

## Diagnosing Microscopic Black Thyroid with Fine Needle Aspiration: Rare but Possible

Enrique Stoopen-Margain, Sofia Valanci Aroesty, Lorenzo Soler Montesinos, Leopoldo Castaneda Martinez  
Javier Baquera, Sigfrido Miracle

### ABSTRACT

Finding a black thyroid is unusual and disconcerting. It is usually induced by chronic minocycline therapy. To this day, no more than 100 cases have been published. Most patients remain asymptomatic and the diagnosis is made incidentally, normally a black thyroid is discovered macroscopically, in this case, we present a microscopically diagnosed black thyroid. A wide variety of causes should be taken into consideration before making the definite diagnosis.

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### CLINICAL SCENARIO

A 33-year-old euthyroid asymptomatic female underwent a medical check-up. She presented with a palpable left-sided thyroid nodule, neck ultrasound was performed and demonstrated an increased size in the left lobule with no adenopathy. The findings of fine needle aspiration biopsy showed thyroid follicles with a chromatic pattern in thick lumps as well as abundant ceroid cytoplasmic pigment with inflammatory cells and homochromatic cytoplasm, consistent with black thyroid (Figs 1 and 2). Since she was asymptomatic, she opted for clinical follow-up.

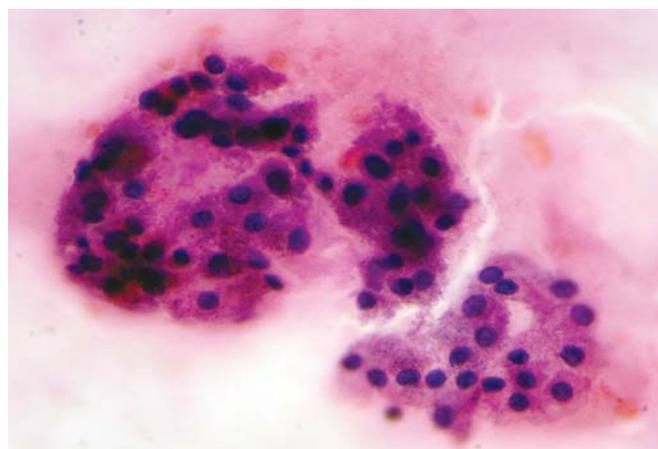
The case was discussed at the Mexican Association of Thyroidology and no guarantee of it being a benign lesion could be given. Therefore, the patient was called back to the office and offered surgical exploration.

Left lobectomy was performed and the transoperative frozen section report was of a colloid goiter with oxiphyllic areas and cavitations with cumulus of pigment in the follicular cytoplasm; however, on gross examination, no black thyroid was found. Final pathologic report confirmed a benign black thyroid by microscopy. No complications presented during surgery and the patient was discharged from the hospital 48 hours later. Her recovery has been successful with no need for hormonal replacement.

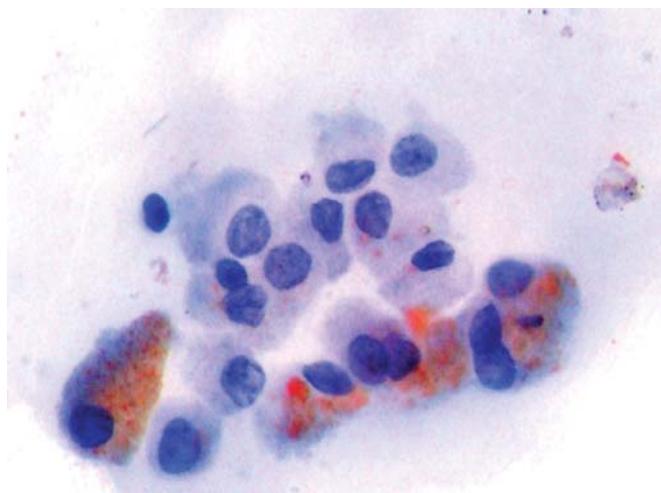
### DISCUSSION

Finding a black thyroid is unusual and disconcerting. Benitz made the first description in 1967 in animal trials with the use of minocycline, found a black discoloration of the thyroid without any alteration on thyroid function.<sup>1</sup> Fourteen years later, an association was made with both papillary and follicular thyroid carcinomas.<sup>2</sup>

It is usually induced by chronic minocycline therapy and has multiple causes. Macroscopic dark-brown pigmentation has been seen in patients with mucoviscidosis, apparently because of excess lipofuscin deposit related to chronic vitamin E deficiency. It has also been described in patients treated with minocycline for acne and for a wide variety of gram-positive and gram-negative infections. Other causes also include hemochromatosis, ochronosis, ceroid storage disease, bruising and hemorrhage. It has been associated with papillary and follicular thyroid carcinomas as well as rare medullary thyroid carcinomas, but thyroid tumors associated with black-pigmented thyroid are rare. Black thyroid pigmentation has even been considered pathognomonic for chronic minocycline ingestion, which is known to act as a competitive inhibitor of thyroid peroxidase in metabolically-active thyroid tissue. This offers a potential mechanism of pigment accumulation. Black thyroid has been associated with



**Fig. 1:** Clusters of follicular monostratified epithelium cells with tubular profile, mixed with an overlapping and crowding pattern. There is no nuclear atypia and cytoplasm is abundant and granular, studded with a brown-black dusty pigment. There are no recognizable macrophages in this microscopic field (hematoxylin-eosin, 100x)



**Fig. 2:** A lamellar assemblage of follicular cells and probably one macrophage, whose cytoplasm is loaded with a coarse granular, Oil Red-O positive pigment, probably lipochrome or another lipid containing complex substance (Oil Red-O stain, 400x)

various clinical scenarios and only few reports consider it as a unique entity.<sup>3</sup>

Most patients remain asymptomatic and the diagnosis is incidental. The diagnosis is made by definite pathology either with surgery or autopsy, rarely with fine needle aspiration biopsy.<sup>4</sup>

## CONCLUSION

In this particular case, there was no history of minocycline therapy or other risk factors. In other reports, no characteristic pigmentation was revealed in fine needle aspiration prior to surgery. To our knowledge, this is the first black thyroid report not associated with minocycline therapy diagnosed preoperatively in FNA. Although cytologic diagnosis in fine-needle aspirates is unlikely, we demonstrate with this case that it is possible. However, literature reports suggest FNA does not seem to be a reliable method in diagnosing black thyroid. Differential diagnosis should be divided in malignant and nonmalignant lesions. Malignant lesions include well-differentiated thyroid carcinoma and nonmalignant lesions include goiter and follicular adenomas. Definite pathologic report should be concluded only after thorough examination.

This case illustrates the importance of good communication between the pathologist and the endocrine

surgeon, as the slides were carefully discussed together. The clinical endocrinologist was also called even though the patient was euthyroid at all times. Once resected and with a benign pathological report, no further treatment is necessary other than standard postoperative care.

Even though macroscopically, the diagnosis of a black thyroid could not be made, as the pathologist demonstrated it microscopically.

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## ABOUT THE AUTHORS

### Enrique Stoopen-Margain (Corresponding Author)

Department of Surgery, The ABC Medical Center, IAP, Mexico  
e-mail: estoopenm@abchospital.com

### Sofia Valanci Aroesty

Resident, Department of Surgery, The ABC Medical Center, IAP Mexico

### Lorenzo Soler Montesinos

Department of Surgery, The ABC Medical Center, IAP, Mexico

### Leopoldo Castaneda Martinez

Department of Surgery, The ABC Medical Center, IAP, Mexico

### Javier Baquera

Department of Pathology, The ABC Medical Center, IAP, Mexico

### Sigfrido Miracle

Department of Endocrinology, The ABC Medical Center IAP, Mexico