SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Surgery

Thyroid Cancer and Carotid Body Concomitant Tumor: A Case Report

Daysi Alejandra León Sanguano[1*], Christian Jara Santamaria[2], Edwin Steven Alarcón Herrera[3], Paula Odaly Herrera Genovese[4], Cristian Antonio Taco Santillán[5], Andrea Carolina Alexander Ortega[6], Daniela Fernanda Almeida Panchez[7], Vanessa Orozco Moya, Duilio Antonio Palacios Molina[9]

[1]General Surgeon from Pontificia Universidad Católica del Ecuador (PUCE), Medical Specialist at Eugenio Espejo Hospital, Quito, Ecuador
[2]General Surgeon from Pontificia Universidad Católica del Ecuador (PUCE), Medical Specialist at Eugenio Espejo Hospital, Quito, Ecuador
[3]General Physician, Universidad de las Américas, Quito, Ecuador
[4]General Physician, Universidad Tecnológica Equinoccial, Quito, Ecuador
[5]General Physician, Universidad de las Américas, Quito, Ecuador
[6]General Physician, Universidad de las Américas, Quito, Ecuador
[7]General Physician, Pontificia Universidad Católica del Ecuador (PUCE), Quito, Ecuador
[8]General Surgeon from Pontificia Universidad Católica del Ecuador (PUCE), Quito, Ecuador
[9]Medical Specialist Head and Neck Surgery, General Surgeon, Hospital de Especialidades Eugenio Espejo, Quito, Ecuador

DOI: 10.36347/sasjs.2024.v10i02.001 | **Received:** 24.12.2023 | **Accepted:** 30.01.2024 | **Published:** 02.02.2024

***Corresponding author:** Daysi Alejandra León Sanguano
General Surgeon from Pontificia Universidad Católica del Ecuador (PUCE), Medical Specialist at Eugenio Espejo Hospital, Quito, Ecuador

Abstract **Case Report**

Carotid body tumors are rare neuroendocrine tumors originating from the autonomic nervous system; the annual incidence is approximately 0.8% per 100,000 people per year with a predisposition in females. Papillary thyroid cancer is a type of differentiated cancer derived from the follicular cells of the gland. It has an incidence of 13.5% per 100,000 with a mortality of 0.5% per 100,000 people, affecting women more frequently. The association of papillary thyroid cancer with tumors of the carotid body is uncommon with few cases reported in the literature. Surgery is the main method of therapy for patients with differentiated thyroid cancer. In the hands of expert surgeons, it presents a low risk of complications, offering the patient a good prognosis and a good quality of life. In cases of carotid glomus, surgical resection is chosen in small tumors, in young patients and tumors that do not invade the base of the skull. We present the case of a patient with papillary thyroid cancer associated with carotid paraganglioma that was managed with surgical resolution in a single operation.

Keywords: Carotid Body Tumor, thyroid Cancer, case report, head and neck surgery.

INTRODUCTION

Paragangliomas are rare neurogenic tumors that arise from the autonomic paraganglia, which are organs that consist mainly of neuroendocrine cells from the neural crest. They can arise anywhere, presenting at the level of the head and neck in approximately 5% [1].

Thyroid cancer derived from the follicular epithelium includes papillary, follicular and anaplastic cancer, with papillary and follicular cancer being differentiated cancers [1, 2].

The association of papillary thyroid cancer with carotid glomus paragangliomas is rare.

We present the case of a 35-year-old woman with no medical history who came for evaluation due to increased volume in the anterior cervical region. Complementary tests were performed where a right carotid body tumor was identified, as well as thyroid nodules with suspected malignancy. decided on surgical treatment through a cervicotomy that allowed the complete excision of the carotid tumor and the thyroid gland. The procedure was performed without complications, presenting adequate pain control in the post-surgical period, no alteration of the tone of the voice, no hypocalcemia and obtaining good aesthetic result.

CASE REPORT

A 35-year-old patient with no medical history came for medical evaluation due to an increase in volume in the anterior cervical region of approximately 3 years of evolution. On physical examination, a pulsating mass was palpated in the right cervical region measuring approximately 3 centimeters in diameter. in addition to a nodule of solid consistency approximately 1 centimeter in diameter in the left lobe of the thyroid gland. Imaging studies were requested, reporting in the ultrasound a thyroid nodule in the right lobe measuring 9.4x7.3 mm, hyperechogenic, solid with well-defined margins, at the level of the left lobe a hypoechoic solid nodule with poorly defined margins with extrathyroidal extension of 13. 4x9.11mm; Additionally, a hypervascularized solid mass measuring 3.3x1.8x2.7 cm was located at the level of the bifurcation of the right common carotid artery. The tomography indicated at the right cervical level III an irregular rounded mass measuring 4 x 2.7cm, located at the level of the bifurcation of the right internal and external carotid arteries, the finding is suggestive of Shamblin III carotid glomus. (Figure 1)

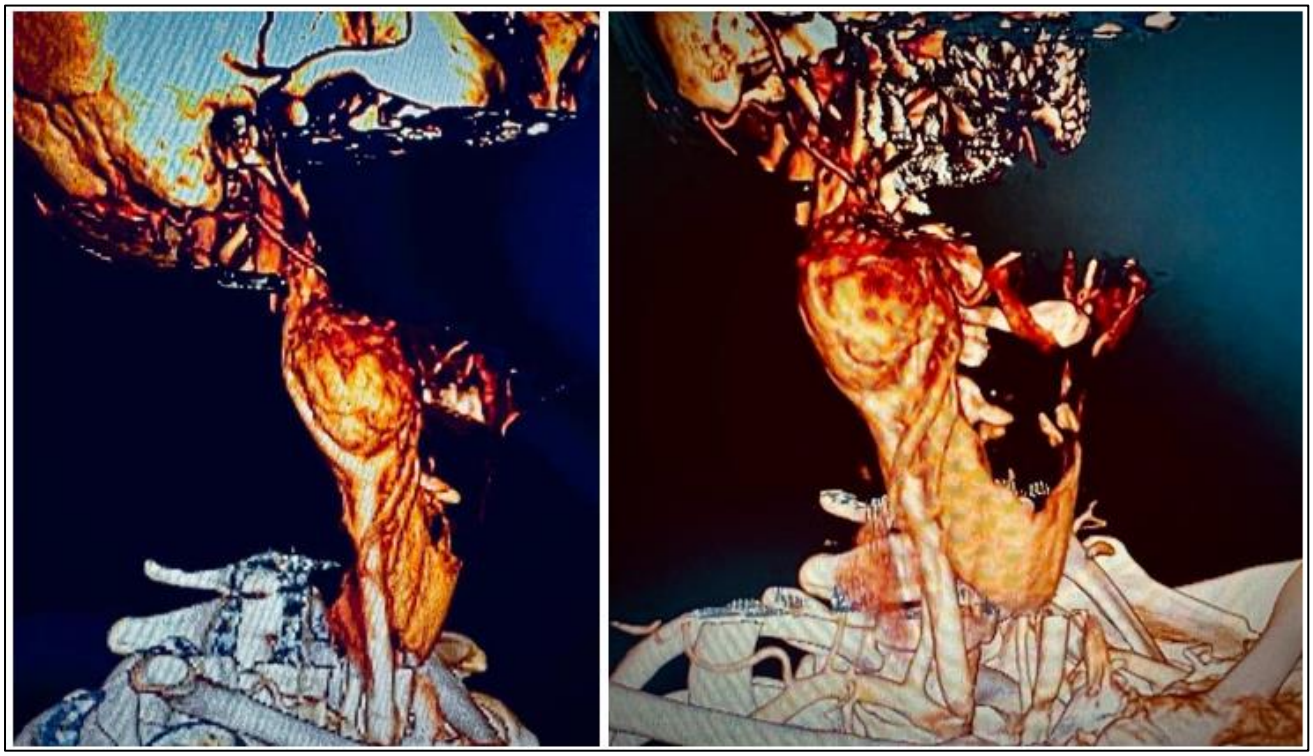

Figure 1: Tomographic study with vascular reconstruction that reported a carotid tumor measuring 4 cm x 2.7 cm, located at the level of the bifurcation of the right internal and external carotid arteries (Shamblin III)

In the cytological study of the left nodule, a Bethesda V was obtained. A cerebral angiography and embolization were requested. Among the findings, the right carotid glomus was found irrigated by branches of the right external carotid and its ascending pharyngeal branch; its nutritional branch was embolized endovascularly. main originating from the ascending pharyngeal artery embolizing 85% of the glomus, leaving dependent branches of the external carotid close to the bifurcation of the right common carotid artery, the occlusion test indicated that there is no neurological deficit, the presence of an anterior communicating artery is confirmed. Subadventitial excision of the right carotid glomus plus total thyroidectomy was performed through a cervicotomy incision. A hypervascularized right carotid body tumor of approximately 4x5 centimeters in diameter was observed that completely surrounded the internal and external carotid arteries, and also surrounded the hypoglossal nerve. (Figure 2). Enlarged thyroid gland attached to the prethyroid muscles, left thyroid lobe with indurated nodule measuring 2 centimeters in diameter at the upper pole, right thyroid lobe with nodule approximately 1 centimeter in diameter, parathyroid glands identified and preserved in number of four and bilaterally identified and preserved recurrent laryngeal nerves. (Figure 3)

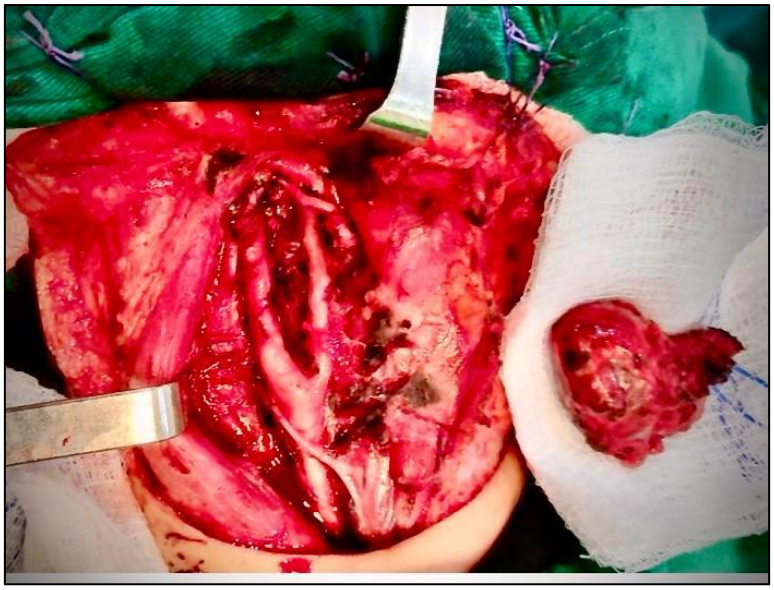

Figure 2: Right carotid body tumor measuring approximately 4x5 centimeters in diameter, hypervascularized, completely surrounding the internal and external carotid arteries, and also surrounding the hypoglossal nerve (Shamblin III)

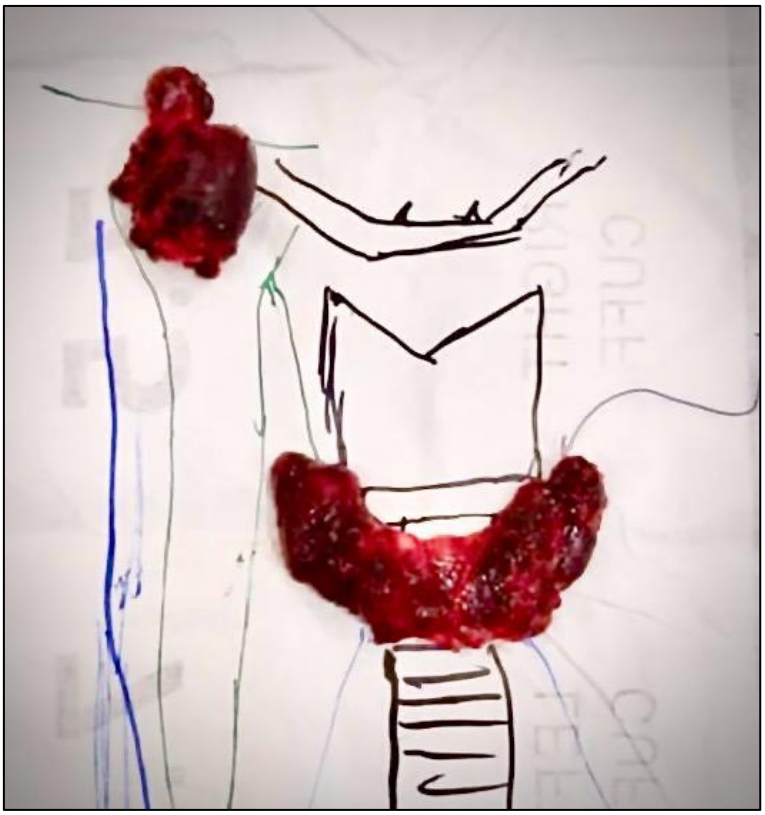

Figure 3: A. Right carotid body tumor measuring approximately 4x5 centimeters in diameter. B. Enlarged thyroid gland with bilateral nodules

The patient was discharged after 48 hours with no signs of hypocalcemia, no neurological deficits, no alteration in voice tonality with adequate pain control and tolerating diet. The pathological study indicated a follicular variant and classic multifocal papillary thyroid carcinoma at the bilateral level of the gland in addition to the carotid glomus. Patient remains under control for thyroid cancer without hypocalcemia, without neurological deficits, without evidence of recurrent thyroid disease 10 months after surgery.

DISCUSSION

Cervical masses are an important reason for consultation in primary care and in hospital emergency services. The differential diagnosis is broad and is

categorized into congenital masses (thyroglossal duct cyst, anomalies of the branchial apparatus, lymphangiomas, hemangiomas, dermoid cysts), inflammatory (bacterial, viral, fungal, parasitic), neoplastic (coming from salivary glands, thyroid, metastasis of squamous cell carcinoma, lymphoma, paragangliomas, schwannoma, lipomas) and immunological disorders (connective tissue involvement, serum sickness and sarcoidosis) [3].

Paragangliomas are rare neurovascular tumors that generally reside in the adventitia of blood vessels or nerves. They can be of sympathetic origin and secrete catecholamines, normally affecting the adrenal glands, or come from the parasympathetic nerves, which are not secretory and are located in the region of the the head and neck at the level of the jugular-tympanic junction, in the carotid body, in the vagus nerve, in the superior and inferior laryngeal paraganglionic tissue, the nasal cavity or orbit [1].

They are benign tumors that occur more frequently in women in the third to fifth decade of life, presenting unifocally, but it is mentioned that 10% can be malignant, 10% are bilateral or multiple, and 10% occur in history. family of paragangliomas. They are non-functional lesions that are identified incidentally in an imaging study and on rare occasions they can present as a pulsating mass and when located in the retromandibular region they give a sensation of fullness. On occasion they can cause episodes of facial flushing and hypertension requiring surgery. of imaging studies, serum and urinary levels of catecholamines for the investigation of other paragangliomas [1,4].

Multiple tumors or presentation in young patients may indicate genetic predisposition [1].

Paragangliomas of the carotid body are also called non-chromaffin paragangliomas, they come from chemoreceptor cells of the carotid sheath that commonly occur in people who live at high altitudes. Their growth is slow, approximately 1 mm per year, and they are richly vascularized, presenting as a pulsating mass, as is the case of our patient. They are classified into three categories according to Shamblin, taking as reference the relationship between the carotids and the nerves adjacent to the tumor. In type I, the carotids are displaced by the tumor and the hypoglossal and superior laryngeal nerves remain on the surface of the tumor. In type II, the internal and external carotid arteries are partially inside the tumor, forming a groove, and the hypoglossal and superior laryngeal nerves are located on the surface. Finally, in type III, the arteries are completely surrounded by the tumor. In cases of malignancy, local invasion of adjacent tissues with cranial nerve paralysis, bone destruction, lymph node or distant metastasis is observed. Cytological study or biopsy of this mass is unnecessary and can be dangerous due to the high risk of bleeding. CT angiography or magnetic resonance imaging are useful in diagnosis and follow-up to assess growth and for surgical planning [1,4,5].

The management of carotid body tumors is based on multiple factors such as the patient's age, surgical risk, tumor location, tumor size, and risk of malignancy. It is considered surgical for tumors with rapid growth in a short period of time, tumors up to 7 cm, young patients, tumors without extension towards the base of the skull, lesions with suspected malignancy due to imaging findings or the presence of cervical or distant metastases; obtaining good results in surgery without causing injury or deficit of the cranial nerves. Radiotherapy does not eradicate the tumor but can prevent additional growth and can be considered in elderly patients or patients with high surgical risk, or in tumor lesions that present rapid growth. Complications include transient paralysis of cranial nerves and risk of second radiation-induced neoplasia [1,4,5].

In surgical cases when the lesions are large and highly vascularized, angiographic studies should be performed to demonstrate the nutritional vessels in addition to considering preoperative embolization. In cases of involvement of the internal carotid artery, balloon occlusion studies of the carotid arteries should be performed to demonstrate satisfactory intracranial cross circulation; however, the anatomical demonstration of cross perfusion and adequate circulation in the circle of Willis does not guarantee preservation. of neurological function. The risk of neurological deficit should be discussed with the patient. In functional tumors that present hypertension and facial flushing, preoperative treatment with alpha blockers and blood pressure monitoring during surgery during tumor mobilization is necessary [1,4,5].

Cancers derived from the follicular epithelium of the thyroid are divided into three categories: papillary (85%), follicular (12%) and anaplastic (<3%) cancer. Papillary and follicular cancer are differentiated cancers. Most anaplastic cancers that are undifferentiated neoplasms can arise from cancers that were initially differentiated. The suspicion of malignancy is established by identifying a thyroid nodule that presents ultrasound characteristics of malignancy and according to the TIRADS classification, fine needle aspiration is indicated for cytological analysis, the result of which is categorized according to the Bethesda classification. Once the risk of malignancy is established, you can opt for surgical resolution, iodotherapy, ablation, monitoring of the nodule or hormonal suppression therapy according to the size of the nodule, location and specific factors of the patient. Surgery is the main mode of therapy for patients with differentiated thyroid cancer and is advised to be performed by an expert thyroid surgeon to minimize the risk of hypoparathyroidism and laryngeal nerve injury. The surgical approach depends on the extent of the disease or lymph node metastases [1,4,5].

In our patient, we opted for the resection of both cervical masses in a single surgical procedure using a transverse cervicotomy that allowed appropriate exposure of the thyroid gland and the carotid bifurcation, allowing adequate identification of the cervical structures, a complete resection of both tumor lesions, producing a better aesthetic result, lower risk of complications, better pain control and avoiding a second incision with a good prognosis without increasing morbidity and mortality.

Declaration of Competing Interest:

The authors declares that there is no conflict of interest regarding the publication of this article.

Ethical Approval: The authors declare that = we obtained permission from the ethics committee in our institution.

Consent: The authors declare that written consent was obtained from the patient before publication of this case.

Registration of Research Studies:

The authors declare that the patient gave his consent to publish this case, and as this is a case report not human participants were involved in a study.

REFERENCES

1. Neumann, H., Young, W.F. & Eng, C. Pheochromocytoma and Paraganglioma. PubMed [Internet]. 2019 Aug 8 [cited 2024 Jan 28];381(6):552–65. Available from: https://pubmed.ncbi.nlm.nih.gov/31390501/
2. ATA Guidelines Tools - Nódulos tiroideos y cáncer differenciado de tiroides (Differentiated Thyroid Cancer) [Internet]. Guidelinecentral.com. 2019 [cited 2024 Jan 28]. Available from: https://eguideline.guidelinecentral.com/i/1141306-n%C3%B3dulos-tiroideos-y-c%C3%A1ncer-differenciado-de-tiroides-differentiated-thyroid-cancer/
3. Chorath, K., & Rajasekaran, K. (2021). Evaluation and management of a neck mass. *Medical Clinics*, *105*(5), 827-837.
4. Garcia-Alva, R., Bobadilla-Rosado, L. O., Arzola, L. H., Escobar-Preciado, M., Anaya-Ayala, J. E., & Hinojosa, C. A. (2018). A case report of a concomitant total thyroidectomy and carotid body tumor resection in a 43 year old female. *International Journal of Surgery Case Reports*, *53*, 17-20.
5. Georgiadis, G. S., Lazarides, M. K., Tsalkidis, A., Argyropoulou, P., & Giatromanolaki, A. (2008). Carotid body tumor in a 13-year-old child: Case report and review of the literature. *Journal of vascular surgery*, *47*(4), 874-880.