Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

A RARE CASE PRESENTATION OF FIBROOSSEOUS METAPLASIA IN COLLOID GOITRE

[1]Dr Pratiksha Mishra, [2]Dr Meenakshi Mohapatro, [3]Prof Kalyani Prava Gouda, [4]Dr Liza Das, [5]Dr Phalgunee Priyadarshini, [6]Dr Chinmayee Lenka, [7]Prof Lity Mohanty

[1]Junior Resident Department of Pathology, SCB Medical College & Hospital
[2]Assistant Professor,Department of Pathology, SCB Medical College & Hospital
[3]Professor,Department of Pathology, SCB Medical College & Hospital
[4]Assistant Professor, Department of Pathology, SCB Medical College & Hospital
[5]Assistant professor, Dept of pathology SCB Medical College & Hospital
[6]Assistant professor, SCB Medical College & Hospital
[7] Professor and HOD Department of Pathology, SCB Medical College and hospital.

Corresponding author- **Dr Meenakshi Mohapatro***

ABSTRACT

Colloid goiter is the most common type of non-neoplastic thyroid condition. They may present with secondary degenerative changes like hyalinization, cystic changes, hemorrhages, fibrosis with rarely presenting with calcification and eventual ossification. Herein we present a case of colloid goiter with fibro-osseous metaplasia in a 55 year male patient who underwent total thyroidectomy due to the clinical suspicion of malignancy.

Key words: Fibroosseous metaplasia, colloid goiter, heterotopic bone formation

INTRODUCTION

Thyroid nodules (nodular or multinodular) are quite common in the general population. Theypresent with a prevalence estimate of 6% when detected through physical examination and palpation, and are detected as high as 85% during autopsy[1]. The thyroid nodules can show numerous secondary changes and can undergo cystic, hemorrhagic or fibrotic changes. However, they rarely show the tendency to ossify or calcify[2]. Herein we present a rare case of fibroosseous metaplasia as a secondary change in colloid goiter in a 55 year old male patient.

CASE REPORT

A 55-year-old male presented to our surgery OPD with gradually increasing thyroid swelling of size 3x2cm since 5 years. The swelling was associated with discomfort during eating. Patient noted mild hoarseness of voice since 2 months. He was a known hypertensive since 10 years, apart from which he had no other comorbidities. There was no family history of anythyroid disease or any malignancy. On clinical examination,firm, non-tender diffuse thyroid swelling was present measuring 3x2cm, more towards left side. The entire swelling moved with deglutition. Comprehensive blood examinations, and thyroid hormone levels were within normal limits.Ultrasonography of neck (USG) and CECT Thorax revealed multiple randomly distributed nodules over both the lobes, largest measuring 3mm in diameter with focal areas of calcification.

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

With the radiological diagnosis of papillary carcinoma of thyroid, patient was planned for fine needle aspiration cytology (FNAC) which revealed colloid goiter (Bethesda Category II). Patient was then planned for total thyroidectomy and tissue was sent for histopathological examination. Grossly, we received an irregular globular structure measuring 18x14x9.5cm*(Figure 1a).* Cut section showed predominantly solid, variegated areas with few cystic areas containing colloid. Multiple thick, fibrotic whitish nodules were present in the lower pole of left lobe of thyroid gland*(Figure 1b)* with the largest one measuring 6x4mm. The nodules were bony hard in consistency and hence were resected from the specimen and decalcified in 5% nitric acid for 3 days. Focal areas of hemorrhage and calcification were seen. Microscopically, colloid filled follicles were found with surrounding osseous metaplasia *(Figure 2a, 2b, 2c).*Numerous foci showed massive sclerosis and focal calcification was seen in benign appearing thyroid. Mature bony trabeculae filled with fatty marrow was found in nodular sections*(Figure 2d).*The surrounding areas showed fibrocollagenous tissue shows chronic inflammatory infiltrates lined by spindled fibroblastic cells, histiocytes with numerous multinucleated giant cells in the stroma*(Figure 2d).*Hence, a final diagnosis of colloid goiter with fibroosseous metaplasia was made.

Figure 1a: Total thyroidectomy specimen measuring 18x14x9.5cm
Figure 1b: Multiple fibrotic whitish nodules present on lower pole of left lobe of thyroid gland.

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

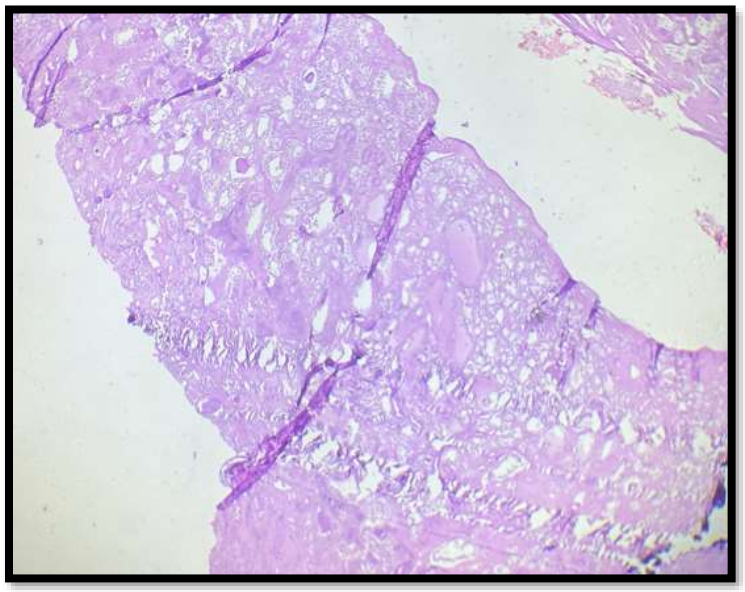

Figure2a: H & E (40x): Microphotograph shows thyroid follicles with colloid with surrounding osseous metaplasia.

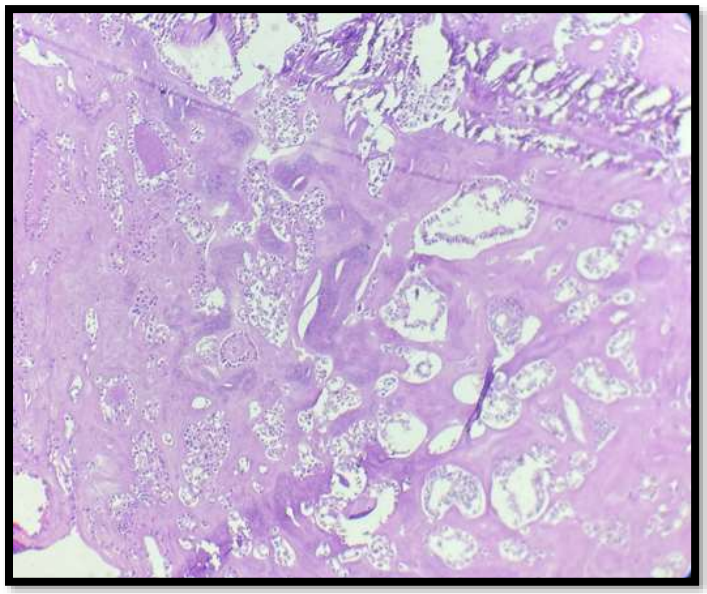

Figure 2b: H & E (100x): Microphotograph shows thyroid follicles filled with colloid with surrounding osseous metaplasia.

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

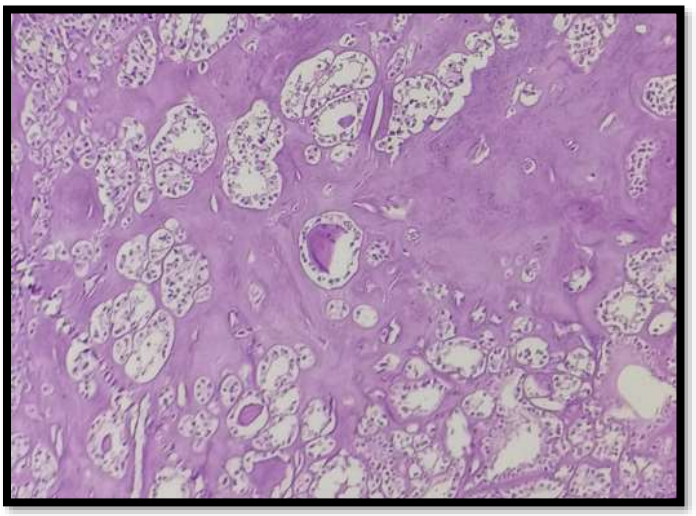

Figure 2c: H & E (100x): Microphotograph shows thyroid follicles filled with colloid with surrounding osseous metaplasia(star mark) and congested blood vessels in between.

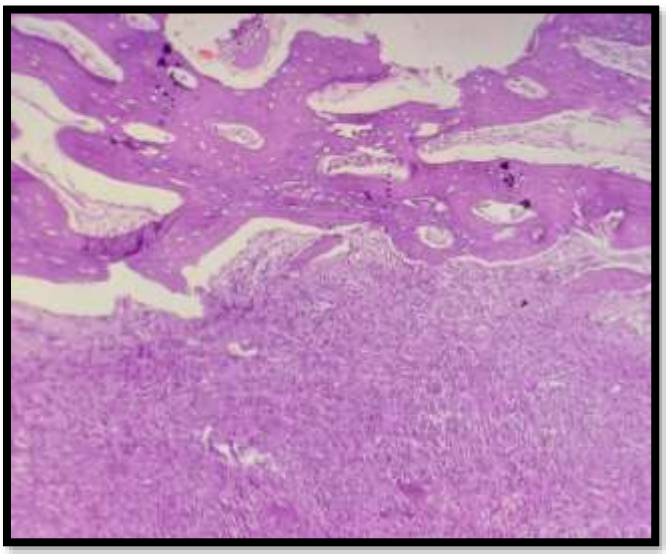

Figure 2d: H & E (100x): Microphotograph shows mature bony trabeculae with scattered small osteocytes in bony lacunae with surrounding fibrocollagenous stroma showing presence of abundant multinucleated giant cells (star mark).

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

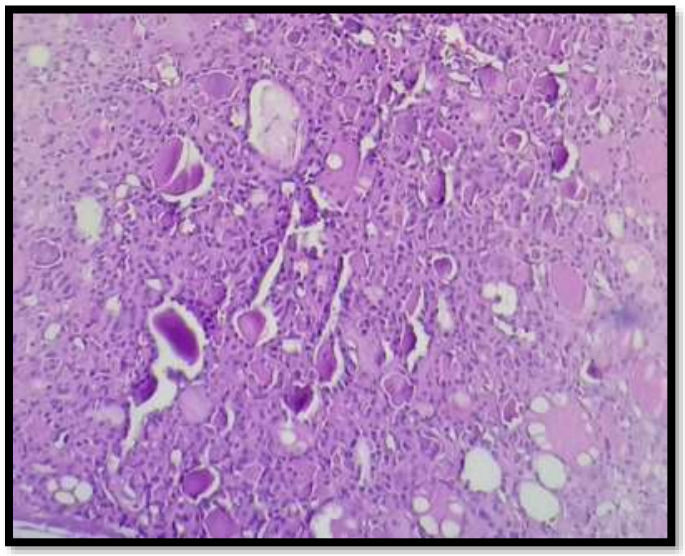

Figure 2e: H & E (200x): Microphotograph shows normal colloid filled follicles showing scalloped borders with calcified colloid present in few follicles.

DISCUSSION

Colloid goiter caused by iodine deficiency in developing countries is the most common thyroid disease. Several factors contribute to the development of colloidal goiter, in addition toiodine deficient diet like foods interfering with hormonal synthesis, mutations in thyroid-stimulating hormone (TSH) receptors, stimulation of thyroid development by globulin, growth hormone, insulin-like growth factor 1 (IGF-1), and genetic factors[3].

Ultrasound (USG) of neck is the initial method of choice to evaluate and diagnose thyroid nodules to differentiate them into neoplastic and non-neoplastic lesions. Our case showed focus of abnormal calcification, hence causing a suspicion of malignancy. So, FNAC of thyroid plays a crucial role in conjunction with USG neck to aid in proper diagnosis.

Colloid goiter like other benign thyroid lesions may show several secondary changes like hyalinization, cholesterol crystallization, hemorrhages, and fibrosis or may show cystic changes. Thyroid may also show several metaplastic changes like squamous metaplasia[4], hurthle cell metaplasia[5], cartilaginous metaplasia[6], and even lipomatous metaplasia have been observed in various studies[7]. Dystrophic calcification may often be seen in a nodular goiter as found in our case, but maturation of this calcified tissue to mature bone is extremely rare[8].

The pathogenesis of the osseous metaplasia is as yet unclear and still remains unknown, though many theories have been proposed in various studies. The most common theory suggests the role of basic fibroblast growth factor (bFGF) and bone morphogenetic protein 2 (BMP-2), the signalling factors responsible for proliferation and growth of cells[9]. The suggested theory is increase in the levels of BMP-2 especially in a calcified thyroid gland as shown in a study conducted by Basbug et al[10]. BMP family which constitutes 30 members, the BMP2 protein is

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

responsible to induce local osseous formation, but the osseous part is formed finally by the presence of specific calcium and phosphate concentrations in our body [10].

Cases of multinodular goiter, thyroid hyperplasia, follicular adenoma, papillary thyroid carcinoma, and anaplastic thyroid carcinoma have been reported with histopathologic findings of osseous metaplasia (OM), bone marrow metaplasia (BMM), ectopic bone formation (EBF), ossification, and extramedullary hematopoiesis (EMH)with majority observed in cases of nodular goiter and in papillary carcinoma of thyroid among the neoplastic conditions of thyroid [11].There are numerous differential diagnoses in this case from thyroid to parathyroid causes which can present with calcification with eventual ossification. This heterotopic osseous formation is also seen in many congenital syndromes and must be suspected in pediatric population like fibrodysplasia ossificans progressive [11]. Management requires wide spread resection of the entire gland so as to prevent recurrence.

CONCLUSION

In conclusion, fibroosseous metaplasia, characterized by the formation of mature bone within the thyroid gland in conjunction with colloid goitre, is an extremely rare condition. The pathogenesis of thyroid osseous metaplasia remains incompletely understood and warrants further investigation[12].Patient's proper history, clinic-radiological examination, adequate grossing with proper histopathological examination is of paramount importance to be considered. Treatment typically involves wide resection of the affected gland.

REFERENCES

1. D. Dean, G. Hossein, Epidemiology of a thyroid nodule, Best Pract. Res. Clin. Endocrinol. Metab. 22 (6) (2008) 901–911.
2. Rosai J (ed): Thyroid gland. In: Rosai and Ackerman's Surgical Pathology. 9th edition. Mosby, New York, NY, p529, 2004.
3. Hoang VT, Trinh CT. A Review of the Pathology, Diagnosis and Management of Colloid Goitre. Eur Endocrinol. 2020 Oct;16(2):131-135. doi: 10.17925/EE.2020.16.2.131. Epub 2020 Oct 6. PMID: 33117444; PMCID: PMC7572169.
4. Chambers M, Sadow PM, Kerr DA. Squamous Differentiation in the Thyroid: Metaplasia, Neoplasia, or Bystander? International Journal of Surgical Pathology. 2022;30(4):385-392. doi:10.1177/10668969211065126
5. Hudak K, Mazeh H, Sippel RS, Chen H. Hürthle cell metaplasia on fine-needle aspiration biopsy is not by itself an indication for thyroid surgery. Am J Surg. 2012 Mar;203(3):287-90; discussion 290-1. doi: 10.1016/j.amjsurg.2011.09.019. Epub 2012 Jan 20. PMID: 22264740.
6. Palo, Seetu. Cartilaginous metaplasia: A unique microscopic finding in multinodular goiter. Thyroid Research and Practice 18(2):p 82-83, May–Aug 2021. | DOI: 10.4103/trp.trp_12_21
7. Joanna Solarewicz, Vijaya Reddy, Pincas Bitterman, Ritu Ghai, Paolo Gattuso, Lipomatous Metaplasia of the Thyroid Gland: A Clinicopathologic Review, *American* Journal of Clinical Pathology, Volume 152, Issue Supplement_1, October 2019, Pages S41–S42, https://doi.org/10.1093/ajcp/aqz113.012

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 8, 2024

8. Pontikides N, Botsios D, Kariki E, Vassiliadis K and Krassas GE: Extramedullary hemopoiesis in a thyroid nodule with extensive bone metaplasia and mature bone formation. Thyroid 13: 877-880, 2003.
9. J.Y. Park, K.H. Lee, S.G. Cho, et al., Incidental thyroid nodules on thoracic contrast-enhanced computed tomography in clinical practice during a 10-year period, Medicine (Baltimore). 96 (11) (2017) e6388.
10. Basbug M, Yavuz R, Dablan M and Akansu B: Extensive osseous metaplasia with mature bone formation of thyroid gland. J Endocrine Met 2: 99-101, 2012.
11. Aurora N, Hashmi I, Misra S, Aydin N. A rare presentation: A case report of osseous metaplasia and mature bone formation in a follicular adenoma of the thyroid. Int J Surg Case Rep. 2017;37:83-86. doi: 10.1016/j.ijscr.2017.06.031. Epub 2017 Jun 17. PMID: 28648877; PMCID: PMC5484983.
12. Hejazi, Soha & Zaidi, Nisar & Ghanem, Ahmad & Aljawhari, Adel. (2019). Osseous metaplasia in thyroid nodule: A case report and review of literature. International Journal of Case Reports. 10.28933/ijcr-2019-09-2005.