



CASE REPORT

Overcoming bleeding: arterial embolization as an aid in giant thyroid goiter surgery – a case report

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Abstract

The usefulness of selective embolization of thyroid arteries in the treatment of voluminous goiters is reported on a 55-year-old patient with a grade 3 goiter. Selective arteriography was used to embolize the thyroid arteries. Radiological embolization reduced the volume of the goiter significantly, resolving the compressive symptoms, improving the dysphonia and respiratory mechanics, and maintaining normal thyroid function. Selective embolization of thyroid arteries before thyroid resection can successfully treat selected patients. Embolization can be repeated until the therapeutic objectives are achieved, with good management of complications.

Keywords: embolization; therapeutic; arteries; goiter; dysphonia.

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Introduction

From a clinical and semiological point of view, goiter is defined as a diffuse or localized increase in the volume of the thyroid gland, whereas from an anatomopathological standpoint, it is defined as a tumor originating from the hyperplasia or hypertrophy of this gland, excluding thyroiditis and neoplasms¹. Goiter can manifest as a single, multiple, or diffuse nodule, and may present thyroid hypofunction, hyperfunction, or eufunction.

Description of the clinical case

A female patient aged 55 years was admitted to Luis Vernaza Hospital, Guayaquil, Guayas, Ecuador in 2022 presenting a large cervical mass that had been growing slowly for eight years. She had no important pathological or surgical history. On physical examination, an anterior cervical mass (17.5 x 12 cm) was observed and associated with dysphonia (Figure 1). Laboratory tests showed thyroid function within normal parameters. Right and left thyroid Fine-Needle Aspiration (FNA) puncture was negative for neoplastic cells (BETHESDA GII). Ultrasound showed an increased gland with multiple nodular areas that was diagnosed as multinodular goiter. Cervical angiography CT scan revealed nutrient vessels from the upper right and lower thyroid branches bilaterally.



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Figure 1. Female, 55 years old, diagnosed with giant thyroid goiter. The tumor causes deformity.

It was decided to perform angioembolization of the thyroid arteries before the surgical intervention by a qualified radiologist using the Seldinger technique. The first embolization was performed and complete devascularization of the nutrient branches from the left lower and upper thyroid arteries was achieved. However, it was not possible to selectively channel the right upper thyroid artery. The second embolization was performed through the right femoral artery, and complete devascularization of the nutrient arteries from the right upper and lower and left upper thyroid arteries was achieved. The post-procedure thyroid profile was normal: TSH 0.08 mIU/L; T3 1.24 nmol/L; T4 10.8 nmol/L.

Eight days after the procedure, a significant reduction in the tumor size was observed on palpation, as well as improvement in dysphonia. At that time, the patient underwent total thyroidectomy, identifying and preserving the left and right recurrent laryngeal nerves and the parathyroid glands (Figures 2-3). Level VI lymph node dissection of the neck was performed. The nodes obtained did not show gross changes and were sent for frozen pathology. The result was negative for malignancy. Blood loss was <100 ml and tumor manipulation and gland removal were subjectively easy.

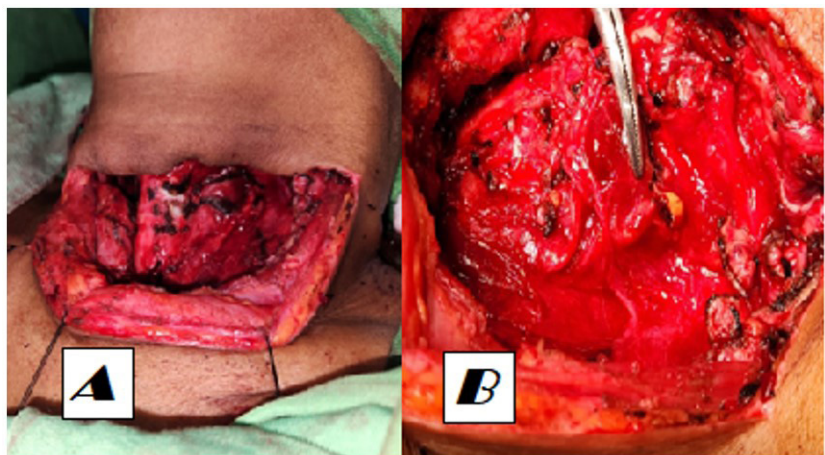


Figure 2. A - Operative field, anterior cervical region. **B** - Increased vascularization of the gland and embolized arteries are displayed with the clamp.

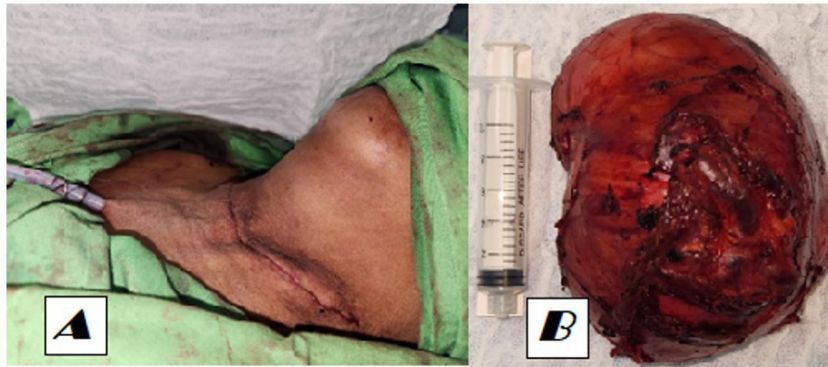


Figure 3. A - Lateral view of the post-surgical cervical region, wide wound, no deformity. **B** - Surgical piece, thyroid gland tumor whose size exceeds the volume of a 10 cm syringe.

Pathology: Encapsulated angioinvasive follicular thyroid carcinoma involving the entire specimen with no evidence of extrathyroidal extension. The patient was discharged six days after surgery with adequate respiratory mechanics and a good tone of voice.

Discussion

According to the American Thyroid Association (ATA), surgery is the treatment of choice for 58% of patients with large symptomatic goiter².

Surgical complication rates range from 6.9 to 25%, including transient hypocalcemia (2–25%) and recurrent nerve injury (3.12–3.52%)¹.

In this case report, the large size and vascularity of the goiter raised the risk of bleeding between 1.2 and 1.6%³. However, selective embolization of the thyroid arteries, blocking most of the blood supply to the gland, causes necrosis and subsequent fibrosis of most of the thyroid tissue⁴. In this case report, embolization induced necrosis and reduced blood supply and tumor size.

When embolized thyroid tissue becomes necrotic, it releases great amounts of hormones into the blood, causing severe immune reactions – free T4 levels of 3 ng/dL are recommended⁵.

Zhao et al.⁴ studied 41 patients treated with angioembolization who presented recurrent hyperfunction that required second embolization. In this case report, two embolization procedures were performed because of the difficult access to the right upper, right lower, and left upper thyroid arteries; both procedures were successful.

The FNA puncture result was BETHESDA GII; however, during the surgical procedure, because of the large tumor size, level VI lymph node dissection was performed and the specimen was sent to frozen pathology intraoperatively. As the result was negative for malignancy, nodal dissection was not further extended.

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References

1. Causa Soteras RJ, Causa García JR, González Pérez YA. Bocio multinodular gigante. Revisión de la literatura a propósito de un caso. *Rev Col Cir.* 2020;35(3):483-90. <http://dx.doi.org/10.30944/20117582.469>.
2. Ramos HE, Braga-Basaria M, Haquin C, Mesa CO, Noronha L, Sandrini R, Carvalho GA, Graf H. Preoperative embolization of thyroid arteries in a patient with large multinodular goiter and papillary carcinoma. *Thyroid.* 2004;14(11):967-70. <http://dx.doi.org/10.1089/thy.2004.14.967>. PMID:15671777.
3. Izquierdo OM, Serrat LMV, Cruz DB, Ramos YAM, Peña GT. Comportamiento quirúrgico de las patologías del tiroides. *Rev Cuba Cir.* 2020;59(1):1-17.
4. Zhao W, Gao B-L, Yang H-Y, Li H, Song D-P, Xiang S-T, Shen J. Thyroid arterial embolization to treat graves' disease. *Acta Radiol.* 2007;48(2):186-92. <http://dx.doi.org/10.1080/02841850601128967>. PMID:17354140.
5. González-Argüelles N, Crespo-Hidalgo M, Placer-Martínez JR, Rabanal-Llevot JM, Torres-Diez E, Gil-García A. Pre-operative embolization of thyroid arteries in a case of refractory amiodarone-induced thyrotoxicosis. Case report. *Rev Colomb Anestesiol.* 2019;47(3):202-5. <http://dx.doi.org/10.1097/CJ9.000000000000100>.