

Letter to the Editor

Nonfunctional middle mediastinal paraganglioma: diagnostic and surgical management

Paraganglioma não funcional de mediastino médio:
diagnóstico e manejo cirúrgico

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To the Editor:

Pheochromocytomas are tumors derived from chromaffin cells of the sympathetic nervous system. When arising from extra-adrenal chromaffin cells, these tumors are called paragangliomas or chemodectomas.⁽¹⁻³⁾ Mediastinal paragangliomas are rare, only approximately 150 cases having been reported in the literature, and two-thirds of these tumors are located in the anterior or middle mediastinum.⁽⁴⁾ Mediastinal paragangliomas are derived from the para-aortic and paravertebral ganglion chain.⁽³⁾ Multicentric tumors are observed in 23% of cases, and there seems to be no specific distribution in the remaining cases.⁽⁵⁾

Similar to pheochromocytomas, paragangliomas can secrete catecholamines, although most are nonfunctional.^(3,6) Functional mediastinal paragangliomas are discovered as a result of the effects of catecholamine hypersecretion⁽¹⁻³⁾ or of compression, which leads to hoarseness, dysphagia, dyspnea, and chest pain.⁽⁷⁾ The diagnosis is incidental in more than 50% of all cases.⁽⁸⁾

Mediastinal paragangliomas are highly vascularized tumors that adhere to adjacent mediastinal structures, such as the heart, large blood vessels, trachea, and spine, and surgical management is therefore difficult.^(1,2) The differential diagnosis includes Castleman's disease, neuroendocrine tumors, lymphomas, and hemangiomas.

We report the case of a patient with a middle mediastinal tumor diagnosed after resection as nonfunctional paraganglioma. This is a very rare tumor, and it is uncommon for such a tumor to be identified preoperatively.

A 60-year-old White female sought treatment in the Thoracic Surgery Department of the *Hospital de Clínicas da Universidade Federal do Triângulo Mineiro (Triângulo Mineiro Federal*

University Hospital de Clínicas) with a 2-year history of moderate, constant pain in the left hemithorax. The patient reported no weight loss and classified herself as a nonsmoker. She had arterial hypertension, fibromyalgia, depression, and Chagas disease, all of which were controlled. Physical examination, laboratory test results, and chest X-ray findings were normal. An echocardiogram showed a solid, heterogeneous opacity between the right pulmonary artery and the aortic arch. Chest CT revealed a well-defined mass in the middle mediastinum, measuring 5.5 × 5.2 × 4.7 cm, which was markedly enhanced after intravenous contrast administration. There were no signs of invasion, although the mass was exerting mild compression on the adjacent vascular structures (Figure 1).

Considering the diagnoses of a neuroendocrine tumor, Castleman's disease, and lymphoma, we first submitted the patient to diagnostic mediastinoscopy. During the procedure, there was massive bleeding from the tumor and we were unable to obtain biopsy material for freezing. It therefore became necessary to perform right lateral thoracotomy. Through careful dissection and the application of numerous metal hemostatic clips, we successfully resected the tumor, which was a solid, elastic, highly vascularized mass, measuring 5 × 5 cm, located adjacent to the pulmonary artery, aortic arch, pericardium, and esophagus.

The postoperative evolution was favorable, and the patient was discharged on postoperative day 10 with mild dysphonia, which subsided within a few weeks. At this writing, the patient had been asymptomatic for 2 years and showed no signs of recurrence.

The diagnosis of mediastinal paraganglioma was confirmed by histopathological analysis and immunohistochemistry. The tumor tested positive for synaptophysin, chromogranin A, and S-100 protein but negative for cytokeratin

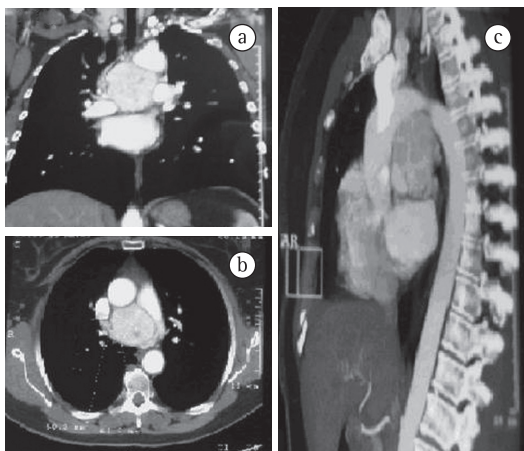


Figure 1 – Contrast-enhanced CT scans of the chest. In a, coronal section; in b, axial section; and in c, sagittal section. Note the well-delineated mass in the middle mediastinum in close contact with the right pulmonary artery and the aortic arch.

(Figure 2). The resected subcarinal lymph nodes showed no signs of metastasis.

The diagnosis of paraganglioma is based on clinical symptoms, imaging exams, and biochemical tests.^(3,8) The biochemical diagnosis of functional paragangliomas is made by measuring catecholamines and their metabolites in urine.^(3,6)

The main imaging methods used for the diagnosis of paragangliomas are CT and nuclear magnetic resonance imaging, both of which have

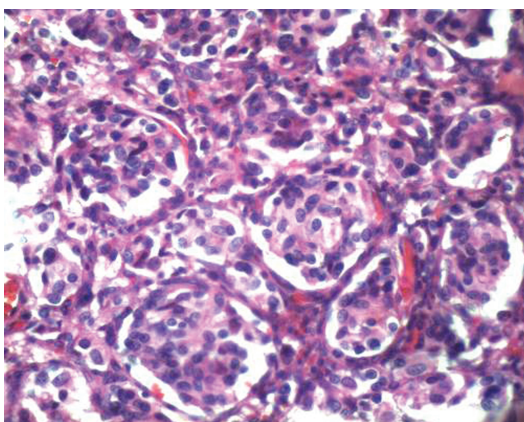


Figure 2 – Photomicrograph of an H&E-stained slide, showing a well-delineated and partially encapsulated benign tumor, consisting of oval or (rare) cylindrical cells. Note the slightly hyperchromatic, pleomorphic nuclei, the eosinophilic cytoplasm, and the finely granular chromatin.

a sensitivity of nearly 98%.⁽⁹⁾ Some investigators have suggested that magnetic resonance angiography is the most effective method.⁽⁴⁾ Metaiodobenzylguanidine scintigraphy is useful for the localization of extra-adrenal tumors and for the detection of multiple tumors.^(4,6)

The malignancy rate is higher for paragangliomas than for pheochromocytomas (29-40% vs. 10-15%). Distant metastases are typically to the lung and bones.⁽²⁾

The treatment of choice is complete surgical resection,^(2,3,8) which is difficult because of tumor hypervascularization and anatomical juxtaposition. Combined incision and extracorporeal circulation are often necessary.^(2,3) We believe that right thoracotomy provides the best access to tumors at this site. Due to the large number of small vessels in this area, which contains various major structures, hemostatic clips or a harmonic scalpel should be used in order to guarantee efficient hemostatic control.

The difficulties encountered in the resection of mediastinal paragangliomas include intraoperative bleeding and secretion of catecholamines in patients with metabolically active tumors.^(2,3) Hormonal crises, although uncommon, have been associated with significant morbidity and mortality.⁽⁸⁾ A meticulous surgical technique and rigorous hemodynamic control (before and during the procedure) are the cornerstones of the prevention and management of these complications.⁽³⁾ After complete resection of the tumor, the prognosis is favorable.^(2,3,7,8) Postoperative follow-up is fundamental for the early detection of metastatic disease, tumor recurrence, or late onset of multiple primary tumors.

At this writing, our patient was in good health, and the initial postoperative dysphonia had improved. Chest X-ray findings and urinary catecholamine metabolites were within normal ranges. Because the diagnosis was unexpected, these metabolites were not measured during the preoperative period.

Some investigators recommend preoperative embolization of paragangliomas at sites of difficult access (e.g., the neck) and the use of radiotherapy rather than resection when surgery is contraindicated or in complex situations, such as tumors involving the base of the skull.

In conclusion, mediastinal paragangliomas are rare tumors and are therefore not typically

included in the differential diagnosis of mediastinal tumors. Because paragangliomas are highly vascularized, they represent a challenge for the thoracic surgeon in terms of diagnosis and surgical strategy for complete resection. Nevertheless, in patients submitted to paraganglioma resection, postoperative morbidity and mortality rates are low.

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