

HORIUCHI et al.

# **Pontine Infarction Caused by Medial Branch Injury of the Basilar Artery as a Rare Complication of Cisternal Drain Placement: Case Report**

Tetsuyoshi Horiuchi, M.D.,<sup>1</sup> Yasunaga Yamamoto, M.D.<sup>1</sup>, Masafumi Kuroiwa, M.D.,<sup>1</sup> Nunung Nur Rahmah, M.D., and Kazuhiro Hongo, M.D.<sup>1</sup>

<sup>1</sup>Department of Neurosurgery, Shinshu University School of Medicine, Matsumoto, Nagano, Japan

## **Corresponding Author:**

Tetsuyoshi Horiuchi M.D.

Department of Neurosurgery, Shinshu University School of Medicine

Asahi 3-1-1, Matsumoto 390-8621, Japan

Tel. +81-263-37-2690; Fax +81-263-37-0480

e-mail: [tetuyosi@shinshu-u.ac.jp](mailto:tetuyosi@shinshu-u.ac.jp)

**Abstract**

We presented a rare complication related with cisternal drain placement during aneurysm surgery. A ruptured anterior communicating artery aneurysm was clipped through a right pterional approach. A cisternal drain was inserted from the retro-carotid to the prepontine cistern. Postoperatively, a left-sided palsy of the upper extremity was developed. Computed tomography of the brain demonstrated that the drain was located between the pons and the basilar artery, resulting in the pontine infarction. Vascular neurosurgeon should keep in mind the present complication when placing a cisternal drain tube. The drain tube should not be inserted too deep in the prepontine cistern.

**Keywords:** aneurysm, cisternal drain, complication, infarction, subarachnoid hemorrhage

## **Introduction**

Cerebral vasospasm remains an important cause of mortality and morbidity following aneurysmal subarachnoid hemorrhage. Although the etiology and pathogenesis of vasospasm are not completely understood, vasospasm may be caused by spasmogenic substances released from the subarachnoid clot. Therefore, external cerebrospinal fluid (CSF) drainage is commonly initiated to remove the subarachnoid clot aiming to avoid vasospasm. Common complications related to CSF drainage are meningitis and late hydrocephalus.<sup>1,2</sup>

In this report, a pontine infarction due to the injury of median branches of the basilar artery (BA) is reported as a rare complication of cisternal drain insertion during clipping surgery.

## **Case report**

An 80-year-old woman presented with right-sided visual disturbance following a headache to our institute. The patient had a history of lumbar canal stenosis and deep venous thrombosis. On arrival, she had a Glasgow Coma Score of 14/15, with a right-sided blindness and monoparesis at the left lower extremity due to the lumbar canal stenosis. A diffuse subarachnoid hemorrhage was seen on computed tomography (CT) scan (Figure 1). Three-dimensional CT angiography disclosed a ruptured anterior communicating artery aneurysm protruding inferiorly (Figure 1). A standard pterional approach was performed. The right optic nerve was destructed by the aneurysm and the aneurysm was well obliterated with a straight clip. A cisternal drain tube was placed through the retro-carotid space into the prepontine cistern. On postoperative day 1, the left upper extremity palsy was noted and CT scan demonstrated a pontine infarction

around the drain tube (Figure 2A). The drain tube was located between the BA and the pons (Figure 2B and C). After removal of the drain tube, she was treated conservatively and the palsy slightly improved. Neither severe vasospasm nor normal pressure hydrocephalus occurred and she was transferred to a rehabilitation hospital.

## **Discussion**

In the present case, the pontine infarction occurred after clipping surgery and the drain tube was located between the BA and the pons. These findings were suggestive of branch injury of the BA caused by the drain tube placement, resulting in the pontine infarction. The pons is supplied by the BA and its branches. Pontine branches of the BA originate from the lateral and posterior aspects of the artery and are divided into medial and transverse type.<sup>3</sup> The median branches arise from the posterior surface and pursue a straight course to enter the pons. The transverse branches originate from lateral surface of the BA and wind around the pons before terminating in it.<sup>3</sup> In the present case, the pontine infarction was caused by the median branch injury based on CT findings. Usually, the BA runs in midline of the pons and there is no space between the pons and the BA. However, in the present case, CT scan disclosed that the BA was displaced to the left side probably due to arteriosclerosis and there was some gap between the pons and the BA. These findings suggested that the medial branches was stretched in the prepontine cistern and injured by the drain tube.

The advantages of cisternal and lumbar drainage after subarachnoid hemorrhage are continuous removal of spasmogen, control of intracranial pressure, and restoration of CSF circulation. Meningitis and hydrocephalus are well known as complications related to external CSF drainage.<sup>1,2</sup> However, vascular injuries related to placement of a cisternal drain tube are extremely rare. We found no reports of vascular injury

associated with the cisternal drainage in the literature.

In conclusion, neurosurgeon should keep in mind the possibility of brainstem infarction due to arterial injury caused by placement of cisternal drain during aneurysm surgery. The drain tube should not be inserted too deep in the prepontine cistern.

## Reference List

1. Klimo P, Jr., Kestle JR, MacDonald JD, et al. Marked reduction of cerebral vasospasm with lumbar drainage of cerebrospinal fluid after subarachnoid hemorrhage. *J Neurosurg* 2004;**100**:215-24.
2. Kodama N, Sasaki T, Kawakami M, et al. Cisternal irrigation therapy with urokinase and ascorbic acid for prevention of vasospasm after aneurysmal subarachnoid hemorrhage. Outcome in 217 patients. *Surg Neurol* 2000;53:110-7.
- 3) Takahashi M. The basilar artery in Newton TH, Potts DG (eds): *Radiology of the skull and brain*. St. Louis: Mosby, 1974:1775-95.

**Figure legends**

Figure 1: Computed tomography (CT) showing a diffuse subarachnoid hemorrhage (left) and three-dimensional CT angiography demonstrating the ruptured anterior communicating and the un-ruptured left middle cerebral artery aneurysms.

Figure 2: Postoperative plain (A), enhanced (B), and bone (C) CT scans showing the right-sided pontine infarction. Note that the cistern drain (arrowheads) is located between the pons and the basilar artery (arrows).

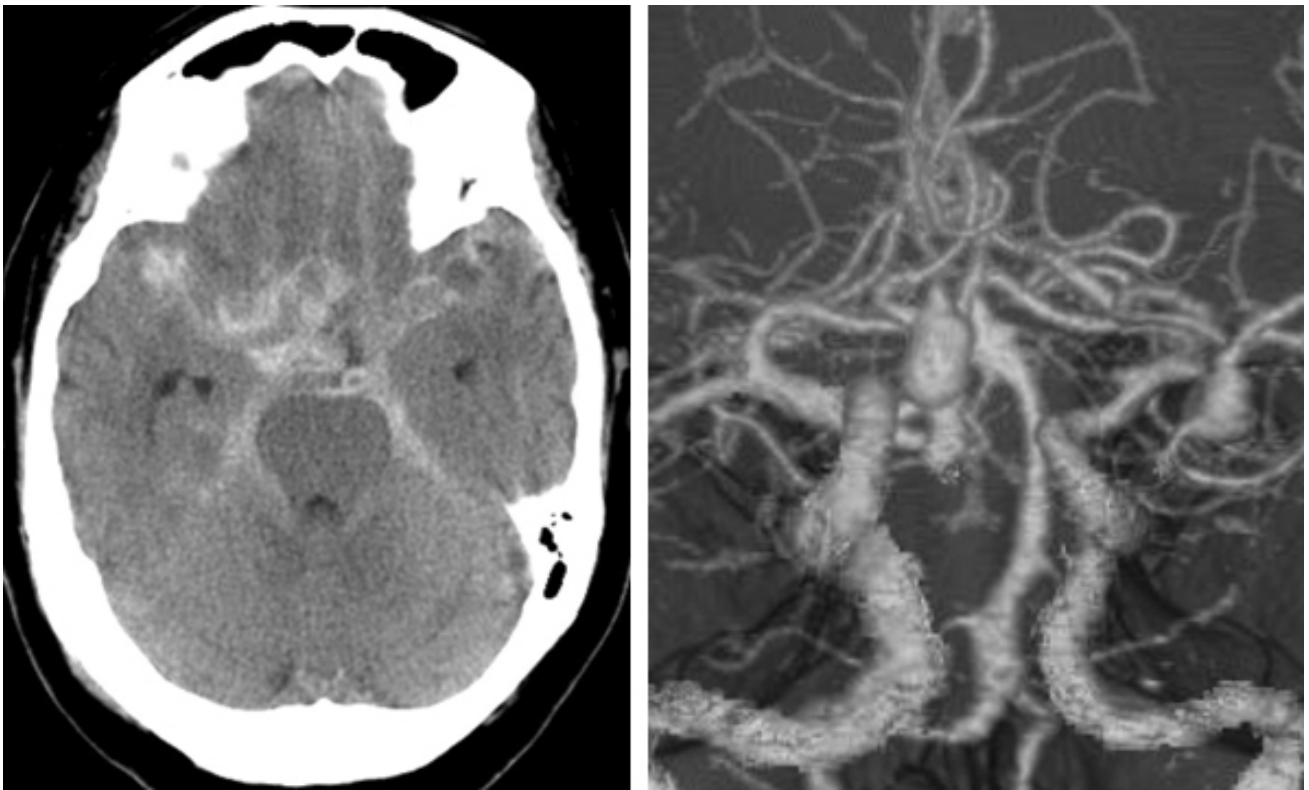


Figure 1

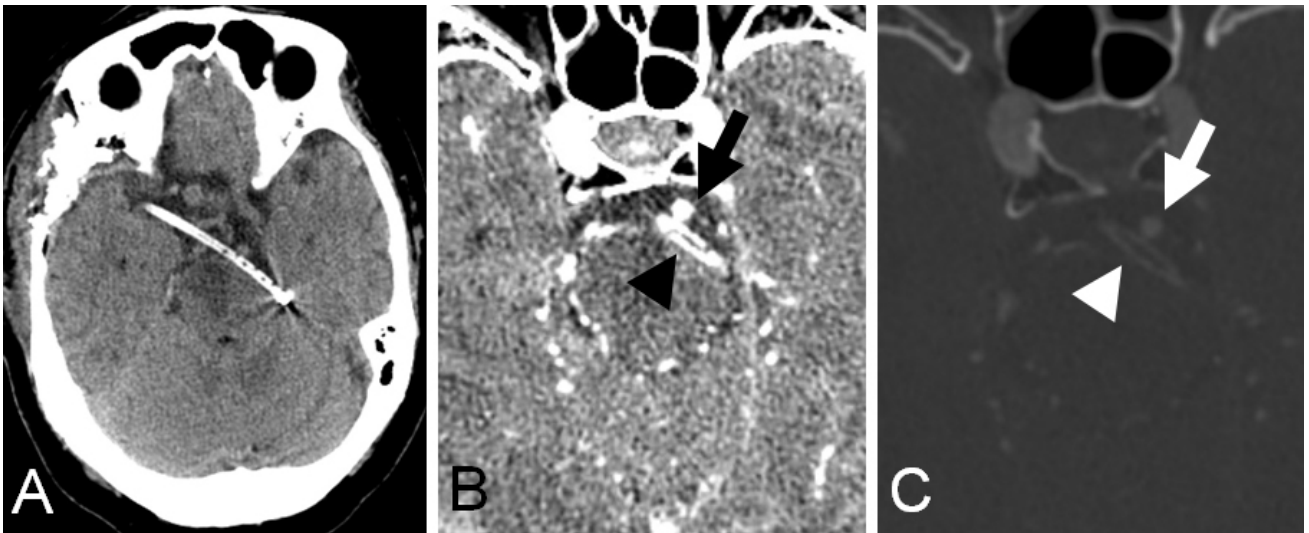


Figure 2