



ULTRASONOGRAPHY AND CYTOHISTOLOGICAL CORRELATION OF SOLITARY NODULE OF THYROID

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ABSTRACT

Background: The solitary thyroid nodule is a palpable discrete swelling in an otherwise apparently normal thyroid.¹ Solitary thyroid nodule is one of the commonest thyroid disorder.

Methods: A two year prospective and two year retrospective study on histomorphological study of solitary thyroid nodule was conducted in M.G.M./Kakatiya Medical College, Warangal from June 2010 to May 2014. Required clinical details were taken.

Results: Out of 175 cases, 11 (6.29%) cases were males and 164 (93.7%) cases were females with a male to female ratio of 1:14.9.

Conclusion: Solitary thyroid nodule is one of the commonest thyroid disorder. The study of macroscopic and microscopic features of different solitary thyroid nodules will enable for categorization into exact morphological type which will help the surgeon for proper management. FNAC has become an integral part of initial diagnosis and management of the patients presenting with solitary thyroid nodule. USG and FNAC are complimentary to surgical biopsy. Although, histopathological diagnosis is the gold standard in diagnosing lesions of solitary nodule of thyroid.

KEYWORDS : Solitary thyroid nodule, Hashimoto's thyroiditis, Papillary carcinoma of thyroid, Medullary ca of thyroid FNAC.

INTRODUCTION

The solitary thyroid nodule is a palpable discrete swelling in an otherwise apparently normal thyroid.¹ Solitary thyroid nodule is one of the commonest thyroid disorder with overall prevalence of about 4-7% in adult population. They are common in females with a ratio of 5:1.²

Though STN is commoner in women, malignancy in STN is commoner in men. The younger the patient with a thyroid nodule, the greater the likelihood of it being malignant; the carcinoma in younger patients is more often of a lower grade than in older patients who tend to have a more aggressive form of malignancy. The most important consideration in deciding the need for therapy of a thyroid nodule is the possibility of malignancy.³

Although a great majority of solitary nodules are benign, a significant minority harbor malignancy.⁴ Cytopathology is concerned with individual cell changes whereas histopathology is mainly concerned with tissue architecture. The disciplines are opposite sides of the same coin and not distinct (MeLcher et al 1981).

AIMS

The ultimate aim in the evaluation of solitary thyroid nodule is to differentiate benign hyperplasia from true neoplasms. Thus, to evaluate STN in terms of comprehensive and appropriate management, the medical team must include a primary care physician, an endocrinologist, a pathologist, a radiologist, and a head and neck surgeon.⁵

OBJECTIVES

The objectives of the present study are:

- 1) To study the histomorphological features of solitary nodule of thyroid.
- 2) To categorize them into various types based on detailed microscopic study.
- 3) To correlate the USG and cytohistological studies in solitary nodule of thyroid

METHODOLOGY

A two year prospective and two year retrospective study on histomorphological study of solitary thyroid nodule was conducted in the pathology department, M.G.M./Kakatiya Medical College, Warangal from June 2010 to May 2014.

A total of 175 solitary nodules were studied. Specimens sent in 10% formalin were fixed and subjected to thorough gross examination according to the protocols. Representative bits were taken and were routinely processed with paraffin embedding. 5 thin multiple sections were taken and stained with hematoxylin and eosin. These were then studied microscopically in detail.

RESULTS

This study was conducted prospectively between June 2012 to May 2014. The study also includes a two year retrospective study from June 2010 to May 2012.

175 cases were taken up for study. Out of 175 cases, 11 (6.29%) cases were males and 164 (93.7%) cases were females with a male to female ratio of 1:14.9.

In this study youngest patient was 10 years old and oldest was 80 years old. Maximum cases occurred between 30-39 years (33.143%).

TABLE-1: FNAC FINDINGS

FNAC findings	Number of cases (n=175)	Percentage (%)
Follicular adenoma	78	44.57
Colloid goiter	56	32
Hashimoto's thyroiditis	9	5.143
Follicular cysts	6	3.43
Thyroid carcinoma	26	14.86
Total	175	100

Majority of the cases 78 (44.57%) were diagnosed as follicular neoplasm followed by colloid goiter 56 (32%), Thyroid carcinoma 26 (14.86%) and Hashimoto's thyroiditis 9 (5.143%) cases.



Fig 1.USG OF LEFT ADENOMA OF THYROID

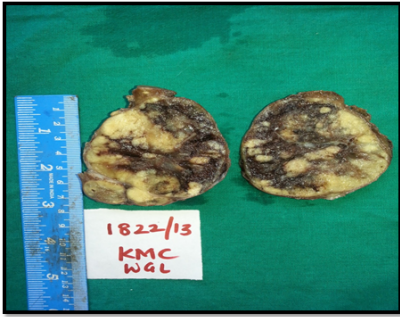


Fig 2 GROSS PICTURE OF FOLLICULAR ADENOMA

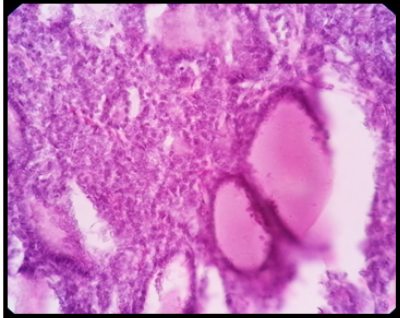


Fig 3 FOLLICULAR ADENOMA H&E 40X

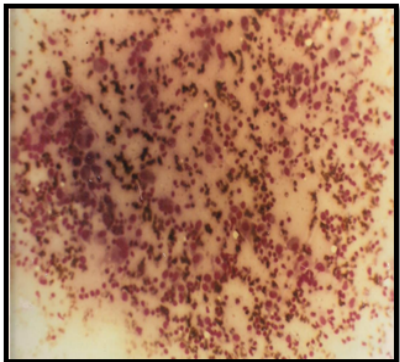


Fig 4 SMEAR SHOWING FOLLICULAR CELLS WITH HURTHLE CELLS AND PLENTY OF LYMPHOCYTES

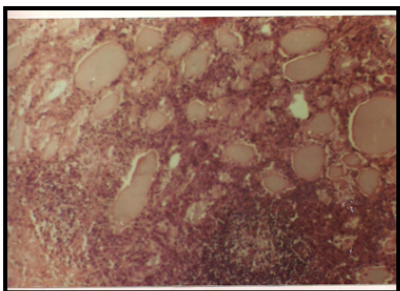


Fig 5 H&E SECTION (10X) HASHIMOTO'S THYROIDITIS



Fig 6 TRANSVERSE SCAN SHOWING HYPERECHOIC NODULES IN RIGHT LOBE AND ISTHMUS S/O MNG

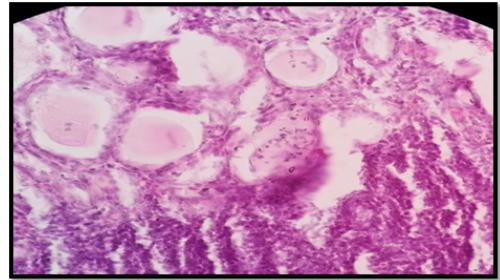


Fig 7 MULTINODULAR GOITER H&E 40X

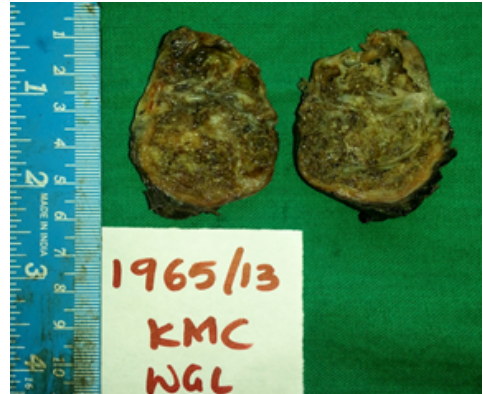


Fig 8 GROSS PICTURE OF PAPILLARY CARCINOMA

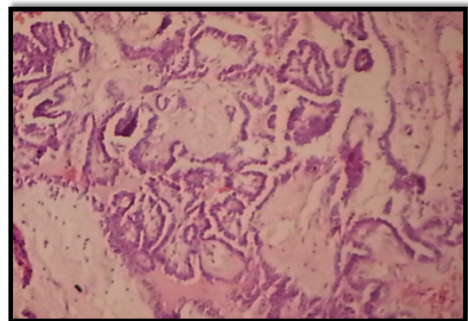


Fig 9 PAPILLARY CARCINOMA H&E 10X

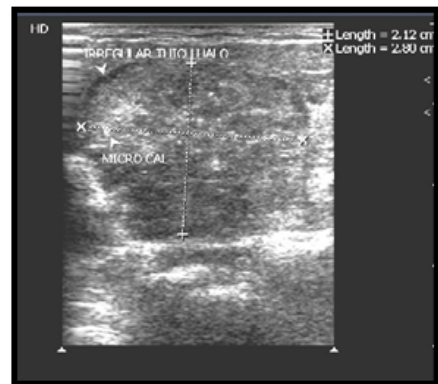


Fig 10 TRANSVERSE SCAN SHOWING WELL DEFINED HYPERECHOIC NODULE IN RIGHT LOBE OF THE THYROID WITH MICROCALCIFICATION AND THICK IRREGULAR HALO S/O MALIGNANCY

DISCUSSION

Solitary thyroid nodule is one of the commonest thyroid disorder with overall prevalence of about 4-7% in adult population. Only 5-20% of all thyroid nodules are malignant.² Ultrasound scanning of Thyroid can distinguish solid from cystic lesions, but all cystic lesions are not benign. Malignancy may be possibility in cold nodules (non-functioning) whereas hot nodules (functioning) are mostly benign.⁶

TABLE – 2: COMPARISON OF STN LESIONS (n=1 75 cases)

Lesions	Fenn et al (1980) ¹³ (%)	Nagori et al (1992) ⁸ (%)	Ananthakrishnan et al (1993) ⁵ (%)	Khadilkar et al ³ (2008) (%)	Present study (2014) (%)
Adenomas	54.9	44	53.3	13	44.57
Nodular colloid goiter	21.92	33	1.2	52	32
Carcinoma	12.57	11	15.3	21	14.86
Chronic thyroiditis	5.26	2	3.6	-	5.143
Cysts	2.1	6	2.3	3	3.43

Thyroid nodules are common in clinical practice. The life time risk for developing a palpable thyroid nodule ranges from 5-10%, while most thyroid nodules are benign, about 5% of all palpable nodules are malignant.¹

In the present study higher incidence of adenomas was seen which is inconcurrence with the findings of Fenn et al, Nagori et al and Ananthakrishnan et al study. Adenoma is the commonest cause of solitary thyroid nodules in India, whereas adenomatous goiters are commoner abroad.⁷

The incidence of benign lesions (86.3%) was comparable to the incidence observed in other studies. The incidence of malignancy (13.7%) in our study was comparable to Nagori et al and Ananthakrishnan et al study. %. Nagori et al reported incidence of 11% and in a Tsegaye et al study it was 8.2%. However it differed from other studies probably because of difference in sample size and duration of study.

Benign neoplasms outnumber thyroid carcinomas by a ratio of 10:1. Overall, the incidence of thyroid malignancy is low, forming 0.5-1.0% of all cancers and 3.3-17% of all thyroid diseases. Carcinomas of the thyroid are thus uncommon, accounting for less than 1% of solitary nodules thyroid.⁴

Preoperative identification of the nodules which are likely to contain malignancy is important, since the advice given to the patient and operative approach may be modified if the surgeon strongly suspects that malignancy is present. The younger the patient with a thyroid nodule, the greater are the chances of it being malignant and diagnosis is best accomplished by a wide surgical excision.⁹

Papillary carcinoma (92.3%) was the most commonest malignant lesion followed by medullary carcinoma (7.7%). Similar observations were made by other studies.

Carcinomas of the thyroid are relatively uncommon. Prognosis in thyroid cancer after definitive treatment depends on the histopathology of the cancer and the local extent of disease.³

TABLE – 5: COMPARISON OF PERCENTAGE OF VARIANTS OF PAPILLARY CARCINOMA (n = 24 cases)

Authors	Classical	Follicular	Tall cell	Micro carcinoma	Diffuse sclerosing	Encapsulated
Akin K.B. (1995) ⁶⁵	70%	10%	4%	-	3%	10%
Akslen LA and LiVolsi VA (2000) ⁶⁶	54.7%	2.3%	5.5%	-	1.6%	-
Present study (2014)	50%	37.5%	8.3%	-	-	4.2%

The majority of subtypes and variants of papillary carcinoma of the thyroid are rare. Classical variant of papillary carcinoma was the most commonly observed variant in the present study which was similar to the observations made by other studies.

MEDULLARY CARCINOMA:

Medullary carcinoma of the thyroid accounted for 7.7% of malignant neoplasms in the present study and was the least common malignant neoplasm.

TABLE – 6: COMPARISON OF PERCENTAGE OF CASES AND SEX DISTRIBUTION IN MEDULLARY CARCINOMA PRESENTING AS STN (n = 2 cases)

TABLE 3: REPORTED INCIDENCE OF MALIGNANCY IN SOLITARY THYROID NODULES⁵ (n = 175 cases)

Sl. No.	Author(s)	Year	Incidence (%)
1.	Schlessinger et al	1938	8.0
2.	Crile and Dempsey	1948	25.5
3.	Cole et al	1949	24.4
4.	Groesbeck	1959	Cold 14.5
5.	Attie	1960	12.5
6.	Kendal and condon	1969	20.9
7.	Knowlson	1971	6.0
8.	Zaman and Bhagbati	1971	8.0
9.	Psarras et al	1972	Cold 12.8 Warm 6.6
10.	Hoffman et al	1972	28.7
11.	Brown and Kantouris	1975	Cold 25.2 All 11.8
12.	Kapur et al	1976	Cold 16.0 Warm 7.0
13.	Lowhagen	1979	23.3
14.	Fenn et al	1980	12.0
15.	Hangen	1981	23.3
16.	Brown	1981	12.0
17.	Hung	1982	14.3
18.	Kapur et al	1982	11.0
19.	Bhansali	1982	9.0
20.	Block	1983	36.0
21.	Belanger	1983	36.0
22.	Gharib	1984	24.0
23.	Brauer et al	1984	26.0
24.	Griffies et al	1985	40.0
25.	Dwarish et al	2006	24.0
26.	Tsegaye et al	2008	8.2
27.	Present study	2014	13.71

TABLE – 4: COMPARISON OF DIFFERENT TYPES OF MALIGNANT LESIONS (n = 26 cases)

Lesions	Ananthakrishnan et al (1993) ⁵ (%)	Tsegaye et al (2003) ⁵⁸ (%)	Khadilkar et al (2008) ³ (%)	Present study (2014) (%)
Papillary carcinoma	46.8	76.6	38.29	92.30
Medullary carcinoma	5.2	1.5	2.94	7.7

Papillary carcinoma (92.3%) was the most commonest malignant lesion followed by medullary carcinoma (7.7%). Similar observations were made by other studies.

Authors	Percentage (%)	M : F ratio
Vittal S. et al. (1993) ⁶⁹	1.74	-
Correa P and Chenn VW (1995) ⁶⁷	3.26	1:1.6
Kishore N et al (1996) ⁶⁴	14.70	1:2.0
Khadilkar et al (2008) ³	2.9	-
Present study (2014)	7.7	1:1

Observations made in our study differed from other authors probably because of difference in sample size and duration of study.

In our study M:F ratio is 1:1 even though female preponderance is common. Similar observations were made by other authors.

Special stains for amyloid showed apple-green birefringence by

polarising microscopy of a congo-red stained section in one case which had amyloid deposits in the stroma. This is consistent with the observations made by other authors in literature (LiVolsi VA¹⁰ and Ljunberg O¹¹).

SIMPLE THYROID CYST:

Cystic lesions of the thyroid gland are common, representing 6% to 35% of all surgically removed solitary thyroid nodules. They usually are the result of degeneration, haemorrhage, or necrosis of an adenomatous nodules. Cystic change occur more commonly in lesions larger than 4cm.¹²

TABLE – 7: PERCENTAGE OF CASES IN SIMPLE THYROID CYST PRESENTING AS STN (n = 6 cases)

Authors	Percentage(%)
Nagori et al. (1992)8	6.74
Khadilkar et al. (2008)3	4.54
Present study (2014)	3.43

Our study documented 3.43% incidence of thyroid cysts and was comparable to study done by Khadilkar et al.

CONCLUSION and SUMMARY

Solitary thyroid nodule is one of the commonest thyroid disorder. The study of macroscopic and microscopic features of different solitary thyroid nodules will enable for categorization into exact morphological type which will help the surgeon for proper management.

Benign lesions are more common than the malignant lesions. Among benign, adenomas are the most common lesions and among malignant, papillary carcinomas are the most common lesions.

- Total of 272 solitary nodules were received which constituted 65.07% of total thyroidectomy specimens received in our department.
- Among these 85.143% were benign and 14.86% were malignant lesions.
- Benign lesions included 78 cases of adenomas, 56 cases of colloid goiter, 9 cases of Hashimoto’s thyroiditis and 6 cases of simple thyroid cyst.
- 56 cases of colloid goiter which accounted to 32% of thyroid lesions were seen.
- Follicular adenoma formed the largest group in this study accounting for 44.57%.
- Among the malignant lesions, papillary carcinoma was the most common and medullary carcinoma was the least common type.
- Medullary carcinoma was the least common type, seen in 2 (7.69%) cases.
- Hashimoto’s thyroiditis comprised of 5.143% of all solitary thyroid lesions.
- Simple thyroid cyst accounted for 3.43% of benign lesions.
- FNAC has become an integral part of initial diagnosis and management of the patients presenting with solitary thyroid nodule. USG and FNAC are complimentary to surgical biopsy. Although, histopathological diagnosis is the gold standard in diagnosing lesions of solitary nodule of thyroid.

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