

HISTOLOGICAL STUDY OF MULTINODULAR GOITER (THYROID FOLLICULAR NODULAR DISEASE)

Wafaa Hadi AL-Hashemi

Basic Science Department, Kufa University, Iraq.

Wafah.hashmi@uokufa.edu.iq

ABSTRACT

Multinodular goiter MNG It is the most common disease of the thyroid gland. It is divided into two types, the malignant MNG and the non-malignant MNG. In this research, we will discuss the non-malignant type. The histological feature under light microscope showed thick connective tissue capsule and formed multinodular: aggregation pathologic tissue of thyroid gland encapsulated that isolated from other tissue. One of the characteristics of follicles that they are characterized by varying differences in size. The large shunt is characterized by being filled with colloid which surrounded by flatted epithelial. In the second stage of MNG, hemorrhage in tissue was observed. Th addition showed degeneration change as foamy histiocytic in thyroid tissue and also see degeneration change in colloid is histiocytic . finally, the over the course of disease, tissue calcification and foci papillary hyperplastic nodule was observed.

Aim: Identify the histological characteristics of the non-malignant multinodular goiter and distinguish it from other pathological tissues.

Key words: *goiter, thyroid gland disease, histocystic, fibrosis, nonmalignant.*

Introduction:

Multinodular Goiter MNG rottenly known as thyroid follicular nodular disease FND, In recent years, it has been observed that the number of patients suffering from thyroid diseases has increased ^[1]. MNG, it is common disease, that is distinguish by enlargement nodular can be observed or felt it. 10% of the glands mass increase at autopsy, but 40% present in microscopic nodularity ^[2]

The essential feature of MNG: most patients do not suffer from noticeable symptom. The nodular enlargement appears in both lobules but some cases occur in one side ^[3]

There are two types of MNG: one, non-toxic MNG, it is characterized by production and secretion of thyroid hormones (T3& T4). Others, toxic MNG: means excess production and secretion due to hyper thyroidism ^[1,4]

Causes of multinodular goiter: there are two reason, first: history of family (heredity) or disorder of the gene due to thyroid dysfunction. Second: Iodine deficiency (it is popular), elevated thyroid stimulating hormone TSH is secreted from anterior lobe of pituitary gland, sex hormone (specially in woman, it's under go monthly change), age also effects (the older people mor at risk) and other effects such as stress, some drugs as well as smoking ^[5, 7].

Materials and Methods:

Sample collection 40 adult humans infection with non-malignant of MNG from tumor center of Al-Sadder hospital in Najaf. Histological examined under light microscope: Prepared the histological section in graduate laboratory, Faculty of dentistry, Kufa University. Routine Histological Processing^[7].

Result

Pathological tissue of Multinodular goiter was examined under light microscope that showed thick c.t capsule surrounded the gland and contain high amount of collagen fibers showed in figure (1). and formed many nodules: aggregation pathologic tissue of thyroid gland encapsulated that have cystic in central and degenerative changes with edematous stalks supply by blood vessels, showed in figure (2). One of the characteristics of follicles that they are characterized by varying differences in size, showed in figure (3). The large shunt is characterized by being filled with colloid which surrounded by flatted epithelial has rounded nuclei, showed in figure (4). In the second stage of MNG, hemorrhage in tissue was observed, showed in figure (5). Th addition showed degeneration change as foamy histocytic in thyroid tissue, showed in figure (6). and also see degeneration change in colloid is histocytic, showed in figure (7). finally, the over the course of disease, tissue calcification was observed, showed in figure (9) and foci papillary hyperplastic nodule, showed in figure (10).

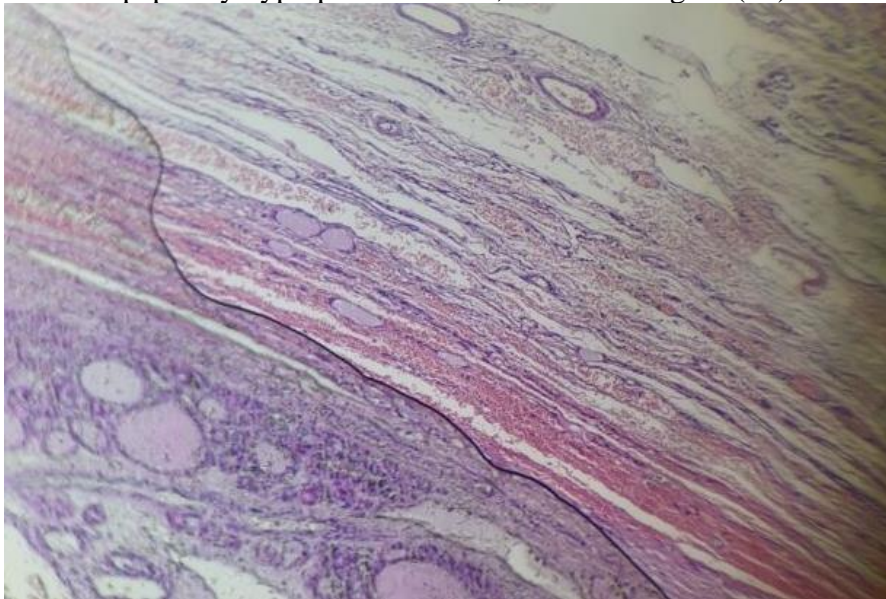


Figure (1): multinodular goiter showed the thyroid gland Surrounded by thick capsule H & E stain. X100.

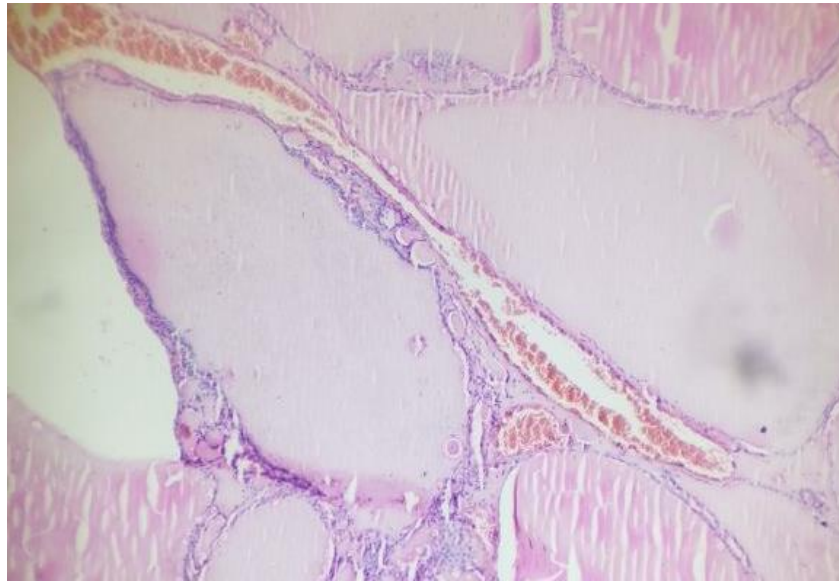


Figure (2): multinodular goiter showed the follicular feature are dilated and very different size Lind flatted hyper plastic epithelial with abundant colloid. H & E stain. X100

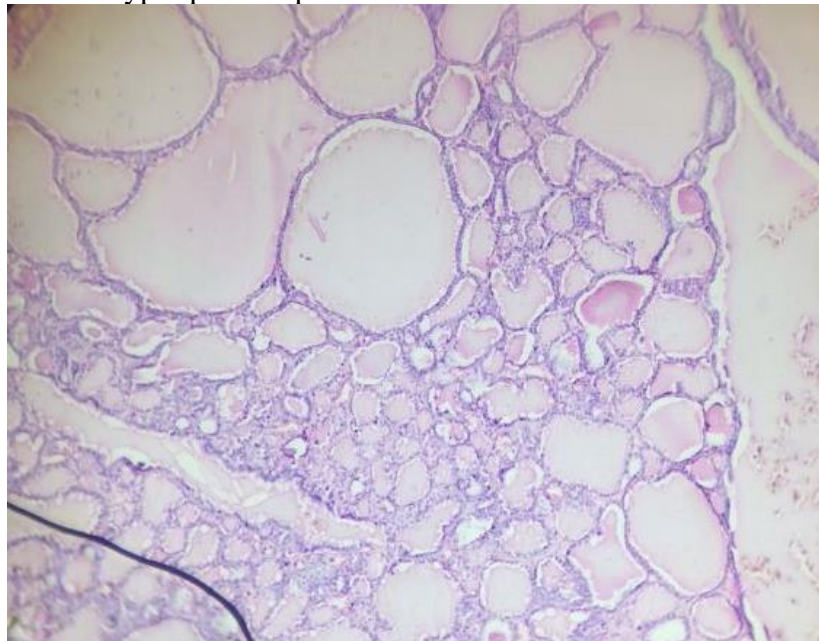


Figure (3): multinodular goiter showed Arranges in variable sized follicles. H & E stain.
X100

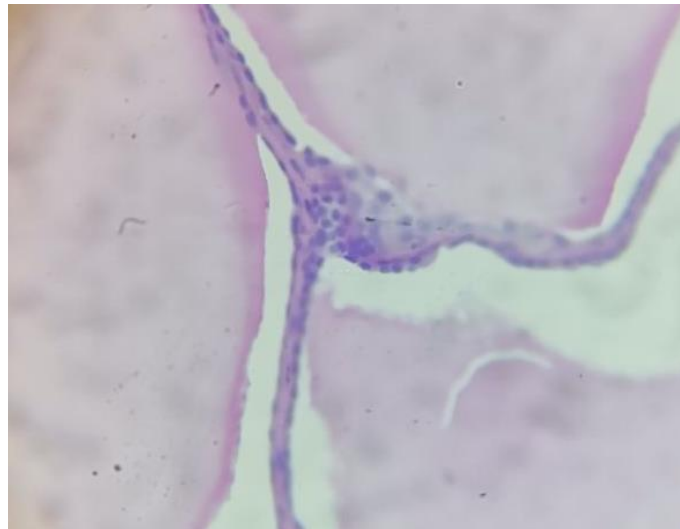


Figure (4): multinodular goiter showed flatted hyper plastic epithelial. H & E stain. X100

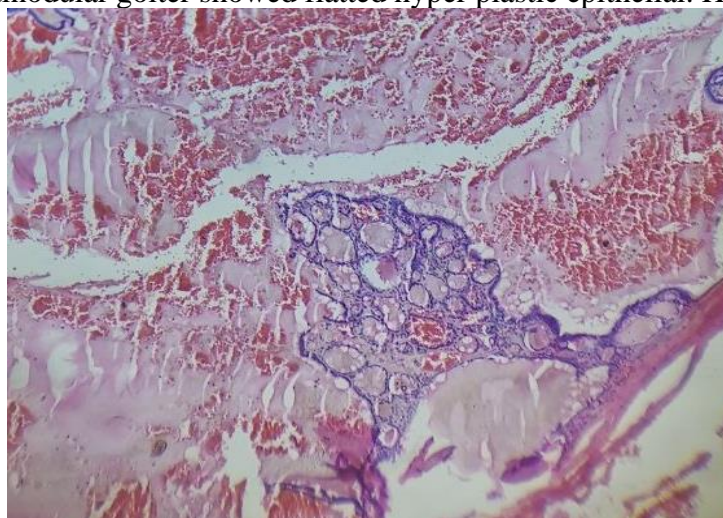


Figure (5): multinodular goiter showed Hemorrhage in thyroid tissue. H & E stain. X100

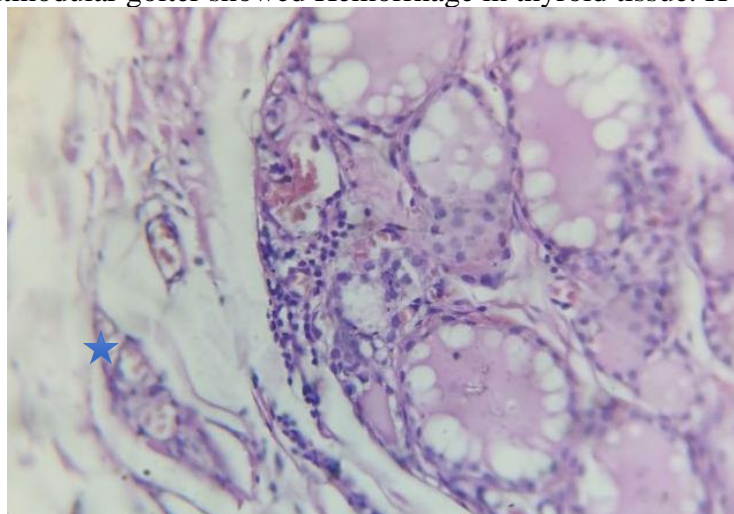


Figure (6): multinodular goiter showed Degenerative change showing foamy histocytes and gaint cell formation in goiter. Noted star shape. H & E stain. X100

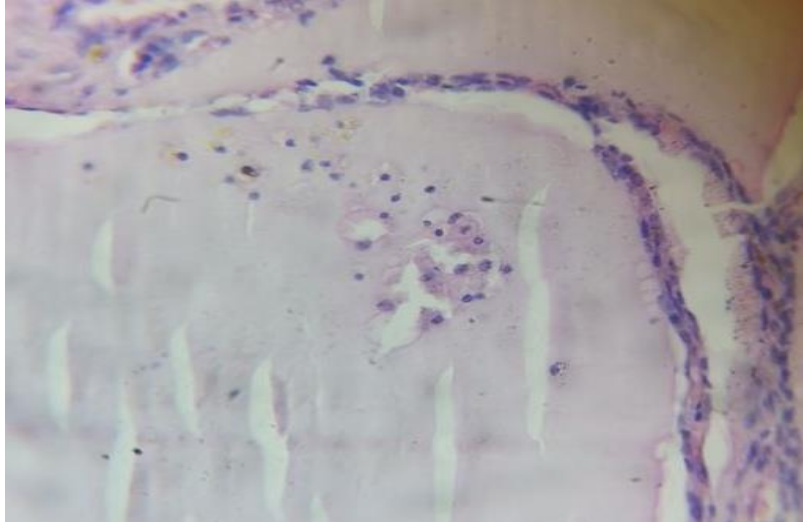


Figure (7): multinodular goiter showed Histiocytic. H & E stain. X100



Figure (8): multinodular goiter showed nodules surround by connective tissue. H & E stain.
X100

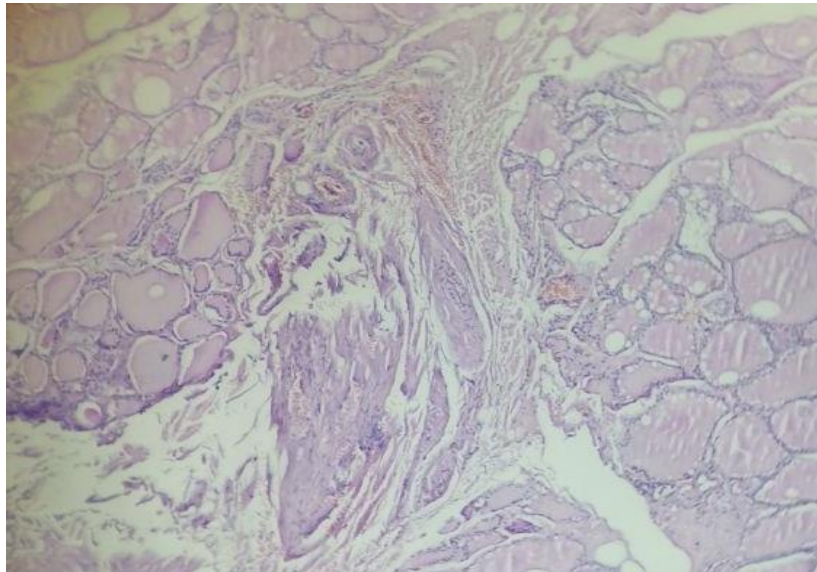


Figure (9): multinodular goiter showed calcification and the fibrosis between follicles . H & E stain. X100

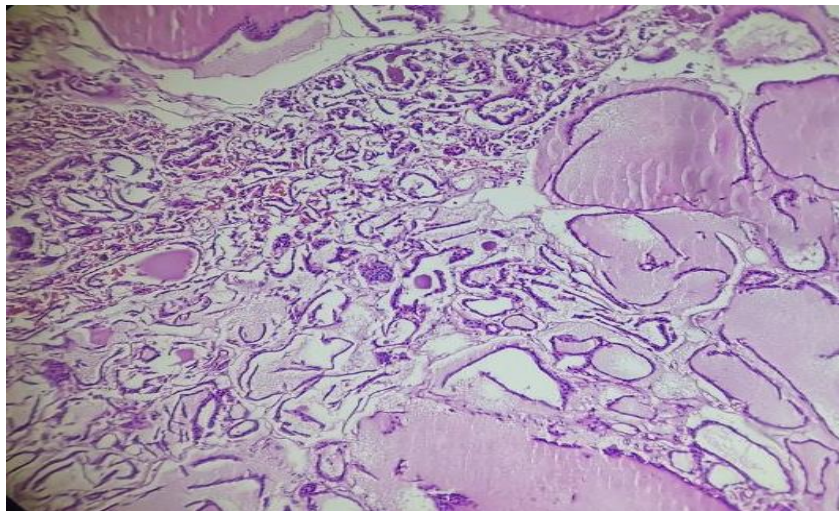


Figure (10): multinodular goiter showed foci papillary hyperplastic nodule. H & E stain. X100

Discussion:

In 2024 the researcher has been showed many hormonal and histological changes of thyroid tissue with non-toxic nodular goiter these are including cellular and matrix changes such as cellular hypertrophy, increase follicular cyst, hemorrhage, fibrosis as well as calcification^[8]. Sabreen 24) it is agreed with our results.

In some orderly people with high secretion and production of thyroid hormones from nodule due to hyperthyroidism, and the researcher observe that all thyroid nodules change in form^[9]. The histological examination f the thyroid gland tissue is that observed the ratio of thyroid gland with the volume 200 cm is lower than the volume 100 cm ^[10]

Previously study found that 40% of affected tissue were cysts but 85% degenerative and necrosis [11], however pother study stated that 66.6% are calcification harder and firmer with hemorrhage of tissue, but 43.3% of affected tissue was fibrosis with hemorrhage [12]

In 2023 the researcher performed histopathology of the thyroid disease it is not itself malignant multinodular goiter is often company with hemorrhage because the venous bleeding in thyroid tissue that common [13].

Parasanna and his group confirmed in their research in 2023 that women more affected non neoplastic lesion. In hospital examination observed the most result is nodular goiter and mor affected middle age woman [14]

In goiter disease, tissue fibrosis often occurs in the thyroid tissue because the node is surrounded by a collagen fiber capsule, especially for patients who started taking thyroid hormone medications after the operation [15,16]

The long period of formed macro-nodules was become necrosis because follicular hyperplasia due to make pressure on blood vessels in thyroid gland tissue due to serous fluid, thyroglobulin or old blood was accumulated. The hemorrhage in to cyst, often formation rough calcification "egg shell" in this area, most cystic nodules are adenomas due to hemorrhage and degeneration [17,18]

Reference:

- 1- Satturwar, S. and Aly Z. Thyroid & parathyroid Hyperplasia / goiter. Thyroid follicular nodular disease (multinodular goiter). PathologyOutlines.com, Inc. **Page views in 2024 to date:** 81,310.
- 2- El Jaouhari ^{S1}, Doghmi N², Najout H², El Hamouni M³, Kabiri H³, Bekkali H², Lalaoui J², Bensghir M² Acute respiratory failure secondary to a cervical goitre in a pregnant woman: a case report. MC Emerg Med. 2019 Jan 29;19(1):18.
- 3- Carlé A, Krejbjerg A, Laurberg P. Epidemiology of nodular goitre. Influence of iodine intake. Best Pract Res Clin Endocrinol Metab. 2014 Aug;28(4):465-79.
- 4- Hoang V and Trinh C. A Review of the Pathology, Diagnosis and Management of Colloid Goitre. National laboratory of medicin. . Epub 2020 Oct 6. 2020 Oct;16(2):131-135.
- 5- Shlomo melmed kenneth s. Polonsky p. Reed larsen henry m. Kronenberg "Williams Textbook of ENDOCRINOLOGY" 12th edition:Chapter 11,page328.
- 6- Studer H. Multinodular goitre: 'much more to it than simply iodine deficiency' Elsevier. Volume 14, Issue 4, December 2000, Pages 577-600
- 7- Bancroft JD., Suvana SK and Layton C. (2013). Bancroft's theory and practice of histological techniques. Elsevier Limited. All rights reserved. 7th ed (book). Ch.12. P 220-228.
- 8- Sabreen Saleem Abd Alkreem Alsaqi*, Zainab Mohammed Jasim, Mariam Mohammed Burhan. Detection of Correlation of Histological changes with Hormone concentrations in Nodular Non Toxic Goiter Patients. Medical and Hearing (Volume 28 S1) / March 2024. Pages:62-67.
- 9- Gupta M, Gupta S, Gupta VB. Correlation of fine needle aspiration cytology with histopathology in the diagnosis of solitary thyroid nodule. J Thyroid Res. 2010;2010.



- 10- Satapathy MC, Dash D, Panda C, Satapathy A. Multinodular goitre turning into follicular carcinoma thyroid after a latency of seven years. *Thyroid Res Pract.* 2014;11(2):70-2.
- 11- harma C. Diagnostic accuracy of fine needle aspiration cytology of thyroid and evaluation of discordant cases. *J Egypt Natl Canc Inst.* 2015;27(3):147e53.
- 12- Tasova V, Kilicoglu B, Tuncal S, Uysal E, Sabuncuoglu MZ, Tanrikulu Y, et al. Evaluation of incidental thyroid cancer in patients with thyroidectomy. *W Indian Med J.* 2013;62(9):844e8.
- 13- Ebrahim M, Gill A, Delbridge L, Serpell J, Sidhu S. Beware the recurrent 'benign' multinodular goiter. *ANZ Journal of surgery.*2023 Volume93, Issue4 Pages 907-910
- 14- Prasanna P.L., 2Dr. Pradeep Kumar N Original research article Clinico-pathological study of multinodular swellings of thyroid by histopathology, FNAC and ultrasound correlation . *journal of cardiovascular disease.* ISSN:0975 -3583,0976-2833 VOL14, ISSUE 1 1 , 2023
- 15- van Hoeven K H and Dookhan D B Cytology of the thyroid gland: pitfalls in aspiration of the fibrotic nodule. *Diagn Cytopathol.* 1996 Jun;14(4):362-6.
- 16- Neumann S, Willgerodt H, Ackermann F, Reske A, Jung M, Reis A, Paschke R. Linkaged of familial euthyroid goiter to the multinodular goiter-1 locus and exclusion of the candidate genes thyroglobulin, thyroperoxidase and NA+/I- symporter. *J Clin Endocrinol Metab* 84:3750-3756, 1999.
- 17- Bignel GR, Canzian F, Shayeghi M, Stark M, Shugart YY, Biggs P, Mangion J, Hamoudi R, Rosenblatt J, Buu P, Sun S, Stoffer SS, Goldgar DE, Romeo G, Houlston RS, Narod SA, Stratton MR, Foulkes WD. Familial nontoxic multinodular thyroid goiter locus maps to chromosome 14q but does not account for familial nonmedullary thyroid cancer. *Am J Hum Genet* 61:1123-1130, 1997.
- 18- Samuels MH. Evaluation and treatment of sporadic nontoxic goiter-some answers and more questions. *J Clin Endocrinol Metab* 86:994-997, 2001.