings other than thyroid is 51.63%.

Benign 97 Cases	Total	Male	Female	Ratio	Incidence	Peak Age Incidence
Multinodular goitre	37	5	32	1:6.4	35.57%	30-39 yrs.
Adenoma of thyroid	34	2	32	1:16	32.69%	30-39 yrs.
Hashimoto's thyroiditis	14	1	13	1:13	13.46%	30-39 yrs.
Colloid goitre	8	1	7	1:7	7.69%	40-59 yrs.
Thyroglossal cyst	4	2	2	1:1	3.84%	0-9 yrs. and 20-29 yrs.
Malignant 7 Cases						
Papillary carcinoma	5	2	3	2:3	4.8%	10-59 yrs.
Follicular carcinoma	1	0	1	-	0.96%	60-69 yrs.
Medullary carcinoma	1	1	0	-	0.96%	30-39 yrs.

Table 1. Age, Sex Incidence and Peak Age Incidence of different Thyroid Swellings

Among thyroid neck swellings, benign swellings were 97 contributing to 93.27% and malignant swellings were 7 contributing to 6.73%.

Out of 104 Cases of Thyroid Swellings, the following findings were observed

Nodular goitre was seen in 37 cases contributing to 35.57% with male and female ratio of 1: 6.4 and peak age incidence of 30 - 39 yrs., adenoma of thyroid in 34 cases contributing to 32.69% with male and female ratio of 1: 16 and peak age incidence of 30 - 39 yrs., Hashimoto's thyroiditis seen in 14 cases contributing to 13.46% with male and female ratio of 1:13 and peak age incidence of 30 - 39 yrs., colloid goitre seen in 8 cases contributing to 7.69% with male and female ratio of 1:7 and peak age incidence of 40 - 59 yrs., thyroglossal cyst seen in 4 cases contributing to 3.84% with male and female ratio of 1: 1 and peak age incidence of 0 - 9 yrs. and 20 - 29 yrs.

Among malignant swellings which were 7 in number, papillary carcinoma of thyroid seen in 5 cases contributing to 4.8% of malignant thyroid tumours. Follicular carcinoma was seen in one case and medullary carcinoma seen in one case contributing to 0.96% each.

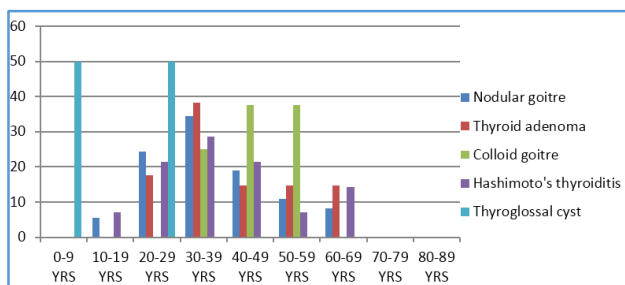


Figure 1. Peak Age Incidence of different Thyroid Swellings

The incidence of thyroid carcinoma in our study is highest for papillary carcinoma thyroid, which is 71.44%. The incidence of follicular and medullary carcinoma is 14.28%. The incidence of thyroid cancers is compared with the study conducted by Shefali Agrawal and RS Rao et al.⁵

Type of Thyroid Carcinoma	Shefali Agrawal and RS Rao et al 1969 - 1993	MIMS
Follicular	34%	14.28%
Papillary	49%	71.44%
Anaplastic	4.7%	-
Medullary	7.5%	14.28%

Table 2. Comparative Incidence of Thyroid Carcinoma

All cases were investigated with FNAC, ultrasound and underwent surgery and specimen is sent for histopathological

examination. The results of FNAC are compared with histopathological reports and analysed.

The results of FNAC and histology are compared with literature. The accuracy of FNAC in our study is 95.16% when compared with Hall et al⁶ which is 89%, Godinho-Matos et al⁷ which is 83% and Holleman et al⁸ which is 65%.

Reference	No. of FNAs	No. of Histology	False -ve (n)	False +ve (n)	Accuracy (%)
Hall et al	795	72	5	7	89
Godinho-Matos et al	144	28	4	4	83
Holleman et al	112	53	2	1	65
MIMS	104	104	5	4	95.16

Table 3. Comparative Accuracy of FNAC with Previous Studies

No. of FNAC	False Negative	False Positive	True Positive	True Negative	Sensitivity	Specificity	PPV	NPV
104	5	4	80	15	94.11%	78%	95.23%	75

Table 4. Analysis of FNAC of different Thyroid Swellings

The results of different thyroid swellings (104), the no. of cases of true positive is 80 and false positive is 4. The true negatives are 15 and false negatives are 5 with a sensitivity of the test being 94.11 and specificity of 78%. PPV of 95.23 and NPV of 75.

DISCUSSION

Neck swelling is one of the common presentation in general practise. Among 215 cases, 104 cases were of thyroid origin and remaining 111 cases were neck swellings of other than thyroid. The incidence of neck swellings of thyroid is 48.37% and incidence of neck swellings other than thyroid is 51.63%. Among thyroid neck swellings benign swellings were 97 contributing to 93.27% and malignant swellings were 7 contributing to 6.73%.

Thyroid nodules are common in women and seen in 4% - 7% of adult population.⁹ Most of the thyroid swellings are benign and only around 10% - 20% are malignant.^{10,11} Male-to-female ratio for different thyroid swellings range from 1:16 (adenoma of thyroid) to 1:1 (thyroglossal cyst). Peak age incidence for multinodular goitre, adenoma of thyroid and Hashimoto's thyroiditis is around 30 - 39 yrs., whereas for

thyroglossal cyst it is 0 - 9 yrs. The common type of presentation of thyroid swelling is multinodular goitre followed by adenoma of thyroid. Papillary carcinoma of thyroid is seen with peak age incidence of 10 - 59 yrs., whereas follicular carcinoma is seen around 60 - 69 yrs. and medullary carcinoma is seen with peak age incidence of 30 - 39 yrs.

Among the thyroid nodules, 0.1% to 20% of nodules that are surgically resected contain malignancy. Some people of thyroid carcinoma die of delayed diagnosis, false negative FNAC and inadequate surgery. Thyroid surgeries carry certain risks. Hence, accurate screening tests are needed to select the nodules that require surgery. Very few diagnostic tests differentiate benign and malignant thyroid swellings. Ultrasound of thyroid can detect solid from cystic lesions, but all cystic lesions are not benign.¹² Thyroid isotope scan using technetium detect hot or cold nodule. Hot nodules are functioning and usually benign, but cold nodules are non-functioning and around 20% may be malignant. Thallium scans also give high false positive results and carries high radiation burden and should be used only for followup after thyroid malignancy.^{13,14} Fine needle aspiration cytology was first described in 1930 by Martin and Ellis.⁹ It is a useful procedure for the detection of type of thyroid nodule and whether it requires surgery and if it is malignant the type of surgery needed.

FNAC is inexpensive and is performed on outpatient basis and has very few complications like absence of tumour implants along the needle tract.¹³ Percentage of inadequate specimen in FNAC ranges from 0% - 25%.¹⁵ When pathologists reporting biopsy does aspiration personally, the percentage of inadequate specimen reduces. Mazzaferri¹⁶ evaluated that one needs to do 20 - 35 aspirates annually to gain adequate experience to perform accurate FNAC. The complications of total thyroidectomy include hypothyroidism, parathyroid damage, post-operative haemorrhage and wound infection.¹⁷ The accuracy of FNAC in our study is 95.16% when compared with Hall et al which is 89%, Godinho-Matos et al which is 83% and Holleman et al which is 65%. FNAC's are false positives and false negatives. Negative FNAC does not exclude malignancy and strong clinical evidence of malignancy should always override.

CONCLUSION

Neck swelling is one of the common presentation in general practise. The incidence of neck swellings of thyroid is 48.37% and incidence of neck swellings other than thyroid is 51.63%. Among thyroid neck swellings, benign swellings were 97 contributing to 93.27% and malignant swellings were 7 contributing to 6.73%.

Thyroid nodules are common in women and seen in 4% - 7% of adult population.⁹ Most of the thyroid swellings are benign and only around 10% - 20% are malignant.^{10,11} Male-to-female ratio for different thyroid swellings range from 1:16 (adenoma of thyroid) to 1:1 (thyroglossal cyst). Peak age incidence for multinodular goitre, adenoma of thyroid and Hashimoto's thyroiditis is around 30 - 39 yrs., whereas for thyroglossal cyst it is 0 - 9 yrs. The common type of presentation of thyroid swelling is multinodular goitre followed by adenoma of thyroid. Papillary carcinoma of thyroid is seen with peak age incidence of 10 - 59 yrs., whereas follicular carcinoma is seen around 60 - 69 yrs. and

medullary carcinoma is seen with peak age incidence of 30 - 39 yrs.

FNAC is inexpensive and is performed on outpatient basis and has very few complications like absence of tumour implants along the needle tract.¹³ Percentage of inadequate specimen in FNAC ranges from 0% - 25%.¹⁵ The sensitivity of FNAC in our study being 94.11 and specificity of 78%. The accuracy of FNAC in our study is 95.16%. Negative FNAC does not exclude malignancy and strong clinical evidence of malignancy should always override.

REFERENCES

- [1] Rugu C. Needle aspiration biopsy. *Am J Pediatr* 1970;62:565-8.
- [2] Bloch M. Fine needle aspiration biopsy of head & neck masses. *Otolaryngol Head Neck Surg* 1997;89:62-8.
- [3] Mundasad B, Mcallidter I, Carson J. Accuracy of fine needle aspiration cytology in diagnosis of thyroid swelling. *Internet J Endocrinol* 2006;2(2):23-5.
- [4] Handa U, Garg S, Mohan H. Role of fine needle aspiration cytology in diagnosis and management of thyroid lesions. *Indian J Pediatr* 2008;25(1):13-7.
- [5] Agrawal S, Rao RS, Parikh DM, et al. Histologic trends in thyroid cancer 1969-1993: a clinico-pathologic analysis of the relative proportion of anaplastic carcinoma of the thyroid. *J Surg Oncol* 1996;63(4):251-5.
- [6] Hall TL, Layfield LJ, Phillippe A, et al. Sources of diagnostic error in fine needle aspiration of the thyroid. *Cancer* 1989;63(4):718-25.
- [7] Godinho-Matos L, Kocjan G, Kurtz A. Contribution of fine needle aspiration cytology to diagnosis and management of thyroid disease. *J Clin Pathol* 1992;45(5):391-5.
- [8] Holleman F, Hoekstra JBL, Ruitenbergh HM. Evaluation of fine needle aspiration cytology in the diagnosis of thyroid nodules. *Cytopathology* 1995;6(3):168-75.
- [9] Martin HE, Ellis EB. Biopsy by needle puncture and aspiration. *Ann Surg* 1930;92(2):169-81.
- [10] Miller JM, Hamburger JI, Kini SR. The impact of needle biopsy on the preoperative diagnosis of thyroid nodules. *Henry Ford Hosp Med* 1982;96:221-32.
- [11] Kendall CH. Fine needle aspiration of thyroid nodules: three years' experience. *J Clin Pathol* 1989;42(1):23-7.
- [12] Rosen IB, Azadian A, Walfish PG, et al. Ultrasound-guided fine-needle aspiration biopsy in the management of thyroid disease. *Am Surg* 1993;166:346-9.
- [13] Franklyn JA, Sheppard MC. The value of imaging in the diagnosis of thyroid cancer (editorial). *Nuclear Med Comm* 1992;13(9):641-3.
- [14] Choo C. Cost-effectiveness of nuclear medicine (letter). *Lancet* 1995;345:512.
- [15] Mandreker SR, Nadkarni NS, Pinto RG, et al. Role of fine needle aspiration cytology as the initial modality in the investigation of thyroid lesions. *Acta Cytol* 1995;39(5):898-904.
- [16] Mazzaferri EL. Management of a solitary thyroid nodule. *N Engl Med* 1993;328(8):553-9.
- [17] Ready AR, Barnes AD. Complications of thyroidectomy. *Br J Surg* 1994;81(11):1555-6.