



SOLITARY THYROID NODULE: CYTOPATHOLOGY AND HISTOPATHOLOGY

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ABSTRACT

Introduction: A thyroid nodule which is a palpable localised solitary swelling in the thyroid gland is a common clinical presentation for a variety of pathological disorders majority being asymptomatic. 5% of them are malignant which require extended surgery, hence correct preoperative diagnosis is mandatory. **Aims and Objectives:** To study & correlate cytopathology and histopathology of solitary thyroid nodule. **Patients and methods:** A Prospective study in the department of pathology, MIMS, Medchal from October 2011 to October 2013

evaluated 45 patients. The patients included those who presented with solitary thyroid nodule in ENT and surgery departments. They were evaluated with thyroid profile, Fine Needle Aspiration Cytology (FNAC) & finally Histopathology in few of them. **Results:** 45 cases were studied which had female preponderance (Female n=39; 86.6 % Vs. male n=6; 13.3%). The youngest patient of our series was a girl of 18 years with colloid goitre and the oldest patient was a man of 69 years, a case of follicular carcinoma. the most common non neoplastic lesion encountered in FNAC was colloid goitre 10(22.2%) and neoplastic being follicular neoplasm 19(42.2%) .Thyroid lobectomy was carried in 39 (86.6 %) patients, while the remaining 6(13.3%) underwent subtotal thyroidectomy. On Histopathological

examination commonest non neoplastic lesion was 8(17.7%) Hashimotos thyroiditis and neoplastic lesion was Follicular adenoma 20(44.4%) Sensitivity . specificity, and accuracy of FNAC for detection of neoplasm were 73%, 100% and 100%. **Conclusion:** The solitary thyroid nodule is a relatively common clinical finding which has a small but significant risk of malignancy. Fine needle aspiration has become the routine initial procedure. Cytological diagnosis is reliable, safe, simple, inexpensive, and reduces the number of unnecessary operations. But confirmation of FNAC diagnosis requires detailed histopathological examination to rule out vascular or capsular invasion.

KEYWORDS: Thyroid nodule, colloid goitre, Hashimotos thyroiditis, Follicular adenoma.

INTRODUCTION

Thyroid gland is unique among endocrine organs as it is the largest endocrine gland in the body and the first to develop in fetal life. Even after 100 years, thyroid gland has been the subject of intense research and considerable attention due to the vast array of developmental, inflammatory, hyperplastic and neoplastic disorders which are exceedingly common in clinical practice.^[1]

Thyroid nodules present a challenge in their diagnosis, evaluation, and management. Often these abnormal nodules are large in size and develop at the edge of the thyroid gland, so that they are felt or seen as a lump in front of the neck. The prevalence of these nodules in a given population depends on a number of factors like age, sex, diet, iodine deficiency, and even therapeutic and environmental radiation exposure. Prevalence increases with age, with spontaneous nodules occurring at a rate of 0 - 0.8% per year, beginning early in life and extending into the eighth decade.^[2]

Thyroid nodules are frequently-encountered entities in clinical practice, occurring with a prevalence of 4% by palpation, 33% to 68% by ultrasound examination and 50% on autopsy series.^[3,4,5,6] While approximately 95% of thyroid nodules are benign, certain historical, laboratory, and sonographic features raise the suspicion for malignancy.^[7]

True solitary thyroid nodules (STN) occur in 4 - 7% of the adult population. They are present in 5% of persons at an average of 60 years. They are more common in females (6.4%) as compared to males (1.5%) and this predisposition exists throughout all age groups. Many palpable thyroid nodules, thought to be solitary, are actually part of a multinodular thyroid

gland. In general, a nodule must reach a size of 1 cm in diameter to be detectable by palpation. Most thyroid nodules are benign hyperplastic lesions, but 5 - 20% of these nodules are true neoplasms. Solitary thyroid nodule first seen can be due to asymmetrical enlargement of one lobe as in chronic lymphocytic thyroiditis (i.e., Hashimoto's thyroiditis), simple goiter, or unilateral agenesis, or rarely due to developmental errors such as ectopic tissue.^[8]

History is rarely helpful in differentiating benign and malignant nodules. An exception is a history of head and neck irradiation in childhood or teenage years. This is by far the greatest risk factor for thyroid malignancy, with a risk of carcinoma in nodules in this group of 35%–40%, in contrast to 5% in the general population.^[9]

The majority of clinically diagnosed thyroid swelling are nonneoplastic; only 5%–30% are malignant and require surgical intervention.^[10]

Aim of the study: To study cytopathology and histopathology of solitary thyroid nodule. To correlate findings of cytopathology and histopathology of solitary thyroid nodule.

MATERIALS AND METHODS

Prospective study was conducted in MediCiti Institute of Medical Sciences(MIMS) for duration of 2 yrs from year October 2011 to November 2013.45 cases of solitary nodule thyroid were included in this study after an informed consent from the patients. All patients were evaluated by thorough clinical examination followed by routine investigations, thyroid function tests, ultrasonography, FNAC and histopathological examination. The cytology reports were compared with the histological diagnoses. All the patients were recorded for their demographic features i.e., age, sex, and address. History of present illness with regard to symptoms and duration was recorded followed by general & local examination. All routine investigations and serum T3, T4, and TSH levels performed by Radioimmunoassay (RIA). All these 45 patients admitted in departments of ENT and surgery were subjected to lobectomy/ thyroidectomy (hemi/subtotal thyroidectomy). The surgical specimens were sent for histopathology.

The results of FNAC and histopathology were compared. Histopathology was taken as gold standard.

RESULTS AND OBSERVATIONS

A total of 45 patients with solitary thyroid nodule (fig.1) were identified: female preponderance was noted with 39 (86.6%) cases while only 6 (13.3%) cases were encountered in males .

The patients included in this study were aged from 10-70yrs. The commonest age group affected was 31-40 yrs 20 (44.4%) and the least affected were in the age group 10-20yrs 1(2.2%) and 61-70yrs 1(2.2%).

FNAC results revealed 10 (22.2%) cases as colloid goitre, 8(17.7%) as hashimotos thyroiditis. 19(42.2%) as follicular neoplasm ,4(8.8%) as Papillary carcinoma and 2(4.4%) as anaplastic carcinoma, 2(4.4%) medullary carcinoma.

Histopathology results were 20 (44.4%) Follicular adenoma, 2(4.4%) follicular carcinoma. 8(17.7%) Hashimotos thyroiditis(fig.2) , 7 (15.5%) colloid goitre , 4(8.8%) Papillary carcinoma (fig.3), 2(4.4%) anaplastic carcinoma, 2(4.4%) medullary carcinoma(fig.4).

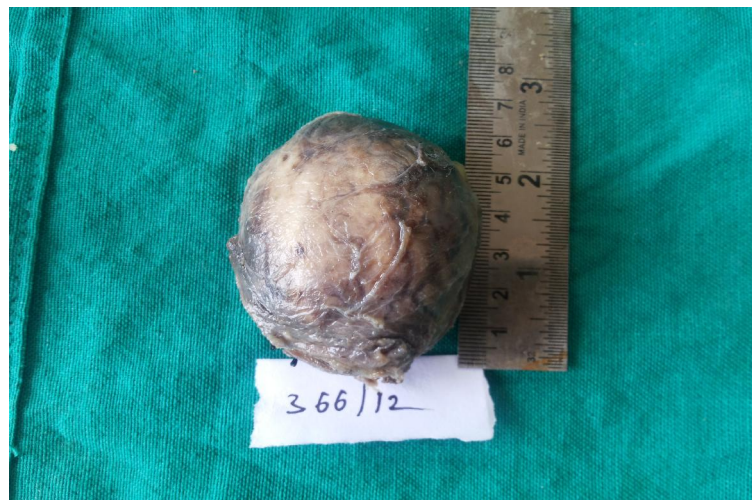


Fig.1 Gross solitary thyroid nodule

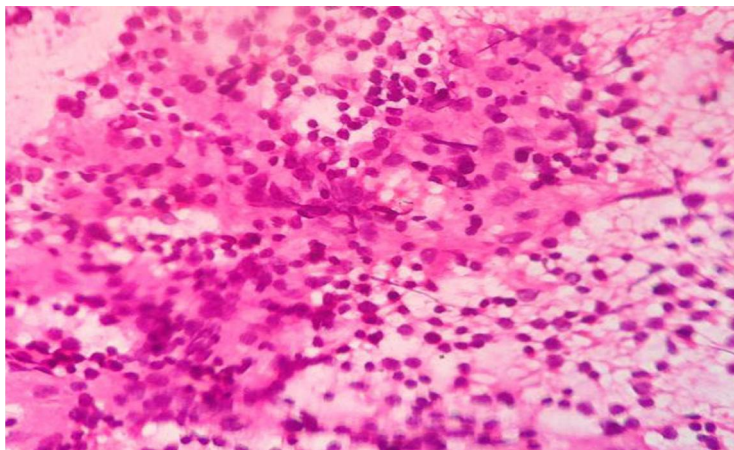


Fig.2 Hashimoto's thyroiditis H&E(40X)

Note: on FNAC :Hashimoto's thyroiditis H&E(40X).Smear shows hurthle cells with abundant granular cytoplasm and large nuclei with mild anisonucleosis admixed with polymorphous

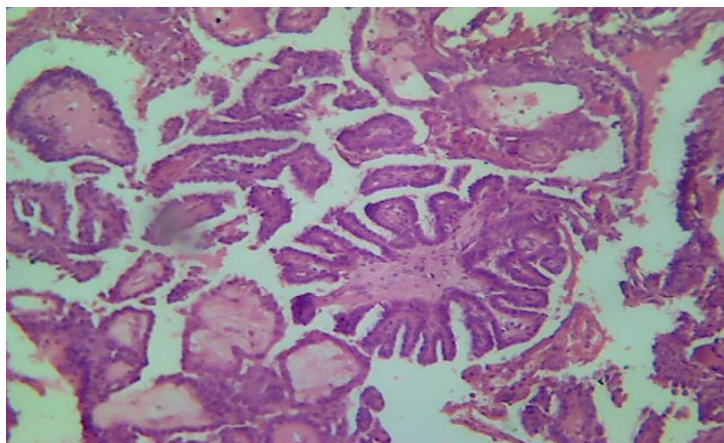


Fig.3_Papillary carcinoma thyroid

Note: Histopathology -10X H & E shows papillary structures

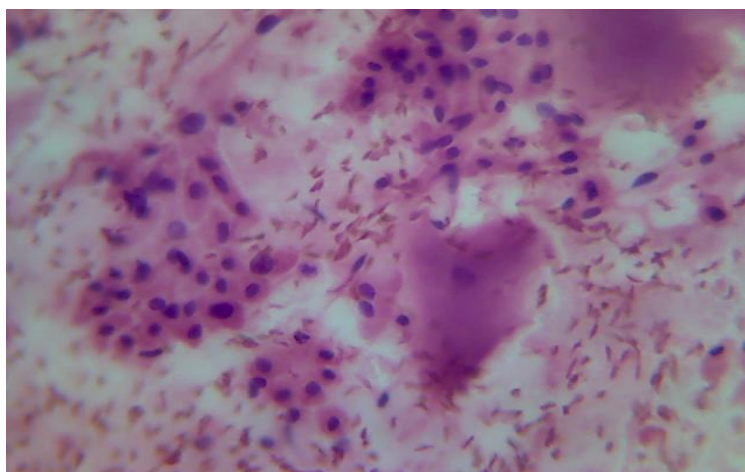


Fig.4 Medullar carcinoma thyroid

Note: _FNAC- 40X H & E showing thyroid follicular cells with amyloid deposition

DISCUSSION

It is a commonly acknowledged fact that solitary thyroid nodules are often diagnosed incidentally due to the thyroid gland's prominent position in the anterior triangle of the neck. Several well-known textbooks of endocrinology state that most thyroid nodules are asymptomatic, and are therefore discovered incidentally, by the patient themselves, by physicians, or on imaging studies.^[11]

In our study out of 45 cases, female were higher in frequency (n=39; 86.6 %) than men (n=6; 13.3%). The youngest patient in this study was a girl of 18 years with colloid goitre. Commonest age group was 30-39yrs with 20 cases (44.4%). This is in accordance with the study conducted by Manoj Gupta et al.^[12]

TABLE 1. PRESENT STUDY FNAC AND HISTOPATHOLOGY CORRELATION

FNAC report	Number of cases (<i>n</i> = 45)	Histopathological report	Number of cases	Remarks
Colloid goitre 10		Colloid goitre	7	True negatives
		Follicular adenoma	2	False negatives
		Follicular carcinoma	1	False negatives
Hashimotos Thyroiditis	8	Hashimotos Thyroiditis	8	True negatives
Follicular neoplasm	19	Follicular adenoma	18	True negatives
		Follicular carcinoma	1	False negative
Papillary carcinoma	4	Papillary carcinoma	4	True positive
Anaplastic carcinoma	2	Anaplastic carcinoma	2	True positive
Medullary carcinoma	2	Medullary carcinoma	2	True positive

Hence, after comparison of results of FNAC with histopathology, FNAC showed overall diagnostic accuracy of 100% with specificity of 100% , sensitivity of 73% for malignant lesions, positive predictive value of 93% for malignancy and negative predictive value of 92% in our study.

The sensitivity, specificity, accuracy, positive predictive value, and negative predictive value were calculated & found similar to previous studies (Table 2). Statistical analysis showed sensitivity, specificity, and accuracy of FNAC for solitary thyroid nodules were 73%, 100%, and 100%, respectively, in our study whereas sensitivity, specificity, and accuracy of FNAC were 93.5%, 75%, and 79.6%, respectively, in a study by Bouvet *et al.* and 79%, 98.5%, and 87%, respectively, in a study by Kessler *et al.* ^[13,14]

In our study 10 cases were found to be malignant on histopathological examination (4 papillary carcinoma and 2 Anaplastic carcinoma. 2 Medullary carcinoma, 2 follicular carcinoma). It is to be stressed that all cases of papillary carcinoma diagnosed by FNAC were papillary carcinoma on histopathological examination also.

TABLE 2 - Comparative studies

	Study Year	Number of patients value	Sensitivity	Specificity	Accuracy	Negative predictive value	Positive predictive value
Afroze <i>et al.</i>	2002	170	61.9%	99.3%	94.5%	94.7%	92.8%
Kessler <i>et al.</i>	2005	170		98.5%	87%	76.6%	98.7%
Manoj gupta <i>et al.</i>	2006	75	80%	86.6%	84%	86.6%	80%
S Guli <i>et al.</i>	2010	140	100%	90%	92.3%	90.5%	100%
Present study	2014	45	73%	100%	100%	92%	93%

CONCLUSION

The solitary thyroid nodule is a relatively common clinical finding which has a small but significant risk of malignancy. Fine needle aspiration has become the routine initial procedure. Cytological diagnosis is reliable, safe, simple, inexpensive, and reduces the number of unnecessary operations. FNAC provides useful information and may be used along with other clinical information to decide best form of treatment in a solitary thyroid nodule. The use of FNAC has reduced the number of patients with solitary thyroid nodules undergoing unnecessary surgery and has led to proper planning of surgery in malignant cases.

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