**Scholars Journal of Applied Medical Sciences**
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

**General Surgery**

# Selective Arterial Embolization for the Management of Large Multinodular Cervicomediastinal Goiter

Jonathan Coello-Vergara[1*], Dannia Montalván-Lalama[2], Kevin Albuja-Delgado[3], Gabriela Paredes Oñate[4], Rosa Gonzaga-Granja[5], Iván Jarro-Villavicencio[1], Andrea Villarreal-Juris[1]

[1]General Surgery, Alfredo Paulson's Specialty Hospital, Guayaquil-Ecuador
[2]Medical Doctor, Monte Sinaí Hospital, Guayaquil-Ecuador
[3]General Surgery, Society for the Fight Against Cancer of Ecuador (SOLCA), Guayaquil-Ecuador
[4]Medical doctor, Lenin Mosquera Hospital, Quito-Ecuador
[5]Medical doctor, Pontifical Catholic University of Ecuador, Quito-Ecuador

**DOI:** 10.36347/sjams.2024.v12i04.028 | **Received:** 19.03.2024 | **Accepted:** 26.04.2024 | **Published:** 30.04.2024

***Corresponding author:** Jonathan Coello-Vergara
General Surgery, Alfredo Paulson's Specialty Hospital, Guayaquil-Ecuador

**Abstract** **Case Report**

In the surgical treatment of thyroid disease, surgery of cervicomediastinal goiters has always been a challenge, due to the high risk of intraoperative and postoperative complications, especially excessive bleeding. ***Case report*** Fifty-one-year-old female patient with multiple underlying diseases, presenting a large cervical mass resulting to be a large multinodular cervicomediastinal goiter. Underwent selective arterial embolization of vascular branches supplying irrigation to the mass and later a total thyroidectomy with minimum blood loss during the intraoperative time. ***Conclusion*** Even if preoperative selective artery embolization is far from being a routine technique in cervicomediastinal goiter surgery, in selected patients who have many underlying medical problems, very voluminous goiter, high bleeding risk or high intraoperative risk, it can be considered a useful and safe procedure.

**Keywords:** goiter, nodular goiter, therapeutic embolization.



## INTRODUCTION

In the surgical treatment of thyroid disease, surgery of cervicomediastinal goiters has always been a challenge, due to the high risk of intraoperative and postoperative complications, especially excessive bleeding [1].

Selective arterial embolization is a relatively new technique, previously described by Chinese authors [2,3] as the treatment for certain thyroid diseases, mostly for the hyperfunction correction.

It is performed endovascularly, and results in ischemic necrosis of part of the thyroid parenchyma, by such means decreasing the size of the goiter, and reducing the risk of excessive bleeding [1]. It is also indicated for patients who are unable or unwilling to have radioiodine therapy or to undergo surgery. Which means this technique can be employed in the treatment of cervicomediastinal goiter as a preoperative procedure or as an alternative to thyroid resection [4].

## CASE REPORT

Fifty-one-year-old female patient with a history of hypertension, diabetes mellitus type I, chronic hyperthyroidism without medical treatment and a large, growing cervical mass, presenting to the emergency room with cervical pain and dyspnea.

A multi-slice tomography of the neck was performed with multiplanar reconstructions in contrast-enhanced single phase, observing an enlarged, heterogeneous, diffuse thyroid gland, with a pseudo-nodular appearance and calcifications that after contrast administration enhanced heterogeneously, of approximately 10 cm x 9.5 cm x 7.7 cm, conditioning the displacement of the bilateral carotid vessels, with extension to the thoracic operculum; without lymphadenopathy in cervical chains. Concluding the presence of multinodular goiter, TIRADS category 4.

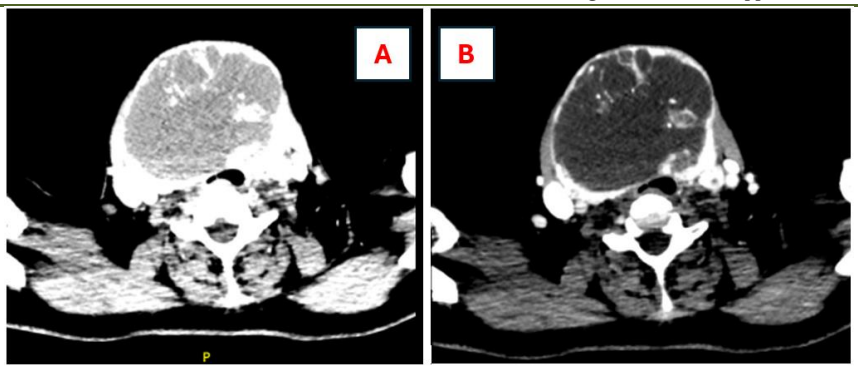


**Image 1: Multinodular bocium with contrast-enhanced and calcification areas (A: arterial phase; B: venous phase)**

Subsequently, a fine needle aspiration biopsy was performed, the result of which was Bethesda II.

Because of the extent of the goiter and the high probability of significant blood loss, total thyroidectomy was a high-risk procedure in this patient, so an endovascular arterial embolization was performed. Briefly: by femoral access, a 6 Fr femoral introducing catheter was placed, subsequently channeling the brachiocephalic and subclavian branches with a 100 cm Cerenovus Envoy 6 Fr guiding catheter with Aquatrack 0.035-inch x 150 cm guide protection; Then, 100 ml Optiray contrast was administered, showing arterial blush. Two afferents were navigated with a microcatheter with a Sniper balloon, performing a controlled injection of Squid 12 embolic liquid and Onyx 18 embolic liquid. Finally, the systems were removed, and the access sealed with Angioseal 6 Fr.

A triphasic neck angiotomography was performed 7 days after the procedure, finding an area of embolization on the right side of the goiter, maintaining tracheal compression, without invasion of adjacent vascular structures, and a slight reduction in the size.

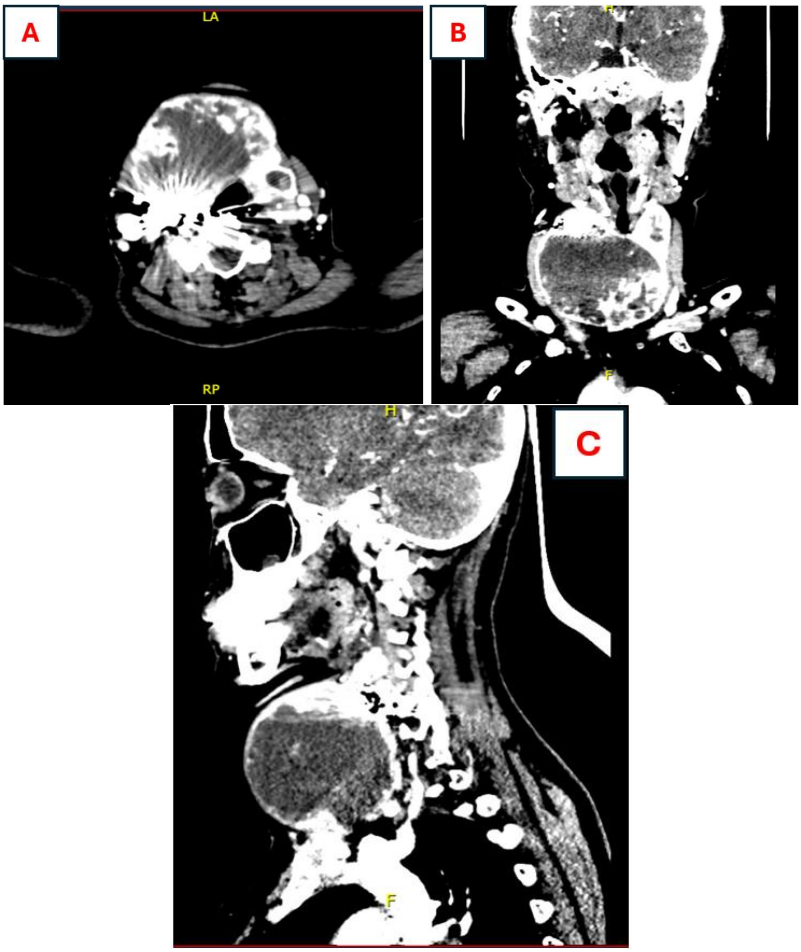


**Image 2: Embolization área (A, B: venous pase; C: arterial pase)**

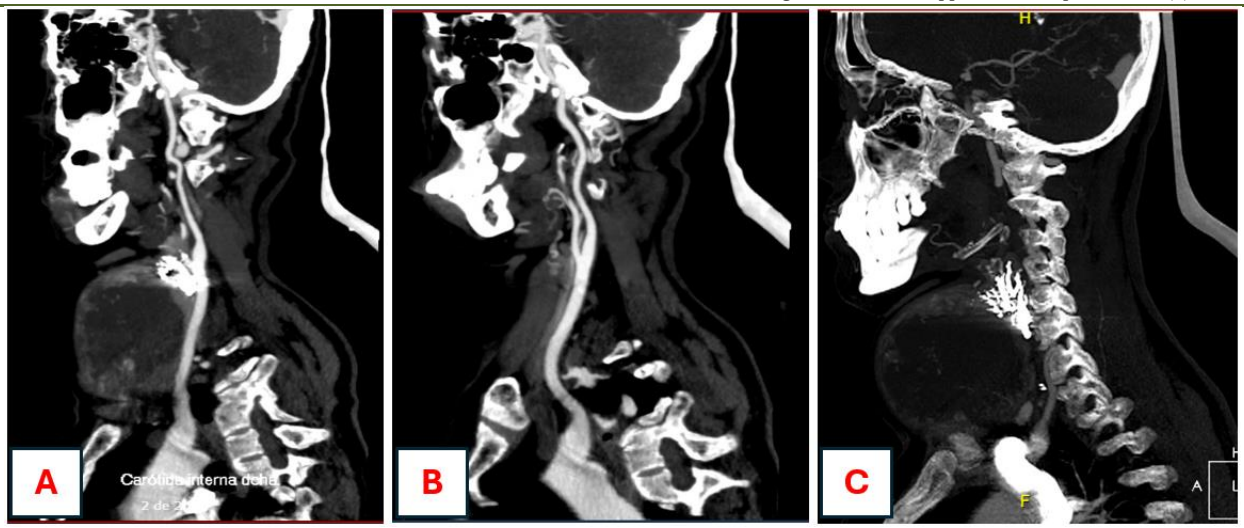


**Image 3: Reconstructions (A: right internal carothid artery; B: left internal carothid artery; C: embolized area)**

Eight days later, the patient underwent a total thyroidectomy, only through cervicotomy, finding an enlarged thyroid gland of approximately 10 x 15 cm, strongly adhered to underlying planes, esophagus, and trachea. She also had an adenoma in the left upper parathyroid. Both recurrent laryngeal nerves were preserved, identifying them with the help of a neurostimulator. The surgery concluded without complications, with total bleeding of approximately 50 ml.

During the immediate post-surgical period, the patient remained hemodynamically stable and symptom-free. She had no signs of bleeding, hematoma or hypocalcemia (parathormone: 10.2 pg./ml, serum calcium:9.1 mg/dl); Her wound showed no signs of infection. She was discharged home.

## DISCUSSION

Patients presenting multinodular goiter are usually asymptomatic but the presence of clinical manifestations, commonly due to the compression to important structures in the neck, usually prompt for intervention [5].

The previously described large cervicomediastinal multinodular hyperfunctioning goiter, made thyroidectomy a ominous challenge, especially considering the risk of intraoperative bleeding [1]. For this, preoperative selective arterial embolization has rarely been described as a possible strategy; however, it has also been described that reduction in size after arterial embolization allows the mass to be safely resected, as reported in other publications [6].

Radioiodine therapy was not considered for the management of this patient because despite effectively reducing a goiter in volume, radiotherapy-induced adherences between the thyroid parenchyma and surrounding tissues can make surgery more laborious than it already is. Also, surgery after radioiodine therapy increases the risk of complications related to the integrity of the inferior laryngeal nerves and parathyroid glands.

Additionally, the report from the surgical team that they found significantly less bleeding than in other similar surgeries confirms the successful blockage of the major vessels and thus decrease in vascularization of the gland. Even if the reduction in the goiter size was not confirmed by postembolization CT scan, it was observed by palpation; this findings have also been described in the literature as well [4,7].

Some Chinese investigators [2,3] consider the indication for this type of procedure to be patients who prefer not to or cannot undergo traditional therapy for hyperfunctioning goiters, whereas Ramos *et al.*, [1] base their choice mainly on the need to reduce intraoperative bleeding, like in this case.

Anyways, although embolization in our patient was uncomplicated, these procedures should always take place in a suitable healthcare facility operated by highly qualified, experienced interventional radiologists and surgeons.

Finally, the notable finding of the absence of signs or symptoms of hypocalcemia needs to be highlighted.

## CONCLUSION

Even if preoperative selective artery embolization is far from being a routine technique in cervicomediastinal goiter surgery, in selected patients who have many underlying medical problems, very voluminous goiter, high bleeding risk or high intraoperative risk, it can be considered a useful and safe procedure.

## REFERENCES


1. Estrela Ramos, H., Braga-Basaria, M., Haquin, C., Mesa, C. O., de Noronha, L., Sandrini, R., ... & Graf, H. (2004). Preoperative embolization of thyroid arteries in a patient with large multinodular goiter and papillary carcinoma. *Thyroid*, *14*(11), 967-970.
2. Zhao, W., Gao, B. L., Tian, M., Yi, G. F., Yang, H. Y., Shen, L. J., ... & Shen, J. (2009). Graves' disease treated with thyroid arterial embolization. *Clinical and Investigative Medicine*, *32*(2), E158-E165.
3. Xiao, H., Zhuang, W., Wang, S., Yu, B., Chen, G., Zhou, M., & Wong, N. C. (2002). Arterial embolization: a novel approach to thyroid ablative therapy for Graves' disease. *The Journal of Clinical Endocrinology & Metabolism*, *87*(8), 3583-3589.
4. Tartaglia, F., Sorrenti, S., Maturo, A., & Ulisse, S. (2019). Selective embolization of the thyroid arteries (SETA): Ten years' experience. *Asian journal of surgery*, *42*(8), 847-848.
5. Tartaglia, F., Salvatori, F. M., Pichelli, D., Sgueglia, M., Blasi, S., & Custureri, F. (2007). Preoperative embolization of thyroid arteries in a patient with a large cervicomediastinal hyperfunctioning goiter. *Thyroid*, *17*(8), 787-792.
6. Hegedus, L., Bonnema, S. J., & Bennedbæk, F. N. (2003). Management of simple nodular goiter: current status and future perspectives. *Endocrine reviews*, *24*(1), 102-132.
7. Qin, L., Yu, H., Mei, J., & Jia, Z. (2021). Thyroid Artery Embolization for Nodular Goiter: The Optimal Candidates and Techniques Have Yet To Be Determined. *Journal of Vascular and Interventional Radiology: JVIR*, *33*(2), 200-201.