

## CASE REPORT

# Quadrigeminal cistern lipoma mimicking intracranial air

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**SUMMARY**

Intracranial lipoma concomitant with traumatic pneumocephalus is very rare and, to the best of our knowledge, there has been no report describing this condition. It may be difficult to distinguish lipoma from intracranial air only with CT, but it is necessary to avoid overtreatment. We report a case of quadrigeminal cistern lipoma mimicking intracranial air in a patient with traumatic pneumocephalus.

**BACKGROUND**

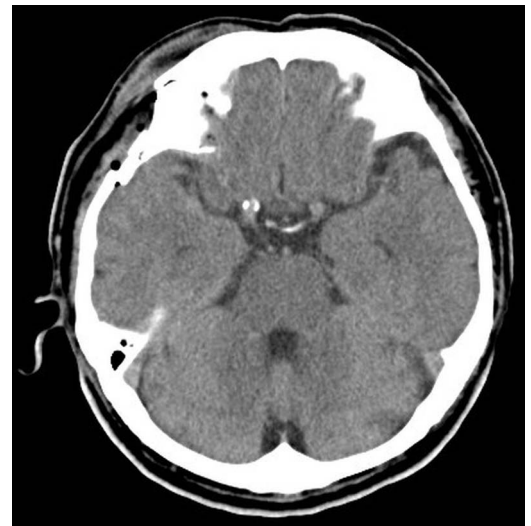
Intracranial lipoma concomitant with traumatic pneumocephalus is very rare and, to the best of our knowledge, there has been no report describing this condition. It may be difficult to distinguish lipoma from intracranial air only with CT, but it is necessary to avoid overtreatment. We report a case of quadrigeminal cistern lipoma mimicking intracranial air in a patient with traumatic pneumocephalus.

**CASE PRESENTATION**

A 51-year-old man received a direct blow to the face by a thick bough during a logging operation. On arrival at the hospital, he was alert and had no amnesia. He had a severe bruise on the right side of his face and nasal bleeding. There was no open wound. CT of the head and face revealed multiple fractures of the right temporal bone, the lateral wall of the right orbit, the zygomatic arch and the maxilla. There was a small haemorrhagic contusion in the right temporal lobe, and blood accumulation in maxillary sinuses and bilateral ethmoid air cells. The CT showed scattered intracranial low-density foci in the frontal dura (figure 1) and a well-demarcated oval low-density area 12 mm in size in the right side of the quadrigeminal cistern (figure 2). The density of the lesion in the quadrigeminal cistern on window-balanced CT was slightly higher than air, which indicated that this might be a fat-containing lesion. We felt that this appearance might represent pneumocephalus with an incidental quadrigeminal cistern lipoma.

The CT scan on the next day showed decreased air in the frontal region. The low-density area in the quadrigeminal cistern was unchanged. MRI performed for further assessment of the cerebral contusion revealed very high intensity on T1-weighted images (figure 3), which was hypointense on fat-suppression images. We diagnosed this lesion as a lipoma.

The patient developed no sequelae and needed no surgical intervention for the multiple fractures and was discharged on the 12th day of hospital stay.



**Figure 1** CT on admission showing scattered low-density foci inside the right frontal dura.

**DIFFERENTIAL DIAGNOSIS**

The differential diagnosis includes arachnoid cyst and epidermoid cyst.

**OUTCOME AND FOLLOW-UP**

The patient developed no sequelae and needed no surgical intervention for the multiple fractures and was discharged on the 12th day of hospital stay.

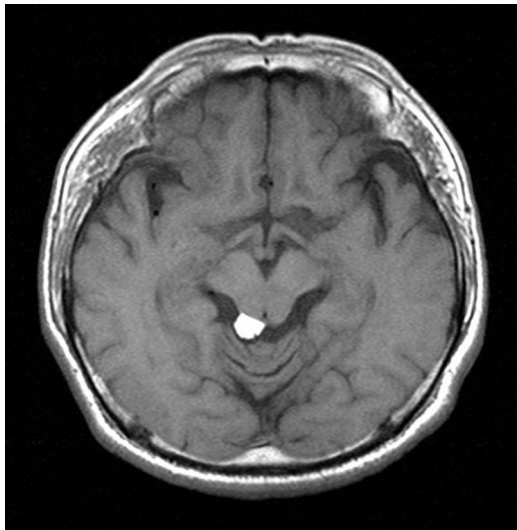


**Figure 2** CT on admission also showing a well-demarcated oval low-density area in the right side of the quadrigeminal cistern.



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**Figure 3** T1-weighted image on MRI showing a high-intensity mass in the right side of the quadrigeminal cistern.

### DISCUSSION

Lipomas are hypodense (mean  $-62$  HU) on CT and hyperintense on conventional sequences on MRI.<sup>1</sup> Air is much less dense ( $-1000$  HU, by definition) on CT and very hypointense on MRI. Thus, MRI is a simple way to distinguish intracranial air from lipomas.

In 1560 consecutive brain autopsy cases, 4 cases of intracranial lipoma, namely 0.3%, were found.<sup>2</sup> The interhemispheric fissure is the most common location for intracranial lipomas. Forty per cent of intracranial lipomas are associated with radiographically detectable congenital abnormalities of the adjacent neural tissue.<sup>3</sup> About 10%<sup>3</sup> to 30%<sup>1</sup> of intracranial lipomas localise in the quadrigeminal cistern. Most quadrigeminal cistern lipomas are asymptomatic.<sup>1</sup> However, they can be associated with headache, hydrocephalus and diplopia.<sup>4 5</sup>

Pneumocephalus is seen in 3% of skull fractures<sup>6</sup> and 12% of maxillofacial trauma cases.<sup>7</sup> Generally speaking, if there is no leak of cerebrospinal fluid (CSF), it may be simply followed.<sup>8</sup> If a CSF leak exists, most cases heal with bed rest and conservative medical management. Surgical treatment is required for the patient with an intractable CSF leak,<sup>8</sup> and cases of tension pneumocephalus need prompt management.

Consequently, intracranial lipoma can be misdiagnosed as a focus of intracranial air in pneumocephalus cases. As it never resolves, misdiagnosing intracranial lipoma as intracranial air may lead to excessive management, such as if the patient undertakes air transportation. Pneumocephalus may require

decompression to prevent the 30% increase in intracranial air volume experienced at normal cabin pressures.<sup>7</sup> Therefore, to avoid unnecessary invasive procedures, it is important to distinguish intracranial lipoma from pneumocephalus.

### Patient's perspective

The patient was able to return to work and has been doing well for 10 months since his hospital discharge.

### Learning points

- ▶ Intracranial lipoma is relatively rare.
- ▶ Intracranial lipoma may be mistaken for air in trauma cases, on CT.
- ▶ Intracranial air may require decompression when its volume increases for any reason.
- ▶ Image interpreters need to distinguish intracranial lipoma from air, on CT.

**Contributors** RM drafted this article and corresponded to all the issues. Yasushi Shibata revised this article. RM and Yasushi Shibata provided medical treatment for this reported case.

**Competing interests** None.

**Patient consent** Obtained

**Provenance and peer review** Not commissioned; externally peer reviewed.

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