Acute onset of headache in an adolescent

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PART A

A 16-year-old male was referred to our hospital following a three-day history of acute onset of headache. A brain computed tomography (CT) was performed at an outside institution (Figs. 1-3). His physical examination was unremarkable, including neurological assessment. There was no history of trauma or discoagulation syndrome. Further workup with magnetic resonance imaging (MRI) (Figs. 4-6) was performed two days after the initial CT scan.

Fig. 1: Brain CT Scan without intravenous contrast administration.

Fig. 2: Brain CT Scan without intravenous contrast administration.

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Fig. 3: Brain CT Scan after IV contrast.

Fig. 4: MRI T1-weighted image in the axial plane.

Fig. 5: MRI T1-weighted image in the sagittal plane.

Fig. 6: MRI FLAIR sequence in the coronal plane.
**Diagnosis:** Spontaneous haemorrhage of an arachnoid cyst with concomitant ipsilateral subdural haematoma.

As illustrated in Fig. 1, a left fronto-temporo-parietal subdural haematoma is demonstrated, approximately 7 mm in thickness with supratentorial midline shift to the right of approximately 10 mm. Fig. 2 is unremarkable. The haematoma is more conspicuous following contrast administration with no other abnormal findings (Fig. 3).

The left fronto-temporo-parietal subdural haematoma appears hyperintense on T1WI and FLAIR sequences, confirming its subacute nature (Figs. 4-6). Concurrent with the subdural haematoma, a well circumscribed hyperintense lesion is illustrated in the left middle cranial fossa, implying the cause of haemorrhage, which was later confirmed on follow-up CT scan.

The patient was treated conservatively and was discharged from the hospital with no neurological sequelae.

A follow-up CT scan was performed 18 days after the initial scan, confirming the presence of an arachnoid cyst in the middle cranial fossa (Figs. 7, 8). The cyst was not demonstrated on the initial scan due to iso- to slightly hyperintense contents of subacute haemorrhage and presence of streak artefacts (Fig. 2). Initial diagnosis was impaired due to intracystic haemorrhage. Intravenous contrast media was administered during the initial CT scan in order to explore the presence of vascular malformations [1].

Arachnoid cysts are benign, extra-axial cerebrospinal fluid collections within layers of the arachnoid that comprise 1% of the lesions occupying the intracranial space [2]. They are usually—but not exclusively [3]—congenital in nature and constitute a serendipitous finding, most commonly encountered in the middle cranial fossa [4]. Other common supratentorial locations for arachnoid cysts include parasellar cisterns, as well as the subarachnoid space over the convexities, whereas infratentorially, they may occur in...
Fig. 3: Brain CT Scan after IV contrast. The haematoma is more conspicuous (arrows).

Fig. 4: MRI T1-weighted image in the axial plane. The haematoma appears hyperintense (arrows).

Fig. 5: MRI T1-weighted image in the sagittal plane. The haematoma appears hyperintense (arrows). A hyperintense lesion is illustrated in the left middle cranial fossa (open arrow).

Fig. 6: MRI FLAIR sequence in the coronal plane. The haematoma appears hyperintense (arrows). A hyperintense lesion is illustrated in the left middle cranial fossa (open arrow).

Fig. 7: Follow-up CT section shows well circumscribed hypodense lesion in the left middle cranial fossa (arrows).

Fig. 8: Follow-up CT section shows well circumscribed hypodense lesion in the left middle cranial fossa (arrows).
the retrocerebellar cisterns, the cerebellopontine angle cisterns, and the quadrigeminal plate cistern. Intraventricular cysts are rare with a predilection for lateral and third ventricles. Arachnoid cysts should always be distinguished from subdural hygromas, dilation of normal subarachnoid space and epidermoid cysts - mostly by means of multi-modality imaging.

Although essentially clinically silent, arachnoid cysts may become symptomatic - especially in paediatric patients [4] - due to haemorrhage or growth resulting in mass effect [1, 4], presenting with signs of increased intracranial pressure. Most common complications referred in literature include subdural effusion, subdural haematoma, intracerebral or intracycistic haemorrhage [2, 5, 6].

The treatment for indolent arachnoid cysts remains controversial; nevertheless, an interventional procedure is indicated in the setting of a symptomatic arachnoid cyst, presenting with raised intracranial pressure - especially in paediatric patients [4] (i.e. headache, vomiting [6]). Cystoperitoneal shunting, microsurgical fenestration and neuroendoscopic fenestration have been proposed as effective procedures for middle cranial fossa arachnoid cysts [4]. In the case of a complicated cyst, an emergency surgical evacuation through burr holes is performed in order to decompress the subdural effusion [6], whereas in less severe cases a conservative approach may be indicated [2].

Although the scope of this case report is to accentuate a rare cause of an atraumatic subdural haematoma, other aetiologies - besides an arachnoid cyst - should be taken into consideration. Spontaneous subdural haematomas have been reported in patients with haemorrhagic disorders, pre-eclampsia and infection. Other causes may include, but not limited to, Valsalva maneuver, exercise or even dehydration [1].

**Conflict of interest**
The authors declared no conflicts of interest.

**REFERENCES**


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