A DISSERTATION ON

A STUDY ON TRUCUT BIOPSY IN ADENOMATOUS GOITRE SPECIMEN IN DIFFRENTIATING FOLLICULAR ADENOMA FROM CARCINOMA

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BONAFIDE CERTIFICATE

This is to certify that the dissertation titled "**A study on trucut biopsy in adenomatous goitre specimen in differentiating follicular adenoma from carcinoma done in MGMGH, Trichy a descriptive study"** is a bonafide original work of **Dr. M.ABINANDHA**, in partial fulfilment of the requirements of M.S General Surgery [Branch-1] examination of The Tamilnadu Dr.M.G.R Medical University to be held in May 2020.

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I hereby declare that the dissertation entitled **"A study on trucut biopsy in adenomatous goitre specimen in differentiating follicular adenoma from carcinoma in MGMGH, Trichy"** was done by me at Mahatma Gandhi Memorial Government Hospital, Trichy during the period of my post graduate study for M.S. Degree Branch-1 (General Surgery) from 2017 to 2019.

This dissertation is submitted to the Tamil Nadu Dr. M.G.R. Medical University in partial fulfilment of the University regulations for award of M.S., Degree in General Surgery.

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LIST OF ABBREVIATIONS

M	MALE
F	FEMALE
T3	TRIIODOTHYRONINE
T4	THYROXINE
SNG	SOLITARY NODULAR GOITRE
MNG	MULTINODULAR GOITRE
NCG	NODULAR COLLOID GOITRE
FOLL.NEO	FOLLICULAR NEOPLASM
FOLL.ADE	FOLLICULAR ADENOMA
HPE	HISTOPATHOLOGICAL EXAMINATION
USG	ULTRASONOGRAM
TFT	THYROID FUNCTION TEST
FNAC	FINE NEEDLE ASPIRATION CYTOLOGY
TSH	THYROID STIMULATING HORMONE
TBG	THYROXINE BINDING GLOBULIN
TRH	THYROTROPIN RELEASING HORMONE

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INTRODUCTION

Thyroid is the largest of all endocrine glands and it is superficial in location. The normal thyroid gland is usually impalpable. The term goitre is used to describe generalised enlargement of the thyroid gland. It is easily approachable to direct physical, cytological and histopathological examination.

The thyroid gland is affected by various pathological lesions that are manifested by various morphologies like developmental, inflammatory, hyperplastic and neoplastic pathology which are very common in clinical practice.

Lesions of thyroid are very common and it presents as diffuse enlargement or solitary or multiple nodules. The incidence of malignancy is very low when compared to overall thyroid nodular lesions. It is important to find diagnostic modalities that may improve the ability to differentiate between benign and malignant lesions.

Fine needle aspiration cytology has been established the investigation of choice in thyroid lesions. It is an outpatient procedure and easy to perform and it is simple and quick. It is the initial

investigation of choice in thyroid disorders. However it has its own limitations. It cannot differentiate between follicular adenoma and carcinoma.

Trucut biopsy is a well tolerated and reliable procedure for providing a tissue diagnosis of malignancy before planning definitive treatment. The procedure is performed using a specially designed needle. Hence a study on diagnostic accuracy of trucut biopsy in differentiating follicular adenoma from carcinoma is done in MGMGH, Trichy.

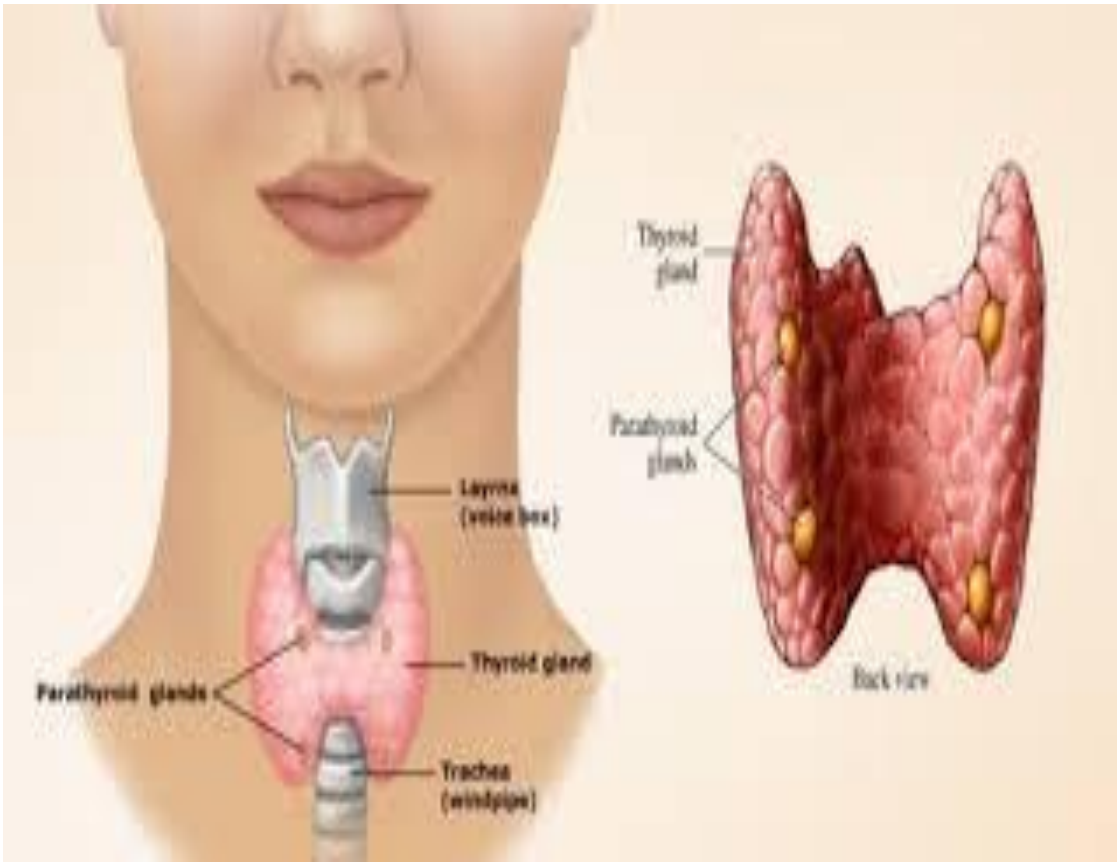
This will provide us a tool for planning exact line of management for benign and malignant lesions and thus preventing unwanted procedures.

AIM OF THE STUDY

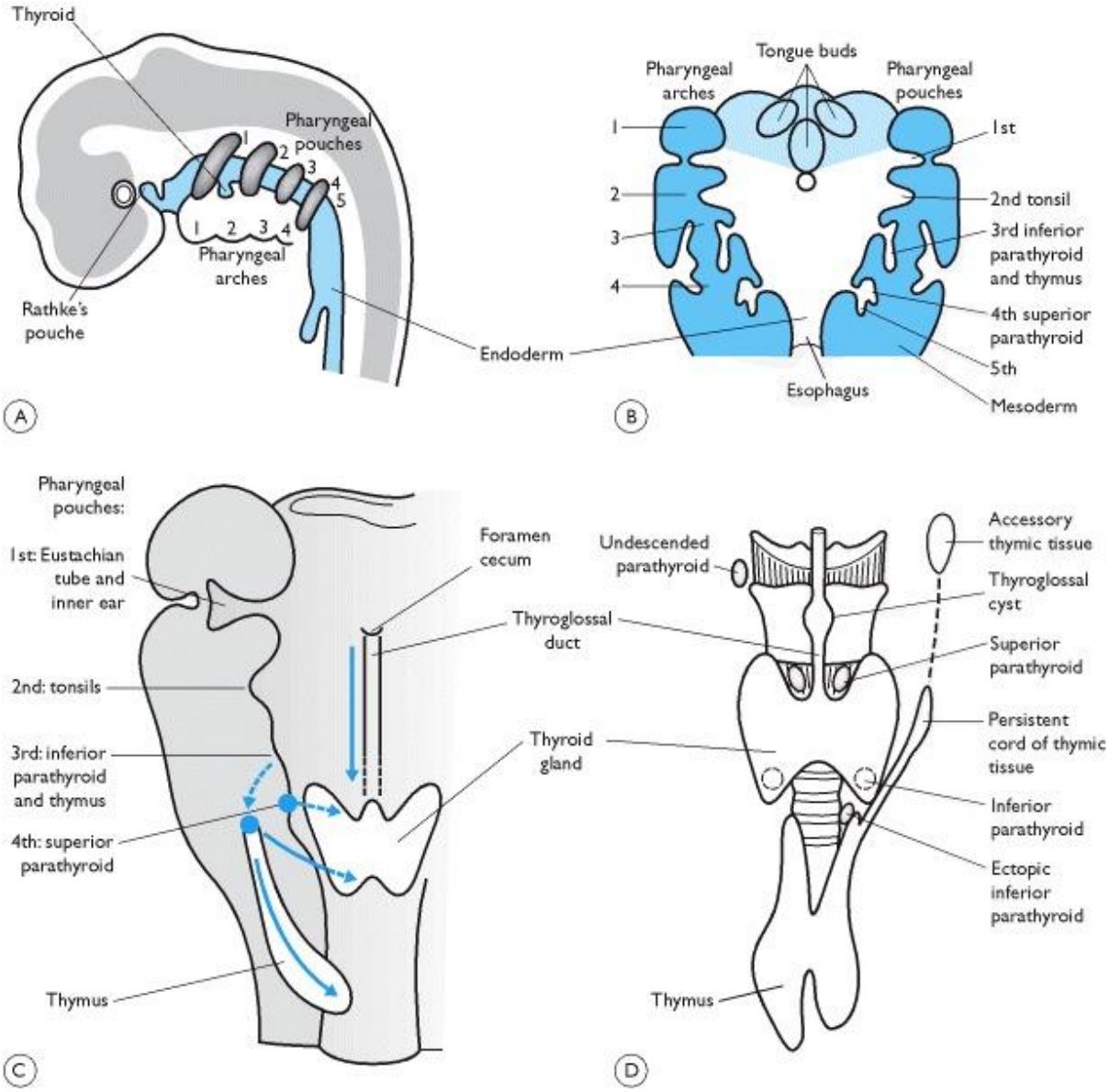
- To study the diagnostic accuracy of trucut biopsy in adenomatous goitre specimen in differentiating follicular adenoma from carcinoma.
- To assess the advantage of trucut biopsy over fine needle aspiration cytology in diagnosing benign and malignant lesions.
- To evaluate the accuracy of trucut biopsy in adenomatous goitre specimen in correlation with gross specimen report following surgery.
- To study the advantage of trucut biopsy in adenomatous goitre lesions.

REVIEW OF LITERATURE

The thyroid gland is one of the unique among all endocrine glands. The first endocrine gland to appear in the foetus. It weighs about 25g and largest of all endocrine glands. Because of its superficial location it is amenable for direct physical examination.



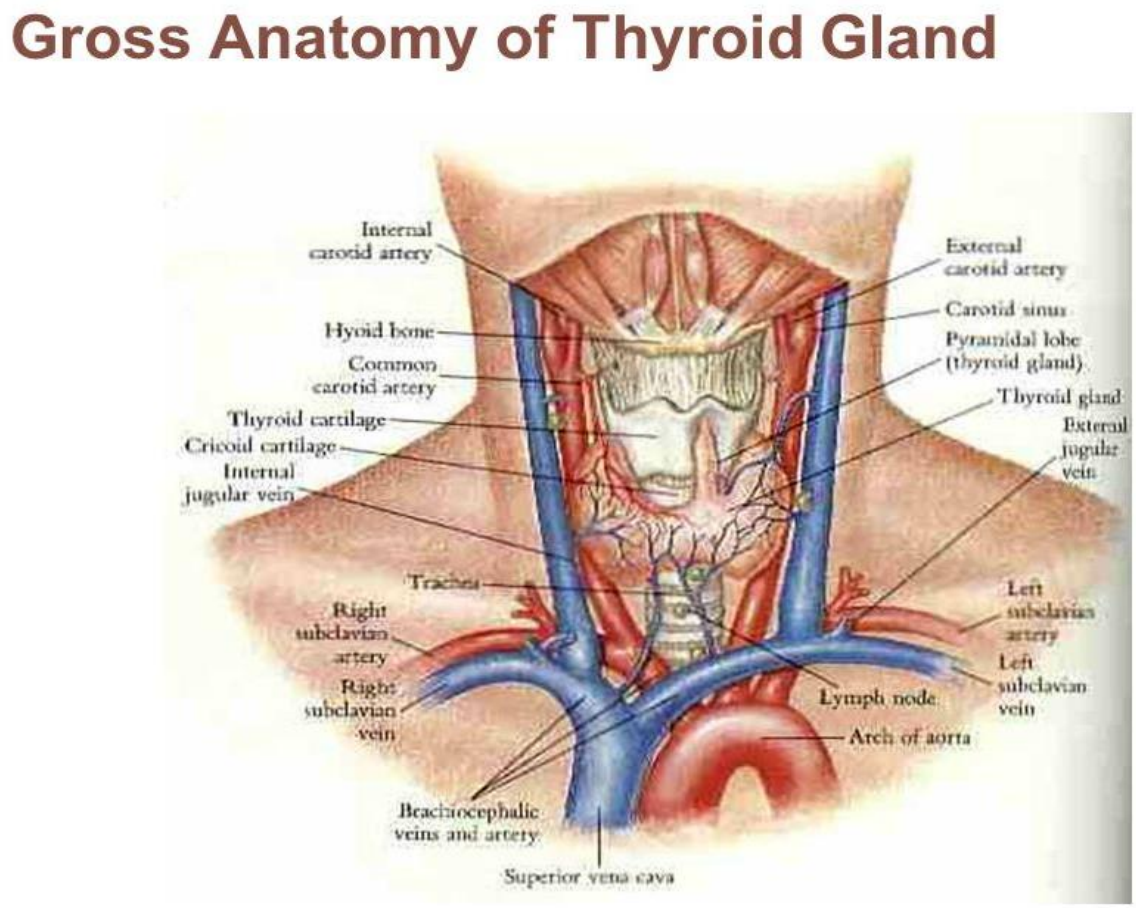
EMBRYOLOGY



The thyroid gland arises as an out pouching of the primitive foregut around third week of gestation. It arises at the base of the tongue in the vicinity of foramen caecum. It grows downwards and backwards as a tubular duct, which bifurcates and subdivides into a series of cellular cords, from which thymus and lateral lobes develop. The ultimo branchial

bodies from the fifth pharyngeal pouches are enveloped by lateral lobes of the thyroid. They are neuro ectodermal in orgin and provide the calcitonin producing C cells which lie in the superioposterior region of the gland. Thyroid follicles are apparent by 8 weeks and colloid formation begins by 11th week of gestation. In the third month, follicular cells first demonstrate iodine trapping and thyroid hormone secretion begins.

ANATOMY

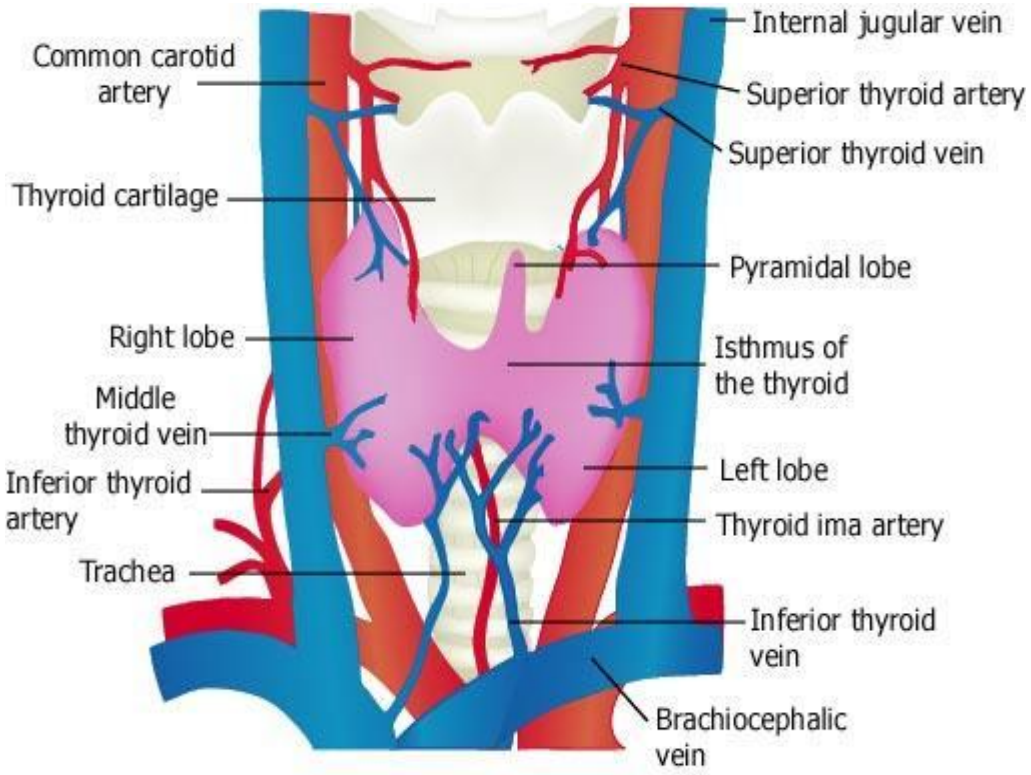


The thyroid gland is a butterfly structure consisting of two bulky lateral lobes (average dimension 4 *2cm) connected by a thin isthmus extending from the middle of the thyroid cartilage above to the sixth tracheal ring below . Right lobe is slightly larger than the left lobe. The small pyramidal lobe of Laloutte which is of variable size joins the isthmus at its junction with the left lateral lobe by a fibrous band or strand of muscle fibres known as levator glandular thyroideae. Each lobe extends between the trachea and oesophagus medially and carotid sheath laterally.

The lateral or superficial surface is convex and it is covered by skin, superficial and deep fascia ,sternocleidomastoid, superior belly of omohyoid ,sternohyoid ,and sternothyroid and lastly by the pretracheal layer of the deep fascia ,which forms the capsule for the gland. The deep or medial surface is moulded over the following structures, viz., thyroid and cricoid cartilages , trachea,constrictor pharynges inferior and posterior part of Cricothyreoideus , oesophagus (particularly on the left side of the neck), superior and inferior thyroid arteries and the recurrent nerves. The anterior border is thin and inclines obliquely from above downward towards the midline of the neck. The posterior border is thick and overlaps the common carotid artery and the parathyroids.

The thyroid gland is is enveloped by a loose connecting fascia that is formed from the partition of the deep cervical fascia into anterior and posterior divisions. The true capsule of the gland is a thin, densely adherent fibrous layer that sends out septa that invaginates into the gland forming pseudolobules. The thyroid capsule is condensed near the cricoid cartilage into posterior suspensory or Berry's ligament. The strap muscles are located anterior to the thyroid and are innervated by the ansa cervicalis (ansahypoglossi).

VASCULAR SUPPLY TO THE GLAND



The thyroid gland is supplied by 4 main arteries: 2 superior thyroid arteries and 2 inferior thyroid arteries.

The superior thyroid artery is the first branch of the external carotid artery and separates immediately above the bifurcation of the common carotid artery. The superior thyroid artery drops medially onto the surface of the inferior pharyngeal constrictor muscle and pierces the substance of the superior pole of the thyroid at its apex. The superior thyroid artery courses medially with the external branch of the superior laryngeal nerve, and this structure must be separated from it when gaining control of the artery. At the apex of the lateral lobe, it divides into a large anterior branch and a usually smaller posterior branch .Occasionally a tributary leaves high on to the left to supply the pyramidal lobe near the midline.

The inferior thyroid artery takes its origin from the thyrocervical trunk. This artery ascends into the neck on either side behind the carotid sheath and then arches medially and enters the thyroid gland posteriorly. There is no direct arterial supply to the thyroid at the inferior boundaries. An occasional inferior arterial supply may occur from a thyroidea ima artery that occurs in absence of a well-defined inferior arterial supply. The thyroidea ima arteries occurs in less than 5% of patients and usually arise directly from the innominate artery or from the aorta.

The inferior thyroid artery has important anatomical relationships. The recurrent laryngeal nerve is directly adjacent (in either an anterior or posterior position) to the inferior thyroid artery within 1 cm of its entrance into the larynx. In this case careful dissection of the artery is mandatory and cannot be completed until knowledge of the position of the recurrent laryngeal nerve is gained. Additionally ,inferior thyroid artery almost always supplies both the superior and inferior parathyroid glands, and care must be taken in evaluating the parathyroids after inferior thyroid artery division.

Numerous unnamed accessory arteries arise from the oesophagus and trachea, but most frequently encountered is the thyroidea ima (Neubauer's artery), which courses up anteriorly on the trachea to reach the isthmus or one of the lower poles and originates from the aorta or brachiocephalic artery. In the absence of the inferior thyroid artery on one side, the thyroidea ima may be the principal source of blood supply to the lobe and therefore substantial.

Three pairs of venous systems drain the thyroid gland.

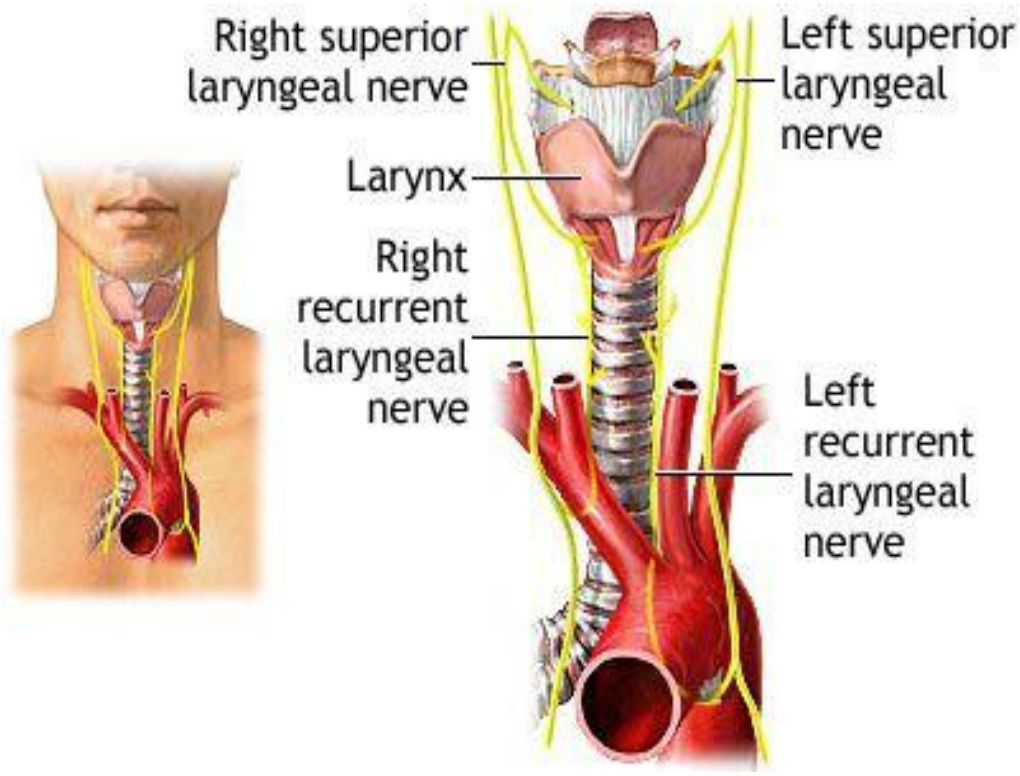
1. Superior venous drainage is immediately adjacent to the superior arteries and joins the internal jugular vein at the level of carotid bifurcation.

2. The middle thyroid courses immediately laterally into the internal jugular vein.
3. The inferior thyroid veins are usually two or three in number and descend directly from the lower pole of the gland into the innominate and brachiocephalic veins. These veins often descend into the tail of the thymus gland.

LYMPHATIC DRAINAGE

Thyroid is drained by upper and lower deep cervical nodes. The thyroid gland and its neighbouring structures have a rich lymphatic supply that usually drains the thyroid in all directions. Within the gland,lymphatc channels occur immediately beneath the capsule and there is communication between the lobes through the isthumus. Upper part of the gland drains into upper deep cervical nodes either directly or through prelaryngeal nodes. Lower part of the gland drains into lower deep cervical nodes either directly or via pretracheal or paratracheal nodes.

NERVE SUPPLY



RECURRENT LARYNGEAL NERVE

The recurrent laryngeal nerves ascends on either side of the trachea and each lies just lateral to the ligament of berry as it enters the larynx. There are lot of anatomical variations in it. There are numerous variations in it. In about 25% it is contained within the ligament as it enters the larynx. The right recurrent laryngeal nerve arches around subclavian vein while the left recurrent laryngeal nerve arches around arch of aorta. The right recurrent laryngeal nerve is usually found 1cm lateral or within the trachea oesophageal groove at the lower border of thyroid. As it ascends, the nerve assumes its position within the tracheo-oesophageal groove.

Unusally, a non-recurrent laryngeal nerve can arise directly from vagus and course medially into the larynx. It is more come on the right side. It is found in 0.5% to 1.5% of patients. More rarely non recurrent laryngeal nerve and recurrent laryngeal nerve appear in the same patient. On the left side, the recurrent laryngeal nerve seperates from the vagus nerve as that nerve transverses over the arch of aorta. Both recurrent laryngeal nerve by the time they are within 2.5cms of their entrance into the larynx, are found within the tracheo-oesophageal groove. They enter the larynx at he level of cricothyroid articulation on the caudal border of the cricothyroid muscle. Great care is needed in surgical dissection in this area because the nerve is damaged as it dives beneath the cricothyroid muscle and can be placed on stretch by vigorous dissection. The function of recurrent laryngeal nerve is abduction of vocal cord from the midline. Damage of recurrent laryngeal nerve results in paralysis of vocal cord on the same side. However, a normal voice can be retained if functional contralateral cord is able to approximate the paralysed cord. If recurrent laryngeal nerve is damaged bilaterally, complete loss of voice or airway obstruction may result requiring emergency intubation and tracheostomy. Occasionally, bilateral damage can result in cords taking an abducted position which although allows airway movement may result in upper airway infection due to ineffective cough.

SUPERIOR LARYNGEAL NERVE

The superior laryngeal nerve separates from the vagus at the base of skull and descends towards the superior pole of the thyroid along the internal carotid artery. At the level of hyoid cornu it divides into two branches. The large internal branch has sensory function and it enters the thyrohyoid membrane as it innervates the larynx. The smaller external branch descends anteriorly and medially along the superior thyroid artery. Within 1cm of superior thyroid artery entrance into thyroid capsule, the nerve usually takes a medial course and enters into the cricothyroid muscle. It has a surgical significance as the nerve may be damaged at this point. Damage to external branch of superior laryngeal nerve can result in severe loss in quality of voice or voice strength. Although it is not as severe as recurrent laryngeal nerve injury, it is extremely bothersome to patients whose occupation demands good voice quality.

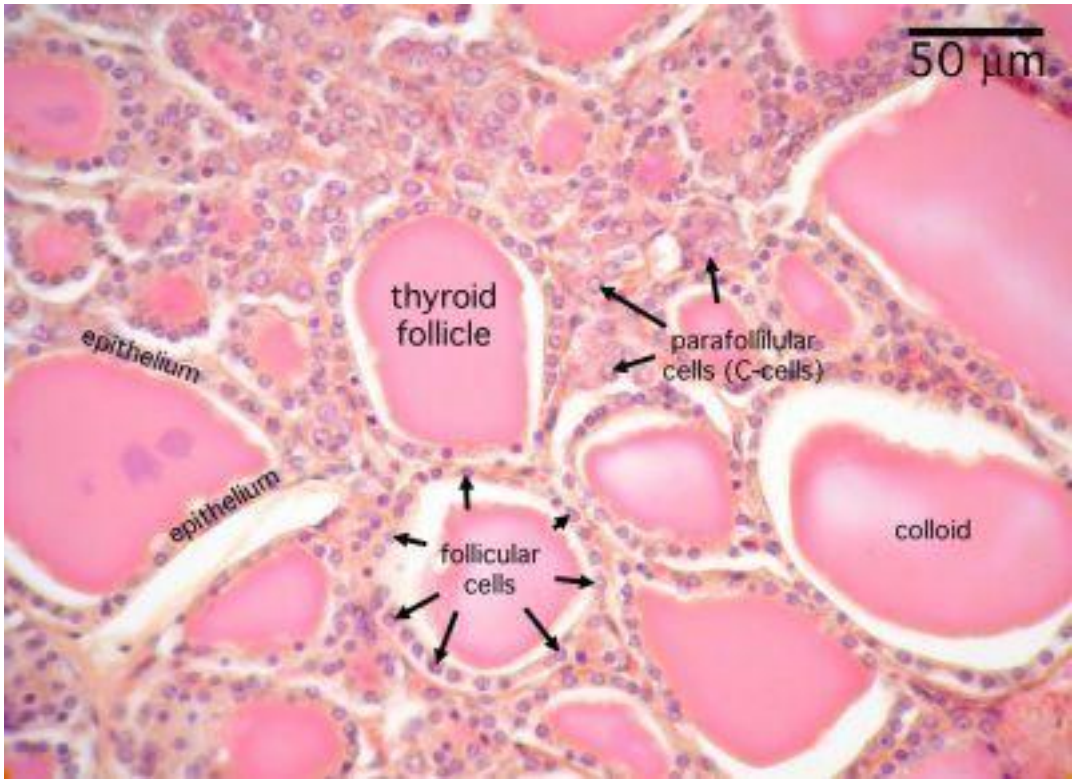
THE CERVICAL SYMPHATHETIC CHAIN

The cervical symphathetic chain underlies the carotid sheath medial to the vagus on the prevertebral fascia and it is in close proximity to the inferior thyroid artery as it arches medially.

PARATHYROID GLANDS

There are usually four parathyroid glands, the upper pair of which lies in close proximity to the dorsal aspect of the thyroid. They are usually found just above and medial to where the recurrent laryngeal nerve crosses the inferior thyroid artery tucking around behind its branches. The lower parathyroid gland on each side is situated within a 2-cm radius around the lower pole of thyroid, typically on its surface anterolaterally and at a level below and medial to where the recurrent laryngeal nerve crosses the inferior thyroid artery.

THYROID HISTOLOGY



The functional and morphological unit of thyroid gland is follicles which are lined by single layer of follicular epithelial cells filled with colloid secreted by epithelial cells under the influence of TSH. The follicles vary in size with average diameter of 200microns. The follicles are surrounded by rich network of capillaries, veins and lymphatics.

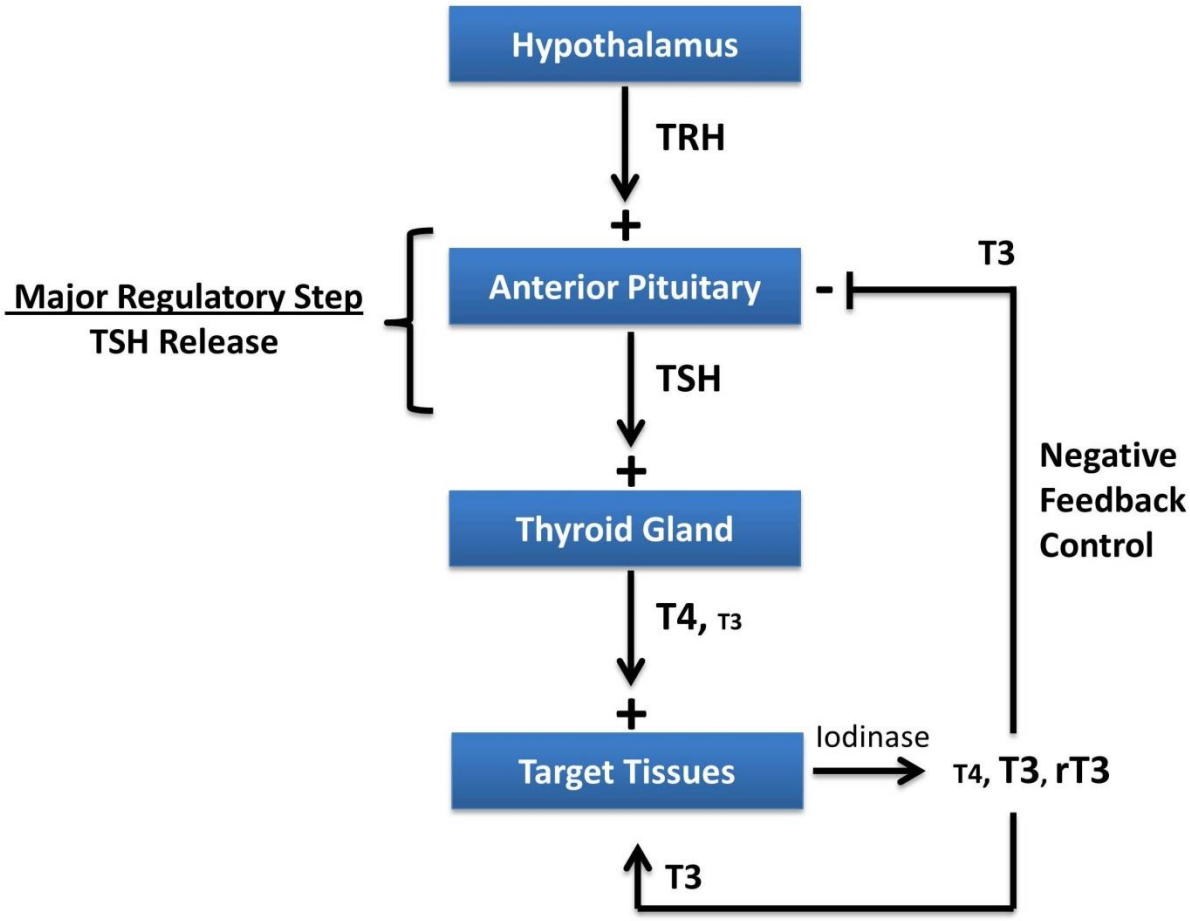
The second group of thyroid secretory cells is the C cells or parafollicular cells, which contain and secrete the hormone calcitonin. They are found as individual cells or clumped in small groups in the interfollicular stroma and located in the upper poles of the thyroid lobes.

According to the functional activity of the gland, the size, lining of the follicle and staining intensity of the colloid varies.In inactive gland, follicles are lined by flattened epithelial cells whereas in functional gland follicles are lined by the tall cylindrical follicular epithelial cells. In hyperfunctioning gland colloid will be scant whereas it is dense, homogenous and intensely eosinophilic in hypoactive gland.

Solid cell rests are remnants of ultimobrachial bodies which are usually found along central axis of the middle and upper third of the lateral lobes. They are mainly composed of polygonal or oval cells admixed with occasional clear cells.

Other structures that are found in the thyroid are parathyroid glands, normal thymus, salivary gland remnants, and occasional teratomatous elements like cartilage.

PHYSIOLOGY:



Thyroid secretes two hormones thyroxine (T3) and triiodothyronine(T4) which is controlled by thyroid stimulating factor(TSH) secreted by anterior pituitary gland, which in turn is controlled by thyroid hormone releasing hormone(TRH)secreted by hypothalamus by classical negative feedback loop.It also secretes another

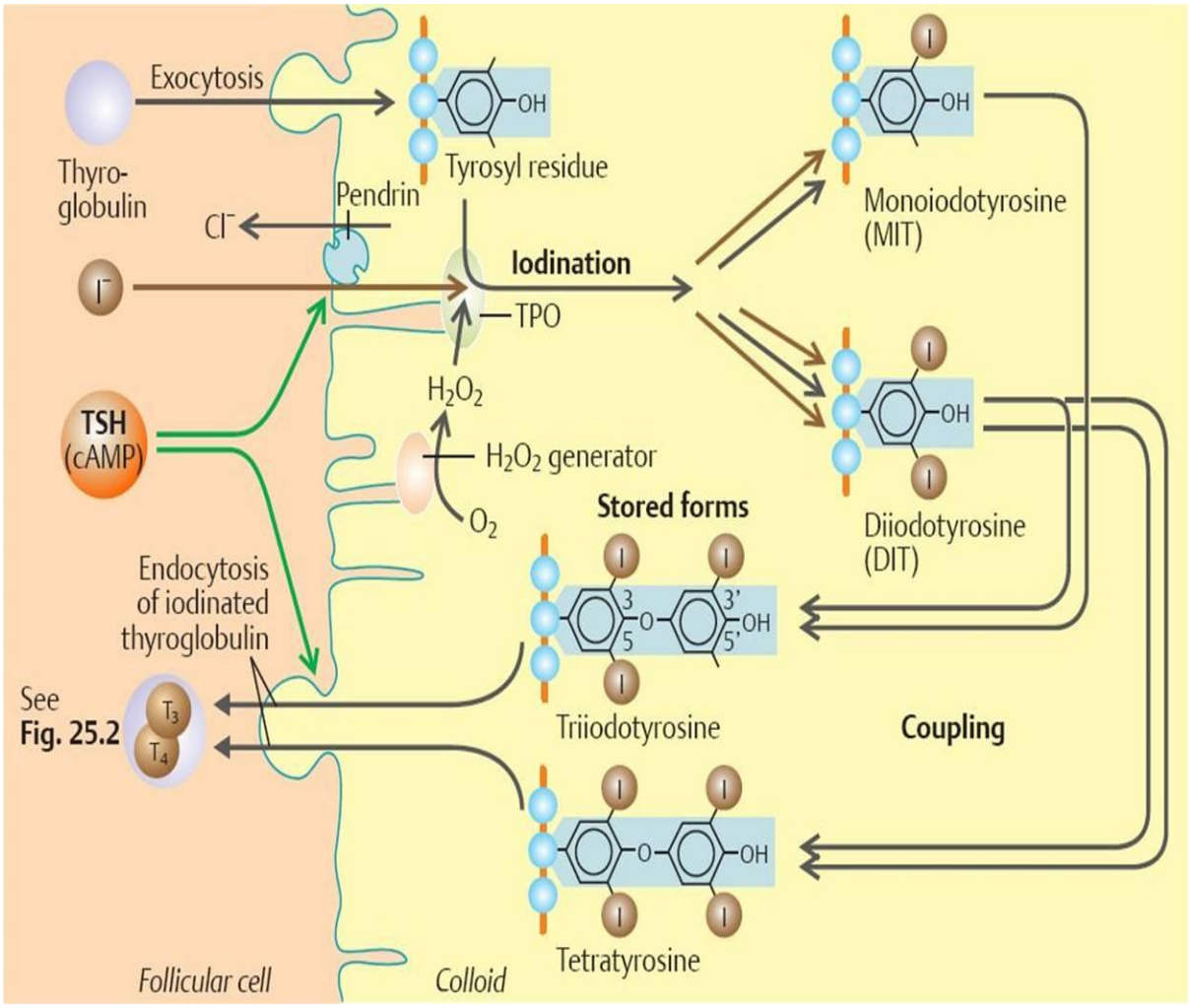
hormone called calcitonin which plays a major role in calcium metabolism. The average daily requiremennt of iodine is 0.1mg which is derived from foods like fish, milk and eggs. The thyroid is the storage site of more than 90% of body's iodine content and accounts for one-third of plasma iodine loss. The hormones T3 and T4 are bound to thyroglobulin within the colloid.

The steps involved in thyroid hormone synthesis are as follows:

1. Iodide trapping – sodium iodide symporter transports iodide from blood to the thyroid follicles
2. Oxidation of iodide to iodine – by the enzyme peroxidase
3. Organification of thyroglobulin(TG) – Binding of iodine with tyrosine portion of TG to form iodotyrosines
4. Iodination of tyrosine and formation of thyroid hormones by coupling reaction.

The iodotyrosine residues are condensed to form the biologically active thyroid hormones. When the gland is stimulated, there will be endocytosis of colloid and proteolysis of thyroglobulin by lysosomal enzymes and release of T3&T4 into the circulation.

After the hormones are secreted they are released into circulation, peripheral conversion of T4 to T3 occurs by deiodination. Triiodothyronine(T3) has high affinity and greater activity when compared to T4.Thyroid hormones are transported in serum bound to carrier proteins such as albumin, thyroxine-binding globulin(TBG) and thyroxine-binding prealbumin(TBPA).T3 is the more potent among two thyroid hormones, although its circulating plasma level is much lower than T4.Half life of T3 is one day and half life of T4 is seven days.



The secretion of thyroid hormones is controlled by the hypothalamic-pituatary-thyroid axis. The hypothalamus produces a peptide thyrotropin-releasing hormone(TRH) which stimulates the pituitary to release TSH or thyrotropin.TSH is a glycopeptide mediates iodine trapping,secretion and release of thyroid hormones. The TSH receptor belongs to a family of G-protein coupled receptors that have seven transmembrane spanning domains and they utilise cAMP in the signal transduction pathway.TSH secretion by the anterior pituitary is also regulated via a negative feedback loop by T4 and T3.

Calcitonin

Calcitonin, 32 aminoacid peptide secreted by parathyroid gland, mainly controls calcium metabolism in the body. Calcitonin acts principally by inhibiting bone resorption of calcium and thereby reducing the peripheral serum calcium levels. Calcitonin secretion can be stimulated clinically by infusion of pentagastrin, calcium and alcohol. The specific action of calcitonin is on the surface receptors of osteoclasts.Calcitonin receptors are also found in renal tubular epithelium as well as in lymphocytes. Basal or stimulated calcitonin levels are sensitive markers for medullary carcinoma of thyroid.

Common clinical manifestations:

Diseases of thyroid gland are grouped into three categories

- Hyperthyroidism - excessive release of thyroid hormones.
- Hypothyroidism – deficiency of thyroid hormones.
- Mass lesions of thyroid

HYPERTHYROIDISM:

The common symptoms of increased secretions of thyroid hormone are

- Weight loss.
- Excessive appetite.
- Heat intolerance.
- Sweating.
- Palpitations.
- Tremors.
- Emotional liability.
- Tiredness.
- Diarrhoea.

The signs of hyperthyroidism are

- Tachycardia.
- Hot moist palms.
- Exophthalmos.
- Eyelid retraction / lid lag.

- Agitation.
- Goitre.

HYPOTHYROIDISM:

The common symptoms of decreased secretions of thyroid hormones are

- Weight gain.
- Constipation.
- Cold intolerance.
- Menstrual disturbances.
- Lethargy.
- Tiredness/weakness.
- Hoarseness of voice.

The signs of hypothyroidism are

- Bradycardia.
- Cold extremeties.
- Dry skin and hair.
- Periorbital puffiness.
- Hoarseness of voice.
- Bradykinesis.
- Delayed relaxation of ankle jerk.
- Carpel tunnel syndrome

PATHOLOGY

The normal thyroid gland is usually impalpable. The term goitre (Latin, guttur = the throat)is used to describe generalised enlargement of the thyroid gland. A discrete swelling (nodule) in one lobe with no palpable abnormality elsewhere is termed an isolated (or solitary) swelling. Discrete swellings with evidence of abnormality else where in the gland are termed dominant.

Classification

- Simple
- Toxic
- Infective
- Inflammatory
- Neoplastic
- Others

Simple goitre

Aetiology

Simple goitre may develop as a result of stimulation of the thyroid gland by TSH, either as a result of inappropriate secretion from a micro adenoma in the anterior pituitary (which is rare), or in response to a chronically low level of circulating thyroid hormones.

The most important factor in endemic goitre is dietary deficiency of iodine but defective hormone synthesis probably accounts for many sporadic goitres.

Stages in goitre formation are:

- Persistent growth stimulation causes diffuse hyperplasia; all lobules are composed of active follicles and iodine uptake is uniform. This is a diffuse hyperplastic goitre, which may persist for a long time but is reversible if stimulation ceases.
- Later, as a result of fluctuating stimulation, a mixed pattern develops with areas of active lobules and areas of inactive lobules.
- Active lobules become more vascular and hyperplastic until haemorrhage occurs, causing central necrosis and leaving only a surrounding rim of active follicles.
- Necrotic lobules coalesce to form nodules filled with either iodine free colloid or a mass of new but inactive follicle.
- Continual repetition of this process results in a nodular goitre. Most nodules are inactive and active follicles are present only in the inter nodular tissue.

Clinically discrete swellings

Discrete thyroid swellings are common and are present in 3-4% of the adult population.15% of isolated swellings prove to be malignant and

30-40% are follicular adenomas. The remaining are non-neoplastic largely consisting of areas of colloid degeneration, thyroiditis or cysts.

Neoplasms of the thyroid

Benign tumours

A thyroid adenoma is a benign tumor of the thyroid gland, that may be inactive or active (functioning autonomously) as a toxic adenoma.

Signs and symptoms of thyroid adenoma

A thyroid adenoma may be clinically silent ("cold" or "warm"adenoma), or it may be a functional tumor, producing excessive thyroid hormone ("hot" adenoma). In this case, it may result in symptomatic hyperthyroidism, and may be referred to as a toxic thyroid adenoma.

Diagnosis

Morphology -Thyroid follicular adenoma ranges in diameter from 3 cm on an average, but sometimes is larger (up to 10 cm) or smaller.

The typical thyroid adenoma is solitary, spherical and encapsulated lesion that is well demarcated from the surrounding parenchyma. The colour ranges from gray-white to red-brown, depending upon:

- The cellularity of the adenoma
- The colloid content.

Areas of hemorrhage, fibrosis, calcification, and cystic change, similar to what is found in multinodulargoitres, are common in thyroid (follicular) adenoma, particularly in larger lesions.

TYPES

Almost all thyroid adenomas are follicular adenomas.Follicular adenomas can be described as "cold", "warm" or "hot" depending on their level of function.

Histopathologically, follicular adenomas can be classified according to their cellular architecture and relative amounts of cellularity and colloid into the following types:

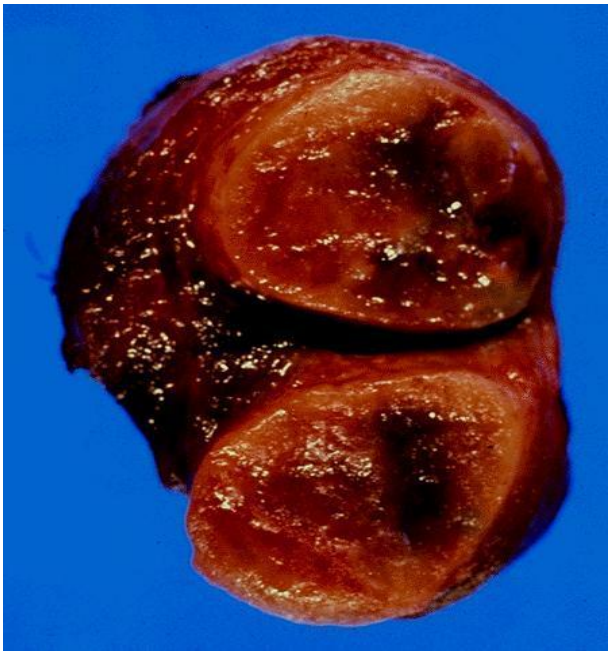
- **Fetal (**microfollicular) - these have the potential for microinvasion. These consist of small, closely packed follicles lined with epithelium.
- **Colloid** (macrofollicular) - these do not have any potential for microinvasion.
- **Embryonal (atypical)** - have the potential for microinvasion.
- **Hürthle cell adenoma** (oxyphil or oncocytictumor) - have the potential for microinvasion.
- **Hyalinizing trabecular adenoma**
- **Papillary adenomas** are very rare.

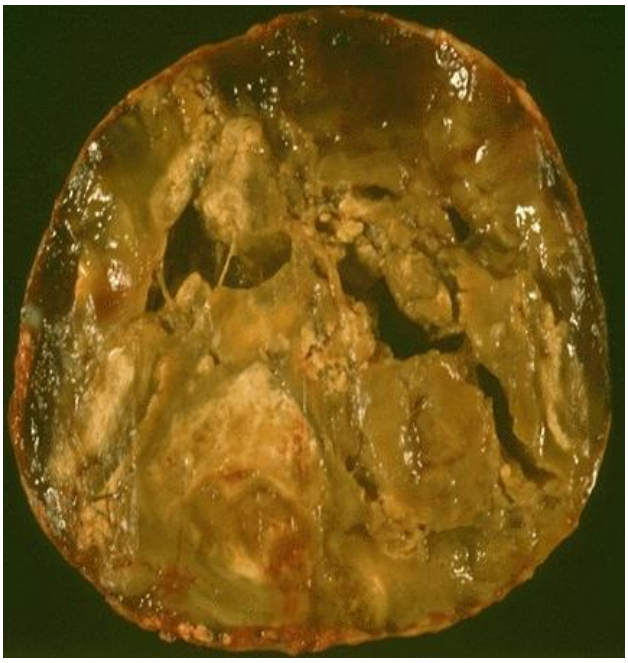
Differential diagnosis

A thyroid adenoma is distinguished from a multinodulargoitre of the thyroid in that an adenoma is typically solitary, and is a neoplasm resulting from a genetic mutation (or other genetic abnormality) in a single precursor cell. In contrast, a multinodulargoitre is usually thought to result from all hyperplastic response of the entire thyroid gland to a stimulus, such as iodine deficiency.

Careful pathological examination may be necessary to distinguish a thyroid adenoma from a minimally invasive follicular thyroid carcinoma

Bissected Adenoma with Hemorrhage





Adenoma with marked necrosis and cystic changes

Management

Most patients with thyroid adenoma can be managed by watchful waiting (without surgical excision) with regular monitoring. Regular monitoring mainly consists of watching for changes in nodule size and symptoms, and repeat ultrasonography or needle aspiration biopsy if the nodule grows.

Malignant tumours

The vast majority of primary growths is carcinomas.

Dunhill classified them histologically as differentiated and undifferentiated:

Differentiated carcinomas are now subdivided into follicular and papillary. Secondary growths are rare but blood-borne metastases occur. Blood borne metastases more usually occur from primary carcinomas of breast, colon and kidney and from melanomas.

Clinical features of thyroid neoplasms

The commonest presenting symptom is a thyroid swelling and a 5-year history is far from uncommon in differentiated growths. Enlarged cervical lymph nodes may be the presentation of papillary carcinoma. Recurrent laryngeal nerve paralysis may be a presenting feature of locally advanced disease.

Papillary carcinoma

Most papillary tumours contain a mixture of papillary and colloid filled follicles, and in some the follicular structure predominates.

Nevertheless, if any papillary structure is present, the tumour will behave in a predictable fashion as a papillary carcinoma. Histologically the tumour shows papillary projections and characteristic pale, empty nuclei (**Orphan Annie-eyed nuclei**).

Papillary carcinomas are very seldom encapsulated. Multiple foci may occur in the same lobe as the primary tumour or less commonly, in both lobes. They may be due to lymphatic spread in the rich intrathyroidal lymph plexus, or to multicentric growth.

Follicular carcinoma

These appear to be macroscopically encapsulated but microscopically there is invasion of the capsule and of the vascular spaces in the capsular region. Multiple foci are seldom seen and lymph node involvement is much less common than in papillary carcinoma. About 15% of all thyroid cancers are follicular thyroid cancer. Blood-borne metastases are common in follicular carcinoma.

Local infiltration is an early feature of these tumours with spread by lymphatics and the bloodstream.The prognosis is directly related to tumour size and lymphovascular invasion.With follicular carcinoma

lung,bone,brain,liver,bladder and skin are potential sites of distant spread.Age is a very important factor in terms of prognosis.

Medullary carcinoma

These are tumours of the parafollicular (C)-cells derived from the neural crest and there is a characteristic amyloid stroma.High levels of serum calcitonin (>0.08 ng/ml) are produced by many medullarv tumours.

Undifferentiated (anaplastic) carcinoma

This occurs mainly in elderly women and is much less often diagnosed now than in the past when many thyroid lymphomas were mistakenly classified histologically as anaplastic carcinomas.

Local infiltration is an early feature of these tumours with spread by lymphatics and by the bloodstream.

Thyroiditis

Chronic Iymphocytic (autoimmune) thyroiditis

It commonly presents as a multinodulargoitre. Features of chronic lymphocytic (focal) thyroiditis are commonly present on histological examination in association with other thyroid disease — notably toxic goitre. Primary myxoedema without detectable thyroid enlargement represents the end stage of the pathological process.

Granulomatous thyroiditis (subacute thyroiditis —de Quervain's thyroiditis)

This is due to a virus infection. In atypical subacute presentation there is pain in the neck, fever, malaise and a firm, irregular enlargement of one or both thyroid lobes.

Riedel's thyroiditis-

This is very rare, accounting for 0.5percent of goitres. Thyroid tissue is replaced by cellular fibrous tissue which infiltrates through the capsule into adjacent muscles, para tracheal connective tissue and carotid sheaths.

DIAGNOSTIC AIDS

Examination sequence

- Inspect the neck from the front.
- Look for a thyroid swelling while the patient swallows asip of water. The thyroid (or a thyroglossal cyst) moves upwards on swallowing since it is enveloped in the pretracheal fascia, which is attached to the cricoid cartilage.
- Ask the patient to sit with the neck muscles relaxed and stand behind the patient.
- Place your hands gently on the front of the patient's neck with your index fingers just touching the goitre.

- ❖ Note the size, shape and consistency of any goitre, and the presence or absence of a thrill. Measure any discrete nodules with calipers.
- ❖ Listen with the diaphragm of your stethoscope for thyroid bruit.
- ❖ Look for any lymph nodes.

Tests of Thyroid Function:

A multitude of different tests are available. TSH is the only test necessary in most patients with thyroid nodules that clinically appear to be euthyroid.

Serum TSH

The tests for serum TSH (normal 0.5 to 5 mIU/mL) are based on the principle that monoclonal TSH antibodies are bound to a solid matrix and bind serum TSH. A second monoclonal antibody binds to a separate epitope on TSH and is labelled with a radioisotope, enzyme or fluorescent tag. Therefore, the amount of serum TSH is proportional to the amount of bound secondary antibody (immunometric assay).Newer second generation "sensitive" TSH assays can measure levels less than 0.1mIU/ml and third-generation or "ultrasensitive" assays can detect TSH as low as 0.01mIU/ml. There is a inverse relationship between free T4 levels and TSH concentration.

Total T4 and Total T3 levels

Total T4 (reference range: 55 to 150 nmol/L) and T3 (reference range:1.5 to 3.5 nmol/L) levels are measured by radioimmunoassay and measure both the free and bound components of the hormones. Total T4 levels reflect the output from the thyroid gland, whereas T3 levels in the non -stimulated thyroid gland are more indicative of peripheral thyroid hormone metabolism and are, therefore, not generally suitable as a general screening test.

Free T4 and Free T3 levels

These radioimmunoassay based tests are a sensitive and accurate measurement of biologically active thyroid hormone. Free T4 (reference range 12 to 28pmol/L) estimates are not performed as a routine in thyroid disorders.FreeT3(reference range 3 to 9 pmol/L) is useful in confirming the diagnosis of early hyperthyroidism in which free T4 and free T3 rise before total T4 and T3.Free T4 levels can also be measured indirectly using the T3 resin uptake test.

Evaluation of the Pituitary-Thyroid Feedback Loop

Evaluation of serum TSH is an important screening test for the diagnosis of thyroid status. TSH is measured by an ultrasensitive radioimmunometric assay, and it has greatly improved clinical diagnosis. This is especially important in the delineation of hypothyroid from euthyroid states. Elaborate tests of the functional status of the

hypothalamo-pituatary axis may require the use of TRH stimulation test. An intravenous dose of TRH is given, for which an normal response should be an elevation in TSH that peaks within 15 to 35 minutes. Pituatary insufficiency demonstrates a subnormal response to TRH, whereas primary hypothyroid patients will demonstrate an enhanced TSH from the anterior pituitary. The use of T3 suppression tests evaluates the autonomous function of the gland because T3 suppresses the TSH release from the anterior pituitary.

Thyroid Antibodies

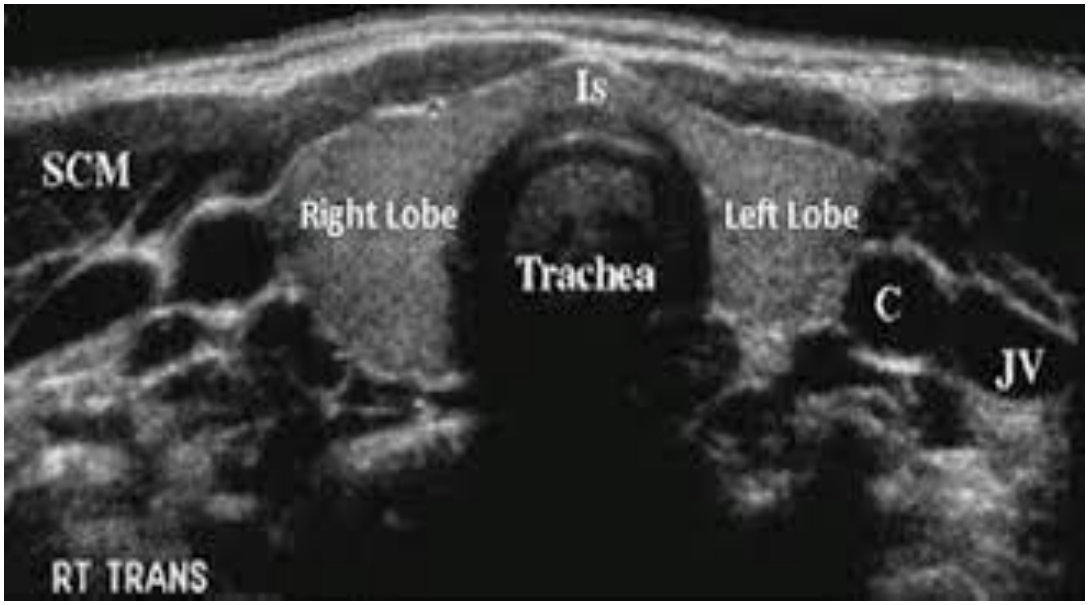
Thyroid antibodies include antithyroglobulin (anti-Tg), antimicrosomal or antithyroid peroxidase (anti-TPO) and thyroid stimulating immunoglobulin (TSI). Anti-Tg and anti-TPO antibody levels do not determine thyroid function; Instead, they indicate the underlying disorder, usually an autoimmune thyroiditis. Approximate four fifth of the patient with hashimoto's thyroiditis have elevated thyroid antibody levels but this can also be increased in Graves disease, multinodular goitre and thyroid neoplasms.

Serum Thyroglobulin

Thyroglobulin is not normally released in circulation, but increases in destructive processes of thyroid such as thyroiditis or overactive states like Graves disease and toxic multinodulargoitre. The most important use

of serum thyroglobulin is monitoring patients with differentiated thyroid cancers for recurrence after total thyroidectomy and radioactive iodine ablation.

ULTRASONOGRAM THYROID



Ultrasound is safe and painless procedure. It produces pictures of inside the body using sound waves. It uses a small probe called a transducer and gel placed directly on the skin. High frequency sound waves travel from the probe through the gel and into the body. They do not use radiation. They are captured in real time, they can show the structure and movement of body's internal organs. They can also show blood flowing through blood vessels.

An ultrasound of thyroid produces pictures of the thyroid gland and adjacent structures in the neck. Ultrasound is very sensitive and shows nodules that cannot be felt.

USES

- ❖ It is used to determine if a lump in the neck is arising from thyroid or an adjacent structure.
- ❖ To analyse the appearance of thyroid nodule and determine if it requires biopsy or not.
- ❖ To determine whether it is solid or cystic lesion.
- ❖ To see if a thyroid nodule has substantially grown over time.
- ❖ To find calcifications inside the nodule.
- ❖ To look for lymph nodes around the nodule as well as their shape and size.

BENEFITS

- ❖ Ultrasound scanning is non invasive.
- ❖ Ultrasound is widely available, easy to use and less expensive.
- ❖ It is extremely safe and does not use radiation.
- ❖ Ultrasound scanning gives a clear picture of soft tissues that do not show up well on x ray images.
- ❖ Ultrasound provides real-time imaging, making it a good tool for guiding minimally invasive procedures such as needle biopsies and fluid aspiration.

RISKS

Standard diagnostic ultrasound has no known harmful effects on humans.

LIMITATIONS

The radiologist cannot distinguish between benign and malignant lumps with complete certainity.

It is not possible to determine thyroid function that is whether the thyroid gland is underactive, overactive or normal.

CT/MRI SCAN

These studies provide excellent imaging of the thyroid and adjacent nodes and are useful in evaluating the extent of large, fixed or substernal goitres and their relationship with airway and vascular structures. Noncontrast CT scans should be obtained in patients who are likely to require subsequent radioactive iodine therapy.

FINE NEEDLE ASPIRATION CYTOLOGY

Fine needle aspiration cytology (FNAC) is a well established, outpatient procedure used in primary diagnosis of thyroid swellings. As FNAC distinguishes between benign and malignant lesions quite effectively, it is the preoperative screening method of choice worldwide. Due to its simplicity, low cost and absence of major complications, it is the initial investigation in the management of thyroid disorders in our hospital. FNAC of thyroid swellings is reported to have sensitivity of 65-98% and specificity of 72-100%.The procedure is technically quite simple. When performed correctly it has a false negative rate less than 5%.This means that a positive finding, such as cancer will be missed fewer than five times out of 100.

The fine needle aspiration is also performed to treat thyroid cysts. A thyroid cyst is a fluid filled sac within the thyroid gland. Aspiration of the cyst with a needle and syringe can shrink the swelling from the cyst and the fluid removed can be analysed for cancer.

There are certain situations where we may not elect to perform a FNAC like over active thyroid, where the chance for a nodule to be cancerous is significantly less.

A fine needle aspiration of thyroid is indicated in following situations.

- To make a diagnosis of thyroid nodule
- To help select therapy for a thyroid nodule
- To drain a cyst that may be causing pain
- To inject a medication to shrink a recurrent cyst

In most cases, if the nodule is felt a biopsy can be performed as a outpatient procedure.In some cases an ultrasound may be needed to help guide the biopsy for example ,if the nodule cannot be felt without difficulty or if the nodule has areas within it that specifically should be biopsied.

Little preparation of the patient is required. The patient is asked to lie down and the neck is exposed. The doctor drapes the area around the neck and cleans the neck off. Some doctors inject a local anaesthetic. Once patient is ready, a small fine gauge needle is inserted into the nodule. Usually a 25 guage needle is preferred. The patient holds his breath while the needle is rocked gently to obtain as much tissue as possible. The procedure is repeated four to six times till adequate tissue is obtained. The entire procedure takes 15 to 20 minutes.

COMPLICATIONS

- BLEEDING
- MILD DISCOMFORT
- CYST FORMATION
- FEVER
- INFECTION

BETHESDA SYSTEM FOR THYROID CYTOPATHOLOGY

DIAGNOSTIC CATEGORY	RISK OF MALIGNANCY
Non diagnostic	1-4%
Benign	0-3%
AUS/FLUS	5-15%
Suspicious for follicular neoplasm	15-30%
Suspicious for malignancy	60-75%
Malignant	97-99%

But FNAC cannot differentiate between follicular adenoma and carcinoma. Since FNAC is a cytological study, capsular breach and lymphovascular invasion could not be made out by FNAC.

CORE NEEDLE BIOPSY

A core needle biopsy is a medical test to remove a piece of tissue from a lesion or mass. The tissue is then tested to find out what it is. A core needle biopsy can remove more tissue than a fine needle biopsy. Hence it can provide more details about the cells and tissue removed.

Core needle biopsy can be used in most parts of the body. the most common are

- Lymph nodes
- Breast
- Prostate
- Bone

Local anaesthesia such as lignocaine will be used to numb the area. Once the area is numb. a needle will be put into the lesion or mass and adequate tissue will be removed. This may be done several times and in several areas to make sure adequate tissue is removed for testing. The actual insertion and removal of the needle takes about one minute but may be done more than once. The entire biopsy takes about 15-20 minutes. If the provider is unable to see or feel the lesion or mass, then an ultrasound, x-ray or CT scan can be used to find the area to biopsy.

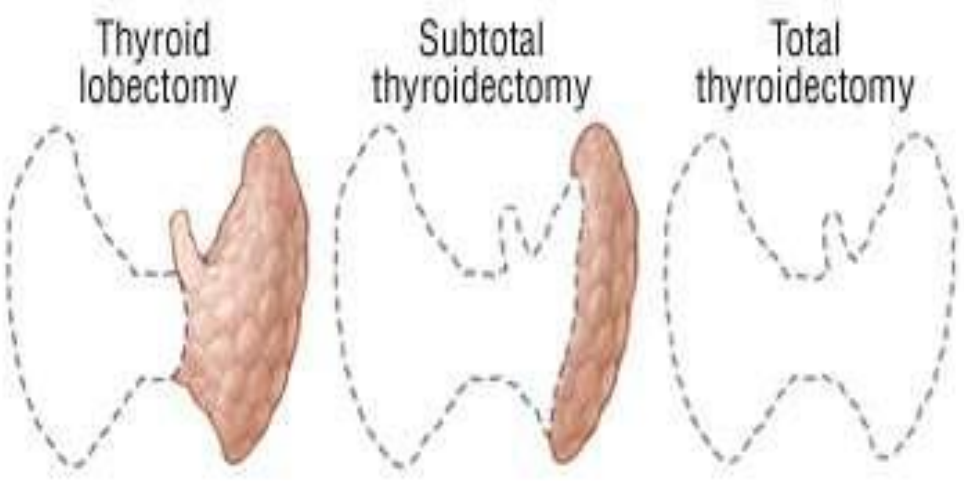
After the procedure there may be some discomfort in the area. There may be small amount of bleeding at the site of biopsy. In some cases a pocket of blood or hematoma will collect in the area of biopsy.

The tissue sample is reviewed by a pathologist and a report is written. The pathology report provides information about the patient and reason for the test. The report will tell both normal and abnormal findings.

Indications for surgery

- Non-toxic goitre
- Diffuse non-toxic goitre
- Solitary nodular non-toxic goitre
- Multinodular non-toxic goitre
- Thyroid cyst
- Carcinoma of the thyroid

Specific thyroid surgical procedures



Hemi thyroidectomy

Near total thyroidectomy

Sub total thyroidectomy

Total thyroidectomy

Steps of thyroidectomy

Cervical approach

A transverse incision is made one inch above the supra sternal notch between the two heads of sternocleidomastoid muscle. Skin incision is carried through the subcutaneous fat and platysma muscle reached. Subplatysmal flap raised superiorly upto the level of thyroid cartilage and inferiorly upto suprasternal notch. At this layer anterior jugular vein is identified and those running in the midline is divided. The midline raphe is identified and opened in midline. The sternohyoid muscle is present and retracted laterally by blunt finger dissection. Sternothyroid muscle is found in a deeper plane and separated off the thyroid capsule to gain lateral exposure of the gland. Exposure of the lateral lobes is enhanced by placing medial traction on the thyroid lobes on either sides.

Middle thyroid vein is identified and ligated and cut by giving medial traction to the gland. Superior pole is identified and double ligated separately to prevent arterio-venous fistula and also external laryngeal

nerve is preserved. Continuous medial traction of thyroid allows exposure of posterior surface of the thyroid. The superior parathyroids are seen in this area within the thyroid sheath.

Further mobilisation of the thyroid allows exposure of tracheo-esophageal groove and the recurrent laryngeal nerve in the lower pole. After the recurrent laryngeal nerve is seen, the branches of inferior thyroid artery supplying the thyroid are ligated thus preserving the parathyroid blood supply. The ligament of berry is situated just anterior and medial to the recurrent laryngeal nerve's entrance beneath the cricothyroid muscle and this structure with a small rim of thyroid tissue can be ligated using 3-0 silk suture.

A total thyroidectomy involves removal of all thyroid tissue bilaterally.

A near-total thyroidectomy involves complete removal of one lobe while leaving a remnant of thyroid tissue on the contralateral side which should incorporate the parathyroids.

A subtotal thyroidectomy leaves a rim of thyroid tissue bilaterally ensuring parathyroid viability and preventing recurrent laryngeal nerve injury.

Hemi thyroidectomy involves removal of one lobe and isthumus of the thyroid gland.

MATERIALS AND METHODOLOGY

A cross sectional study titled "Study on trucut biopsy in adenomatous goitre specimen in differentiating follicular adenoma from carcinoma" was planned with a objective of "evaluating the diagnostic accuracy of trucut biopsy in differentiating follicular adenoma from follicular carcinoma" at Department of Surgery , KAPV Govt. Medical College And MGMGH ,Trichy.

Study area **:** KAPV Govt. Medical College and MGMGH, Trichy

Study design **:** Descriptive study

Study population : 50 Adenomatous goitre patients

Study duration **:** 2 Years

Sampling method **:** Simple random sampling**.**

Study tool **:** clinical examination, USG of neck, FNAC, Trucut biopsy and HPE

INCLUSION CRITERIA:

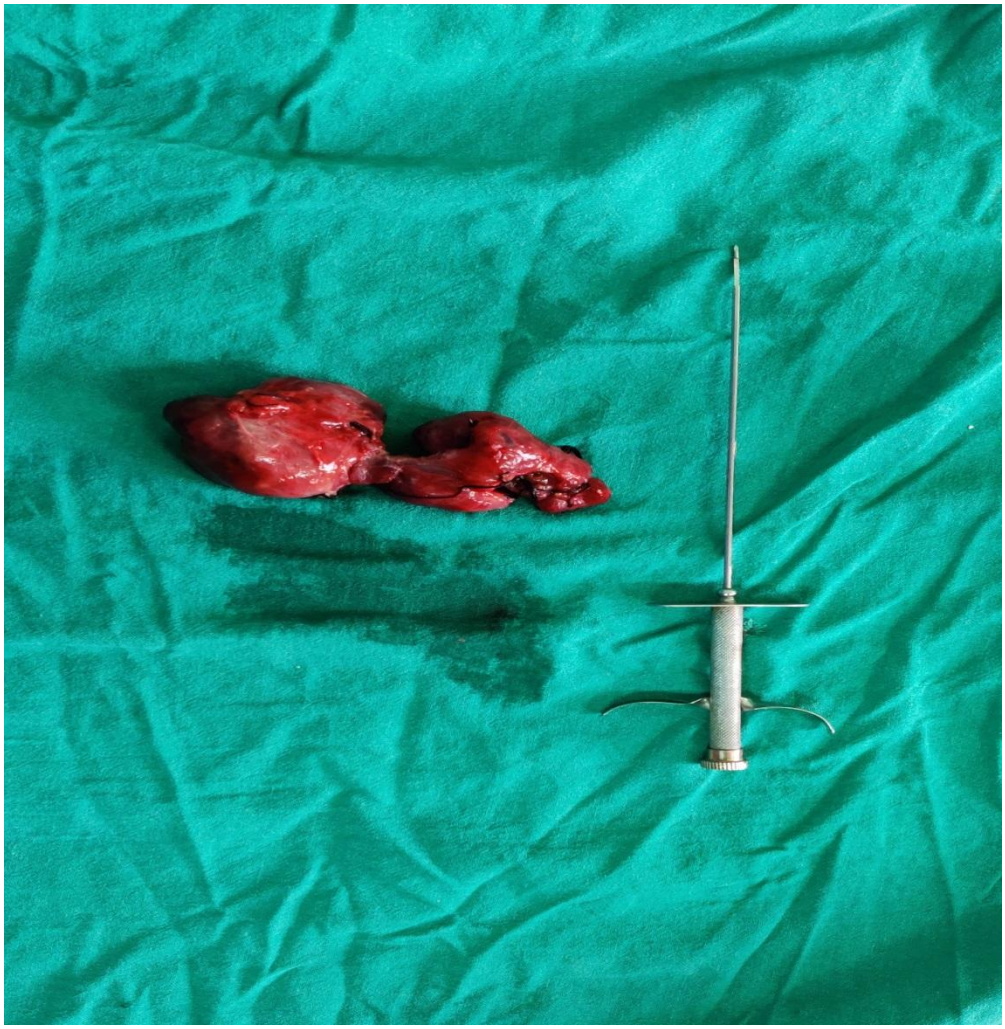
1. Age between 20 to 50 years
2. Euthyroid patients with/without antithyroid drugs
3. USG/CT confirmation of adenomatous goiter

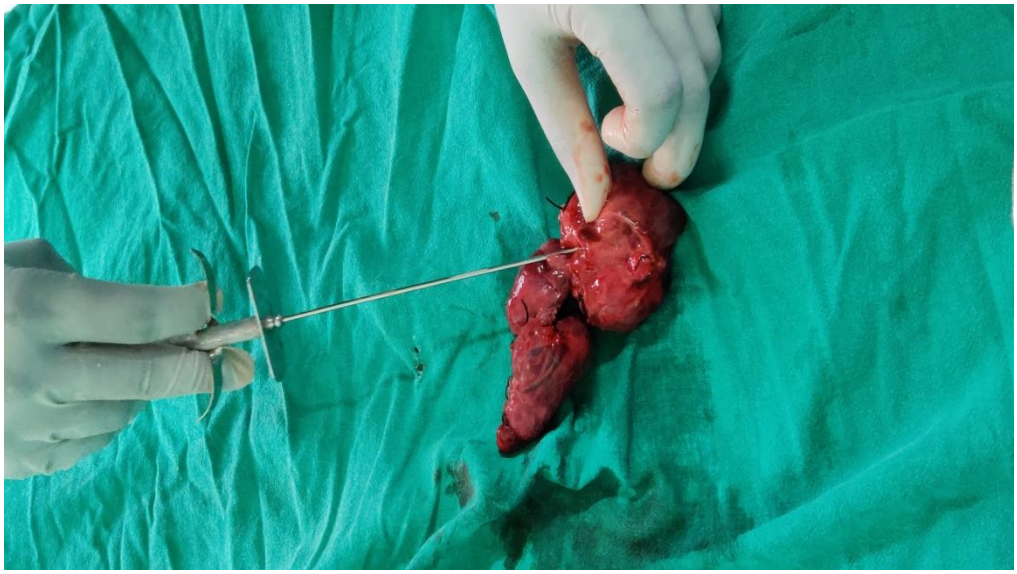
EXCLUSION CRITERIA:

1. Previous thyroid surgery
2. On Anticoagulant therapy
3. FNAC findings suggestive of thyroiditis

Every alternative patient who came to the Surgery OPD with the above mentioned inclusion and exclusion criteria were included in the study after getting written informed consent. Prior ethical committee clearance was obtained before the start of the study. All the patients were subjected to a detailed clinical examination. Socio demographic details of the patients were collected along with duration of symptoms, size of the goitre, etc.,

USG of neck was done for all patients to make a provisional diagnosis. Fine needle aspiration cytology was done for all the patients after explaining the need for it. A clinical diagnosis was arrived based on the examination. After detailed investigations and examination, the patients were advised surgery. During surgery when the thyroid gland was removed, a trucut biopsy was done using a 14 guage needle on the removed part of the gland and was sent to pathology for determining whether the tissue sent was benign or malignant. The gross specimen was also sent for HPE and diagnosis.





In order to avoid bias, the trucut biopsy specimen was blinded by the operating surgeon before sending to the lab. After reporting, the trucut biopsy reports were decoded and the trucut biopsy report was compared with the HPE report to find the association between both.

The basic socio demographic and clinical variables were presented as percentages. Kappa measure was used to find the level of agreement between the results. The results are tabulated and displayed in the next column**.**

RESULTS AND OBSERVATION

Table - 1

Distribution of study population according to age group

Age group	Frequency	Percentage
<20	2	4
21-30	8	16
31-40	16	32
41-50	6	12
51-60	15	30
>60	3	6
Total	**50**	**100**

32% of the study population were in the age group of 31-40 years, another 30% were in the age group of 51 to 60.Around 74% of study population were in the age group of 31-60.

Chart - 1

Distribution of study population according to age group

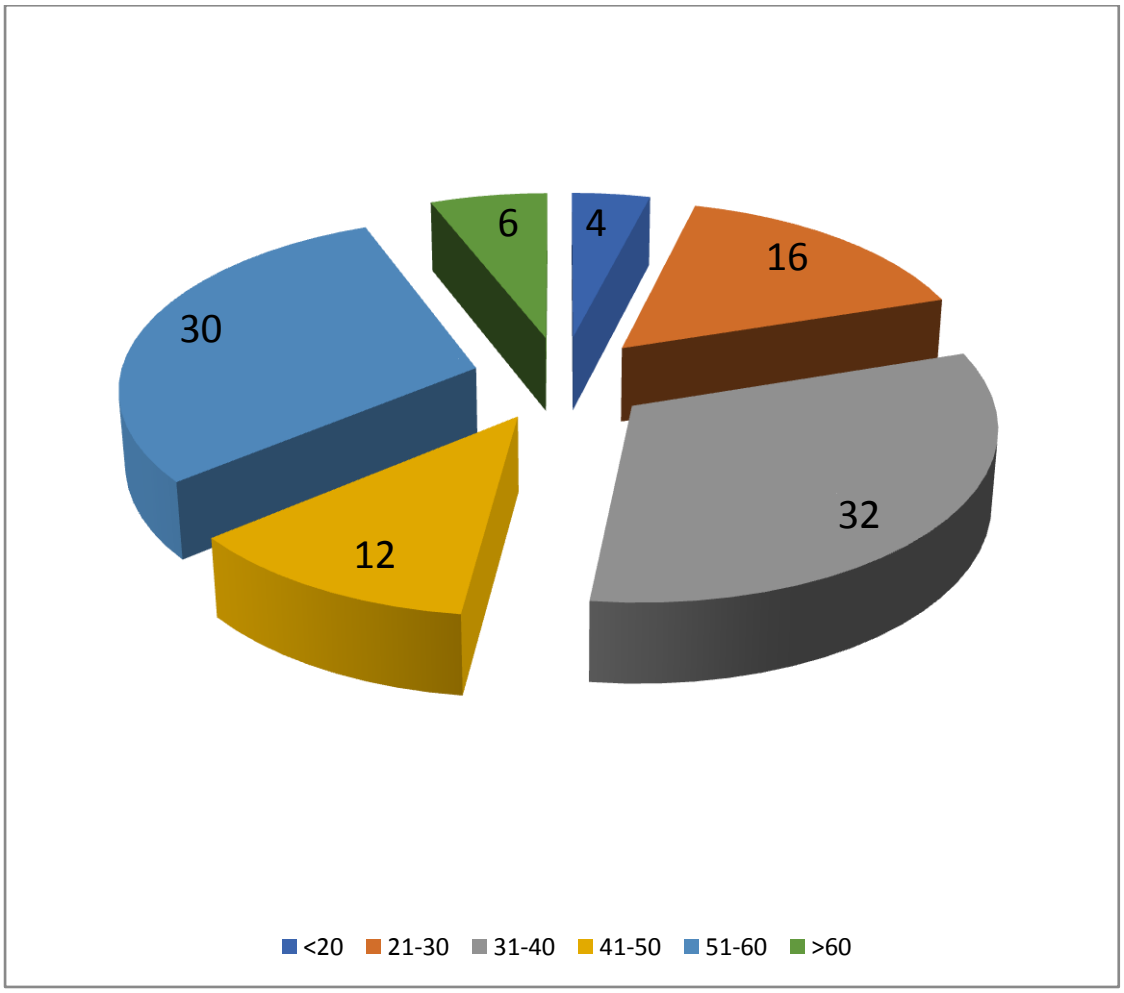


Table - 2

Distribution of study population according to gender

Age group	Frequency	Percentage
Male	3	6
Female	47	94
Total	**50**	**100**

Around 94 % of study population were females

Chart - 2

Distribution of study population according to gender

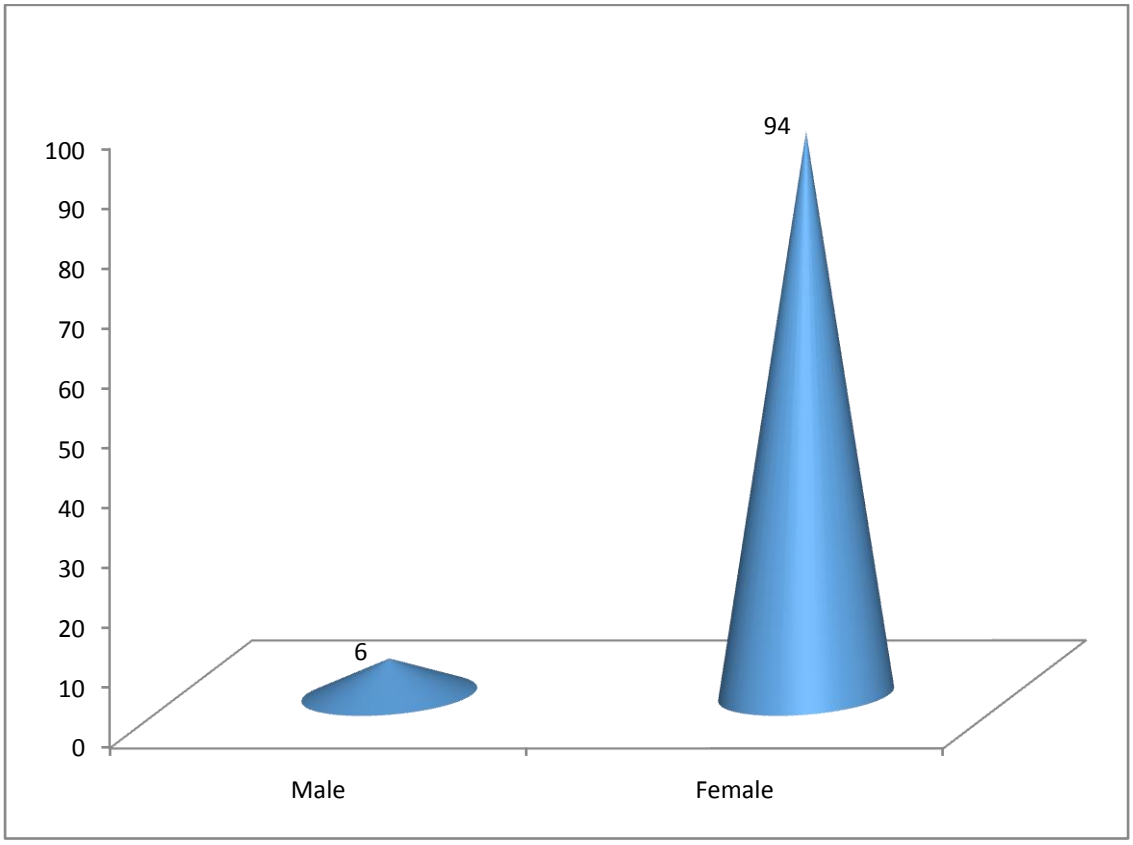


Table – 3

Distribution of study population according to duration of swelling

Duration of swelling	Frequency	Percentage
< 6 months	8	16
6 -12 months	13	26
1-2 years	17	34
2-3 years	9	18
>3 years	3	6
Total	**50**	**100**

Around 34 % of the study population had swelling for 1-2 years duration. About 42% of study population had swelling for less than one year.

Chart – 3

Distribution of study population according to duration of swelling

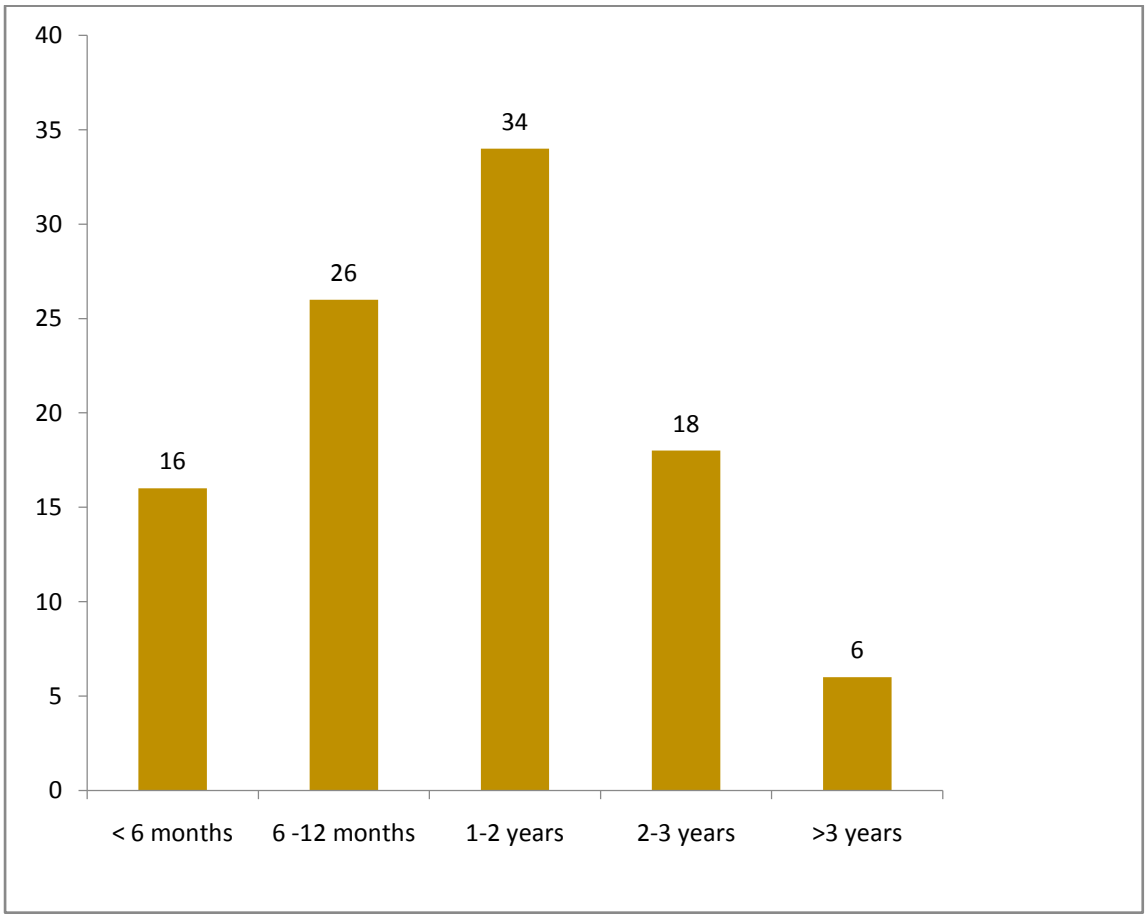


Table – 4

Distribution of study population according to clinical diagnosis

Clinical diagnosis	Frequency	Percentage
Solitary nodule left	10	20
Solitary nodule right	20	40
Multinodular goiter	13	26
Colloid goitre	7	14
Total	**50**	**100**

Around 60% of the study population had solitary nodule of which right side was 2/3rd .around 26% had multinodulargoitre

Chart – 4

Distribution of study population according to clinical diagnosis

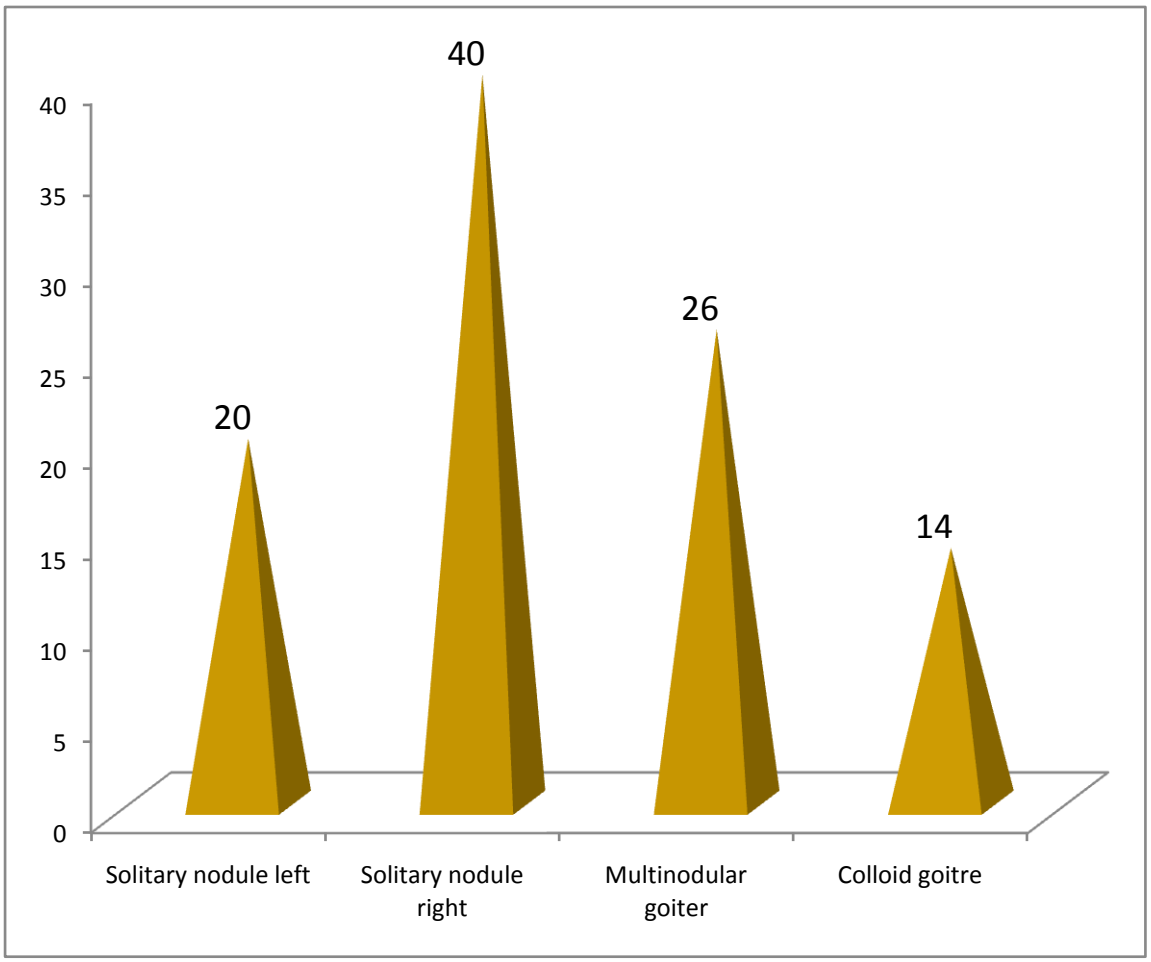


Table – 5

Distribution of study population according to USG findings

USG findings	Frequency	Percentage
Solitary nodule left	8	16
Solitary nodule right	17	34
Multinodular goiter	16	32
Adenoma left lobe	3	6
Adenoma right lobe	6	12
Total	**50**	**100**

Around 50 % of study population had solitary nodule while another 32% had multinodular goiter

Chart – 5

Distribution of study population according to USG findings

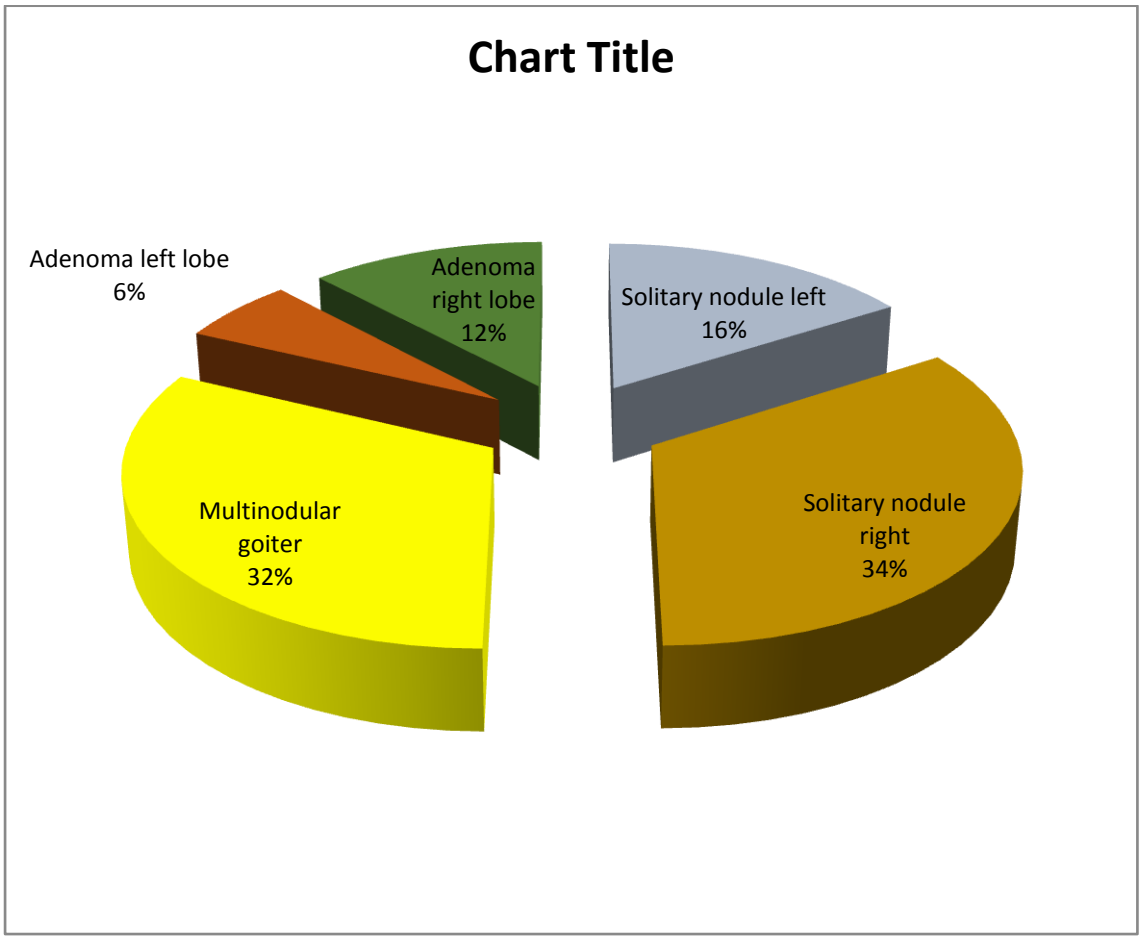


Table – 6

Distribution of study population according to FNAC findings

FNAC findings	Frequency	Percentage
Follicular neoplasm	24	48
Nodular colloid goitre	26	52
Total	**50**	**100**

Around 48 % were diagnosed as neoplasm while the rest 52% were diagnosed as colloid goitre.

Chart – 6

Distribution of study population according to FNAC findings

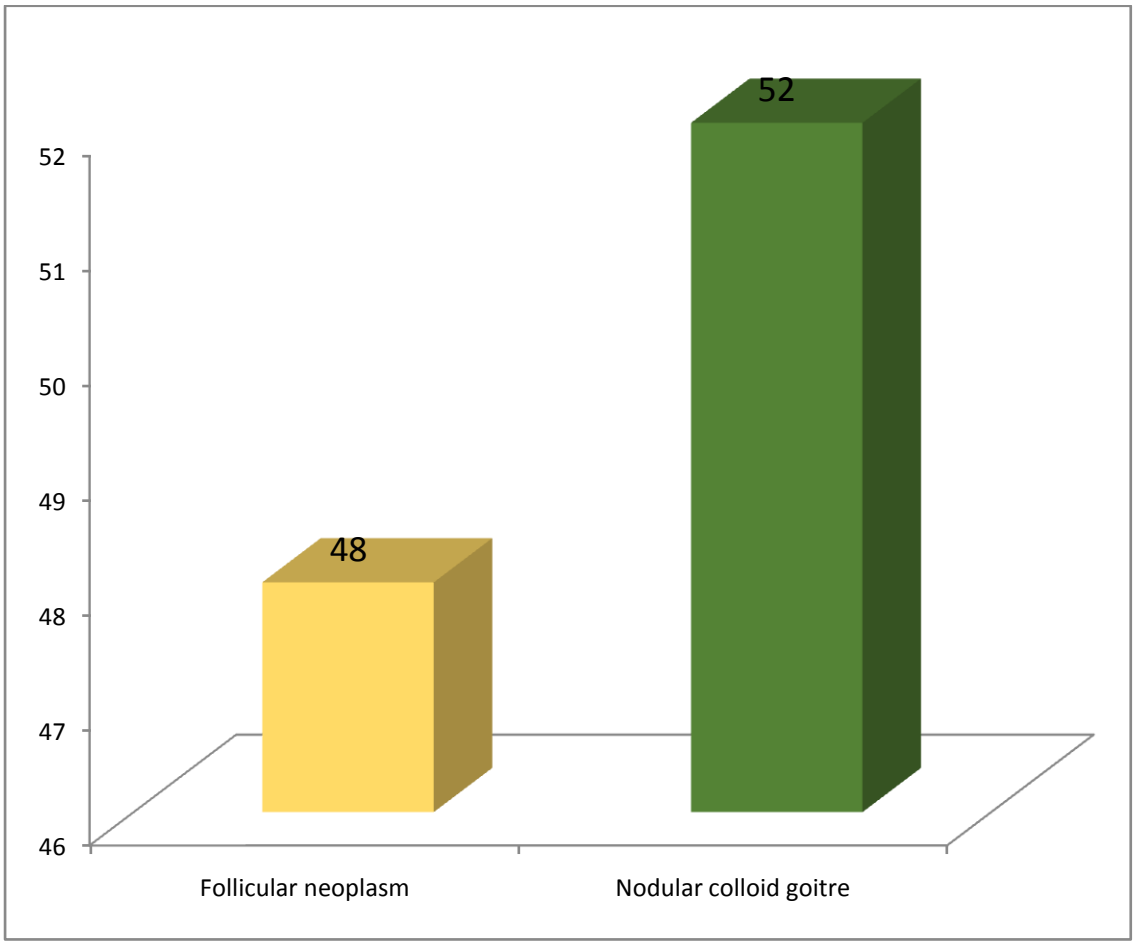


Table – 7

Distribution of study population according to surgical Procedure done

Procedure done	Frequency	Percentage
Left hemithyroidectomy	10	20
Right hemithyroidectomy	21	42
Total thyroidectomy	19	38
Total	**50**	**100**

42% of the study population underwent hemithyroidectomy,38 % underwent total thyroidectomy.

Chart – 7

Distribution of study population according to surgical Procedure done

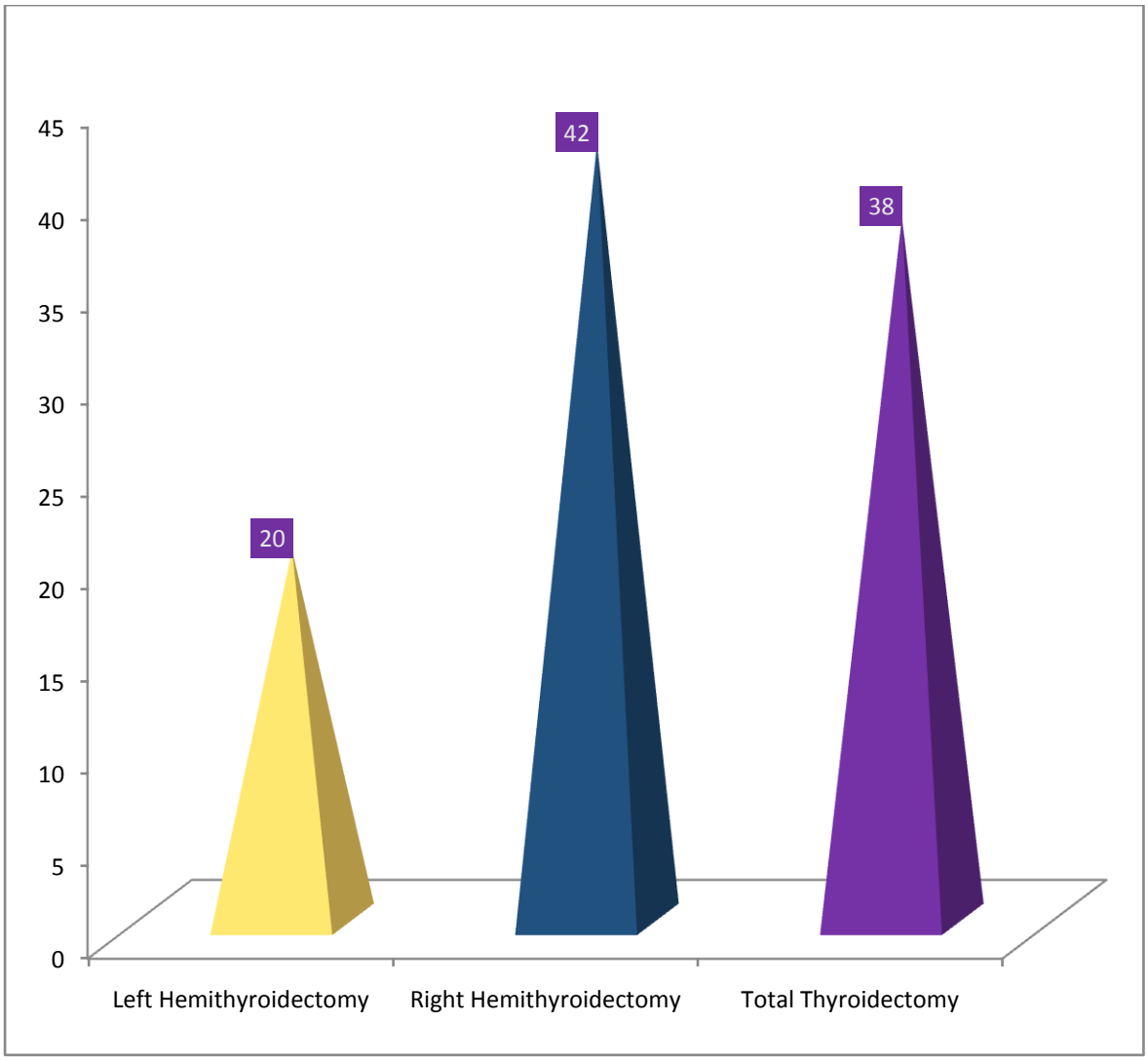


Table – 8

Distribution of study population according to trucut biopsy findings

Trucut biopsy findings	Frequency	Percentage
Follicular Adenoma	50	100
Follicular carcinoma	0	0
Total	**50**	**100**

Trucut biopsy diagnosed everyone as having follicular adenoma

Chart – 8

Distribution of study population according to trucut biopsy findings

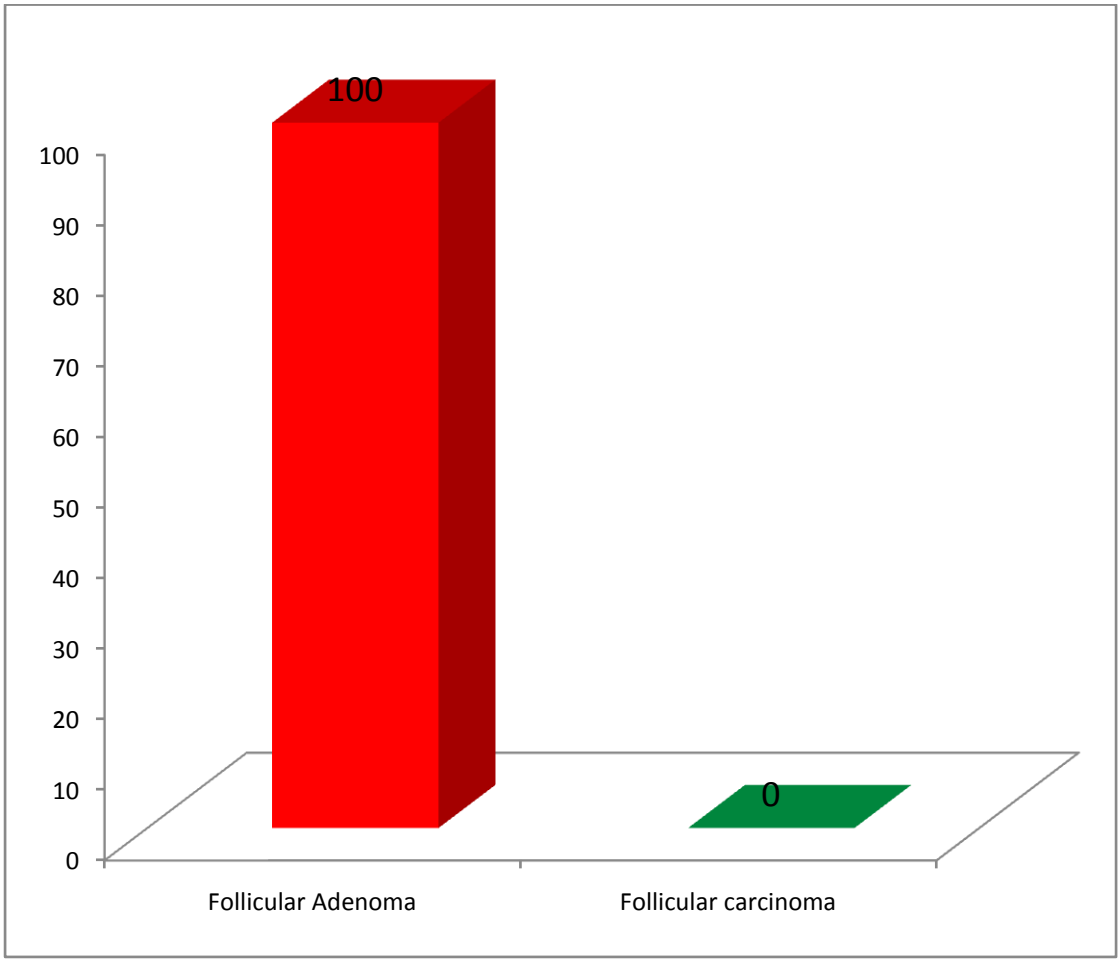


Table – 9

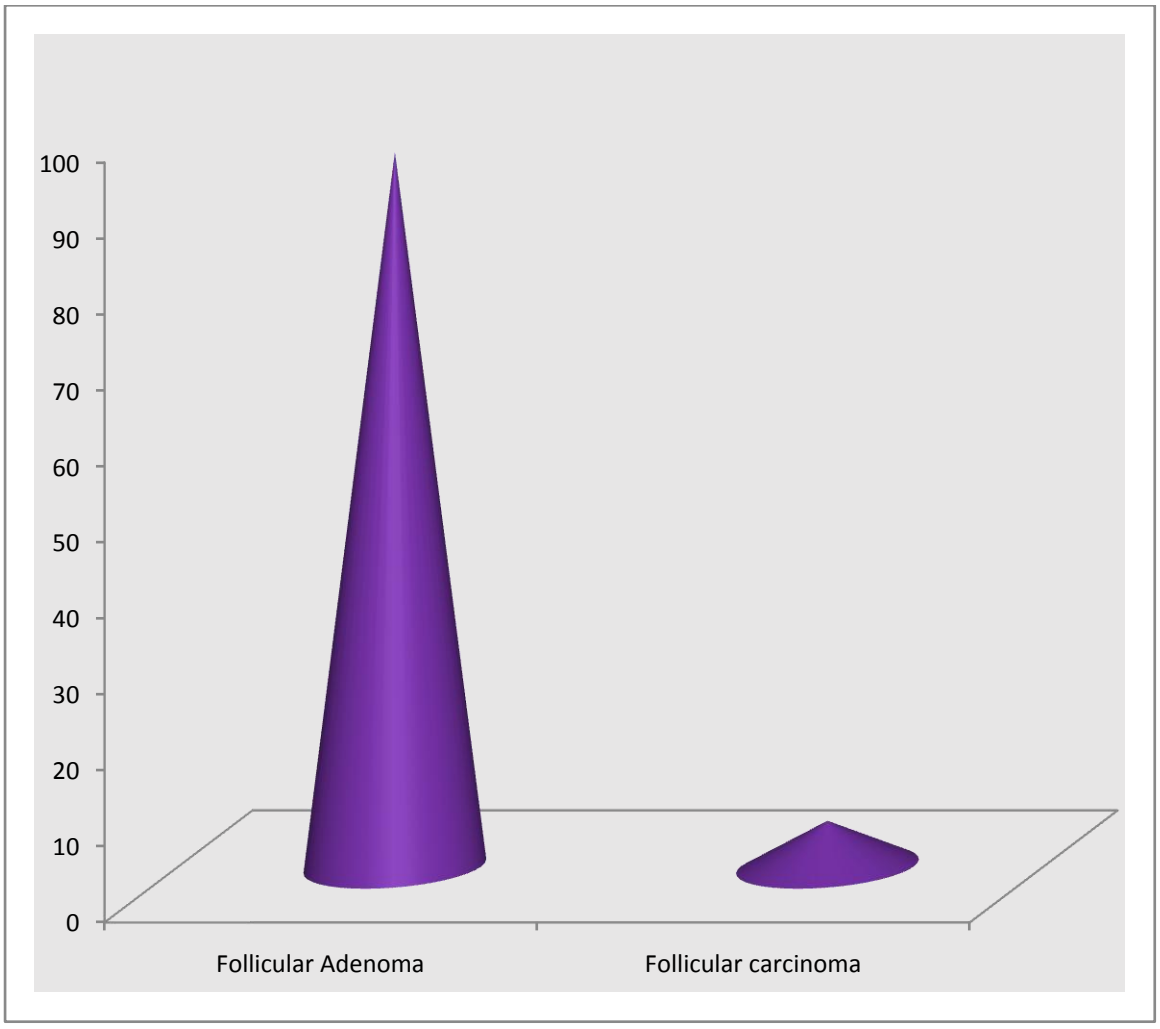
Distribution of study population according to HPE Diagnosis

Trucut biopsy findings	Frequency	Percentage
Follicular Adenoma	47	94
Follicular carcinoma	3	6
Total	**50**	**100**

Biopsy revealed that 94 % had follicular adenoma while 6% had carcinoma

Chart – 9

Distribution of study population according to HPE Diagnosis



DISCUSSION

FNAC has been the gold standard investigation used in diagnosing well differentiated thyroid carcinoma. However FNAC cannot differentiate between follicular adenoma and carcinoma.

This study was undertaken to find out the diagnostic accuracy of trucut biopsy as against HPE done after surgery in adenomatous goitre patients in diffrentiating follicular adenoma from carcinoma. The ability of trucut biopsy in correctly identifying those who have follicular carcinoma is zero. All the cases were identified as follicular adenoma.

This is because of the fact capsular and lymphovasular invasion in follicular carcinoma can occur anywhere in the gland and it is very difficult to take a tissue biopsy exactly from the same location of invasion.

Although ratio of follicular carcinoma compared to follicular adenoma is very low, follicular carcinoma is a more serious condition and needs extensive treatment. Inadequate treatment can result in serious complications.

Hence like FNAC, even trucut biopsy was not able to differentiate between follicular adenoma and carcinoma.

CONCLUSION

The clinical presentation of thyroid swellings had varied radiological and pathological diagnosis.

Most of the patients were females and were mostly in the age group between 31-60 years. The commonest presentation was solitary nodule.

FNAC showed results as either colloid goitre or follicular neoplasm.

Trucut biopsy was done after the surgery in the thyroid gland specimen and reported as follicular adenoma in all the cases.HPE report in thyroid gland specimen came as follicular adenoma in 94% of patients and follicular carcinoma in 6% of the patients.

Hence trucut biopsy cannot be used as an diagnostic tool in differentiating follicular adenoma from carcinoma.

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PROFORMA

NAME : AGE : SEX :

PAST H/O :

PERSONAL H/O :

H/O IRRADIATION :

ANTITHYROID DRUGS : DURATION:

TOXIC FEATURES :

HB% : SLEEPING PULSE RATE :

USG NECK : FNAC :

THYROID FUNCTION TEST :

VOCAL CORD STATUS :

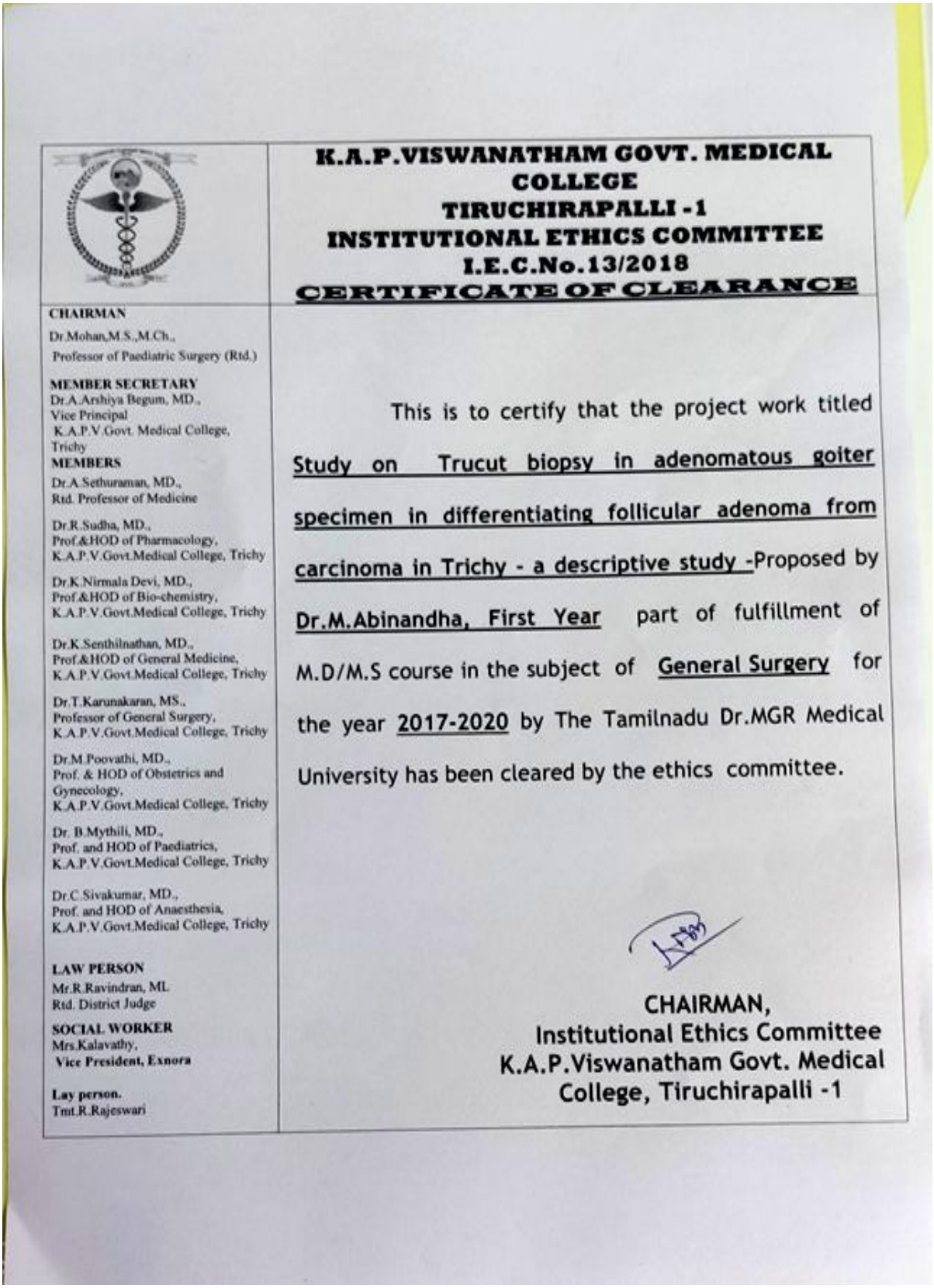
PROCEDURE DONE :

TRUCUT BIOPSY : HPE :

DIAGNOSIS :

REMARKS:

ETHICAL COMMITTEE CLEAREANCE CERTIFICATE



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TIRUCHIRAPALLI -1
INSTITUTIONAL ETHICS COMMITTEE
I.E.C.No.13/2018
CERTIFICATE OF CLEARANCE

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LAW PERSON
Mr.R.Ravindran, ML
Rtd. District Judge

SOCIAL WORKER
Mrs.Kalavathy,
Vice President, Exnora

Lay person.
Tmt.R.Rajeswari

This is to certify that the project work titled Study on Trucut biopsy in adenomatous goiter specimen in differentiating follicular adenoma from carcinoma in Trichy - a descriptive study -Proposed by Dr.M.Abinandha, First Year part of fulfillment of M.D/M.S course in the subject of General Surgery for the year 2017-2020 by The Tamilnadu Dr.MGR Medical University has been cleared by the ethics committee.

CHAIRMAN,
Institutional Ethics Committee
K.A.P.Viswanatham Govt. Medical College, Tiruchirapalli -1

URKUND

Urkund Analysis Result

Analysed Document:	pliagirism check.docx (D57154178)
Submitted:	10/17/2019 6:15:00 AM
Submitted By:	abifalcon09@gmail.com
Significance:	14 %

Sources included in the report:

A COMPREHENSIVE STUDY OF THYROID MALIGNANCIES IN PATIENTS UNDERGOING SURGERY FOR BENIGN THYROID DISEASE.docx (D42473721)
for plagiarism.docx (D42328901)
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https://www.slideshare.net/mohamedhazemelfoll/surgical-anatomy-of-thyroid-and-para-thyroid-glands-hazem-elfolldocx

Instances where selected sources appear:

40

MASTER CHART

						MASTER	CHART					
S.NO	NAME	AGE	SEX	CLINICAL DIAGNOSIS	USG NECK	FNAC NO	FNAC-DIAGNOSIS	PROCEDURE DONE	TRUCUT BIOPSY NO	TRUCUT BIOPSY-DIAGNOSIS	HPE NO	HPE DIAGNOSIS
1	THULASIMANI	27	F	MNG	MNG	2011/17	NCG	TOTAL THY	113612/17	FOLLICULAR ADENOMA	2811/17	FOLLICULAR ADENOMA
2	BACKIYAM	51	F	SNG RT.LOBE	SNG RT.LOBE	2018/17	FOLL.NEO	RT.HEMI THY	113670/17	FOLLICULAR ADENOMA	2884/17	FOLLICULAR ADENOMA
3	SUJA	40	F	MNG	MNG	2045/17	NCG	TOTAL THY	113705/17	FOLLICULAR ADENOMA	3060/17	FOLLICULAR ADENOMA
4	BANU	24	F	SNG LT.LOBE	SNG LT.LOBE	2068/17	FOLL.NEO	LT.HEMI THY	113790/17	FOLLICULAR ADENOMA	3102/17	FOLLICULAR ADENOMA
5	LALITHA	40	F	SNG LT.LOBE	ADENOMA LT.LOBE	2079/17	FOLL.NEO	LT.HEMI THY	113810/17	FOLLICULAR ADENOMA	3176/17	FOLLICULAR ADENOMA
6	VANITHA	35	F	MNG	MNG	2112/17	FOLL.NEO	TOTAL THY	113819/17	FOLLICULAR ADENOMA	3208/17	FOLLICULAR CARCINOMA
7	AMUTHA	38	F	SNG RT.LOBE	SNG RT.LOBE	2120/17	NCG	RT.HEMI THY	113826/17	FOLLICULAR ADENOMA	3276/17	FOLLICULAR ADENOMA
8	KAMALAM	58	F	MNG	MNG	2135/17	NCG	TOTAL THY	113898/17	FOLLICULAR ADENOMA	3325/17	FOLLICULAR ADENOMA
9	KALIYAMMAL	55	F	SNG RT.LOBE	ADENOMA RT.LOBE	2145/17	FOLL.NEO	RT.HEMI THY	113901/17	FOLLICULAR ADENOMA	3392/17	FOLLICULAR ADENOMA
10	SARASWATHI	50	F	SNG RT.LOBE	SNG RT.LOBE	0023/18	NCG	RT.HEMI THY	113945/18	FOLLICULAR ADENOMA	0020/18	FOLLICULAR ADENOMA
11	KAVITHA	30	F	SNG RT.LOBE	SNG RT.LOBE	0060/18	FOLL.NEO	RT.HEMI THY	113976/18	FOLLICULAR ADENOMA	0043/18	FOLLICULAR ADENOMA
12	BACKIYAM	38	F	SNG RT.LOBE	ADENOMA RT.LOBE	0065/18	FOLL.NEO	RT.HEMI THY	113990/18	FOLLICULAR ADENOMA	0054/18	FOLLICULAR ADENOMA
13	GANESAN	55	M	COLLOID GOITRE	MNG	0072/18	NCG	TOTAL THY	114002/18	FOLLICULAR ADENOMA	0071/18	FOLLICULAR ADENOMA
14	SELVI	37	F	MNG	MNG	0090/18	FOLL.NEO	TOTAL THY	114024/18	FOLLICULAR ADENOMA	0093/18	FOLLICULAR ADENOMA
15	KANIYAMMAL	43	F	COLLOID GOITRE	SNG LT.LOBE	0100/18	NCG	LT.HEMI THY	114040/18	FOLLICULAR ADENOMA	0134/18	FOLLICULAR ADENOMA
16	SIRUMBAYEE	37	F	SNG RT.LOBE	SNG RT.LOBE	0182/18	NCG	RT.HEMI THY	114078/18	FOLLICULAR ADENOMA	0167/18	FOLLICULAR ADENOMA
17	PADMA	63	F	COLLOID GOITRE	MNG	0234/18	NCG	TOTAL THY	114092/18	FOLLICULAR ADENOMA	0222/18	FOLLICULAR ADENOMA
18	LAKSHMI	32	F	SNG RT.LOBE	SNG RT.LOBE	0312/18	FOLL.NEO	RT.HEMI THY	114123/18	FOLLICULAR ADENOMA	0298/18	FOLLICULAR ADENOMA
19	PARVATHY	60	F	MNG	MNG	0388/18	NCG	TOTAL THY	114167/18	FOLLICULAR ADENOMA	0345/18	FOLLICULAR ADENOMA
20	RAMYA	28	F	SNG RT.LOBE	MNG	0450/18	NCG	TOTAL THY	114194/18	FOLLICULAR ADENOMA	0467/18	FOLLICULAR ADENOMA
21	SURYAKALA	23	F	SNG LT.LOBE	ADENOMA LT.LOBE	0478/18	FOLL.NEO	LT.HEMI THY	114211/18	FOLLICULAR ADENOMA	0498/18	FOLLICULAR ADENOMA
22	USHA	25	F	SNG RT.LOBE	SNG RT.LOBE	0523/18	NCG	RT.HEMI THY	114267/18	FOLLICULAR ADENOMA	0556/18	FOLLICULAR ADENOMA
23	LALITHA	29	F	COLLOID GOITRE	SNG RT.LOBE	0670/18	NCG	RT.HEMI THY	114288/18	FOLLICULAR ADENOMA	0710/18	FOLLICULAR ADENOMA
24	MURUGAN	33	M	SNG LT.LOBE	SNG LT.LOBE	0720/18	NCG	LT.HEMI THY	114301/18	FOLLICULAR ADENOMA	0781/18	FOLLICULAR ADENOMA
25	MEENA	31	F	SNG RT.LOBE	MNG	0777/18	NCG	TOTAL THY	114314/18	FOLLICULAR ADENOMA	0811/18	FOLLICULAR ADENOMA
26	VALLI	55	F	SNG RT.LOBE	SNG RT.LOBE	0865/18	FOLL.NEO	RT.HEMI THY	114343/18	FOLLICULAR ADENOMA	0845/18	FOLLICULAR ADENOMA
27	RAJALAKSHMI	40	F	MNG	MNG	0923/18	FOLL.NEO	TOTAL THY	114306/18	FOLLICULAR ADENOMA	0878/18	FOLLICULAR ADENOMA
28	LEELA	39	F	SNG RT.LOBE	SNG RT.LOBE	1100/18	FOLL.NEO	RT.HEMI THY	114376/18	FOLLICULAR ADENOMA	1101/18	FOLLICULAR ADENOMA
29	SRIDEVI	34	F	SNG LT.LOBE	SNG LT.LOBE	1187/18	NCG	LT.HEMI THY	114397/18	FOLLICULAR ADENOMA	1210/18	FOLLICULAR ADENOMA
30	VISHVAS MARY	55	F	MNG	MNG	1345/18	FOLL.NEO	TOTAL THY	114412/18	FOLLICULAR ADENOMA	1409/18	FOLLICULAR CARCINOMA
31	DURAI	57	M	SNG RT.LOBE	SNG RT.LOBE	1477/18	NCG	RT.HEMI THY	114478/18	FOLLICULAR ADENOMA	1498/18	FOLLICULAR ADENOMA
32	KAMALAM	55	F	SNG LT.LOBE	SNG LT.LOBE	1545/18	NCG	LT.HEMI THY	114493/18	FOLLICULAR ADENOMA	1589/18	FOLLICULAR ADENOMA
33	DHANAM	55	F	MNG	SNG RT.LOBE	1670/18	FOLL.NEO	TOTAL THY	114512/18	FOLLICULAR ADENOMA	1720/18	FOLLICULAR ADENOMA
34	REVATHI	20	F	SNG RT.LOBE	SNG RT.LOBE	1789/18	FOLL.NEO	RT.HEMI THY	114560/18	FOLLICULAR ADENOMA	1801/18	FOLLICULAR ADENOMA
35	JOTHIMANI	36	F	COLLOID GOITRE	ADENOMA RT.LOBE	1869/18	FOLL.NEO	RT.HEMI THY	114575/18	FOLLICULAR ADENOMA	1910/18	FOLLICULAR ADENOMA
36	LAKSHMI	63	F	SNG LT.LOBE	SNG LT.LOBE	1923/18	NCG	LT.HEMI THY	114597/18	FOLLICULAR ADENOMA	1994/18	FOLLICULAR ADENOMA
37	KASTHURI	45	F	SNG LT.LOBE	SNG LT.LOBE	2015/18	NCG	LT.HEMI THY	114623/18	FOLLICULAR ADENOMA	2118/18	FOLLICULAR ADENOMA
38	ANJALAI DEVI	55	F	SNG RT.LOBE	SNG RT.LOBE	2110/18	FOLL.NEO	RT.HEMI THY	114656/18	FOLLICULAR ADENOMA	2256/18	FOLLICULAR ADENOMA
39	PRIYA	19	F	SNG RT.LOBE	SNG RT.LOBE	2210/18	FOLL.NEO	RT.HEMI THY	114671/18	FOLLICULAR ADENOMA	2389/18	FOLLICULAR ADENOMA
40	SUBBULAKSHMI	39	F	MNG	ADENOMA LT.LOBE	2276/18	NCG	TOTAL THY	114689/18	FOLLICULAR ADENOMA	2418/18	FOLLICULAR ADENOMA
41	KAMALA	40	F	COLLOID GOITRE	ADENOMA RT.LOBE	2297/18	FOLL.NEO	RT.HEMI THY	114704/18	FOLLICULAR ADENOMA	2467/18	FOLLICULAR ADENOMA
42	KAMALAMBAL	62	F	SNG RT.LOBE	ADENOMA RT.LOBE	0014/19	FOLL.NEO	TOTAL THY	114753/18	FOLLICULAR ADENOMA	0023/19	FOLLICULAR CARCINOMA
43	SAMPOORNAM	56	F	SNG LT.LOBE	SNG LT.LOBE	0034/19	NCG	LT.HEMI THY	114780/19	FOLLICULAR ADENOMA	0067/19	FOLLICULAR ADENOMA
44	LURTHUMARY	55	F	SNG RT.LOBE	SNG RT.LOBE	0078/19	NCG	RT.HEMI THY	114801/19	FOLLICULAR ADENOMA	0101/19	FOLLICULAR ADENOMA
45	CHELLAMMAL	60	F	SNG LT.LOBE	MNG	0095/19	NCG	TOTAL THY	114825/19	FOLLICULAR ADENOMA	0134/19	FOLLICULAR ADENOMA
46	KANAGAMMAL	55	F	MNG	MNG	0176/19	FOLL.NEO	TOTAL THY	114843/19	FOLLICULAR ADENOMA	0202/19	FOLLICULAR ADENOMA
47	GANDHIMATHI	50	F	SNG RT.LOBE	ADENOMA RT.LOBE	0223/19	FOLL.NEO	RT.HEMI THY	114876/19	FOLLICULAR ADENOMA	0289/19	FOLLICULAR ADENOMA
48	PONNI	45	F	MNG	MNG	0310/19	NCG	TOTAL THY	114888/19	FOLLICULAR ADENOMA	0387/19	FOLLICULAR ADENOMA
49	BANAZIR	26	F	MNG	MNG	0345/19	NCG	TOTAL THY	114902/19	FOLLICULAR ADENOMA	0401/19	FOLLICULAR ADENOMA
50	INDRANI	46	F	COLLOID GOITRE	SNG RT.LOBE	0423/19	FOLL.NEO	RT.HEMI THY	114943/19	FOLLICULAR ADENOMA	0545/19	FOLLICULAR ADENOMA