Vagus Nerve Paraganglioma: Radiological Features We Should Be Aware of

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Abstract

Introduction A rare case of vagal paraganglioma is reported.

Material and Methods The specific radiological features of this tumor are presented to the clinician in order to make presumptive diagnosis.

Conclusion By CT-scan and/or MRI it must be suspected when a hypervascular tumor in relation to the major cervical vessels displaces the internal and external carotid arteries forward, does not open the carotid bifurcation, and displaces the internal jugular vein backwards.

Keywords Vagus nerve paraganglioma · Radiological features · Presumptive diagnosis

Introduction

Paragangliomas are rare tumors arising from paraganglion cells. These cells have a common embryological origin in

the neural crest from which they migrate out of the sympathetic chain to acquire the glandular character. They clinically develop as asymptomatic cervical masses, but they eventually may cause cranial nerve palsies. Among them, paragangliomas of the vagus nerve are less frequent in head and neck, being far behind from carotid and jugulotimpanic paragangliomas [1, 3–6, 9]. The authors focus on radiologic features by CT-scan and MRI, which are of utmost importance for differential diagnosis and surgical treatment planning (Figs. 1, 2, 3).

Case Report

A 51 year-old woman presented with a right progressive-growing painless cervical mass. The CT-scan showed a 4-cm well-defined mass at the right carotid space, above the carotid artery bifurcation. It displaced the internal jugular vein posterolaterally and the internal and external carotid arteries forward, without opening the carotid bifurcation. The mass presented a vascular hyper-enhancement. In the angio-MRI, lesion was similar to muscle on T1-weighted images, and slightly hyperintense on T2-weighted images, with multiple signal voids sequences related to vascularization signal sequences. Catecholamines in 24-h urine was normal. A mass receiving its blood supply mainly from the right ascending pharyngeal artery was observed in the angiography. This artery was further embolized.

Twenty-four hours after embolization, the patient was operated. A right mid-cervical incision was performed to approach the mass. A rounded tumor that rejected the internal jugular vein backwards, and the carotid bifurcation forwards, without infiltrating these vascular structures was observed. The mass depended on the vagus nerve, which encompassed and infiltrated. Resection of the tumor was performed including the

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Fig. 1 3D-CT cervicofacial. *VP* vagal paraganglioma. Hypervascular tumor in relation to major cervical vessels, which displaces the internal and external carotid arteries forward, (without opening the bifurcation) and the internal jugular vein backward. *IJV* internal jugular vein; *ICA* internal carotid artery; *ECA* external carotid artery

right vagus nerve, which had to be sacrificed. As a result, the patient had a residual dysphonia due to the paralysis of the right vocal cord. The mass was submitted for histologic study, which confirmed the diagnosis of vagal paraganglioma.

Discussion

While evaluating the CT-scan and/or MIR images, the presence of a mass located in the parapharyngeal space that displaces the internal and external carotid arteries forwards without infiltration, and also displaces the internal jugular vein backwards is, in our opinion, the keypoint for differential diagnosis and surgical treatment planning. In the much more common carotid paragangliomas, an increase in the distance between the external and the internal carotid arteries at the carotid bifurcation is observed. Meanwhile, a lesser or a greater degree of carotid artery infiltration is appreciated. This issue may determine the type of surgery, from a less aggressive subadventitial dissection to a more invasive surgery requiring reconstruction with grafts or prostheses [4, 7, 8, 10].

Fig. 2 CT axial cervicofacial with contrast. *VP* vagal paraganglioma; *IJV* internal jugular vein; *ICA* internal carotid artery; *ECA* external carotid artery

Fig. 3 Angio MRI supra aortic vessels. *VP* vagal paraganglioma; *ICA* internal carotid artery; *ECA* external carotid artery

Differential diagnosis with tumors that are located in the parapharyngeal space has to be performed: (1) schwannoma: it is a fusiform mass in the carotid space, showing no increase in the angiography in the size and number of the feeding arteries, and has less vascularization than

paragangliomas; (2) meningioma: it extends from the jugular foramen, which displays bone sclerotic changes, while vascular enhancement is lower than in paraganglioma; (3) carotid paraganglioma: there is an increase in the distance between the external and the internal carotid arteries at the carotid bifurcation; (4) jugulotimpanic paraganglioma: the mass is centered on the jugular foramen, which is permeable and the edges are homogeneous [1–3].

Conclusion

In a CT and/or MRI in which the clinician observes a hypervascular mass in relation to major cervical vessels, that shows no infiltration, with an anterior displacement of the carotid bifurcation (non-separated bifurcation) and a posterior displacement the internal jugular vein, the diagnosis of vagal paraganglioma must be suspected and the surgical treatment accordingly planned.

Conflict of interest None.

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