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## HISTOLOGICAL CHARACTERISTICS OF NODULES IN THE THYROID GLAND

**Summary:** The nodules in the thyroid gland are clearly defined formations of varying histological structure. The most common formation is the colloid nodular goiter consisting of irregular large follicles with inactive colloid inside them. The follicular cells are flattened with dark regularly shaped nuclei. The nodule is encompassed by connective tissue. The cyst that evolves as the result of the involution of the nodular goiter is composed of a connective capsule and parts of the follicle. Sometimes there are regressive papillae with a fibrovascular stroma, lined with a single row of regular follicular cells with dark nuclei. The hyperplastic colloid nodule characteristic of Graves' disease has follicles with visible, light colored, hyperactive colloid in them. The follicular cells are slightly enlarged, regular in shape, with dark nuclei. They sporadically form papillae which protrude into the lumen of the follicle. These papillae consist of groups of cells without a stroma. A follicular adenoma is a benign tumor of the thyroid gland which is enveloped by a clearly visible capsule free of invasion by tumor cells. It is composed of follicles with a little colloid in them or solid patches where regularly shaped follicular cells with dark nuclei are located. The papillary carcinoma of the thyroid gland may be clearly encapsulated. It consists of papillae, follicles and solid patches where slightly enlarged follicles with irregularly shaped hypochromic nuclei are located in groups. The follicular carcinoma of the thyroid gland is often a solitary nodule with a visible capsule invaded by tumor cells. Follicular cells with dark, regularly shaped nuclei constitute small follicles or solid patches with little colloid. The Hurthle oxyphilic adenoma is composed of uneven oxyphilic cells with profuse cytoplasm and dark irregular nuclei with a moderate number of mitoses. Hurthle carcinoma shows an invasion of the capsule and its blood vessels by tumor cells. Rare findings in the nodule are Hashimoto's thyroiditis, medullary and anaplastic thyroid gland carcinoma.

**Key words:** thyroid gland, nodular goiter, pathohistology.

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## ***INTRODUCTION***

Nodules are clearly defined formations leading to the enlargement of the thyroid gland. They can be solitary or multiple. The structure of the nodules varies and ranges from benign to malignant lesions. The histological diagnosis of the formation in the nodule at the time of surgery determines the scale of the surgical procedure. In order to establish a pathohistological diagnosis it is necessary to analyze the parameters characteristic of individual lesions.

### ***Research Goal***

The goal of this research paper is to show histological parameters that define the pathohistological diagnosis of thyroid gland nodules. The histological picture in the nodule, the capsule and the tissue around the nodule are analyzed. The criteria for setting the diagnosis are: changes in the follicles, the appearance of the colloid, the appearance of the follicular and C cells, the shape of the nucleus, the quality of the chromatin in the nucleus and the nucleus: cytoplasm ratio. The combination of structural changes indicates certain diseases. The capsule surrounding the nodule is a significant criterion for establishing the diagnosis of certain malignant tumors of the thyroid gland.

## ***METHODS***

The material analyzed is cut from frozen blocks or paraffin molds. It is treated using the standard fixation and staining methods with hematoxylin and eosin. If necessary, immunohistochemical analyses are performed.

## ***RESULTS***

Colloid adenoma is the most frequently occurring nodule in the thyroid gland. It is a part of colloid cystic goiter encompassed by a continuous fibrous capsule composed of sheaves of connective fibers. Large irregular follicles filled with inactive, dark colloid are located in the nodule. This colloid is in direct contact with the follicular cells. The follicular cells are flattened and they have dark, regularly shaped nuclei without mitoses<sup>1</sup>. Sometimes, there are regressive papillae composed of fibrovascular stroma covered by regularly shaped follicular cells with dark nuclei<sup>7</sup>. A thyroid gland cyst is composed of a fibrous capsule inside of which there are parts of follicles and a large quantity of colloid. Usually the capsule is very thick.

The hyperplastic colloid nodule which can be found in the case of Graves' disease is a clearly encapsulated formation composed of irregularly shaped follicles filled with hyperactive colloid that is noticeably light in color in contact with follicular cells<sup>4</sup>. Follicular cells are enlarged, regular in shape, with basally positioned dark nuclei without mitoses. The cells sporadically group into papillae that have no connective stroma in their base. Usually focal lymphocyte infiltrates are present<sup>1,3</sup>.

Follicular adenoma is a benign tumor of the thyroid gland which is always a solitary nodal lesion. It is encompassed by an intact capsule. Inside the capsule uniform and small follicles with a small quantity of colloid or solid patches made up of regularly shaped follicular cells with dark, regularly shaped nuclei can be seen. Hurthle oxyphilic adenoma is a benign tumor of the thyroid gland composed of oxyphilic cells. It is a clearly encapsulated nodule made up of irregularly shaped, polygonal cells which have abundant cytoplasm and dark irregularly shaped nuclei with a moderate number of mitoses. Oxyphilic cells make up follicles, solid patches or strips in whose vicinity there is a small quantity of colloid.

The papillary carcinoma of the thyroid gland can be found as a clearly defined nodule in the thyroid gland. It is made up of enlarged follicular cells which have light colored nuclei in which the chromatin is located on the inner side of the nuclear membrane. Some of the nuclei are dented<sup>6,8</sup>. In the lesions in the thyroid gland, cells with hypochromic nuclei can often be found. The criterion for establishing the diagnosis of papillary carcinoma is that such cells are visible in groups or that they form continuous chains. Follicular cells in papillary carcinoma form papillae, follicles or solid patches<sup>8</sup>. Sometimes psammoma bodies can also be found.

Follicular carcinoma of the thyroid gland which is formed by follicular cells is a limited nodule consisting of small follicles with a little colloid in the lumen. Follicular cells are uniform, with dark, regularly shaped nuclei with a small number of mitoses. The cells infiltrate the capsule and are visible as tumor thromboses in the blood vessels of the capsule. Hurthle carcinoma of the thyroid gland formed by oxyphilic cells is most often a clearly defined formation in the thyroid gland. It is made up of irregularly shaped, uneven cells forming follicles, trabeculae and solid patches. Oxyphilic cells have abundant eosinophilic cytoplasm and dark colored, irregularly shaped nuclei with a small number of mitoses. They can be found near blood vessels in the nodule and they infiltrate the capsule which can be found around the tumor. Segmentation of the capsule as well as tumor thrombosis is present in the blood vessels of the capsule.

Lesions which rarely form nodular formations in the thyroid gland are Hashimoto's thyroiditis, medullary and anaplastic thyroid gland carcinoma.

## **DISCUSSION**

Nodules in the thyroid gland have different histological pictures. The combination of the appearance of the cell make-up, the cell structure, the appearance of the nucleus, and the continuity of the capsule indicate a certain diagnosis.

Follicular structures lined with follicular cells with dark colored nuclei indicate colloid goiter but if they are lined with cells containing hypochromic nuclei then it is a case of papillary carcinoma. A homogenous inactive colloid in the follicles indicates colloid goiter while hyperactive colloid with lighter areas around follicular cells indicates Graves' disease. An intact capsule is a sign of a benign formation while segmentation or tumor thrombosis indicates a malignant tumor.

## **CONCLUSION**

Histological analysis of nodular lesions in the thyroid gland includes parameters important for establishing a diagnosis, which are: the appearance of the capsule, the appearance of the histological structures, cells, the cytoplasm and the nuclei.

Based on the combination of these parameters a pathohistological diagnosis is established, and the surgical procedure and prognosis for the illness is dependent on this diagnosis.

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