CEREBELLOPONTINE ANGLE LIPOMAS

Magnetic resonance imaging findings in two cases

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Vestibular schwannomas and meningiomas are the most common lesions of the cerebellopontine angle (CPA), accounting for approximately 85–90% of the tumors seen in this location[1]. Lipomas are rare at this topography, representing about 0.15% of the CPA lesions[2,3]. These tumors are maldevelopmental masses that arise from abnormal differentiation of the meninx primitiva[1,4,5]. Clinically, CPA lipomas can cause slowly progressive neurological symptoms and signs affecting cranial nerves or brain stem[3,6-8]. Because these lesions usually are strongly attached to the surrounding structures, any surgical attempts of complete resection can result in neural or vascular damage, reinforcing the importance of the pre-operative imaging diagnosis[1-3,7,9,10]. Although the CT findings of CPA lipomas can be typical, the magnetic resonance (MR) imaging, especially the fat suppression sequences, had improved the identification of these lesions.

We aimed to report two patients with a CPA lipoma, emphasizing the MR imaging findings.

CASE

Case 1

A 13-year-old female patient was evaluated due to a 1-year history of headache and hearing loss. The physical examination was unremarkable. The audiometric evaluation demonstrated a discrete sensorineural hearing loss on the right side. The CT scan revealed a markedly hypodense non-enhancing mass in the right CPA. The MR imaging showed a lesion measuring 2.1 × 2.0 × 1.7 cm in the right CPA cistern. The mass was hyperintense on T1-weighted images and isointense with hypointense halo (chemical-shift) on T2-weighted images, with very low signal on T1-weighted images with fat suppression (Figs 1 and 2). The VII and VIII cranial nerves were seen as linear images with low signal inside the CPA mass. The diagnosis of CPA lipoma was sug-

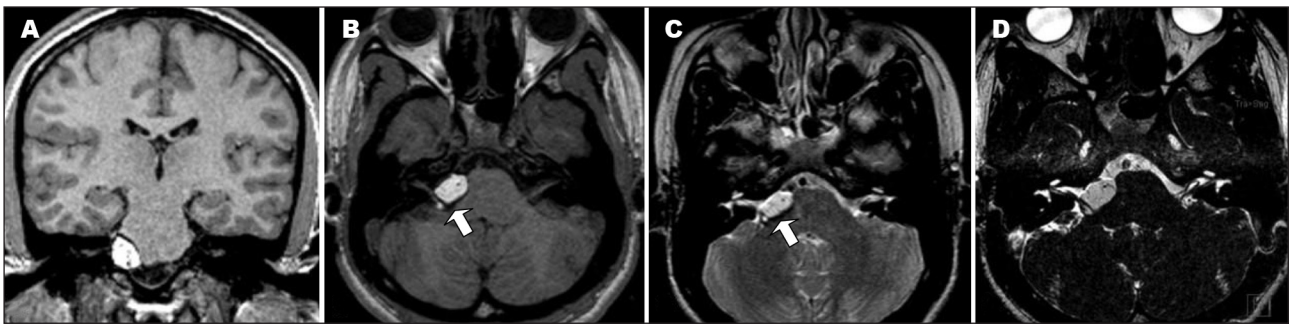

Fig 1. Patient 1. Coronal [A] and axial [B] T1-weighted MR image show a hyperintense mass in the right CPA involving the VII and VIII cranial nerves. [C] Axial T2-weighted image demonstrates a lesion with the same signal intensity of subcutaneous fat. (D) Axial CISS 3D image clearly shows the VII and VIII cranial nerves crossing the mass, which is less hyperintense than the CSF. The chemical-shift artifact is noted on T1- and T2-weighted images posterior to the lesion, close to the right cerebellar peduncle (arrows).

LIPOMAS DO ÂNGULO PONTO-CEREBELAR: ACHADOS DE RESSONÂNCIA MAGNÉTICA EM DOIS CASOS

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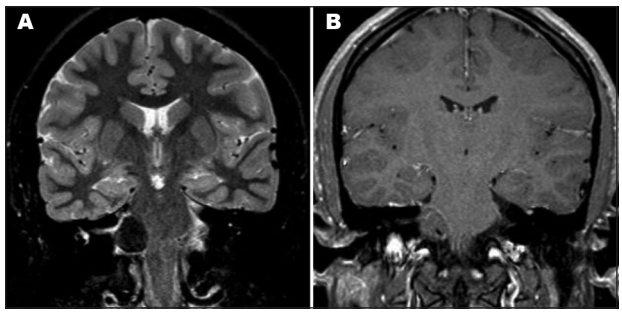

Fig 2. Patient 1. [A Coronal STIR MR image demonstrates the lipoma with very low signal intensity due to the fat suppression. [B] Coronal contrast-enhanced T1-weighted image with fat suppression also shows the signal suppression of the lesion.

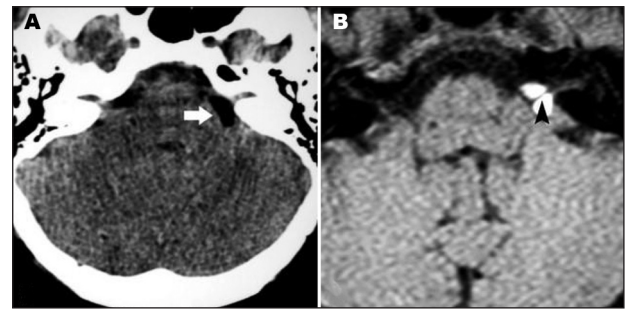

Fig 3. Patient 2. [A] Axial CT scan shows a markedly hypodense lesion in the left CPA (arrow) close to the internal auditory canal. [B] T1-weighted MR image demonstrate the lesion with high signal, presenting linear structures (arrowhead) representing the cranial nerves.

gested and the surgical treatment was chosen once the patient was young and the chance of lesion growing and future complications was considerable. A craniotomy with posterior fossa approach was performed, the lesion was partially removed, and the histological examination confirmed the diagnosis of lipoma. Six months after the surgery the patient remains asymptomatic. The parent signed the informed consent agreeing with the study.

Case 2

A 35-year-old woman presented with a six-month history of vertigo, without significant abnormalities on physical examination. A CT scan revealed a left-sided hypodense non-enhancing CPA mass. The MR imaging showed a left CPA cistern hyperintense lesion on T1-wheighted images and isointense with hypointense halo (chemical-shift) on T2-weighted images, measuring 1.4 × 1.3 cm and showing no enhancement after contrast administration (Fig 3). The diagnosis of CPA lipoma was suggested and the patient was managed conservatively. The symptoms were controlled with medical therapy. The follow-up MR imaging performed one year later showed no significant modifications. The patient signed the informed consent agreeing with the study.

DISCUSSION

Intracranial lipomas are rare lesions, corresponding to less than 0.1% of all intracranial tumors[3,10,11]. Some authors have suggested that lipomas are congenital malformations because their lack of cellular atypia, dysplasia and other evidences of malignancy, as well as due to the fact that they are usually associated to other malformations[4,7,11]. They may originate from persistence of the meninx primitive, a precursor of pia mater and arachnoid, which develop into fat[4]. Most of the intracranial lipomas are pericallosal asymptomatic lesions found incidentally during neuroimaging studies[6]. On the other hand, the most common extra-axial site of lipomas in the posterior fossa is the CPA[4,7]. These tumors can cause symptoms related to the VIII nerve involvement, such as hearing loss, tinnitus, vertigo and nausea. However, trigeminal symptoms such as neuralgia, paresthesia or headache, can also occur in patients with CPA lipomas extending to the trigeminal nerve[3,5,7,8]. Our patients presented with headache, vertigo and sensorineural hearing loss.

Due to their peculiar imaging findings, the diagnosis of intracranial lipomas is highly suggestive on the basis of imaging studies[3,5]. The CT scan demonstrates a marked hypodense nonenhancing lesion in the CPA, with attenuation characteristics similar to adipose tissue (–40 to –100 HU)[1,5,9,10]. Regarding the MR imaging findings, lipomas have signal characteristics similar to the subcutaneous tissue, with high-signal intensity on T1-weighted images, and iso- to hypointense signal on T2-weighted images, usually without contrast enhancement[1]. The use of the MR imaging with fat suppression is extremely helpful to clearly demonstrate the lipomas[12]. The disappearance of a CPA mass with fat suppression techniques, such as short-time inversion recovery (STIR), and T1-weighted images with fat suppression, is highly suggestive of lipomas. In addition, the chemical-shift artifact, usually seen on T2-weighted images, also corroborates the diagnosis of lipoma. This artifact produces a ring of low signal intensity around the tumor and is virtually diagnostic of a fatty lesion[3]. The MR imaging artifact is a result of the difference of the resonance frequency between lipid and water protons[12]. The high-density structures seen inside the lesion on CT scan, which are hypointense on T1-weighted MR imaging, most likely represent cranial nerves. The differential diagnosis of CPA lipomas should include vestibular schwannoma and meningiomas, as well as other fatty tumors, such as epidermoids and dermoids cysts[5,8,11,13]. In our cases the CT scan showed a CPA hypodense lesion. Furthermore, the MR imaging studies reveal a mass with signal intensity similar to the subcutaneous fat on T1 and T2-weighted images, with chemical-shift artifact around the lesion and no signal of fat suppression sequences.

Unlike vestibular schwannomas, complete surgical re-

section of CPA lipomas is difficult to achieve and not frequently indicated. These tumors are indolent, but infiltrate along cranial nerves, making complete removal difficult due to the high risk of postoperative cranial nerves deficit. Subtotal resection of CPA lipomas is only indicated in patients with brain stem compression or significant cranial nerve deficit, such as intractable headache, trigeminal neuralgia, facial spasm, vertigo and nauseas that are resistant to clinical treatment[5,7,8,13]. Because surgical intervention in patients with CPA lipoma is usually avoided, correct imaging diagnosis is essential[3,5]. Regarding our cases, the patient 1 underwent a partial resection of the CPA lipoma, relieving her headache. The surgical management was chosen once the patient was young and the possibility of lesion growing was considered[3]. Further studies with longer follow-up of these cases are needed to exclude this potential growth[3]. The patient remains asymptomatic six months after surgery. However, the conservative approach was adopted in case 2 because the symptoms were controlled with medical therapy. A one year later follow-up MR imaging showed no considerable alterations.

In conclusion, CPA lipomas are very rare tumors, which can be accurately diagnosed with CT scan and/or MR imaging. Regarding the MR imaging sequences, T1-weighted images with and without fat suppression are fundamental for the diagnosis. In addition, because CPA lipomas are slowly progressive tumors, imaging follow-up is suggested, especially in asymptomatic patients. Finally, due to it's benign potential and slow growth, a conservative follow-up should be preferred to surgical resection.

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