

Study of Clinical Pattern of Thyroid Swellings and Their Management

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Abstract

Introduction: Thyroid diseases are common worldwide. In India too, there is a significant burden of thyroid diseases. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Clinically palpable nodules are encountered in about 8% of the adult population. With the use of imaging techniques, particularly ultrasound, the chance of detection of thyroid nodules has increased many folds. The recent data suggest that the incidence of thyroid malignancy is increasing over the years. There is very little data on the pattern of thyroid lesions for this part of country.

Aims and objectives: The aim of the present study is to study the various presentation pattern of histomorphological changes of non – neoplastic and neoplastic lesions of the thyroid and their management.

Conclusions: The majority of thyroid swelling patients presented in the age group of 31-40 years. Male to female ratio being 1:7.3. Thyroid swelling was more common on right side of the gland. Swellings were firm in most of the cases. Most of the patients were euthyroid at presentation. 16 patients showed heterogenous hypoechoic lesion on ultrasonography and cervical lymphadenopathy was seen in 5 cases. Among 33 patients, which showed colloid goiter on FNAC, 2 patients reported papillary carcinoma and 1 follicular adenoma on histopathology. There were 8 patients of papillary carcinoma on FNAC, 1 patient reported colloid goiter on histopathology. Colloid goiter was most commonly encountered disease. Papillary carcinoma was most commonly seen in age group of 21-40 years. Total thyroidectomy was most commonly performed surgery. Total thyroidectomy was performed along with neck dissection in 14% cases. Recurrent nerve palsy was seen in 2 patient, hypocalcemia in 3 patients, wound infection in 1 patient and seroma was seen in 2 patients. There was no mortality reported in our study.

Keywords: Thyroid swelling, colloid goitre, recurrent laryngeal nerve, thyroidectomy

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I. Introduction

Thyroid gland is largest endocrine gland in body. Normal thyroid function is necessary for physiological activity of most organs. Thyroid enlargement has been a common problem encountered in general surgical practice. Its involvement has a diverse issue apart from a meagre cosmetic problem to a more concerned malignancy.¹

India being a developing country, there is a lack of resources in health sector and lack of health awareness. The presentation is diverse. The clinical evaluation of the patient in such scenario is of utmost importance. Diseases of the thyroid gland are common and comprise a spectrum of entities causing systemic disease (Grave's disease) or a localized abnormality in the thyroid gland such as nodular enlargement (goitre) or a malignant mass. After diabetes mellitus, thyroid gland is the most common organ to cause endocrine disorders.² Thyroid disorders are the most common endocrine diseases particularly in countries where iodine intake through diet is low.

There are a number of factors that may cause thyroid gland to become enlarged. A diet deficient in iodine can cause a goitre, but this is rarely the cause because of the readily available iodine in our diets. A more common cause of goitre is an increase in thyroid stimulating hormone (TSH) in response to a defect in normal hormone synthesis within the thyroid gland.

Nodular goitre is probably the most common endocrine problem in the world today.³ Nodular lesions comprise those disorders that produce a clinical nodule and consists of non-neoplastic hyperplasia as well as benign and malignant tumours.

In nodular goiter, multiple nodules form the multinodular goitre.⁴ Appropriate diagnosis and proper treatment is the need of the hour and multinodular goitre has to be managed appropriately. The process involves a good physiological and medical knowledge combining a sound surgical and anatomical knowledge, taking into account the pathological diagnosis. Diffuse thyroid lesions are those that are associated with conditions affecting entire gland such as hyperplasia and thyroiditis.⁵

Neoplasm of the thyroid are relatively uncommon disease. They constitute only 0.7% of all cancers in female and 0.2% in males. However, there has been an increase in the incidence of thyroid neoplasm in India and abroad.⁶ In India, there are 2, 16, 000 new cases of thyroid malignancies per year.⁷

The great variety of types and the wide range of aggressiveness of thyroid cancers continue to complicate both diagnosis and management. Evaluation of different methods of therapy continues to be a problem, partly because thyroid cancers are uncommon

Management of thyroid problems pose a great challenge to the medical fraternity and needs to be studied vastly. Magnitude of the thyroid goiter problem in India is far greater than what it was estimated earlier. Now about 170 million people are estimated to be affected in the country.⁸ Endemic goitre is a significant problem affecting upto 12% of the world population.³

Striking advances in various disciplines of medicine and science as applied to the study of thyroid lesions have led to a better understanding and management of many thyroid disorders.

Most important function of physical examination, however, is the detection of thyroid swelling rather than the determination of its benign or malignant nature.

II. Investigations

Biochemical Assessment: Measurement of a serum TSH level by a sensitive immunometric assay should be performed to exclude thyroid dysfunction. If the screening TSH proves to be normal, free T₄ and T₃ should be measured. Patients with thyroid cancer rarely have abnormality in serum TSH levels. Measurement of serum anti thyroid peroxidase (anti-TPO) antibody and anti-thyroglobulin (anti-Tg) antibody levels may be helpful for diagnosing chronic autoimmune thyroiditis, especially if the serum TSH level is increased.

Standard Radiography: Suspicion of malignancy within a thyroid swelling is of course an indication for a chest X-ray to exclude the presence of pulmonary metastasis. Thoracic inlet views should be requested in presence of obstructive symptoms, tracheal deviation or suspected retrosternal extension. Sometimes, calcification may be detected within a papillary carcinoma of thyroid as psammoma bodies.

Isotope Scanning: For many years radioisotope scanning had been a mainstay of investigation of the patient with a solitary thyroid nodule. Previously, an iodine isotope (I-131 or I-123) was used but more recently technetium 99m pertechnetate has become the isotope of choice because it is readily available, is inexpensive and exposes the patient to less radiation without sacrifice of quality of images obtained. By convention, the nodules in these scenarios have been categorized as cold, warm and hot respectively.

Ultrasonography: High-resolution ultrasonography (USG) is the most sensitive imaging modality available for examination of the thyroid gland and associated abnormalities. Iso or hyper-echogenicity of the thyroid nodule in conjunction with a spongiform appearance is the most reliable criterion to be benign on gray-scale ultrasound. USG features predictive of malignant nodules include presence of micro calcifications, size more than 1 cm, taller than wide shape and an intra- nodular vascularity.

Neck ultrasound is an ideal technique for establishing whether a palpable cervical mass is within or adjacent to thyroid and for differentiating thyroid nodules from other neck masses. In addition, sonography may confirm the presence of thyroid nodules when the findings on physical examination are equivocal.

The major limitation of ultrasound in thyroid imaging is that it cannot determine thyroid function. Real time USG also helps to guide the diagnostic and therapeutic interventional procedures in various thyroid diseases.

Computed Tomography and Magnetic Resonance Imaging: CT and MRI do not add significantly to the workup of uncomplicated thyroid nodules that are otherwise well characterized by ultrasound. However, either modality may be helpful in evaluating local extension in more advanced stages of thyroid cancer. CT or MRI is particularly appropriate for a suspicious mass (or biopsy-proven cancer) with bulky cervical lymph nodes. Additionally, either modality can be used for postoperative follow-up, particularly for suspicion of recurrent disease.

Fine needle aspiration cytology (FNAC): It has proven to be a first line tool to evaluate the thyroid lesions because of its cost effectiveness and high patient acceptance. FNAC particularly, guided is highly successful in triaging patients with thyroid nodules into operative and non-operative groups. This enables surgeons to take an early decision regarding mode of treatment to be applied.

The use of large-needle biopsy in addition to standard FNAC has improved diagnostic accuracy in difficult FNAC. But in less experienced hands, this is associated with increased complication rates such as hemorrhage, tracheal puncture and injury to the recurrent laryngeal nerve.²⁸

For cystic thyroid nodules, sampling from margin of the nodule, rather than from the cystic fluid and debris in the center, increases accuracy. USG guided FNAC can be used for this purpose. Although such guided biopsies may sometimes be helpful, routine use of ultrasound guided biopsy in clinically palpable nodules is not any better than 'free hand' aspiration.

Apart from its limited utility in evaluation of follicular neoplasms, the only other limitation of FNAC is non-diagnostic specimens, which may be obtained in up to 20% of cases. Some authorities recommend a trial of TSH suppression, which can sometimes shrink benign nodules. Although repeated aspiration increases both the accuracy and the rate of diagnostic aspirations, even repeated attempts may sometime fail. Hence either close observation or surgical removal of the nodule is probably the best option.

Classification of Thyroid Swelling:

1. Simple (Euthyroid)
 - A. Diffuse Hyperplastic
 - B. Multinodular Goiter
 - C. Solitary Nodul
2. Toxic
 - A. Diffuse (Grave's disease)
 - B. Multinodular
 - C. Toxic Adenoma
3. Neoplastic
 - A. Benign
 - B. Malignant
 - Papillary Carcinoma
 - Follicular Carcinoma
 - Medullary Carcinoma
 - Anaplastic Carcinoma
 - Lymphoma
4. Inflammatory
 - A. Autoimmune
 - Chronic lymphocytic thyroiditis
 - Hashimoto's disease
 - B. Granulomatous - De Quervain's thyroiditis
 - C. Fibrosing - Reidel's thyroiditis
 - D. Infective
 - E. Others - Amyloid

Treatment

Radioactive iodine-131 can be used to destroy thyroid tissue. Radioactive iodine is selectively taken up by the thyroid, which over time destroys the cells involved in its uptake. The chosen first-line treatment will depend on the individual and local expertise. Thyroidectomy can be performed by open or minimally invasive technique. Surgery carries a risk of damage to the parathyroid glands and the nerves controlling the vocal cords. This surgery did not find ready acceptance by Germans and French initially who called these operations "Foolhardy Performances". If the total thyroidectomy is done, hypothyroidism will naturally result and thyroid hormone substitutes will be needed.

Theoretically, total thyroidectomy is a logical and optimal surgical procedure for benign thyroid disease affecting the entire thyroid gland as it has the advantage of immediate and permanent cure with no recurrence. Now, there is a change in a surgical practice from sub-total thyroidectomy to total thyroidectomy for benign thyroid disease. It is increasingly being done almost all over the world almost for the past 40 years.

Thyroid surgery has been performed since ancient times. Abu al-Qasim, Islam's legendary medieval surgeon, is credited with performing the first goiter excision in which the patient just avoided exsanguinations, as recorded in his surgical tome, *Al-Tasrif*, in 952 AD. The first documented partial thyroidectomy was carried out by Pierre Joseph Desault in 1791. He removed a four cm mass from the thyroid through a vertical incision, tying the superior and inferior thyroid artery.

Theodor Kocher who is generally credited with the most important contribution within the field, and thus has been called the father of thyroid surgery. Theodor Kocher was the first surgeon to receive the Nobel Prize in Medicine and Physiology in 1909 for his life work in understanding thyroid diseases through surgery and research. The surgical management of Grave's disease and multinodular goiter has been controversial over the years. Some authors support total thyroidectomy and others subtotal thyroidectomy, leaving approximately

3-4g remnant thyroid tissue on one or both sides (Hartley-Dunhill; Enderlen-Hotz procedure respectively), or near total thyroidectomy leaving approximately 1 g thyroid tissue in situ. All above procedures have been utilized for almost 100 years. Recent studies support total thyroidectomy as the treatment of choice for MNG, because of the risk of recurrent disease when leaving tissue remnants.

III. Aims And Objectives

1. To study clinical presentation of thyroid swellings
2. To know the various histopathologic types and their features in relation to different types of thyroid swelling
3. To study management of different thyroid swellings

IV. Material And Methods

This study was conducted at Department of General Surgery, Guru Nanak Dev Hospital and Government Medical College, Amritsar. Appropriate permission was taken from Institutional Ethics Committee. 50 Patients with thyroid swelling who gave informed consent were included in the study.

Detailed history was taken. Physical examination of patients was done, more stress was given on local examination. A note of all the clinical details such as age, sex, duration of symptoms, signs and symptoms suggestive of toxicosis and malignancy was made. After clinical diagnosis patient were subjected to various investigations including thyroid function tests, indirect laryngoscopy, ultrasonography and FNAC. The patients were clinically assessed for any metastasis. Special investigations like bone scan, CT scan were performed only if there was high clinical suspicion. After surgery, all resected tissues were subjected to histopathological examination. The decision for surgery was made on patient's examination and laboratory findings. The plan of surgery was decided beforehand i.e. hemi-thyroidectomy, total thyroidectomy, total thyroidectomy with neck dissection.

After surgery and final histopathological diagnosis, all the patients having malignancy were referred to the Department of Radiotherapy / Department of Oncology for further management.

Inclusion Criteria :

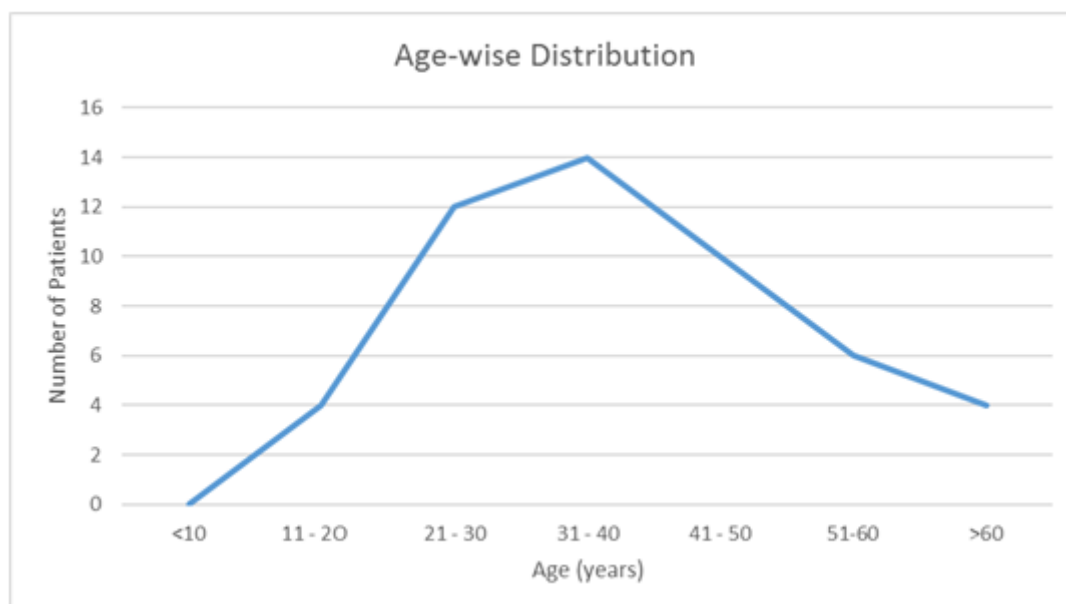
All cases of thyroid swelling were included under study irrespective of age and sex.

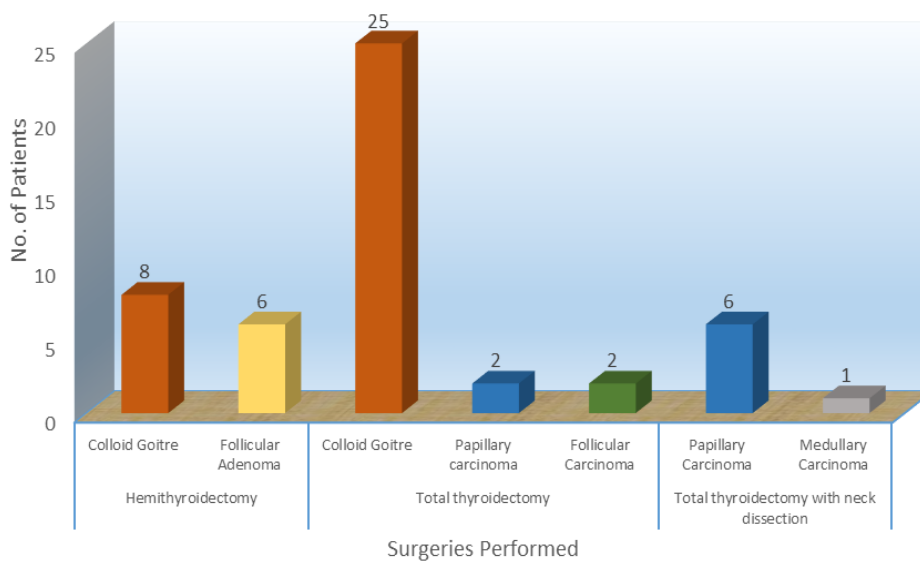
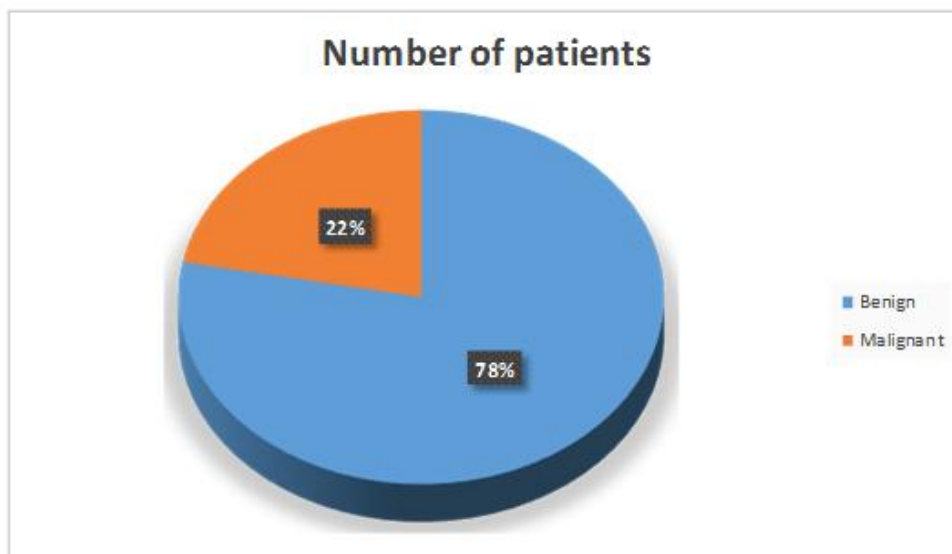
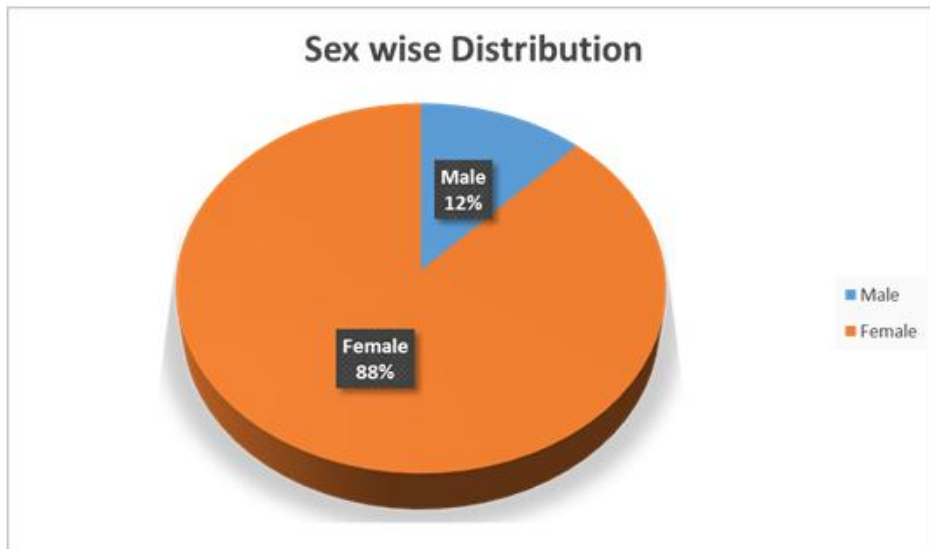
Exclusion Criteria:

Patients who were not willing to take complete treatment or participate in the study.

V. OBSERVATIONS

In this study of 50 cases, it was noted that the majority of thyroid swelling patients presented in the age group of 31-40 years (14 cases), 12 patients presented in the age group of 21-30 years, 10 patients were in age group of 41-50 years, 6 patients were in age group of 51-60 years, 4 patients were in age group of 11-20 years and 4 patients above 60 years.







PHOTOGRAPH SHOWING SPECIMEN OF THYROID IN PATIENT OF MULTINODULAR GOITRE WHO UNDERWENT TOTAL THYROIDECTOMY



PHOTOGRAPH SHOWING RECURRENT LARYNGEAL NERVE ON LEFT SIDE IN TRACHEO-OESOPHAGEAL GROOVE, NERVE IS PRESEVED WHILE TOTAL THYROIDECTOMY (TRACHEA RETRACTED MEDIALY)

VI. Discussion

Thyroid swellings are not uncommonly encountered. With the rise of health awareness and medical facilities, the number of such cases have increased over the time. The main concern for the patients is cosmesis and fear of malignancy.

The objective of the present study was to become conversant with the pattern of various types of thyroid swellings, their clinical presentation, role of various investigations in diagnosing thyroid swellings and their management.

The majority of the patients belonged to the age group of 21-40 years(52%), the highest incidence of thyroid swelling in our study was found in the fourth decade (28%) followed by third decade (24%). Our results

are similar with the study done by Kumar A et al¹⁰, which reported maximum number of patients in fourth decade of life i.e. 32% and 54% patients in age group of 21-40 years. Vyas CS et al¹¹ also showed 62% patients in age group of 21-40 years.

The youngest patient in the study was 18 years old female with colloid goiter. The oldest patient was 73 years old male having compressive symptoms with cytological diagnosis of multi nodular goitre. Mean age of presentation in our study was 38.9 years. It is similar to the study done by Kumar A et al which showed mean age 38.5 years in a study of 295 patients. Sathiyamurthy K et al reported mean age of presentation was 36.5 years.¹⁰

Female to male ratio in our study was 7.3:1. Similar results were seen in a study conducted by Handa U et al¹², ratio being 6.35:1. It is a well known fact that thyroid diseases affect females more commonly than males.

Presentation of thyroid swelling depends upon the severity of symptoms, awareness and socio-economic status of the patients. All the patients in our study presented with chief complaint of neck swelling. Four cases (8%) had pressure symptoms like difficulty in breathing, difficulty in swallowing and change in voice. Three patients (6%) had cervical lymphadenopathy. One case had toxic symptoms of hyperthyroidism (palpitations, tremors, sweating, anxiety). Findings of our study are comparable with the findings of study done by Chetan VR et al¹³, who in their study of 100 patients found that all the patients presented with thyroid swelling.

Majority of the patients, 20 cases (40%) presented within 1-2 years since the onset of swelling. 17 cases (34%) presented within 1 year and 13 cases (26%) presented late i.e. after two years of onset of swelling. In our study, 66% patients presented after one year of onset. Findings of our study correlates with study done by Handa U et al¹², which showed that 62.2% patients presented after one year of onset of swelling. Majority of the swellings involved right lobe of thyroid gland (38% patients). Liechty RD et al¹⁴ noticed that there was a predilection for benign and malignant nodules to occur in the right lobe compared to left lobe. Similar results were reported by Kumar A et al¹⁰ and Sengupta A et al¹⁵ which showed right lobe involvement in 32.54% cases and 43.3% cases respectively.

In this study, the majority of nodules were firm in consistency (41 cases), out of which 35 cases were benign and 6 cases were malignant in nature. Hard nodules were found in 7 cases, out of which 5 cases were malignant and 2 cases were benign in nature. There were 2 cases of soft swellings, both of which were benign in nature. Bhansali et al⁹ reported that majority of the malignant nodules are firm.

In our study, the majority (44%) of the patients had thyroid swelling of size of 2.1-3cm (22 cases). 12 cases (24%) showed large thyroid swelling (>4 cm). Maximum size of the swelling was 8 cm in diameter. Jayaram G¹⁶ and Orell SR et al¹⁷ stated that nodules less than 1 cm in diameter were not detected by palpation, but rather detected during USG thyroid examination

On examination, the solitary nodule was most commonly present in our study (44% cases). Multinodular Goiter was present in 36% patients and diffuse swelling was seen in 22% patients. Our results are comparable with study by Kumar V et al, they reported majority of thyroid swellings were solitary nodules (58%) followed by MNG (22%) and diffuse thyroid swellings in 20%. Subhabharta et al in their study also found predominance of solitary nodule thyroid (35%) over MND (33%) and diffuse thyroid swellings (31%).¹⁸

In our study, 94% patients were euthyroid, 4% patients had hypothyroidism and 2% patient were hyperthyroid. Both cases of hypothyroidism turned out to be colloid goiter on histopathology. Our thyroid function test findings were consistent with study by Godinho-Matos L et al, which reported 88% patients were euthyroid at presentation in a study of 144 patients. Sengupta A et al¹⁵ reported 90% patient were euthyroid in their study of 178 cases.

Ultrasonography of the thyroid swelling was done in all the cases. 68% (34 cases) of cases revealed homogeneous solid mass with well defined borders. Classical feature of benign nodule is homogeneous internal echo without disruption of the sonolucent halo around the nodule as reported by Katz JF et al¹⁹ and Cole-Beuglet C et al²⁰. On the other hand, hypoechoic, solid nodule with heterogenous internal echoes and irregular border is regarded as malignant ultrasonographically. In our study we found hypoechoic lesion in 16 cases, which were suggestive of malignancy, out of which 11 cases turned out to be malignant. USG has high accuracy in determining the size of the nodule but regarding extension of the thyroid tumour beyond thyroid capsule, it has low sensitivity. In our study, out of 11 cases of malignancy, USG showed 5 cases with cervical lymphadenopathy.

All the patients were subjected to X-ray neck and indirect laryngoscopy. X-ray neck showed tracheal deviation in 3 cases (6%) and calcification was seen in another 3 cases (6%). Indirect laryngoscopy showed restricted vocal cord mobility in 2 cases (4%).

For preoperative tissue diagnosis, FNAC of the swelling was done in all the 50 cases. Majority of the swellings showed colloid goitre i.e. 66% (33 patients). Papillary carcinoma was reported in 16% (8 patients), 14% (7 patients) showed follicular neoplasm and 2% (1 patient) showed medullary carcinoma.

All the cases were subjected to surgery after thorough evaluation. Benign solitary lesions were usually managed by hemithyroidectomy which included ipsilateral lobectomy with isthmectomy in 28% cases. Cases with preoperative FNAC diagnosis of papillary carcinoma underwent total thyroidectomy and neck dissection depending on status of patient. 29 cases underwent total thyroidectomy. Modified radical neck dissection was done if cervical lymph nodes were palpable or risk factors were present as in 6 cases of papillary carcinoma.

In our study, total thyroidectomy was most commonly performed surgery, done in 72% cases. It was done along with neck dissection in 14% cases. There is increasing evidence for total thyroidectomy for multinodular goitre. It helps reducing re-surgery in multinodular goitre as recurrence is common after sub-total thyroidectomy. Both the patients which showed follicular carcinoma on histopathology were subjected to completion thyroidectomy. Patient with medullary carcinoma thyroid underwent total thyroidectomy and bilateral neck dissection. Care was taken especially to preserve the vascular supply of parathyroid gland and to avoid injury to recurrent laryngeal nerve while surgical dissection in cases of total thyroidectomy.

On final histopathology, there were 33 cases (66%) of colloid goitre, 6 cases (12%) of follicular adenoma, 8 cases (16%) of papillary carcinoma thyroid and 2 cases (4%) of follicular carcinoma. There was only one case of medullary carcinoma. Our results are similar to study done by Uddman R et al which described the incidence of papillary thyroid carcinoma 80%, follicular carcinoma 10% and medullary carcinoma 5%. In our study, however no patient had any history of radiation exposure in childhood or occupation which predispose to papillary carcinoma. The greatest problem encountered in FNAC is the lack of distinction between follicular carcinoma and follicular adenoma. Therefore the authorities on the subject recommend that such lesions be classified as follicular neoplasm and must be subjected to the histopathological examination as studied by Kendall CH. In our study, out of 8 follicular neoplasm as diagnosed by FNAC, 5 cases were of follicular adenoma and 2 case had follicular carcinoma and 1 case was of colloid goitre on histopathological examination.

In our study, 1 case of papillary carcinoma was missed on pre-operative FNAC. Chances of missing papillary carcinoma are high when the lesion is cystic. Nilsson G, et al in their study concluded that the causes of false negative reports in cystic papillary carcinoma were lack of cytological pleomorphism as a result of the needle missing the lesion particularly when the lesion is small or the sampling is inadequate. Rate of malignancy as revealed by histopathology of resected thyroid specimens in our study was 22%. Other studies like study done by Abu Eshy et al showed rate of malignancy 15.2% and by Kendal AN as 11-20%. Our results are closest to the study by Khadilkar UN et al²¹ which reported 21% cases of malignancy. Higher incidence (22%) in our study was probably due to referral of cases from various hospitals to our institution. In our study, recurrent laryngeal nerve palsy was seen in 4% cases – both of which were temporary in nature, probably due to neuropraxia during dissection. However, both recovered within 1 month of surgery. Both the patients had large thyroid swelling preoperatively with restrictive mobility.

Incidence of hypocalcaemia due to removal or damage to the parathyroid gland was found to be 6%, which was treated successfully with injection calcium gluconate and vitamin D3. All these patients had underwent total thyroidectomy.

Superficial wound infection was seen in 2% cases, which was managed conservatively. Seroma was seen in 4% cases, which was managed by aspiration. No case of postoperative hemorrhage was seen which is life threatening complication. Our results are comparable with the study done by J. Sambasiva Rao which reported post-operative 16% cases of hypocalcemia and that of RLN paralysis, wound infection, seroma and haematoma were 2%, 4%, 2% and 2% respectively.

Monthly follow up was done in all the cases to assess complications. Follow up was done for three months. Patients were subjected to clinical examination and biochemical investigations like TSH and calcium levels. After one month, one patient had hypocalcaemia suggesting hypoparathyroidism requiring oral calcium and vitamin D supplements. In this patient hypoparathyroidism persisted even after three months of follow up.

Suppressive dose of thyroxine was given to papillary carcinoma patients to keep TSH level low. All cases of total thyroidectomy were given oral thyroxine at maintenance dose.

We had few limitations in our set up. We did not have facilities for frozen section analysis. Facility for radioiodine ablation was also not available. Most of the patients were of poor socio-economic status. There was no facility of nerve monitoring available for large goiter. Using nerve monitoring may have helped in better preservation of parathyroid gland and prevent injury to recurrent laryngeal nerve. Ultrasound guided FNAC was not available. Ultrasound guided FNAC from solid part might have improved FNAC results. These factors affected our treatment policy in some cases particularly in thyroid carcinoma patients.

VII. Conclusion

1. The majority of thyroid swelling patients presented in the age group of 31-40 years (28% cases).
2. It was seen that thyroid swelling was largely more common in females than males, male to female ratio being 1:7.3.

3. All the 50 patients (100%) had neck swelling as their chief complaint.
4. Histopathological examination of specimen was done in all patients. It reported colloid goitre was most commonly encountered pathology in 33 patients (66%). Papillary carcinoma was seen in 8 patients (16%), 2 patients had follicular carcinoma and 1 patient of medullary carcinoma thyroid.
5. Total thyroidectomy was most commonly performed surgery.

The number of patients presenting with thyroid swellings is increasing, though patients usually visit physician when there is increased fear of malignancy or cosmetic problem. They need to be assured that most swellings are benign in nature. Surgery remains mainstay for treatment. With improved healthcare facilities and newer energy sources, complications have declined substantially with reduced mortality.

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