

Case Report

Subdural hematoma of the posterior fossa due to posterior communicating artery aneurysm rupture

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Abstract

Background: We describe an unusual presentation of a ruptured aneurysm of the posterior communicating artery with an acute subdural hematoma (SDH) located in the posterior fossa. We also reviewed the literature, focusing on the location of this intracranial hematoma.

Case Description: An 83-year-old woman was admitted to our institution with recent sudden headache and dizziness. Magnetic resonance imaging showed a thin collection of blood in the subdural space adjacent to the clivus, along the wall of the posterior fossa, and at the cervical spine level. A right posterior communicating artery aneurysm was diagnosed using computed tomography angiography and digital subtraction angiography. The aneurysm had two lobes, one of which was attached to the right dorsum sellae. The aneurysm was occluded by stent-assisted coil embolization. The patient was discharged 3 weeks after admission with absence of neurological deficit.

Conclusion: A ruptured aneurysm of the posterior communicating artery may cause an acute SDH.

Key Words: Aneurysm, posterior fossa, subdural hematoma

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INTRODUCTION

Rupture of a cerebral aneurysm into the subdural space is a rare but well-known occurrence.^[7,9] However, in most cases with subdural hematoma (SDH) associated with aneurysm, the location of the SDH is interhemispheric or at the tentorium or convexity.^[8] The literatures describe four cases of spontaneous posterior fossa hematoma, adjacent to the clivus.^[3,4,12,13] However, different understandings of the location (interdural or subdural) of the hematoma were presented.^[3,4,11]

We present a case with an SDH that developed

in the posterior fossa due to rupture of a posterior communicating artery aneurysm. We present our opinion regarding the location of this hematoma.

CASE REPORT

An 83-year-old woman presented to another hospital complaining of sudden headache, dizziness, and nausea. Magnetic resonance imaging (MRI) performed at this hospital 13 days after the onset of symptoms was interpreted as a normal finding. The patient was transferred to our unit.

On admission, 15 days after the symptom onset, neurological examination was normal, with the exception of mild confused mentality. We reviewed outside first MRI, which revealed the presence of a thin blood collection along the dural lining of the posterior dorsum sellae, clivus, and occipital bone down to the whole border of the foramen magnum. This blood accumulation extended to the cervical spine level with cerebrospinal fluid intensity inside the subarachnoid space [Figure 1]. We also performed computed tomography (CT)-angiography 15 days after the symptom onset. CT-angiography revealed the presence of a right posterior communicating artery aneurysm with two lobes. The medial lobe of the aneurysm was attached to the right dorsum sellae [Figure 2]. Angiographic examination performed 16 days after ictus also showed the aneurysm, which had two lobes with a maximal diameter of 10 mm.

Twenty-one days after ictus, the patient underwent stent-assisted coil embolization (using a 4.5 mm × 28 mm Enterprise stent; Cordis Endovascular, Miami Lakes, FL, USA). The aneurysm was embolized successfully [Figure 3]. The postoperative course was uneventful and the patient was discharged with antiplatelet drug (aspirin) from our unit without any neurological deficit 3 weeks after admission. In 3 months after discharge, she demonstrated neither neurological deficit nor headache.

DISCUSSION

Cases with clival hematoma similar to the one described here have been reported in the literature.^[3,4,12,13] However, different understandings of the location of the hematoma were presented. Some authors proposed that clival hematomas were located in the interdural space of the

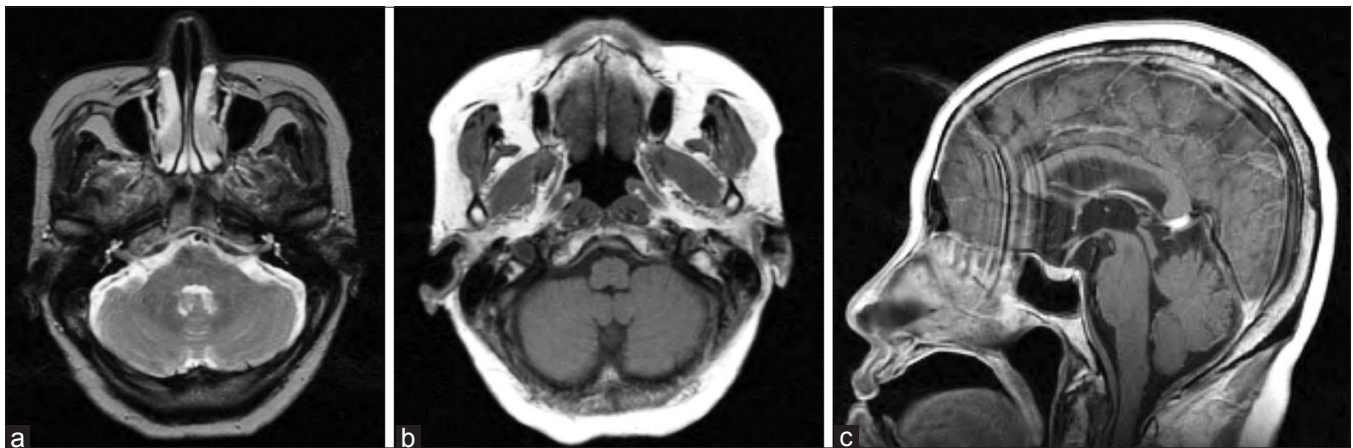


Figure 1: Magnetic resonance imaging performed 13 days after the symptom onset. (a) T2-weighted axial image at the mid-pons level demonstrating a thin blood collection adjacent to the clivus and both petrous bones. (b) T1-weighted axial image at the lower medulla level showing a thin blood collection at the retroclival area. (c) T1-weighted sagittal image showing a thin blood collection located in the retroclival and the dural lining along the occipital bone

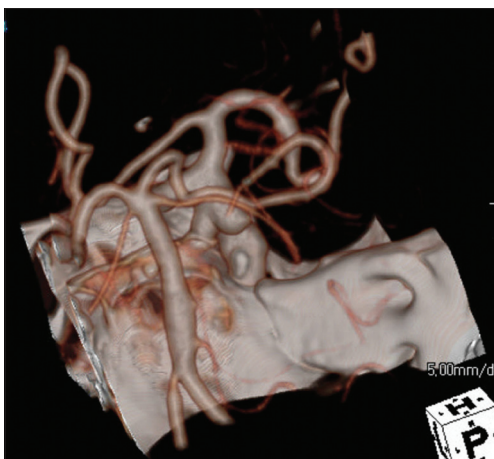


Figure 2: Computed tomography-angiography performed 15 days after ictus demonstrated the presence of an aneurysm with two lobes. One lobe was directed in an inferior-posterior manner, whereas the other exhibited an inferior-medial orientation and was attached to the right dorsum sellae

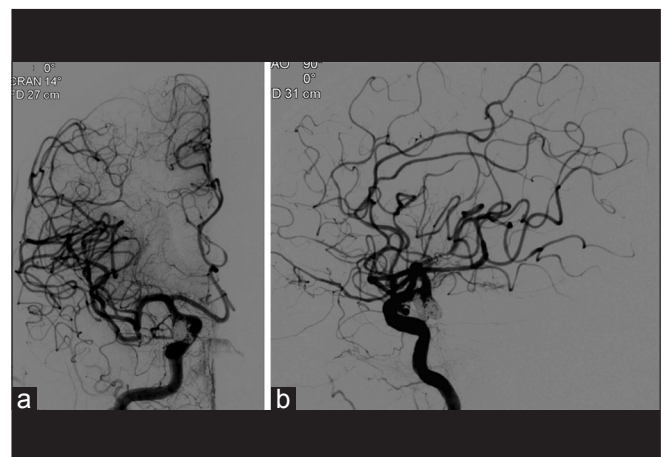


Figure 3: Postembolization cerebral angiography (a: antero-posterior view, b: lateral view) demonstrated good embolization

posterior fossa.^[3,4] In contrast, other authors insisted that these hematomas were located in the pure subdural space of the posterior fossa.^[1,11] We present our opinion and understanding of the blood location of our case and other reports as follows.

The cranial dura mater is a composite structure of the cranial periosteum and dura propria (meningeal dura layer); the latter is composed of fibroblasts and a large amount of extracellular collagen, and the innermost part of the dura is formed by the dural border cell layer.^[5] The arachnoid membrane has two different cell layers: the arachnoid barrier cell layer and the arachnoid trabecula.^[6] There is no naturally occurring biological space at the dura–arachnoid junction in the calvarial region. However, the subdural space is different at the skull base. Ayberk *et al.*^[2] demonstrated that subdural space was present at the skull base region between the meningeal dura mater and the arachnoid membrane. These authors^[2] reported the detailed dissection of the subarachnoid, subdural, and interdural spaces at the clival region. Figure 1a of the report by Ayberk *et al.*^[2] included an excellent description of the subarachnoid space and subdural space at the adjacent clivus. Also, Ayberk *et al.*^[2] described very strong and firm fibrous trabeculations between the two dural layers, with the periosteal dura mater securely attached to the clival bone.

Some authors reported interdural or intralaminar dural hematomas.^[5,10] However, in these reports, the hematomas were located in the calvarial region and exhibited a biconvex appearance as epidural hematomas. The calvarial region contains firm fibrous trabeculations between the two dural layers. Therefore, interdural or intralaminar hematomas presented a biconvex appearance. In the skull base region, the two dural layers also had very strong and firm fibrous trabeculations. The separation of the two dural layers is more difficult in the skull base region than it is in the calvarial region. However, our patient and two previous cases^[3,4] exhibited a thin blood collection and not a biconvex appearance.

Using sagittal MRI [Figure 1c], we identified a subtentorial hematoma along the lower surface of the tentorium in our patient, with no hematoma in the interdural space (e.g., the lumen of the sagittal sinus). In addition, we identified no continuation of the hematoma and interdural space in our case.

We think that our case including Brock *et al.*'s^[4] and Bartoli *et al.*'s^[3] cases demonstrated cranial SDH due to aneurysm rupture. We think that the spinal hematoma shown in Figure 2 of Bartoli *et al.*'s report^[3] was located in the subdural space. Hematoma in the spinal compartment in Figure 2 of Bartoli's report was located

anterior and posterior to the spinal cord. This appearance is typical for subdural location of hematoma in spine. In that report,^[3] with the assistance of an axial image of the spinal hematoma (not presented), we would be able to differentiate whether the hematoma was located in the subdural or in the epidural space. Moreover, with the assistance of sagittal MRI of the brain (not presented), we would be able to identify a subtentorial location of the hematoma in Bartoli *et al.*'s report. Brock *et al.* might be surprised that they had not found SDH in operation. They thought that preoperative hematoma in clivus and occipital bone was located in the interdural space. But they did not think of migration of cranial blood into the spinal compartment.

This was an interesting case showing an uncommon SDH after intracranial aneurysm rupture. Although other authors suggested that the location of hematoma was interdural, we think that the hematomas in our case and two other cases^[3,4] were located in the subdural space.

REFERENCES

1. Ayberk G, Ozveren MF. Could infraclinoidal aneurysm cause interdural hemorrhage. *Acta Neurochir (Wien)* 2011;153:1331.
2. Ayberk G, Ozveren MF, Aslan S, Yaman ME, Yaman O, Kavaci S, *et al.* Subarachnoid, subdural and interdural spaces at the clival region: An anatomical study. *Turk Neurosurg* 2011;21:372-7.
3. Bartoli A, Kotowski M, Pereira VM, Schaller K. Acute spinal epidural hematoma and cranial interdural hematoma due to a rupture of a posterior communicating artery aneurysm: Case report. *Neurosurgery* 2011;69:E1000-4.
4. Brock S, Prada F, Maccagnano E, Giombini S. Interdural haemorrhage of the posterior fossa due to infraclinoidal carotid artery aneurysm rupture. *Acta Neurochir (Wien)* 2010;152:1543-6.
5. Chung CK, Kim YM, Chi JG. Intralaminar dural haematoma developing in the contralateral convexity after temporal lobectomy. *J Neurol Neurosurg Psychiatry* 1999;66:248-9.
6. Haines DE, Harkey HL, Al-Mefty O. The "subdural" space: A new look at an outdated concept. *Neurosurgery* 1993;32:111-20.
7. Ishibashi A, Yokokura Y, Sakamoto M. Acute subdural hematoma without subarachnoid hemorrhage due to ruptured intracranial aneurysm—Case report. *Neurol Med Chir (Tokyo)* 1997;37:533-7.
8. Ishikawa E, Sugimoto K, Yanaka K, Ayuzawa S, Iguchi M, Moritake T, *et al.* Interhemispheric subdural hematoma caused by a ruptured internal carotid artery aneurysm: Case report. *Surg Neurol* 2000;54:82-6.
9. Kondziolka D, Bernstein M, ter Brugge K, Schutz H. Acute subdural hematoma from ruptured posterior communicating artery aneurysm. *Neurosurgery* 1988;22:151-4.
10. Miyajima K, Hayashi N, Kurimoto M, Kuwayama N, Hirashima Y, Endo S. Idiopathic interdural hematoma looking like a "Chinese dumpling"—Case report. *Neurol Med Chir (Tokyo)* 2004;44:75-6.
11. Ozveren MF, Kayaci S, Ayberk G. Interdural hematoma extending from the clivus to the spinal epidural space in an intracranial aneurysm case. *Neurosurgery* 2011;69:E1339-41.
12. Schievink WI, Thompson RC, Loh CT, Maya MM. Spontaneous retroclival hematoma presenting as a thunderclap headache. Case report. *J Neurosurg* 2001;95:522-4.
13. Tomaras C, Horowitz BL, Harper RL. Spontaneous clivus hematoma: Case report and literature review. *Neurosurgery* 1995;37:123-4.