REVIEW OF LITERATURE
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Thyroid gland is one of the most important and most active endocrine gland. It is located anterior to trachea measure 2x3x6 cm weight upto 20-25 gram. Histologically gland consist of acini of variable sizes, filled with differentially staining colloid and in various stages of development. Acini are lined by cuboidal to columnar epithelial cells. Dispersed within these are special "C" cells concerned with calcitonin secretion. Physiologically gland secret hormone thyroxin \((T_4)\) and \((T_3)\) which regulate iodine metabolism. The gland activity is under the hormonal influences from ant pitutary whose activity is in turn controlled by thyroid secretions.

Diseases of the thyroid are of great importance because most are amenable to medical or surgical management, they present principally as hypothyroidism, hyperthyroidism, tumours and tumour like enlargement of glands. Thyroid neoplasms have been classified into various categories (WHO, 1974).

Carcinoma of the thyroid gland is rare between 0.4% to 1.6% of all human cancers with an average of 0.94% (Farooki, 1969). Few reports on this subjects in Indian literature are available (Budhraja et al, 1972; Vickers et al, 1981). Analysis of various reports on the incidence

In order of frequency simple (non functional) enlargement, hyperthyroidism, multinodular goitre, thyroiditis and a solitary nodule, only 0.1 - 0.2% clinically palpable nodules are cancers. Since 1935 the over all incidence of thyroid carcinoma had tripled. Irradiation during childhood has the greatest risk from 4-9%, individuals irradiated during infancy have developed thyroid carcinoma after a mean latent period of 20 years. In other study, 80% children of thyroid carcinoma were found irradiated previously. In Japan incidence of thyroid carcinoma is 6.7% in atomic bomb exposed persons.

Increased risk for thyroid carcinoma has been associated particularly with high doses of irradiation, young age at time of exposure and female sex. Thyroid carcinoma can occur at all ages, but about 15% of thyroid carcinoma are first diagnosed under age of 30 years and most are diagnosed in 5th and 6th decades.
Classification of Tumours of Thyroid Gland (C.H.O., 1974):

I. EPITHELIAL TUMOURS:

(A) BENIGN:
1. Follicular adenoma
2. Others

(B) MALIGNANT:
1. Follicular carcinoma
2. Papillary carcinoma
3. Squamous cell carcinoma
4. Undifferentiated (Anaplastic) carcinoma:
   (a) Spindle cell type
   (b) Giant cell type
   (c) Small cell type
5. Medullary carcinoma

II. NON EPITHELIAL TUMOURS:

(A) BENIGN

(B) MALIGNANT:
1. Fibrosarcoma
2. Others

III. MISCELLANEOUS TUMOURS:

(A) Carcinomasarcoma

(B) Malignant haemangio endethelioma

(C) Malignant lymphoma

(D) Teratoma

IV. SECONDARY TUMOURS

V. UNCLASSIFIED TUMOURS
VI. TUMOUR LIKE LESIONS:

(A) Adenomatous (Nodular) goitre
(B) Cystic lesions
(C) Ectopic thyroid tissue
(D) Chronic thyroiditis
(E) Amyloid goitre

TUMOURS OF THYROID:

In the thyroid, as in other endocrine glands, it is difficult to distinguish between hyperplastic and neoplastic conditions and between benign and malignant tumours. This problem is even more complex in endemic goitre areas where hyperplastic and neoplastic conditions are associated. Indeed, it may be more difficult to distinguish between hyperplastic and neoplastic conditions than between adenoma and carcinoma. The usual criteria for cancer, such as cellular atypia and mitotic activity are not always helpful in the diagnosis of thyroid carcinoma. For example, well differentiated follicular carcinoma may be histologically distinguished from benign conditions only by demonstrating vascular or capsular invasion.
Diagnosis of diseases by needle aspiration cytology was originated back in 1904 when Greig and Gray isolate trypanosomes from lymphnodes to confirm the diagnosis of sleeping sickness by puncture with a hypodermic syringe.

Although Papanicoalou is recognised as father of exfoliative cytology and the term aspiration biopsy cytology was used by Zazicek (1974) and Lowhagen (1979). The term was chosen to clearly distinguish aspiration from exfoliative cytology. Two terms are consistently used for aspiration, fine needle aspiration cytology (FNAC) or Fine needle aspiration biopsy cytology (FNABC) by other authors.

The merit of aspiration biopsy from thyroid was discussed by Stewart (1933). Judging from 45 cases, he felt that the procedure was useful for the diagnosis of anaplastic carcinoma. Lipton and Abel in (1944) measured aspirated cells to evaluate hypothyroidism and Tanpka and associates (1948) studied aspirates from colloid goitres.

Out of 1000 patients hospitalized for a neck mass, thyroid nodule was responsible for almost half of the cases (Slaughter, 1960), only 6% were malignant (Skandalakis et al, 1960), where aspiration biopsy is practised surgery is halved (Miller, J.M. et al, 1979). Crile and associates (1979), stated that by routine use of needle biopsy "In 82% patients with palpable lesions. It was possible to rule out the presence of cancer in suspicious area and to use medical treatment instead of thyroidectomy.

BENIGN EPITHELIAL NEOPLASMS :

Adenoma :

Adenomas range in size from a few millimeters to 8 cm or so in diameter, present as solitary, discrete, small nodule, and contain follicles of varying size and in variable proportions, on cross section they range from pale tan to gray are soft and flashy and sometimes have foci of softening, hemorrhage, or central fibrosis with calcification.

Morphological criteria used to identify an adenoma are :-

1. Complete fibrous encapsulation.

2. A clear distinction between architecture inside and outside the capsule.
3. Compression of the thyroid parenchyma around the adenoma.

4. Lack of multinodularity in remaining gland.

All adenomas are characterized by some variation in the size and number of follicles as well as in the abundance of interfollicular stroma.

**Histopathology**

1. *Follicular adenoma:*

   (i) Solitary with well defined capsule.

   (ii) Adjacent glandular tissue may be compressed.

   (iii) Composed of follicles of various sizes or may show a trabecular pattern in embryonal:
   - Tubular or microfollicular in fetal.
   - Normofollicular in simple.
   - Macrofollicular in colloid adenoma.

   (iv) Degenerative changes as haemorrhage, oedema, fibrosis, calcification, bone formation and cyst formation are common.

   (v) Tumour cells resemble those of the thyroid follicles, some time oxyphilic (so called Hurthle cells) or clear cells may occur.

   The thick fibrous capsule of adenomas usually contains numerous large venous sinusoids and occasional eccentrically thickened arteries. The peripheral margin
of cellular adenomas is not always smooth and irregular collection of tumours cells may be incorporated into the inner portion of the capsule giving a false appearance of invasion.

2. **Other Adenomas**:

   (a) **Papillary adenoma**:

   Tumours similar to follicular adenomas but with variable amounts of papillary have occasionally been described and called papillary adenoma.

   (b) **Atypical adenoma**:

   Rarely, very cellular, encapsulate, fleshy tumours, a range of structural patterns is found and there are foci of neoplastic cells with very bizarre giant cell nuclei. The cytological characteristics suggest malignancy, but mitotic figures are infrequent and the capsule and venous sinusoids are not invaded.

**CYTOPATHOLOGY**:

Aspiration in follicular adenoma is monomorphic with rather cohesive, small polarized sheets or acini arranged around colloid. The nuclei with prominent chromo-centres are usually uniform small and eccentric within a granular cytoplasm or along as beaked nuclei. There sometimes, is anisokaryosis.
Cytopathology in papillary and atypical adenoma reveals a dense smear with nuclear crowding and overlapping. Pleomorphic and spindle cells are sometimes seen. The nuclear cytoplasmic ratio is greater in the atypical adenoma than in the follicular adenoma. There may be anisonucleosis and minimal nuclear membrane irregularity moderate cohesion, finely granular chromatin and absence of macronucleoli distinguishes this neoplasm from carcinoma (Lamg, W. et al, 1978).

Papillary carcinoma:

It is the most common form of thyroid cancer in adults and children. Incidence is 54% to 68% of thyroid malignancies occur, approximately 80% of thyroid cancers is seen in individuals under 40 years of age, largely because the less well differentiated neoplasms tend to occur in old persons. The tumour usually presents as an incidental, painless lump in the neck. Not infrequently, the primary lesion remains occult and the first sign of the disease is metastatic enlargement of a cervical lymph node, formerly, enlarged cervical lymph node without any palpable thyroid enlargement or modularity was regarded as lateral aberrant thyroid.

It is a malignant epithelial tumour containing papillary structures. Papillary carcinoma may be pure but over half contain an admixture of follicular elements.
Macroscopically as a discrete, but not encapsulated, firm, 1-5 cm in diameter, embedded within a thyroid lobe. Occasionally tumours are larger and these are liable to invade the capsule of the gland. The tumour tends to be fibrotic and some are cystic.

Microscopic picture is dominated by papillae consisting of a capillary and connective tissue network, supporting epithelial cells that often possess overlapping pale, so called ground glass nuclei.

Cytoplasm may be clear or oxyphilic. The follicle formation is almost always present and sometimes extensive small calcified spherical bodies (Psammoma bodies, calcospherites, microliths) are encountered frequently in papillary carcinomas but very rarely in other thyroid lesions also.

A characteristic feature of these tumours is their tendency to spread via the lymph vessels. Metastasis usually remain localized for a long period in the cervical lymphnodes e.g. lateral aberrant thyroid, metastasis of a latent papillary carcinoma.

In general all papillary tumours of thyroid should be regarded with the greatest suspicion, since true papillary adenomas are extremely rare. But macropapillary lesions of adenomatous goitre and papillary structures of diffuse hyperplastic goitre should not be confused with papillary carcinoma.
The aspirate contains a high concentration of cells in sheet, branching fronds, small papillary groups or, rarely isolated. Well differentiated carcinoma may be characterized by monomorphism. The cells of approximately 10 μ have nuclei of about half the size of cellular volume. Nucleus is bounded by a slightly irregular membrane, contains finally dispersed chromatin and often an eosinophilic nucleolus, is a circumscribed pale area, occupying at least a quarter of nucleus is some time present. This is the intranuclear cytoplasmic inclusions so designated because electron microscopic studies indicate a cytoplasmic invagination into the nucleus. This inclusion has been identified in some non thyroid tumours and within benign cells of the adrenal gland, liver and kidneys.

Rounded, laminated, calcified psammoma bodies are usually associated with papillary carcinoma. They may be surrounded by atypical or malignant cells or by relatively normal ones. When the encircling cells appear benign, the unit may be mistaken for a colloid follicle. However it reacts positively to Von Kossa’s stain for calcium.

Cystic degeneration of the papillary carcinoma may cause problems in interpretation of aspirate. There may be inflammatory cells and multinucleated giant cells, suggestive of thyroiditis.
Lohnagen et al (1974) observed papillary structures in 7 - 10% case, intranuclear inclusions in 50% to 90% and psammoma bodies, in 25% to 50% aspirates.

Edwin Gould, Laura Watsak et al (1989), investigated specificity and sensitivity of nuclear grooves and inclusions for papillary carcinoma. Ultrastructurally, these grooves and inclusions are cytoplasmic invaginations into the nucleus. Over all 100% papillary carcinomas contained nuclear grooves while 70% contained inclusion, grooves however, could be seen in 70% of non papillary neoplasms and 56% of non neoplastic conditions. Inclusions were present in 13% of non papillary neoplasms and were observe in non neoplastic conditions.

Nuclear groove, also called "Nuclear eyebrow" or "chromatin ridge". In fact, Kini (1984) mentioned chromatin ridge as a part of pathognomonic cytologic tetrad for papillary carcinoma along with pale enlarged nuclei, dusty chromatin, nucleoli and intranuclear cytoplasm inclusions.

A nuclear grooves was defined as a dark line extending usually from one side of the nuclear envelope close to the opposite side. Poorly defined, thinner lighter lines were also seen and were also interpreted as "grooves". The number of nuclear grooves were semiquantitatively graded after examining multiple high power fields (Edwin Gould et al, 1989).
Grade 0 - No nuclear grooves present.

Grade I - Rare grooves (On the average less than 1 per 5 HPFs).

Grade II - Few grooves (On the average 2/5 HPFs).

Grade III - Frequent grooves (15 or more/15 HPFs).

In India also importance of nuclear grooves as an additional diagnostic criteria has been stressed up (Bhambhani et al, 1989).

The number of intranuclear vacuoles was also semiquantitatively graded.

Grade 0 - No nuclear inclusions present.

Grade I - Rare (1 per 10 HPFs)

Grade II - Few (2 or 3 per 10 HPFs)

Grade III - Frequent (10 per 10 HPFs).

In cytological preparations, nuclear vacuoles or intranuclear cytoplasmic inclusions are considered to be of diagnostic value and have been seen in anywhere from 30% to 90% of cases of papillary carcinoma (Christ et al, 1979; Jayaram Geeta, 1985; Kini, Miller et al, 1984).

**Follicular Carcinoma:**

Follicular carcinoma is second most common thyroid malignancy with frequency of 12% to 14% (Baz K e. J.D. et al 1977, occurs more in females than males and
peak incidence is in 4th decades (Vickery, 1978). A diagnosis of follicular carcinoma implies upto a 70% mortality at five years (Franssila, K., 1973).

It is biologically more aggressive than the papillary carcinoma. Critical to the segregation of follicular from papillary carcinoma is the absence of ground glass nuclei, well formed papillary and psammoma bodies.

It is a malignant epithelial tumour with growth pattern and cells resembling those seen in mature or developing thyroid glands.

1- The tumours are composed of follicles of various sizes or of combinations of follicles and cords.

2- Nuclei are compact and hyperchromatic.

3- Cytoplasm usually resembles that of normal follicular cells, oxyphilic cells (so called Warthle cells) or clear cells may be found in part or throughout the tumour.

Characteristic feature of follicular carcinoma is their tendency to spread via the blood stream and a distant metastasis, especially in the bone may be the initial presenting symptom. Lymph node metastasis is rare.
1- **Well Differentiated Follicular Carcinoma**:

These are tumours composed of follicles sometimes indistinguishable from normal thyroid tissue, adenomatous goitre, or adenomas. Some of these tumours have been called metastasizing adenoma, malignant adenoma or metastasizing goitre.

2- **Moderately Differentiated Follicular Carcinoma**:

In this group the tumours show solid masses of cells or form trabecular patterns with varying degrees of differentiation into follicles. These tumours have been referred to as trabecular carcinoma and some have been called "**WUNCHUERDE STRUMA LANGHAN'S**".

The invasive obviously cancerous mass results in irregular enlargement of gland. The tumour is greyish white over grows the thyroid, replaces large parts of it, and extends through the capsule, adherent to or invade the trachea, muscle, skin and great vessels of the neck. In this infiltrative progression, the recurrent laryngeal nerves are often trapped. Both the localized and invasive forms often have an abundant fibrous stroma, hemorrhages, cyst formation, and areas of necrosis are frequently present.

Thyroglobulin may be demonstrated immunohistochemically.
There are several rare variants histologic patterns of follicular carcinoma (Ramzi S. Cotran et al 1989):

- Cells with clear cytoplasm and closely resemble the clear cell carcinoma of kidney.
- Cells large and abundant cytoplasm (acidophelic) with small piknotic central nuclei closely resemble hurthle cells.
- Insular type, aggressive form of follicular carcinoma, showing predominantly solid growth patterns (Carcangiu, M.l. et al, 1984). Striking resembles with modullary carcinoma but thyroglobulin positive and calcitonin negative by immunohistochemically.

**CYTOPATHOLOGY**:

Aspirate from well differentiated carcinoma, there is an abundant, monotonous, monomorphic collection of follicular cells with slight anisonucleosis and some nuclear overlapping and crowding. They form follicles with discernable colloid or small sheets, or are isolated. Evenly granular cytoplasm may be moderate or scant. In contrast poorly differentiated form is readily identified because of its dense cellularity, dissociation, and marked anisonucleosis. The cells display irregular nuclear membranes and some macronucleoli.


Medullary Carcinoma :

Medullary carcinoma was first recognised as an entity distinct from follicular carcinoma in 1959 by Hazard and associates. This type of malignant epithelial tumours are less frequent types (Approximately 5-10%). It is the most versatile of thyroid carcinomas, Derived from para-follicular (c) cells within the thyroid, medullary carcinoma is a prototypic neuroendocrine neoplasm. It has three distinctive features:

(1) Its amyloid stroma
(2) Its genetic association
(3) Its elaboration of calcitonin and other peptides.

The amyloid in these tumours is derived from the neoplastic 'C' cells and represents altered calcitonin molecule with respect to genetic association perhaps 80-90% of these neoplasms occur sporadically, usually in adults, but 10-15% are encountered in children and teenagers.

Approximately 80-90% of medullary carcinoma secrete calcitonin, somatostatin and gastrin releasing peptide (Bombesin). They may produce histaminase, prostaglandins and (More rarely) ACTH, vasoactive intestinal peptide (VIP) and serotonin. Calcitonin and/or prostaglandins induce diarrhoea can seen in about 30% of patients of medullary carcinoma.
Macroscopically the tumour tissue may be soft and fleshy or firm and gritty, ranges from grey white to yellow brown. There may be foci of hemorrhage and necrosis in larger sections. Two patterns can be described macroscopically. Discrete tumours in one lobe, or numerous nodule that usually involve both lobes.

Microscopically tumour often containing amyloid, composed of spindle shaped, polygonal or round cells arranged in sheets, cords or trabecule, often tumour has a well defined organised pattern and, rarely, it forms follicle like structures and artifacts resembling papillae. Its histological pattern may resemble that of a carcinoid, a paraganglioma, an islet cell tumour or an undifferentiated carcinoma. Neoplastic cells have functional and structural characteristics of parafollicular cells (C. cells).

Ultrastructural studied usually disclose in all cytologic patterns membrane bound secretory granules that represent sites of storage of calcitonin and other peptides.

**CYTOLOGY**:

Aspirate with plasma cytoid, spindle or follicular type cells. These are patterned in sheets, small groups with no acini formation, or singly. The cells are similar in size or larger than follicular cells. The fine
granularity of the sometimes abundant cytoplasm is eosinophilic (Lowhagen, T., 1979). Plasmacytoid cells are triangular and characterized by binucleation or trinucleation. There may be some anisonucleosis of the usually eccentric nuclei as well as a few nucleoli. Diffuse or focal collections of amyloid, resembling colloid strands, may be apparent.

Amyloid can be specifically identified by special stain: a positive crystal violet stain indicates either amyloid or colloid (Lijunberg, O., 1972). But the more specific is congo red.

Soderstrom et al (1975) reviewed aspirates from 18 medullary carcinoma. The malignancy was correctly identified in 87% (including one occult carcinoma) and in 60%, the congo red stain was positive.

**UNDIFFERENTIATED (ANAPLASTIC) CARCINOMA**

**Histopathology:**

A malignant epithelial tumour, about 10% - 15% of all thyroid carcinoma belong to this group. These tumours usually occur in 7th and 8th decade of life and include some of the most malignant neoplasms encountered in human. Most neoplasms have usually involved large areas of the thyroid gland and indeed, have extended beyond its confines to
produce bulky masses. Invasion beyond the capsule, blood vessels involved, and foci of infarct necrosis highlight the aggressive rapid growth of these form of neoplasm.

This tumour is typically composed of varying proportions of spindle, giant or small cells, commonly imitating a sarcoma. Definite neoplastic epithelial structures can usually be found, although examination of multiple section may be necessary, often there is a mixture of components including squamous cells. Occasionally there are foci of bone, cartilage, and osteoclast like cells. In some cases the tumour seems to represent the terminal stage in the dedifferentiation of a follicular or papillary carcinoma in the primary lesson of the metastasis. In others, it may be associated with an adenoma or adenomatous goitre. In cases with remnants of collicular or papillary carcinomas the tumour should be placed in the undifferentiated carcinoma category. The undifferentiated carcinoma are the more aggressive thyroid tumours.

**Variants:**

(a) **Spindle cell type**: These tumours consist mainly of spindle cells.

(b) **Giant cell type**: These tumours are composed of varying proportion of giant cells, which predominant and spindle cells. Bizarre cell forms and nuclei are frequent. Atypical mitosis may be numerous.
(c) **Small cell type**: These tumours are composed of cells that are smaller than those of follicular epithelium and have little cytoplasm. The cells are usually round or ovoid and nuclei hyperchromatic. The cells grow in compact clusters or in diffuse sheets resembling a malignant lymphoma.

**Cytology**: 

*Aspiration biopsy reveals bizarre, large cells.*

Many are isolated and may be mistaken for cells from a sarcoma. The cytoplasm is moderate in amount and clearly defined. Binucleation and multinucleation are common. Nuclear membranes are irregular, chromatin is clumped, and macronucleoli may be seen. Blood and necrosis are common. Cells from small cell tumour resemble histiocytic lymphoma. Dysesines, small cell groups have scant cytoplasm and anisonucleosis. Rarely are there abnormal papillary forms (Lowhagen et al, 1974).

**Squamous cell carcinoma**: 

A malignant epithelial tumour which are extremely rare with cells showing so called intercellular bridges and/or forming keratin.

This category is reserved for extremely rare tumours composed purely of squamous epithelium. Such type should not be confused with a direct extension from a cancer
of the larynx, trachea or oesophagus nor with a metastasis from a distant site nor with squamous metaplasia which is common in neoplasm and inflammation of the thyroid.

When squamous carcinoma cells are aspirated, the possibility of extension from a cancer in the larynx trachea or oesophagus, must be considered.

In cytologic specimens the most distinctive finding in highly differentiated cases is the presence of tumour cells of varying size with abundant or angeophilic cytoplasm indicative of keratin production. The tumour cells may occur singly, in small clumps or loose clusters. Much variation in size and shape is characteristic of this tumour type and bizarre form or elongated spindle shaped cells seen. Marked nuclear hyperchromasia with coarse chromatin is uniformly present.

Keratinized, degenerate, and anucleate squames are often present (WHO, 1977).

**TUMOUR-LIKE LESIONS**

A variety of non-neoplastic lesions may appear as swellings of the thyroid gland and be suspected clinically to be tumours and can be confused with neoplasm histologically.
ADENOMATOUS (NODULAR) GOITRE

Deficiency of thyroid hormone leads to a spectrum of lesions beginning with diffuse hyperplasia and often in an adenomatous goitre. Each stage of this process can simulate tumours, for example, the severe hyperplasia of some congenital goitres, macropapillary structure of hyperplastic epithelium, and the nodules in an adenomatous goitre. Macropapillary structures found in adenomatous goitres should not be confused with papillary neoplasms.

Whereas the uniformity of structure, the distinct encapsulation, and the compression of surrounding tissue are characteristics of follicular adenomas, such features at times may also be found in the nodules of adenomatous goitre, and distinction between the two entities may be impossible.

Cytologic differentiation of colloid nodules from follicular neoplasm has not been possible because of scanty amount of tissue obtained by FNAC, and in a cellular bloody aspirate, most authors find differentiation difficulty between follicular neoplasm and cellular colloid (Block et al, 1983; Kline, T.S., 1981; Koss et al, 1984; Suen et al, 1983; and Orell et al, 1986).

The distinction between these two entities is important because colloid nodules may be managed conservatively, and follicular neoplasms need to be excised since
the determination of malignancy depend on histologic eval-
uation of capsular and vascular invasion (Ackerman et al.,

that presence of hyperplastic papillae and fragments of
dilated follicles in aspirates of colloid nodules are useful
for distinguishing colloid nodules from follicular neoplasm.

The colloid containing aspirates almost always
indicate the presence of a colloid nodule (Friedman et al.,
1979; Lever, 1985). Fluid containing aspirates may occa-
sionally come from papillary carcinoma or anaplastic carci-
noma, such aspirates are usually cellular and diagnosis can
be made from nuclear features (Chan et al, 1986). Bloody
aspirate present problem in differentiating cellular colloid
nodule, follicular adenoma or carcinoma (Black et al, 1983;

Chronic thyroiditis:

Especially the Hashimoto type, a variety of
lesions occur that have been mistaken for malignant neoplasm
extreme infiltration with lymphoid cells may suggest lymphoma.
However, the presence of mature lymphocyte often with lymphoid
follicles containing a germinal centre, plasma cells, and
residual thyroid follicles lined by oxyphil cells is usually
sufficient to distinguish thyroiditis from malignant lymphoma. In some cases of Hashimoto thyroiditis epithelial proliferation is prominent feature and must be differentiated from carcinoma. A small biopsy of thyroid or of extruded thyroid tissue affected by thyroiditis may lead to an erroneous diagnosis of metastatic follicular carcinoma in a lymphnode since abnormal epithelium in an abundant lymphoid stroma seen.

Aspirate characterized by the presence of numerous lymphocytic cells with a scanty admixture of follicular cells. Follicular cell may show enlarged hyperchromatic nuclei surrounded by eosinophilic granular cytoplasms.

Ravinsky and Safneck (1988) performed a study on differentiation of hashimoto’s thyroiditis from thyroid neoplasm in FNAC, and concluded that distinguishing characteristics are cell arrangements, nuclear chromatin pattern and nucleolar appearance. Hashimoto’s thyroiditis was characterized by flat sheets and clusters of epithelial cells with oncocytic changes or occasionally by cohesive tissue fragments with cells well oriented one to the other. Thyroid neoplasms were characterized by loosely cohesive, syncytial type tissue fragment with crowded overlapping cells poorly oriented one to the other and/or numerous isolated single cells. Second criterion is appearance of nuclear chromatin in Hashimoto’s Thyroiditis