

Metastatic Thyroid Carcinoma of Jugular Foramen Simulating Glomus Jugulare Tumor : A Case Report¹

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We report a case of hypervascular metastatic thyroid carcinoma of the jugular foramen simulating a glomus jugulare tumor. Computed tomography(CT) revealed areas of irregular lytic bony destruction of the left jugular foramen, as well as characteristic invasion routes of a glomus jugulare tumor. Magnetic resonance(MR) imaging and angiography demonstrated a hypervascular mass similar to a glomus tumor.

Index words : Skull, base

Skull, secondary neoplasms

Skull, CT

Skull, MR

Angiography

The clinical presentation of metastatic carcinoma involving the jugular foramen is rare. It shows usually hypovascular lytic bony destruction of the jugular foramen (1).

Hypervascular metastases such as those from renal and thyroid carcinoma may produce destructive vascular lesions similar to paragangliomas (2).

The authors report a case of hypervascular metastasis from thyroid carcinoma in the jugular foramen simulating glomus jugulare tumor.

Case Report

A 63-year-old woman presented with progressive headache, dizziness and hoarseness; Prior to hospitalization, she had suffered from the former two complaints for several months, and hoarseness for several years. A subsequent problem was left auricular pain.

Neurological examination indicated decreased gag re-

flex, left facial nerve palsy, and leftward deviation of the tongue. There was neither hearing impairment nor tinnitus, nor any visual symptoms.

Initial brain CT revealed a lobulated inhomogeneous enhanced mass in the left jugular foramen and temporal bone. On temporal bone CT (Fig. 1), a large mass with irregular bony destruction in the left jugular foramen and temporal bone was seen, extending into the adjacent posterior fossa and hypotympanum. The sigmoid sinus plate was destroyed, and the ipsilateral carotico-jugular spine, jugular tubercle, and hypoglossal canal were eroded.

On T1-weighted MR imaging of the brain (Fig. 2A), inhomogeneous low signal intensity was seen, together with punctate vascular signal voids. The adjacent posterior fossa was severely indented by the mass. T2-weighted MR imaging (Fig. 2B) revealed inhomogeneously mixed signal intensities, again with punctate vascular signal voids. On postcontrast T1-weighted MR images (Fig. 2C), the mass showed strong enhancement.

Angiography of the left common carotid artery (Fig. 3) demonstrated an extremely vascular mass with persistent vascular staining. The predominant source of vascular supply was the left occipital artery, while a small part of the mass was supplied from both the ascending

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pharyngeal and posterior auricular arteries. The venous phase showed occlusion of the left sigmoid sinus and the internal jugular vein. Preoperatively the left occipital artery was successfully embolized using coils.

Four days later, the mass was surgically removed and appeared to be a glomus jugulare. Postoperatively the pathologic diagnosis was metastatic papillary adenocar-

cinoma.

Work-up for the primary origin of the mass was performed; a mass in the right anterior part of the neck was palpable. Color Doppler ultrasonography of the thyroid gland demonstrated a heterogeneous solid mass in the



Fig. 1. Temporal bone CT scan
Axial CT scan shows a large expansile lesion in the left jugular foramen and temporal bone with irregular bony margin. Sigmoid sinus is destroyed. Ipsilateral caroticojugular spine (small arrows) and jugular tubercle (long arrow) are eroded.



Fig. 3. Left common carotid angiogram
Lateral arterial phase shows an extremely vascular mass. The vascular supply is predominantly from the occipital artery, and small part of the mass is supplied from the ascending pharyngeal and posterior auricular arteries. Venous phase reveals occlusion of left sigmoid sinus and internal jugular vein (not shown). Preoperative embolization of left occipital artery by the coils was performed successfully (not shown).

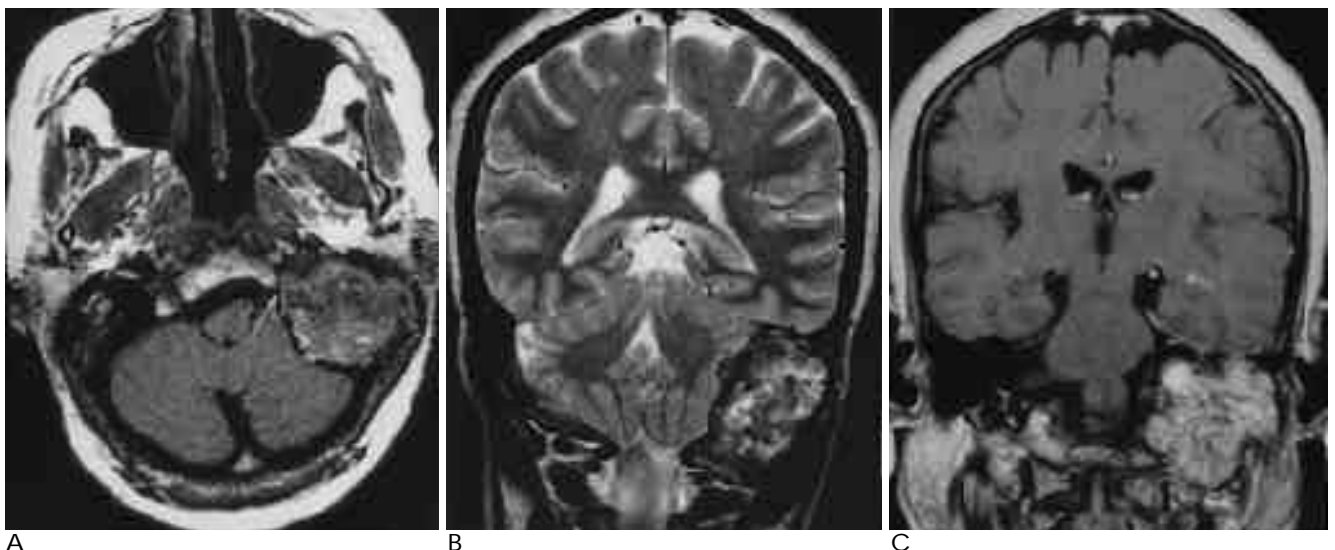


Fig. 2. Brain MR imaging
Axial T1-weighted image (A) reveals a large lobulated mass in the left jugular foramen and temporal bone, extending into the posterior fossa. Ipsilateral cerebellar hemisphere is indented. The mass shows inhomogeneous low signal intensity with internal vascular signal voids. Ipsilateral hypoglossal canal (arrow) is invaded by direct extension of the mass. On T2-weighted coronal image (B), this mass shows inhomogeneous signal intensity with multiple vascular signal voids. Postcontrast coronal T1-weighted image (C) shows strong enhancement.

lower pole of the right thyroid gland with internal blood flow. By means of sono-guided needle aspiration, papillary adenocarcinoma was confirmed.

Twenty days later, the patient underwent follow up MR imaging and was found to be free of residual tumor.

Discussion

As a complex bony canal, the jugular foramen transmits vessels and nerves from the posterior cranial fossa through the skull base into the carotid space. The jugular foramen is subdivided into a pars nervosa anteriorly and a pars vascularis posteriorly by a fibrous or bony septum; it contains the glossopharyngeal nerve and inferior petrous sinus anteriorly (pars nervosa) and the vagus nerve, spinal accessory nerve, jugular vein, and posterior meningeal artery posteriorly (pars vascularis). MR imaging is the modality of choice for soft tissue assessment but lesions affecting small cortical bony structures may require CT for further evaluation (1, 3).

Most malignant tumoral lesions of the jugular foramen are seen on CT as areas of infiltrative bone destruction, whereas schwannoma and meningioma cause smooth enlargement of the jugular foramen (4).

On contrast enhanced CT, a glomus jugulare tumor manifests as areas of irregular, lytic bony destruction of the jugular foramen, with significant enhancement. It tends to be extended in predictable patterns along pathways of least resistance, frequently below the skull base, into the mastoid air cells, and into the hypotympanum (1, 4). Erosion of the caroticojugular spine, jugular tubercle and hypoglossal canal, and progressive circular enlargement of the jugular fossa are common findings, with circular indentation of the adjacent posterior fossa dura and encroachment on the internal carotid artery. It frequently invades the jugular vein, sigmoid sinus or inferior petrosal sinus with subsequent formation of anastomotic venous channels (2, 5). On MR imaging, the tumor shows low signal intensity on T1-weighted images and high signal intensity on T2-weighted images.

Postcontrast T1-weighted MR images show strong enhancement. A speckled appearance with multiple flow voids is typical in tumors larger than 2 cm in diameter.

Angiography demonstrates an extremely vascular lesion. The vascular supply is predominantly from the external carotid artery, particularly the ascending pharyngeal artery (4, 5). Preoperative embolization of the feeding artery dramatically reduces intraoperative blood loss and improves the chances of complete tumor re-

moval (5).

If they happen to destroy the jugular foramen, carcinoma, sarcoma, myeloma, metastasis, and other malignancies found in this orifice may be indistinguishable from a glomus jugulare tumor, as seen on CT (6, 7).

Metastatic carcinoma involving the jugular foramen is rare (1, 8), the common primary tumors being lung and breast carcinomas. Metastases to the jugular foramen are more aggressive, and clinical onset of their symptoms is often more rapid than is that of a glomus jugulare tumor (4, 8). Metastases do not usually follow the characteristic routes of invasion of a glomus tumor and MR imaging shows that the flow voids are usually absent. Angiography reveals that most are much less vascular than a glomus tumor. Hypervascular tumors such as metastatic thyroid carcinoma, metastatic renal cell carcinoma, metastatic pheochromocytoma, plasmacytoma, and hemangiopericytoma in the jugular foramen may, however, be indistinguishable from a glomus jugulare tumor, as shown by cross-sectional imaging and on angiography (3, 4, 6, 8-10).

In our case, the patient's clinical symptoms progressed slowly and radiographic findings of the mass mimicked the usual roentgenographic presentation of a glomus jugulare. On CT, the mass manifested as areas of irregular and lytic bony destruction of the left jugular foramen and temporal bone, with significant enhancement. The mass followed the characteristic routes of invasion of a glomus jugulare tumor, and as seen on MR images was similar to this tumor. Conventional angiography revealed an extremely vascular lesion, supplied from an external carotid artery such as the occipital, ascending pharyngeal, or posterior auricular.

Although the existence of an extensive vascular mass in the jugular fossa, together with lytic bony destruction, is more consistent with a diagnosis of glomus jugulare tumor, hypervascular metastasis from thyroid carcinoma must be differentiated.

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