Abstract

Non-traumatic dural arteriovenous fistula/malformation (dural AVF/AVM) presenting with pure subdural hematoma (SDH) is relatively rare. We report on a male patient who showed pure acute SDH and was diagnosed as having dural AVF on the convexity near the superior sagittal sinus (SSS), based on angiographic findings. A 27-year-old man was admitted to our hospital due to headache with acute onset. The patient did not have a history of head trauma or injury. Head CT showed an abnormal high-density area on the surface of the cerebral hemisphere on the left side, indicating acute SDH. Angiography during the arterial phase demonstrated that an abnormal artery originating from the left occipital artery was connected with a dural vein and a diploic vein on the convexity near the SSS. We concluded that a dural AVF existed at this area, and that the dural AVF had caused the acute SDH. Dural AVF/AVM which causes non-traumatic SDH is usually accompanied by intracerebral hemorrhage (ICH) and/or subarachnoid hemorrhage (SAH). In contrast, non-traumatic dural AVF/AVM presenting with pure SDH is rare, and our patient represents such a rare case. We should consider dural AVF/AVM and perform angiography if necessary when we encounter a patient showing non-traumatic SDH without ICH and/or SAH.

Key words: dural arteriovenous fistula; acute subdural hematoma; angiography; convexity near the superior sagittal sinus; headache.

Introduction

Subdural hematoma (SDH) caused by non-traumatic dural arteriovenous fistula/malformation (dural AVF/AVM) is usually accompanied by intracerebral hemorrhage (ICH) and/or subarachnoid hemorrhage (SAH) (Kohyama et al., 2009). In contrast, dural AVF/AVM presenting with pure SDH, not accompanying ICH or SAH, is relatively rare (Kohyama et al., 2009; Ito et al., 1983; Halbach et al., 1988; Kominato et al., 2004). We report a patient who showed a pure acute SDH caused by non-traumatic dural AVF on the convexity near the superior sagittal sinus (SSS).

Case report

A 27-year-old man complained of headache with acute onset, and was admitted to our hospital 4 days after onset because the headache persisted. There was no head trauma or other disease in his history. Body temperature and blood pressure were within the normal range. Neurological examination showed that cranial nerves were normal. Muscle strength and tone of the four extremities were normal. Head CT showed an abnormal high-density area, which indicated acute SDH, on the surface of the left cerebral hemisphere (Fig. 1). Blood analysis, including blood cell counts and coagulation cascades, was normal. The patient was admitted to the neurosurgery department of our hospital. After hospitalization, cranial angiography of the 4 vessels was performed in order to examine the cause of acute SDH. Left external carotid angiography showed an abnormal artery originating from the left occipital artery (Fig. 2A, B). This abnormal artery reached the convexity near the SSS on the left side (Fig. 2A, B). The angiography of the arterial phase also showed a dural vein (Fig. 2A) as well as a diploic vein (Fig. 2B). These 2 veins were connected with the abnormal artery originating from the left occipital artery at the convexity near the SSS (Fig. 2A, B), while a nidus was not shown. Evacuation of the hematoma and resection of the dural AVF were performed on the same day. After operation, the patient no longer complained of headache, and was discharged without any complication.
Discussion

Dural AVF is an acquired lesion between the meningeal arteries and their associated draining veins, and usually presents with intracranial hemorrhage or progressive neurological deficits (Wilson et al., 2008). In our patient, angiography of arterial phase showed an abnormal artery originating from the left occipital artery and reaching the convexity near the superior sagittal sinus (arrow). This abnormal artery is connected with a dural vein (small arrow), and a dural arteriovenous fistula is formed between these 2 vessels (double arrows).

B: A diploic vein (arrow) is also connected with the dural arteriovenous fistula.

Table 1
Non-traumatic dural arteriovenous fistula/malformation presenting with pure subdural hematoma

<table>
<thead>
<tr>
<th>Author (years)</th>
<th>Age/sex</th>
<th>Type of SDH</th>
<th>Initial symptom</th>
<th>Findings on angiography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ito et al. (1983)</td>
<td>64/male</td>
<td>Acute SDH in the right frontal area</td>
<td>Unconsciousness</td>
<td>Right opthalmic artery, anterior and posterior ethmoidal arteries, Midline of the base of the anterior fossa, SSS</td>
</tr>
<tr>
<td>Halbach et al. (1988)</td>
<td>48/female</td>
<td>SDH on the right side (not indicated acute or chronic)</td>
<td>Weakness (details were not reported)</td>
<td>Walls of the middle third of the SSS near the Rolandic inflow, Bilateral middle meningeal arteries, SSS</td>
</tr>
<tr>
<td>Kominato et al. (2004)</td>
<td>42/female</td>
<td>Acute SDH on the right side</td>
<td>Headache</td>
<td>Parieto-sagittal part of the falx cerebri (autopsy)</td>
</tr>
<tr>
<td>Kohyama et al. (2009)</td>
<td>60/male</td>
<td>Acute SDH on the left side</td>
<td>Headache</td>
<td>Left convexity adjacent to the SSS, Bilateral middle meningeal arteries, SSS and pterygoid venous plexus</td>
</tr>
<tr>
<td>Our patient</td>
<td>27/male</td>
<td>Acute SDH on the left side</td>
<td>Headache</td>
<td>Left convexity near the SSS, Left occipital artery, Dural vein and diploic vein</td>
</tr>
</tbody>
</table>

AVF, arteriovenous fistula; AVM, arteriovenous malformation; SDH, subdural hematoma; SSS, superior sagittal sinus.
arteriovenous shunt between these 2 veins (draining veins) and the artery (a feeder artery) at the convexity near the SSS. Therefore, we diagnosed the patient as having a dural AVF due to the presence of an arteriovenous shunt, and concluded that the acute SDH was caused by the dural AVF.

Non-traumatic SDH caused by dural AVF is usually accompanied by ICH and/or SAH (Kohyama et al., 2009). Non-traumatic dural AVF/AVM presenting with pure SDH is rare (Kohyama et al., 2009; Ito et al., 1983; Halbach et al., 1988; Kominato et al., 2004). There have been only 4 reported patients with non-traumatic dural AVF/AVM presenting with pure SDH (Kohyama et al., 2009; Ito et al., 1983; Halbach et al., 1988; Kominato et al., 2004) (Table 1). Dural AVF/AVM was detected by angiography in 3 previously reported patients (Kohyama et al., 2009; Ito et al., 1983; Halbach et al., 1988) and in our patient. In the other patient reported by Kominato et al., dural AVM was detected at autopsy (Kominato et al., 2004). The initial symptom was headache in 2 reported patients (Kohyama et al., 2009; Kominato et al., 2004) and in our patient. Dural AVF/AVM was located at the SSS or in an area near the SSS such as the falk cerebri in all reported patients (Kohyama et al., 2009; Ito et al., 1983; Halbach et al., 1988; Kominato et al., 2004). In our patient, dural AVF was also located on the convexity near the SSS. On angiography, SSS was visualized as the draining vein in 3 of the reported patients (Kohyama et al., 2009; Ito et al., 1983; Halbach et al., 1988), however, angiography did show a patent SSS in our patient.

Although dual AVF/AVM presenting with non-traumatic, pure acute SDH is rare, we should consider dural AVF/AVM in patients with acute SDH without ICH and/or SAH.

REFERENCES


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