Enlarged geniculate ganglion fossa in idiopathic intracranial hypertension

Clinical History:

A 45-year-old female patient presented to the ENT department with a history of bilateral sensory-neural hearing loss, worse in the right ear. She was otherwise fit and well with no other reported symptoms. She previously had a CT examination following a head injury which was reported as normal at the time.

Imaging Findings:

MR IAM (internal auditory meati) was performed to rule out acoustic neuroma. Thin slice high-resolution T2-weighted imaging revealed high T2-signal in the bilateral geniculate fossae which were dilated (Figure 2).

The optic nerve sheaths were also dilated bilaterally (Figure 1). Both the thin slice and standard T2 imaging showed a dilated CSF filled sella turcica (the empty sella sign) and dilated Meckel's caves (Figure 2).

On reviewing the previous CT, bony windows confirmed that both geniculate fossae were expanded at that time as was the pituitary fossa and Meckel's cave (Figure 3).

Discussion:

Background- The geniculate fossa, containing the geniculate ganglion, is located in the petrous temporal bone lying supero-medial to the middle ear cavity. Enlarged geniculate ganglion fossa (GGH) is associated with geniculate ganglion mass or facial nerve canal fracture. Very limited literature is available regarding cases of enlarged GGH in association with idiopathic intracranial hypertension (IIH).

IIH is a syndrome of raised intracranial pressure (over 250mm water) without an identifiable secondary cause and with normal CSF composition [1]. There are frequently symptoms and/or signs of raised intracranial pressure. Papilloedema is usually present however is not required to make a diagnosis [2].
IHH is most commonly seen in female patients with high BMI. Patients commonly present with headache. The only serious complication is visual loss and up to 10% of patients develop bilateral blindness [2,7]. The other symptoms include transient visual loss and tinnitus [2].

Due to its long intracranial course, the sixth cranial nerve is particularly susceptible and a reversible sixth nerve palsy is seen in 10-30% of IIH cases [3]. Hearing loss can occur in association with IIH [4]. Other infrequent associations include seventh nerve palsy, radicular pain and CSF rhinorrhoea or otorrhoea.

**Imaging perspective**

Orbital findings, best seen with high resolution thin section T2-weighted imaging, include flattening of the posterior globe, distension of the peri-optic nerve sheath and vertical tortuosity of the optic nerve. Intra-ocular protrusion of the optic nerve head with or without abnormal contrast enhancement is the imaging equivalent of papilloedema [4,7]. These findings relate to transmission of elevated CSF pressure along the course of the optic nerves.

The empty sella is another useful sign associated with IIH [1,5,7]. This is due to herniation of the arachnoid membrane and subarachnoid space through the infundibular hiatus of the diaphragm sella and into the sella itself. The sella appears empty of tissue which is replaced by CSF. Bony re-modelling and dilatation of the Meckel’s cave are other related imaging signs which occur over time to a variable extent [6].

**Outcome**

IHH causes increase in the CSF spaces and therefore it is logical that the GGF may also secondarily expand. We could find only one previous case report of an enlarged, CSF-filled geniculate fossa due to IIH. This was unilateral and was found in a 9-year-old child who presented with a facial nerve palsy, diplopia and papilloedema [5]. To the best of our knowledge, this is the first reported case of bilaterally enlarged geniculate fossae associated with other imaging findings of chronically raised intracranial pressure and the first case in an adult.

Written informed patient consent for publication has been obtained.

**Differential Diagnosis List:** Idiopathic intracranial hypertension, Facial nerve schwannoma, Haemangioma, Facial canal fractures

**Final Diagnosis:** Idiopathic intracranial hypertension

**References:**

Friedman DI, Jacobson DM. Diagnostic criteria for idiopathic intracranial hypertension. Neurology 2002;59:1492-1495. (PMID: [12455560](PMID:12455560))


**Description:** Axial thin slice high resolution T2 image showing dilated CSF filled optic nerve sheaths.

**Origin:** Radiology department, Royal Hallamshire Hospital, Sheffield Teaching Hospital NHS Foundation Trust, United Kingdom 2018
Figure 2

Description: Axial T2-weighted imaging. (a) Thin slice high resolution and (b) standard T2 showing an empty sella (thin arrow) and dilated Meckel’s caves (wide arrow). Origin: Radiology department, Royal Hallamshire Hospital, Sheffield Teaching Hospital NHS Foundation Trust, United Kingdom 2018.
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Description: Axial CT showing: (a) An enlarged pituitary fossa (thin arrow) and bilateral enlarged geniculate fossae (wide arrows) and (b) bony expansion of Meckel’s cave within the greater wing of the sphenoid. Origin: Radiology department, Royal Hallamshire Hospital, Sheffield Teaching Hospital NHS Foundation Trust, United Kingdom 2018
Description: Axial CT showing: (a) An enlarged pituitary fossa (thin arrow) and bilateral enlarged geniculate fossae (wide arrows) and (b) bony expansion of Meckel’s cave within the greater wing of the sphenoid. Origin: Radiology department, Royal Hallamshire Hospital, Sheffield Teaching Hospital NHS Foundation Trust, United Kingdom 2018