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MANAGEMENT OF SOLITARY THYROID NODULES AT ALHILLA TEACHING HOSPITAL

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ABSTRACT

Background: Current guidelines recommend evaluation of solitary thyroid nodule (STN) to exclude thyroid malignancy. Historically, all investigations have them inherit limitations. The aim of this study is to evaluate these methods and their values in diagnosing thyroid cancer among STN. **Patients and Methods:** A prospective study comprises cases of STN during three years period from January 2013 to January 2016. Each patient was evaluated with clinical examination, thyroid function tests, thyroid ultrasound examination, and fine needle aspiration (FNA) and the results were compared with operative and biopsy findings. **Results:** The study included 35 patients, 42 Females and 11 males, with a female to male ratio of about 4:1, the right lobe was about two times more frequently involved than the left (34:19). The highest incidence of females (59%) occurred in the early age groups (10-30 years) compared with low incidence of males in this age groups. The male to female ratio approximate towards the old age groups. Carcinoma was diagnosed in 4 cases (7.6%) only. The peak incidence of carcinoma in solitary nodules was in third decade. **Conclusions:** The incidence of thyroid carcinoma in this study was 4 cases.

KEYWORDS:

INTRODUCTION

A solitary thyroid nodule (STN) is defined as a single palpable or radiologically detected nodule within an otherwise normal thyroid gland. The incidence of STN in the general population is relatively high, with reported rates ranging from 0.7% to 6.5%. These nodules are more common in females, particularly in middle age, and less frequent in males. The majority of STNs are benign; however, approximately 5% to 20% may represent neoplastic lesions. A key objective in evaluating STNs is distinguishing between benign hyperplasia and true neoplasms. Clinical history and physical examination play a crucial role in assessing the nature of a thyroid nodule. Most individuals with thyroid nodules are euthyroid, and fewer than 1% of these nodules result in hyperthyroidism or thyrotoxicosis.[1] A wide array of diagnostic modalities are employed in the evaluation of STNs, including thyroid function tests (especially TSH), radioisotope scanning, fine-needle aspiration cytology (FNA), core needle biopsy, and histopathological examination. Each of these methods carries its own limitations. Nevertheless, fine-needle aspiration biopsy (FNAB) has emerged as the most pivotal diagnostic tool in this context. Certain factors, such as male gender, family history of thyroid cancer, and prior head or neck irradiation (e.g., for acne or adenoids), increase the risk of malignancy in individuals with thyroid nodules. The following table, based on the National Cancer Institute Thyroid Nodule Classification, outlines the estimated risk of malignancy based on FNAB findings.[2]

Category	***Risk of malignancy***
Benign	<1%
Atypia if undetermined significance	5-10%
Suspicion for follicular neoplasm	20-30%
Suspicion for malignancy	50-70%
malignant	100%
nondiagnostic	

METHOD

This prospective study was conducted at our hospital over a three-year period, from January 2013 to January 2016. A total of 53 consecutive patients presenting with

solitary thyroid nodule (STN) and selected for surgical treatment were included.

Each patient underwent a comprehensive evaluation that included.

1. Clinical assessment: Age, sex, presenting symptoms, and physical signs were recorded.
2. Laboratory and imaging investigations: All patients were evaluated with thyroid function tests (TFTs), neck ultrasound, and fine-needle aspiration (FNA).
3. Isotope scanning was not performed due to unavailability at our center.
   Fine-needle aspiration (FNA) results were classified into the following categories:

- Benign: Presence of normal thyroid epithelial cells with varying amounts of red blood cells or colloid.
- Malignant: High cellularity with significant variation in cell shape, size, and nuclear characteristics.
- Suspicious: High cellularity with sheets of follicular cells showing nuclear variability, but not definitive for malignancy.
- Insufficient: Samples considered inadequate for cytological diagnosis.

All patients underwent surgical management, and final histopathological diagnoses were obtained. These results were then compared with preoperative clinical, radiological, and cytological findings to assess diagnostic accuracy and correlation.

RESULT

The study included fifty-three patients with. Patient's demographics are shown in the table 1.

Table 01: Gender and age distribution.

Age (Years)	*Male*	*Female*	*Total*	*Percentage*
10-20	-	8	8	15.1
21-30	3	19	22	41.5
31-40	3	6	9	16.9
41-50	1	6	7	13.2
51-60	2	2	4	7.5
61-70	1	1	2	3.8
71-80	1	-	1	1.9
Total	11	42	53	100

The highest incidence 58.48% occurred between 20-40 years of age. More females were affected than male with a ratio of about 4:1. The highest incidence of females (59%) occurred in the early age groups (10-30 years) compared with low incidence of males in this age groups. The male to female ratio approximate towards the old age groups. Clinically, 41 patients presented with painless neck swelling, 7 with dysphagia, 4 with dyspnea and one case with unilateral lymphadenopathy. As in fig 1.

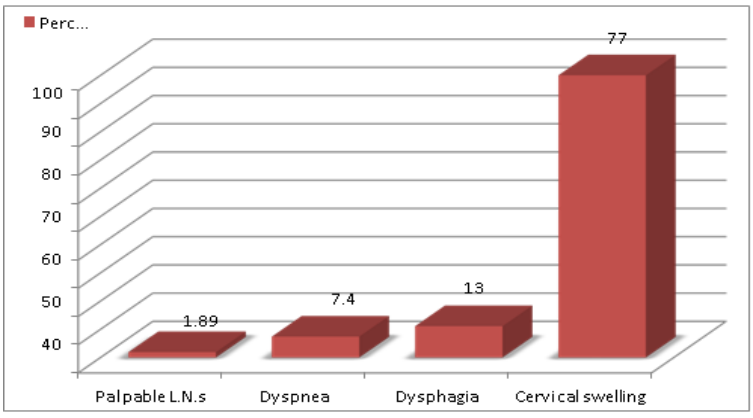

Figure 1: signs and symptoms.

Regarding thyroid status, 39 patients were euthyroid, 2 were hy`pothyroid and 12 were hyperthyroid according to TFTs. On Ultrasonography all showed single thyroid nodule, 40 were solid and 13 were cystic. FNA cytology showed initially 45 benign, 1 suspicious, 3 malignant and 4 insufficient. The types of surgery for these patients include: 9 were treated by subtotal thyroidectomy,7 by lobectomy and isthmusectomy and 30 cases by neartotal thyroidectomy & 7 cases by total thyroidectomy. One patient who were initially treated by lobectomy+ isthmusectomy need completed total thyroidectomy after proved to be cancerous on biopsy. After surgery and histopathology, the suspicious was benign, one insufficient was malignant and all the three malignant were malignant. As in table 2.

Table 2: Results of fine needle aspiration.

Results of FNA	*No. of patients*	*Comments*
Benign	45	45 cases reported to be negative
Suspicious	1	Consider to be positive, later it proved to be benign so it was false positive
Malignant	3	proved to be malignant
Insufficient	4	one revealed malignancy on biopsy

Forty-two patients were colloid nodule with focal fibrosis and hemorrhage, 6 cases follicular adenoma,1 case of thyroiditis, 3 cases were papillary carcinoma and1 case was follicular carcinoma with overall incidence of malignancy of four cases. As in table 3.

Table 3: Results of histopathology.

Histopathology	*No. of cases*	*Percentage*
Colloid nodule	42	79.24
Follicular adenoma	6	11.32
Hashimoto's thyroiditis	1	1.88
Papillary carcinoma	3	5.66
Follicular carcinoma	1	1.88
Total	53	100

On reviewing the four patients with thyroid carcinoma regarding their demographics, clinical findings, investigations, operative and histopathologic findings, the following facts are identified. As in table 4.

Table 4: details of the four malignant cases.

Sex	**Age**	**Clinical Features**	**TFT**	**Ultrasound Findings**	**FNA Result**	**Operation**	**Histopathology**
Female	23	Neck swelling, dyspnea, dysphagia, palpable L.N.	Euthyroid	Solid, increased nodular vascularity (Doppler), invasion of regional L.N.	Suggestive of papillary thyroid carcinoma (inclusion bodies)	Total thyroidectomy	Papillary thyroid carcinoma (psammoma bodies, papillary criteria)
Female	28	Neck swelling	Euthyroid	Solid, hypoechoic	Insufficient	Right lobectomy	Follicular carcinoma (vascular and capsular invasion)
Female	35	Normal	Euthyroid	Solid with microcalcifications, increased flow (Doppler)	Hypercellular, suggestive of papillary carcinoma	Total thyroidectomy	Papillary thyroid carcinoma (hypercellular, orphan Annie nuclei)
Male	58	Neck swelling	Hypothyroid	Solid, hypoechoic, irregular, with microcalcifications	Papillary projections, consistent with papillary carcinoma	Total thyroidectomy	Papillary thyroid carcinoma (psammoma bodies)

DISCUSSION

In the present study, solitary thyroid nodules (STNs) were most frequently observed in the 21–30 years age group, accounting for 59% of the cases. This finding is approximately consistent with other studies. For instance, Shukri AM reported that 63% of cases occurred between 18 and 37 years of age.[3] while Sengupta A et al. found that 43.3% of STNs were in patients aged 21 to 40 years.[4] Similarly, Vidal-Casariego A et al. reported the highest incidence of STNs in the 21–40-year age range.[5] The lower incidence of solitary nodules in older populations may be attributed to the increasing prevalence of multinodular goiters with advancing age.

Table 5: Age Incidence of Solitary Thyroid Nodule in Different Studies.

Studies	Age Group (years)	Percentage
Our Study	21–30	59%
Shukri[3]	18–37	63%
Sengupta A et al.[4]	21–40	43.3%
Vidal-Casariego A et al.[5]	21–40	42.8%

This study also demonstrated a marked female predominance, with a female to male ratio of 4:1. This is consistent with the findings of Jentzen W et al., who also reported a 4:1 ratio.[6] Ibars MT et al. found a 6:1 ratio[7], and Sengupta A et al. observed an even higher 7:1 female predominance.[4] These results suggest a clear hormonal or genetic predisposition in females for developing thyroid nodules.

Table 6: Comparison of Female to Male Ratio in Different Studies.

Studies	Female to Male Ratio
Our Study	4:1
Jentzen W et al.[6]	4:1
Ibars MT et al.[7]	6:1
Sengupta A et al.[4]	7:1

With regard to the nature of nodules, 24.53% of cases in our study were cystic, while 75.47% were solid. These findings are comparable to those reported by Kim DW, who found 32% cystic and 68% solid nodules.[8] Similarly, Shukri observed 33% cystic and 67% solid nodules.[3] It is important to note that aspiration of cystic fluid often leaves behind a residual palpable mass; therefore, repeat FNA of the solid component in mixed lesions is advised for accurate diagnosis.

Table 7: Comparison of Incidence of Cystic and Solid Nodules.

Studies	Cystic Nodules (%)	Solid Nodules (%)
Our Study	24.53%	75.47%
Kim DW[8]	32%	68%
Shukri[3]	33%	67%

The incidence of malignancy in our study was 7.54%, which falls within the range reported in the literature. Kim JW et al. found a slightly higher rate of 10%, while Füessl HS et al. reported 5.7%, and Shukri AM documented 4%.[3, 9, 10] These variations can be influenced by differences in study populations, diagnostic criteria, and sample sizes.

Table 8: Comparison of Incidence of Malignancy in STN.

Studies	Incidence (%)
Our Study	7.54%
Kim JW et al.[9]	10%
Füessl HS et al.[10]	5.7%
Shukri AM.[3]	4%

CONCLUSION

The likelihood of malignancy in a solitary thyroid nodule is greater in females and younger patients. Palpable cervical lymphadenopathy is a strong indicator of malignancy. A family history of benign goiter may support a benign diagnosis, though this was absent in our malignant cases. Even with benign cytology, clinical suspicion should guide surgical intervention when risk factors for cancer are present.

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