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# From diagnosis to treatment: Examining disparities in thyroid nodule evaluation and its impact on patient care

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**Abstract**
Controversy exists regarding the management of thyroid nodules because of conflicting information regarding the excessive occurrence of thyroid nodules, various occurrence of most cancers stated in the ones surgically excised and the frequency of loss of life from thyroid most cancers. The guidelines suggest an algorithm for evaluation of thyroid masses. [1]Workup should start with history and physical examination, proceed to laboratory studies, and then to imaging. Even though FNAC is superior to USG, basically USG is used for evaluation of all thyroid masses initially, followed by FNAC. This study was done to know about the disparities between preoperative investigations and postoperative histopathology report of thyroid swelling.

**Methods:** Study was done in 50 patients with thyroid masses which were subjected to FNAC, TFT and USG neck and their results were later correlated with histopathological examination report (HPR) whenever available.

**Results:** Out of 50, 7 patients had disparities between preoperative and postoperative diagnosis, but it was statistically insignificant.

**Conclusion:** FNAC stands at higher level with respect to P value and significance. Despite the fact is that, there are some patients whose preoperative and postoperative diagnoses were different. They either didn't want the first surgery or they want a second one. [2]Detecting malignancy preoperatively allows total thyroidectomy in a single operation without the need for frozen section or a second operation for completion of a thyroidectomy if malignancy is found during the initial thyroid lobectomy. Among them, FNAC was more reliable compared to other investigations in diagnosing malignant conditions preoperatively. Both FNAC and USG over diagnosed colloid goitre.

**Keywords:** USG, TFT, FNAC, histopathological examination report (HPR)

## Introduction
Thyroid nodules are common, being detected in up to 65% of the general population. This is likely due to the increased use of diagnostic imaging for purposes unrelated to the thyroid. There are different methods in the evaluation of thyroid nodules. Most patients with thyroid nodules have small and asymptomatic benign nodules. Nodules that are large enough to cause compression symptoms or having concerning features of cancer should be worked up with ultrasound and FNAC.

About evaluation of dominant thyroid masses, an overall increase in incidence of thyroid cancer and cancer in patients operated upon for nodular goitre is noted. This probably reflects better patient selection achieved by using a variety of criteria, both specified and unspecified [5]. Thyroid nodules are common, yet treatment modalities range from observation to surgical resection. Thyroid nodules are frequently found incidentally during routine physical examination or imaging performed for another reason. Clinical decision making depends on proper evaluation of the thyroid nodule. Treatment is indicated, however if the patient is symptomatic and/or has an autonomously functioning nodule, or if cancer is suspected [5].

## Materials and Methods
This study was conducted in Department of ENT of Karnataka Institute of Medical Sciences, Hubli after obtaining clearance from institutional review board.

Period of study is 1 year from November 2021 to November 2022.Design of study is Observational study. Sample size is Fifty (50) patients, calculated using $N=1.96*1.96(PQ)/L^2$, Where N=Sample size=Prevalence=100-prevalence and L= maximum possible error.

This study included patients having thyroid nodules who need and willing for thyroidectomy surgery and excluded patients with inflammation or infection of thyroid gland and those patients are not willing for invasive investigations.

Patients underwent preoperative investigations like a. USG-neck. FNAC -thyroid swelling. TFT and d. CT scan-neck. Depending on investigation reports, an operating method decided. Patient undergoes either hemi or total thyroidectomy or isthmectomy. Informed consent taken both for surgery and for tracheostomy, if needed. Intraoperatively findings will be noted, like increased vascularity or necrotic areas or cystic areas. Wound closed with subcuticular suture with tight dynaplaster dressing. The operated and removed out thyroid specimen send for histopathological examination postoperatively.

Patient is given postoperative IV antibiotics for 7 days. Drain will be removed, on 2nd or 3rd postoperative day when collection is less than 10 ml. Suture will be removed on 10th day. Follow-up done in OPD basis with HPR report.

All the data was entered into Excel sheet, analyzed using computer software SPSS (statistical package for social sciences) version 25 for this comparative study and the results were presented in tables and figures. Level of significance was considered at $p < 0.05$ at 95% confidence interval.

## Results

In our study out of 50 patients, 33 patients come under the age group of 21 to 40 age group. Only 5 (10%) had comorbidities.6 had difficulty in swallowing. Those patients had huge thyroid mass in anterior aspect of neck. 2 had change in voice as chief complaint. Only 5 had pain over swelling.

In our study, 45 patients border of thyroid mass were well defined. Rest 5 patients showed ill-defined margins.45 swellings were firm in consistency.one was hard. We operated only 1 patient, whose thyroid hormones levels are not within normal limits. Even though 2 patients were hypothyroid initially, with regular medications, they became euthyroid state. Most of patients (60%) diagnosed as nodular goitre on USG report.

Follicular neoplasm diagnosed in USG in 2 patients. Most of patients got nodular goitre as report as same as USG. Among 50 patients, 42 undergoes hemithyroidectomy. Majority got HPR report as nodular goitre. Among 50 patients, one patient diagnosed as Hashimoto's thyroiditis on histopathological examination who doesn't need a surgery and has to be treated conservatively.

In our study of 50 patients, 84% patients underwent hemithyroidectomy. But among them, 7 actually, needed other management. Among 12 patients needed total thyroidectomy. But only 7 underwent the same.

In our study of 50 patients, USG and FNAC findings were almost same for patients. Post-operative HPR report were almost similar as preoperative USG findings except for follicular and papillary conditions. Most of patient's reports were same by preoperative FNAC and HPR, except for papillary and follicular carcinomatous conditions.

P value <0.05 is considered as significant. Here p value is 0.02 and 0.002 for USG with Intraoperative and FNAC with intraoperative findings respectively. Hence these investigations are significant. For example, if patient USG and FNAC report showed colloid cyst, on table we intervened with enlarged gland with colloid inside.

Association between USG with HPE and required surgery in those patients where there are disparities between done surgery and required surgery checked value is insignificant 0.79, hence there is no association. That means there are chances of disparities. Association between FNAC with HPE and required surgery in those patients where there are disparities between done surgery and required surgery checked value is 0.21. This also points to same findings.so FNAC is more reliable than USG.

## Discussion

An observational study was conducted to "compare Preoperative and Post-Operative Evaluation Of Thyroid Masses". Thyroid masses are one of the commonest neck diseases presenting in the inpatient wards of hospitals in India. Most of these patients undergo surgery. However, a number of patients actually undergoes 2nd surgery or doesn't need surgery at all. The patient informed about need for total thyroidectomy or 2nd stage completion thyroidectomy, in case of preop FNAC of follicular adenoma.

The diagnostic power of USG, FNAC, TFT were studied earlier in detail. It has also been proved their ability to diagnose diseases very accurately. [6]These investigations are readily available, repeatable, cost-effective, patient-friendly, quick result along with high sensitivity, specificity, and accuracy makes them initial diagnostic tools for preoperative evaluation of patients with thyroid swelling.

The socio demographic profile of the study indicates that the person in third and fourth decade of life is more prone to develop thyroid masses. More common in female patients (70%).[7]Sex dimorphism strongly impacts tumour biology, with most cancers having a male predominance. 10% patients had preexisting co morbidities, among them two were having hypothyroidism. (But were euthyroid when they presented to hospital), two had preexisting hypertension and one case of Grave's disease. Furthermore, when the existence of swelling over the thyroid region was taken into consideration, all 50 patients were presented with swelling. 12 percent of the patients also had trouble swallowing in addition to the other symptoms. In addition to that, 4% of patients reported a change in voice, and 10% of people reported pain over swelling as their other main prominent symptoms.

On comparing, patient who had multiple swelling in palpation reported as multinodular goiter only in USG. When the thyroid mass was locally examined it was found that majority of the masses were solitary, smooth with well-defined border and firm in consistency. Except one patient, all the other patients were euthyroid at the time of pre op thyroid profile evaluation.

Among the pre op evaluation done, FNAC was seen to be more specific than ultrasound as the diagnosis moved towards more specific findings of adenomatous lesions and

that of colloid goiter than from broad classification of being nodular and cystic lesions. [8]USG can accurately determine the number and the size of the nodules. It is extremely useful in guiding FNAC; However, its role in predicting malignancy is doubtful. FNAC and USG over diagnosed colloid goiter when compared with postoperative HPE.

The most important part of the findings stresses the importance of pre op findings as it is observed that seven cases of hemithyroidectomy could have been avoided and instead the total thyroidectomy could have been performed in five patients, one of them could have been managed with isthmectomy and another patient only required conservative management. [9]The management of Hashitoxicosis is based on symptoms control usually with β-blockers, euthyroidism requires periodical thyroid stimulating hormone measurements to assess for progression to hypothyroidism, and hypothyroidism is treated with thyroid hormone replacement therapy.

P value less that 0.05 was considered significant and thus significant association was found between USG with histopathology report and extremely significant association was found between FNAC with histopathology report and intra operative finding, type of surgery performed and type of surgery patient actually required.

**Table 1:** Indicates the local examination findings of the thyroid mass

| Number of nodules | Number of patients |
|---|---|
| Solitary | 49 |
| Multiple | 1 |
| Surface of nodule | Number of Patients |
| Smooth | 48 |
| Irregular | 2 |

**Table 2:** Indicates preoperative FNAC findings of the patients.

| Fnac finding | Number of patients |
|---|---|
| Colloid goitre | 13 |
| Nodular goitre | 29 |
| Benign lesions | 3 |
| Suspicious carcinoma | 1 |
| Adenomatous lesions | 2 |
| Follicular lesions | 1 |
| Cystic lesions | 1 |

**Table 3:** Indicates the required surgery that was supposed to be done for the patient

| Required surgery | Number of patients |
|---|---|
| Hemithyroidectomy | 35 |
| Total thyroidectomy | 12 |
| Ishtmuscectomy | 2 |
| Conservative management | 1 |

**Table 4:** Indicates comparative analysis for the choice of pre-operative investigation

| Finding | Ultrasoud | Fnac |
|---|---|---|
| Nodular | 30 | 28 |
| Colloid | 10 | 13 |
| Benign cystic | 6 | 3 |
| Follicular Adenomatous | 2 | 3 |
| Suspicious Carcinoma | 0 | 2 |
| Bulky thyroid | 1 | 0 |

**Table 5:** Indicates comparative analysis between pre-operative FNAC and post-operative HPE

| Finding | Fnac | Hpe |
|---|---|---|
| Nodular | 28 | 29 |
| Colloid | 13 | 5 |
| Benign and cystic | 4 | 2 |
| Hashimoto's | 0 | 6 |
| Follicular Adenomatous | 3 | 5 |
| Suspicious Carcinoma | 1 | - |
| Papillary Carcinomatous | 0 | 3 |

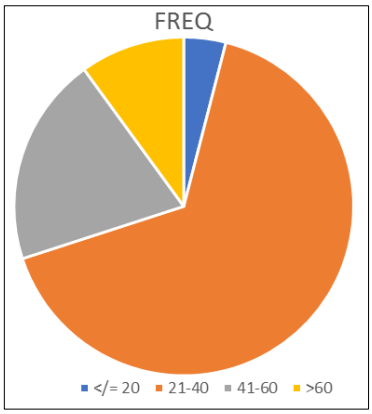


**Fig 1:** Indicates the age distribution of the patients

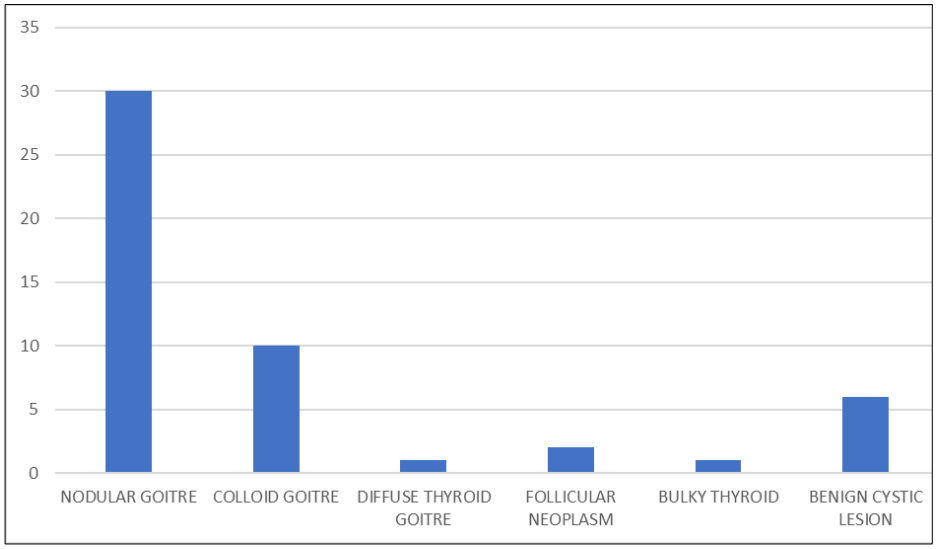


**Fig 2:** Indicates the pre-operative ultrasound findings

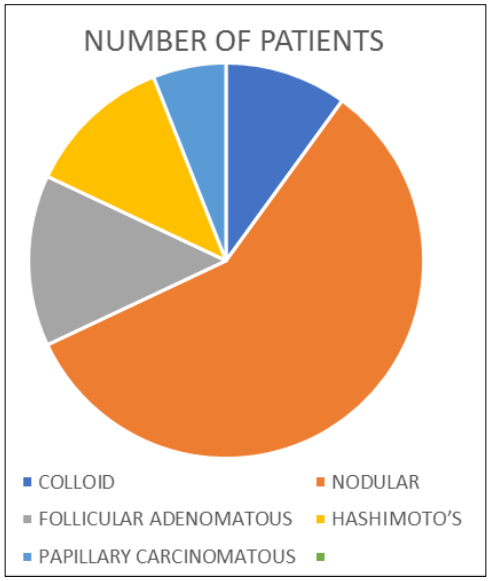


**Fig 3:** Indicates post-operative histopathology findings

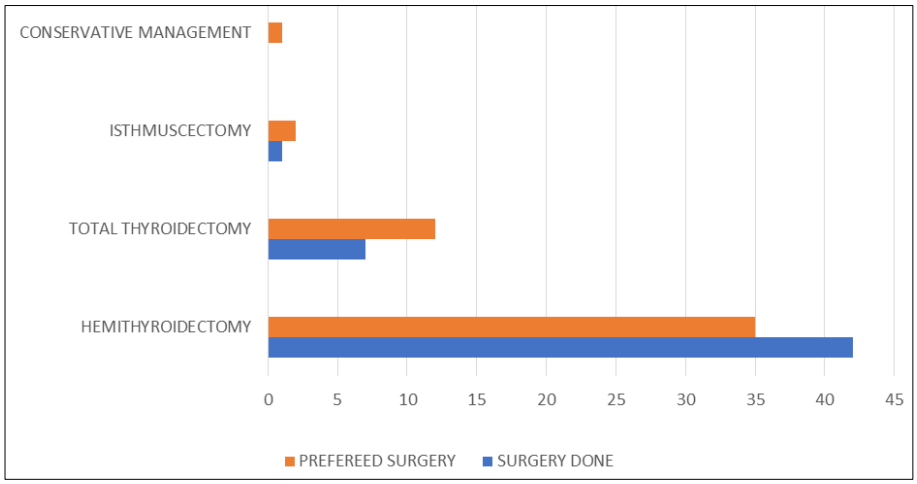


**Fig 4:** Indicates comparative analysis of the type of surgery that could have been avoided

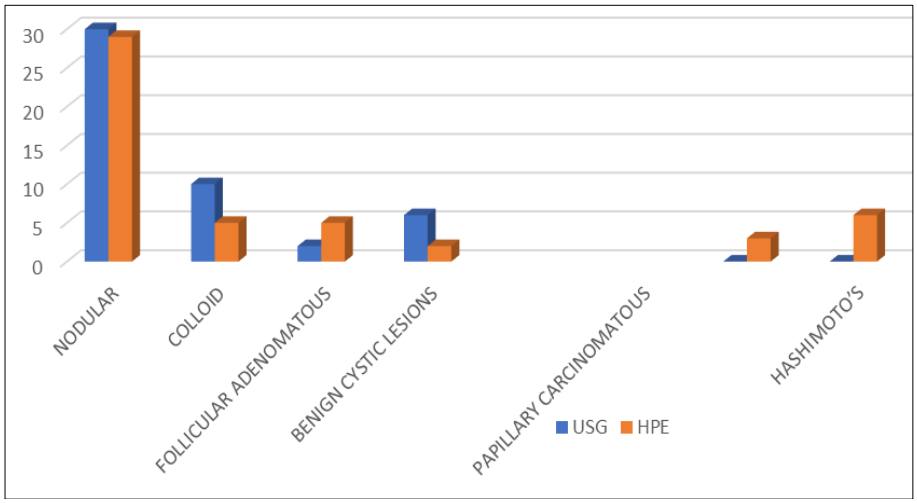


**Fig 5:** Indicates comparative analysis between pre-operative USG and post-operative HPE

## Conclusion

Preoperative investigations like USG, FNAC, CT scan, TFT are easy, simple, effective and economical options available for patients who wants a diagnosis for neck masses, especially thyroid. Besides saving time and effort, its easy repeatability makes it more acceptable to the patients. Despite this, there are some patients whose preoperative and postoperative diagnoses were different. They either didn't want the first surgery or they want a second one. Among them, FNAC was more reliable compared to other investigations in diagnosing malignant conditions preoperatively. Both FNAC and USG over diagnosed colloid goiter. Elevated thyroid hormones caused increased bleeding on table. CT scan mainly helped to see the

retrosternal extension more than reaching diagnoses.7 patients had disparities between preoperative and postoperative diagnosis, but it was statistically insignificant. In those cases, the patient and parties will experience discomfort, time loss, financial strain, and a lack of mental satisfaction.

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