Enlarged cervical sympathetic ganglion: an unusual parapharyngeal space tumour

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ABSTRACT

Primary parapharyngeal space tumours are rare, but they pose not only diagnostic but also therapeutic challenges in head and neck surgery. Imaging studies, in particular magnetic resonance (MR) imaging, play a central role in the diagnosis of parapharyngeal space (PPS) tumours. Besides schwannomas, primary lesions arising from the sympathetic chain within the PPS are extremely rare. We describe a 49-year-old man in whom the cervical sympathetic ganglion became enlarged after radiotherapy for nasopharyngeal carcinoma, and appeared as a parapharyngeal mass. This phenomenon has not been reported in the literature. We also discuss the features of the enlarged cervical sympathetic ganglion on MR imaging.

Keywords: magnetic resonance imaging, nasopharyngeal carcinoma, parapharyngeal space, radiotherapy, superior cervical sympathetic ganglion

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CASE REPORT

A 49-year-old Chinese man was diagnosed with stage T2bN1M0 nasopharyngeal carcinoma and received external radiotherapy, with 70 Gy to the postnasal space and 50 Gy to the neck. On completion of treatment, there was good resolution of the tumour clinically and radiologically. One year after treatment, surveillance magnetic resonance (MR) imaging revealed enlarged deep cervical nodes in the left neck with an adjacent mass in the parapharyngeal space (PPS). The mass measured about 1.5 cm and was located between the left longus capitis muscle and the left internal carotid artery (ICA), which was displaced anteriorly (Figs. 1 & 2). The mass exhibited low signal intensity on both T1- and T2-weighted images (Figs. 1 & 3). In contrast, adjacent lymph nodes showed low to intermediate signal intensity on T1- (Fig. 4) and high signal intensity on T2-weighted images (Fig. 3). Biopsy of the postnasal spaces revealed no local recurrence of tumour. The patient was asymptomatic and there were no significant findings on physical examination.

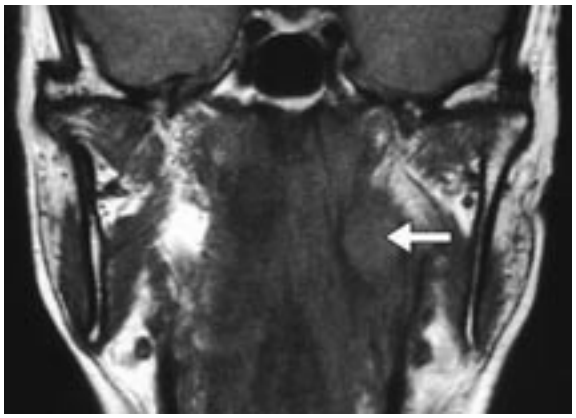

Fig. 1 Coronal T1-weighted MR image shows the enlarged left superior cervical sympathetic ganglion (SCSG) (arrow) with low signal intensity.

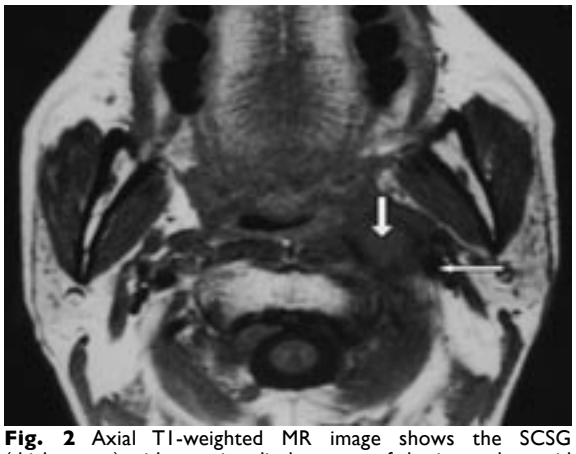

Fig. 2 Axial T1-weighted MR image shows the SCSG (thick arrow) with anterior displacement of the internal carotid artery (thin arrow).

Preoperatively, a diagnosis of metastatic lymphadenopathy was made. The patient underwent a left radical neck dissection via the standard surgical approach. Intraoperatively, the mass measured 2 cm in diameter and corresponded to the enlarged left superior cervical sympathetic ganglion

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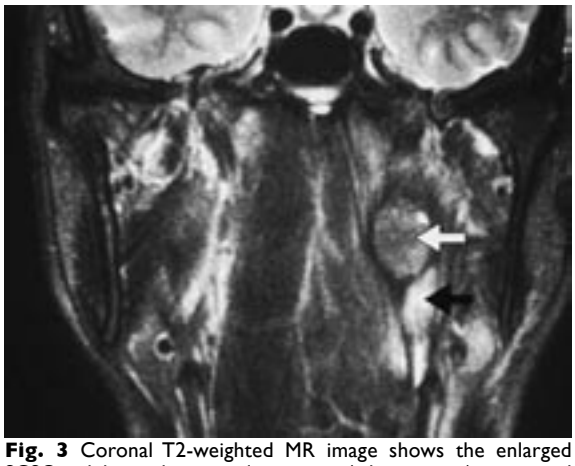

Fig. 3 Coronal T2-weighted MR image shows the enlarged SCSG exhibiting low signal intensity (white arrow) compared to the high signal intensity of adjacent metastatic lymph nodes (black arrow) in the left neck.

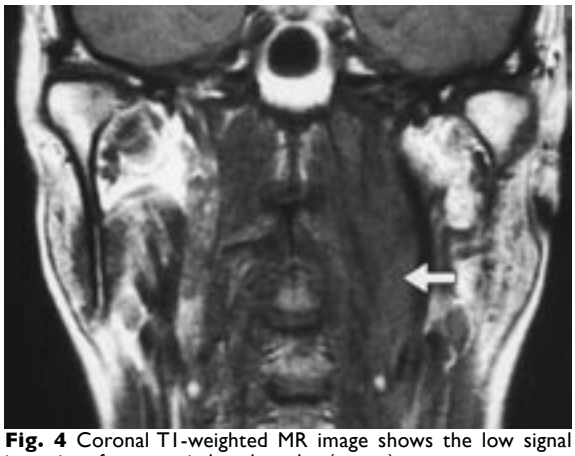

Fig. 4 Coronal T1-weighted MR image shows the low signal intensity of metastatic lymph nodes (arrow).

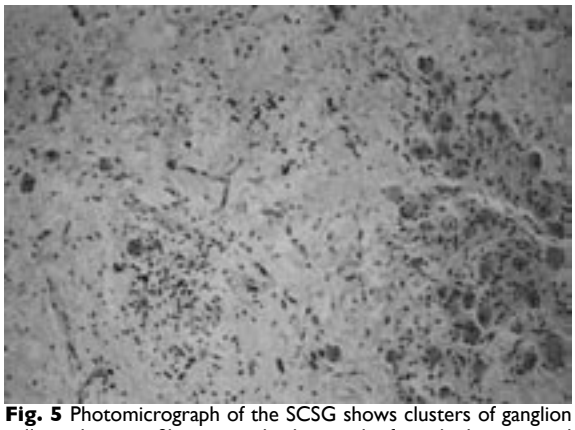

Fig. 5 Photomicrograph of the SCSG shows clusters of ganglion cells and nerve fibres in a background of marked interstitial oedema (Haematoxylin & eosin, x100).

(SCSG). Histopathological examination of a sliver of ganglion showed marked interstitial oedema (Fig. 5). There was no tumour involvement of the ganglion. The adjacent lymph nodes were positive histologically for recurrent metastatic tumour. The patient developed mild left-sided Horner's syndrome postoperatively which resolved uneventfully. The patient is currently undergoing treatment for recurrent metastatic NPC.

DISCUSSION

The PPS is a region of complex anatomical relationships and its location makes it a challenging region to evaluate clinically[1,2]. Radiological studies, especially MR imaging, have become indispensable tools in determining the pathology and aetiology of lesions in the PPS, and in providing information for planning treatment and surgical approaches[2-4]. The contents of the PPS and hence differential diagnosis of parapharyngeal masses are often considered by dividing the PPS into pre- and post-styloid compartments[2-5]. Typical location within the compartments, characteristic imaging features and relationship of the masses to the great vessels within the PPS, are important in the diagnosis of PPS lesions[2,6,7].

The most common neoplasm of the PPS are salivary gland neoplasms[2,4,6]. These neoplasms arise in the prestyloid compartment and displace the internal carotid artery posteriorly[4-6]. The post-styloid compartment includes the carotid space and contains the internal jugular vein, internal carotid artery (ICA), the ninth to twelfth cranial nerves, the cervical sympathetic chain and lymph nodes. The most common primary neoplasms of the poststyloid compartment are the benign nerve sheath tumours or schwannomas[5-7]. Schwannomas arise most commonly from the vagus nerve, the sympathetic chain and the jugular bulb, in that order[8,9] and usually display intermediate to high signal on T2-weighted MR images[4,6]. Like other poststyloid compartment tumours, schwannomas displace the ICA anteriorly[5,6]. Other poststyloid neoplasms include lymph nodes and paragangliomas.

The retropharyngeal space lies posteromedial to the PPS and contains retropharyngeal nodes. These nodes, including the superior node of Rouviere, are first-order drainage nodes for the nasopharynx and oropharynx and are frequently enlarged in patients with nasopharyngeal carcinoma[10]. These nodes lie medial to the ICA, and between it and the longus colli muscle. Generally, these lymph nodes display low signal intensity on T1- and high signal on T2-weighted images[10] (Figs. 3 & 4). However, low to intermediate signal intensities have been documented[4,6]. Hence, the initial diagnosis of the PPS mass in our patient was a metastatic lymph node.

Paragangliomas or chemodectomas in the PPS are benign vascular neoplasms that originate from either the vagal or carotid bodies. They show low signal intensities on T1- but high signal on T2-weighted images[2,4-6]. In addition, they may demonstrate a "salt-and-pepper" appearance on T2-weighted images, representing areas of solid tumour intermingled with vascular flow voids[6].

The cervical sympathetic chain lies against the prevertebral muscles and posteromedial to the ICA, and consists of three ganglia, which are composed of multipolar nerve cells embedded within a capsule of connective tissue. They serve as part of a circuit to distribute sympathetic fibres to the head and neck region.

The SCSG is the largest and most superior of the cervical ganglia. It lies on the fascia of the longus capitis muscle, posteromedial to the internal carotid artery and is usually located in front of the first to third cervical vertebrae. In its normal state, the SCSG is too small to appear on routine radiological images of the complex anatomy within the PPS. In addition, primary pathologies involving the SCSG are exceedingly rare. The enlarged SCSG in our patient displayed many features similiar to other poststyloid tumours, such as low signal intensity on T1-weighted images and anterior displacement of the ICA (Figs. 1 & 2). However, the most distinctive feature of the ganglion is the low signal intensity on T2-weighted images (Fig. 3). As alluded to, most common tumours of the PPS display intermediate to high signal intensity on T2-weighted images. The exact reason for the low T2 signal intensity of the SCSG in our patient is not clear. Nevertheless, irradiation can cause MR imaging changes on anatomical morphology and signal intensity. Oedema and other radiation- induced changes, such as fatty degeneration and fibrosis, may have contributed to the appearance of the SCSG in our patient.

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