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Intrapartum Subarachnoid Hemorrhage from Suspected Lateral Posterior Choroidal Artery Dissection

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Abstract

Stroke associated with pregnancy or puerperium is rare, but represents an important problem for women of childbearing age. We herein report a case of subarachnoid hemorrhage (SAH) due to suspected lateral posterior choroidal artery (LPChA) dissection during delivery. A 34-year-old woman developed deterioration of consciousness during delivery at a maternity clinic. Her Glasgow Coma Scale score was E3V3M6. She was sent to our hospital after 12 hr, where CT revealed SAH with intraventricular hematoma. Radiographic examinations showed contrast pooling on the left LPChA. Repeated angiography showed enlargement of the contrast pooling, which indicated pseudoaneurysm. It also showed a relatively clear but stenosed LPChA communicated with the lesion which could not be recognized in the angiography on day 0. This stenosed LPChA indicated arterial dissection. Therefore, endovascular parent artery occlusion was performed on day 11. Determining the exact extent of dissection was difficult because the LPChA was extremely narrow. Occlusion of the posterior cerebral artery was needed to achieve complete hemostasis, which, however, resulted in infarction of the medial temporal and occipital lobes. At the time of final follow-up 3 years later, the patient was alert and completely independent, but showed persistent incomplete homonymous hemianopsia. We reported a rare case of SAH from suspected LPChA dissection during delivery. Repeated angiography provided information about the source of hemorrhage and definite diagnosis, which opened the way to treatment. It is also important to recognize the difficulty in identifying the exact extent of dissection when treating dissections of small arteries.

Keywords: dissection, subarachnoid hemorrhage, intervention, intrapartum

Introduction

Stroke associated with pregnancy or puerperium is rare, but represents an important problem for women of childbearing age.[1)] Subarachnoid hemorrhage (SAH) secondary to dissections during pregnancy and puerperium is extremely rare. Endovascular treatment plays a very important role in preventing re-bleeding in such patients with dissections.[2)]

We herein report a case of SAH from suspected of dissection located on the lateral posterior choroidal artery (LPChA) during delivery. To the best of our knowledge, this represents the first report of SAH from a dissecting aneurysm of the LPChA during delivery.

Case Report

A 34-year-old woman developed deterioration of consciousness during delivery at a maternity clinic. The deterioration was initially attributed to

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exhaustion from delivery. She was sent to our hospital 12 hr after delivery, where CT revealed SAH (Fig. 1A). She had no hypertensive disorder of pregnancy and no past medical history of connective tissue disorders or Moyamoya disease (MMD). The course of pregnancy had been uneventful. Her Glasgow coma scale score was E3V3M6 and World Federation of Neurosurgical Societies grade was 4. Source images from CTA revealed a small, hyperdense area in the hematoma around the choroidal fissure (Fig. 1B–D). Subsequent DSA and 3D rotational angiography (3DRA) showed contrast pooling at the same point (Fig. 2A and 2B), but with no obvious communication with the lesion, because the parent artery was very thin. There was no evidence of MMD. We decided not to treat the lesion at that time and decided on conservative follow-up. The lesion was located so distally that neither an intimal flap nor mural hematoma, which indicates arterial dissection, could be recognized on MRI. DSA on day 6 showed enlargement of the pseudoaneurysm and relatively clear communication with the lesion (Fig. 2C and 2D), and hence, embolization was performed on day 11 (Fig. 3). DSA was performed under usual radioprotection (i.e. minimal fluoroscopy, protective board) because she had already delivered her baby. DSA during embolization showed severe stenosis of the parent artery just proximal to the contrast pooling and absence of arterial branches around the lesion (Fig. 3A). These findings

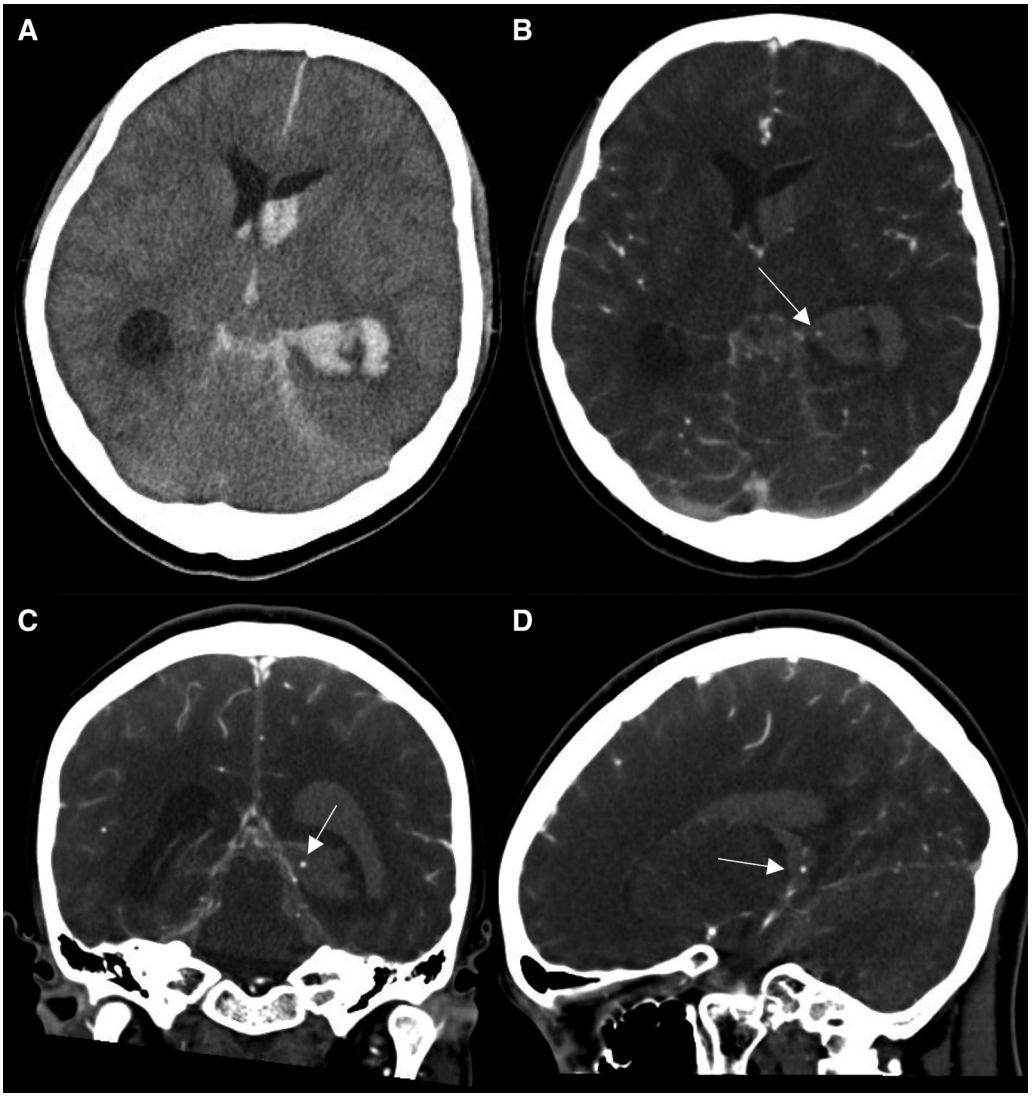

Fig. 1 CT and CTA on admission. (A) CT shows subarachnoid hemorrhage and intraventricular hemorrhage, with a thick hematoma around the choroidal fissure. (B–D) CTA. The point of rupture is visualized as a high-density spot (white arrow).

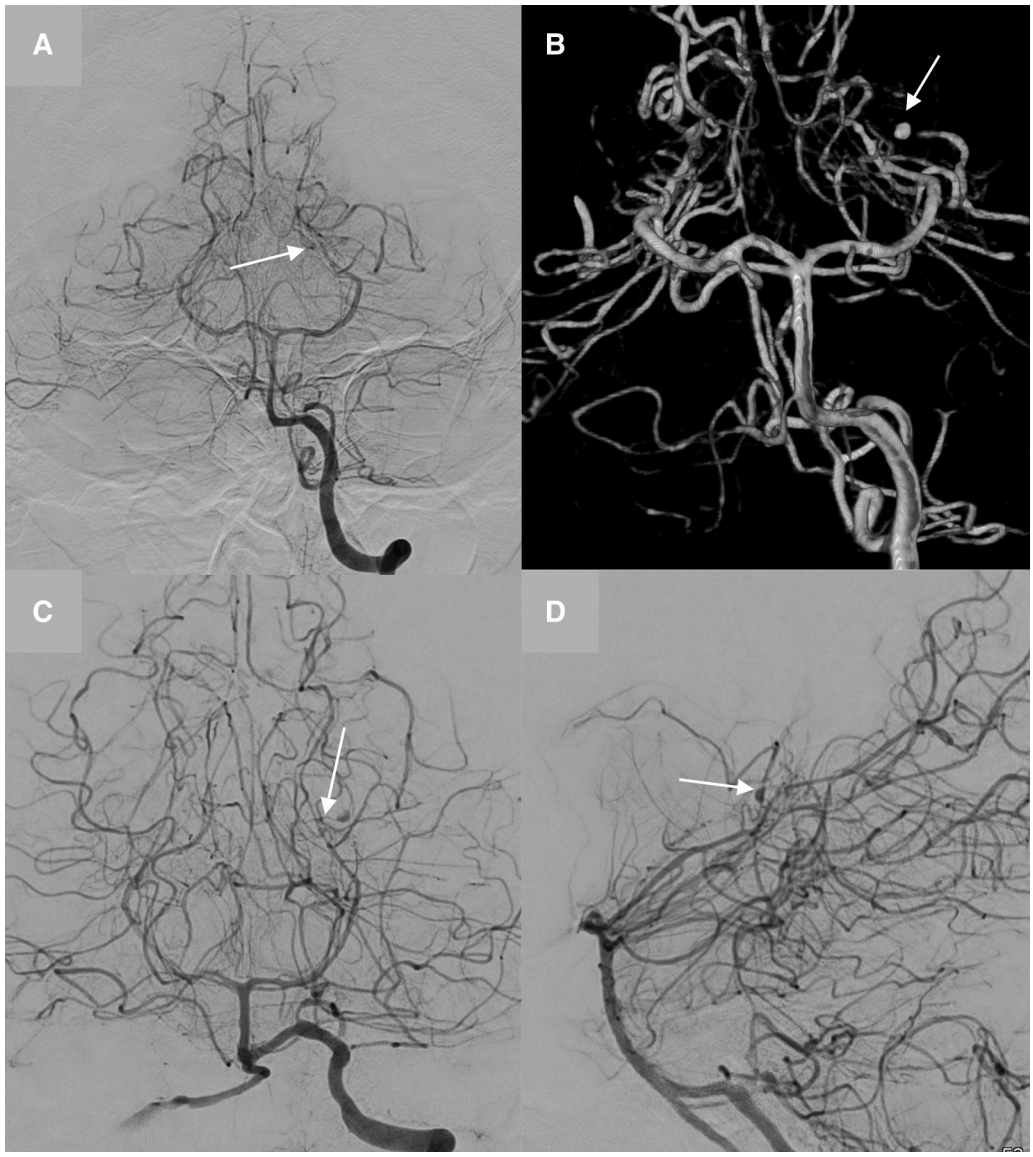

Fig. 2 Cerebral angiography on day 0 and day 6. (A) DSA of the left vertebral artery (cranial 22°) on day 0 shows a small amount of contrast pooling (white arrow), but identifying the lateral posterior choroidal artery (LPChA) itself is difficult. (B) 3D rotational angiography on day 0 clearly reveals the aneurysm (white arrow). (C) DSA of the left vertebral artery (cranial 35°) on day 6 shows enlargement of the dissecting aneurysm and slight enlargement of the LPChA proximal to the aneurysm (white arrow). (D) Lateral view of the left vertebral artery injection. White arrow: contrast pooling.

were consistent with a diagnosis of SAH from dissection of the left LPChA.

Our initial plan was to navigate a flow-guided-type microcatheter to the lesion and perform parent artery occlusion with diluted Histoacryl (B. Braun, Melsungen, Germany), but the microcatheter could not be inserted into the LPChA because of the tortuous course (Fig. 3B). We then changed the microcatheter to a firmer one, followed by coil embolization of the dissection and the LPChA (Fig. 3C). The LPChA was so thin that defining the exact extent of dissection was difficult. DSA just after embolization of the dissection and LPChA showed contrast extravasation (Fig. 3D). Hence, additional coils were placed and occlusion of the main trunk of the posterior cerebral artery was needed to completely stop the extravasation (Fig. 3E and 3F).

Diffusion-weighted imaging performed 2 days after the procedure showed new hyperintense lesions in the left medial temporal and occipital lobes (Fig. 4). During her 4-week stay in our hospital,

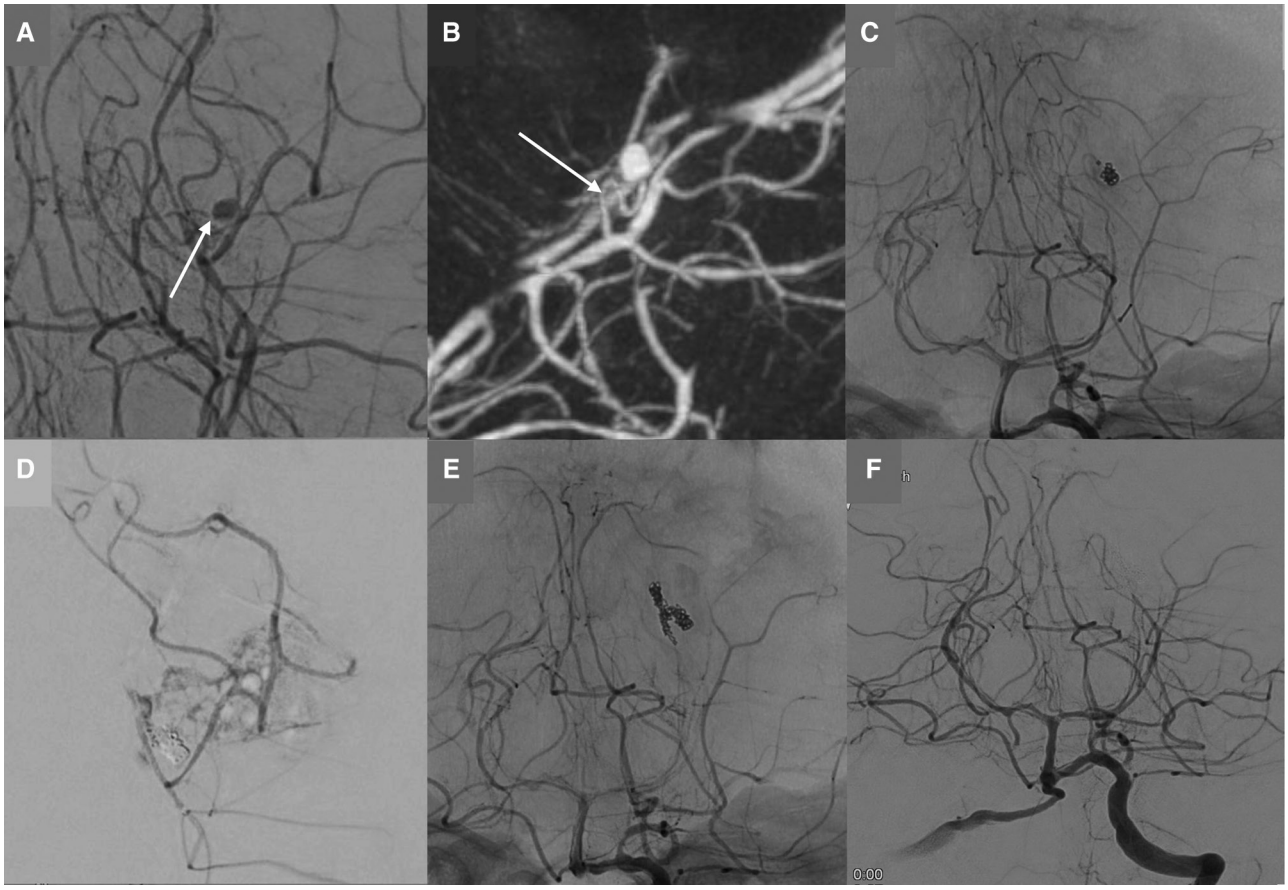

Fig. 3 Intraoperative images. (A) DSA of the left vertebral artery (cranial 30°) before embolization shows severe stenosis of the parent artery (white arrow) just proximal to the contrast pooling, and no branches around the lesion. (B) Cone beam CT with undiluted contrast medium shows a tortuous lateral posterior choroidal artery (LPChA) (white arrow) proximal to the aneurysm. (C) Control left vertebral angiography after embolizing the aneurysm and LPChA. The left posterior cerebral artery (PCA) is difficult to see because of the microcatheter. (D) Injection from the microcatheter performed just after obtaining image C shows contrast medium extravasation. (E) Control left vertebral angiography after occlusion of the left PCA. Platinum coils are seen in both the LPChA and main trunk of the PCA. (F) Final control DSA of the left vertebral artery (cranial 30°). The main trunk of the left PSA is not evident.

she suffered from right homonymous hemianopsia and memory disturbance. During 3 years of follow-up, the partial hemianopsia persisted, but she was independent and had recovered almost completely from the memory disturbance. MRI showed no evidence of recurrence.

Discussion

Stroke associated with pregnancy or puerperium is rare (10.2 per 100000 deliveries in Japan), but represents an important problem for women of childbearing age.[1] Hemorrhagic stroke reportedly accounts for 73.5% of cases, of which 19.8% involve aneurysms.[1] SAH from arterial dissection is extremely rare and very few reports have described SAH due to dissection during pregnancy or puerperium.[3,4] All previously reported lesions were located on large vessels, such as the internal carotid and vertebral and proximal segment of posterior cerebral arteries.[4,5]

Hemorrhagic strokes from choroidal arteries are reported in patients with MMD.[6,7] However, this patient did not have any evidence of MMD. This is one of the atypical aspects of this case. CTA on admission (Fig. 1B–D) showed the fair proximity of the lesion to the tentorium cerebelli. It is reported that central venous pressure during delivery exceeds 50 cm H_2O.[8] We speculated the possibility that venous hypertension and the eventual slight brain swelling induced by straining during delivery might have made the LPChA touch the tentorial incisura in our patient, which caused dissection.

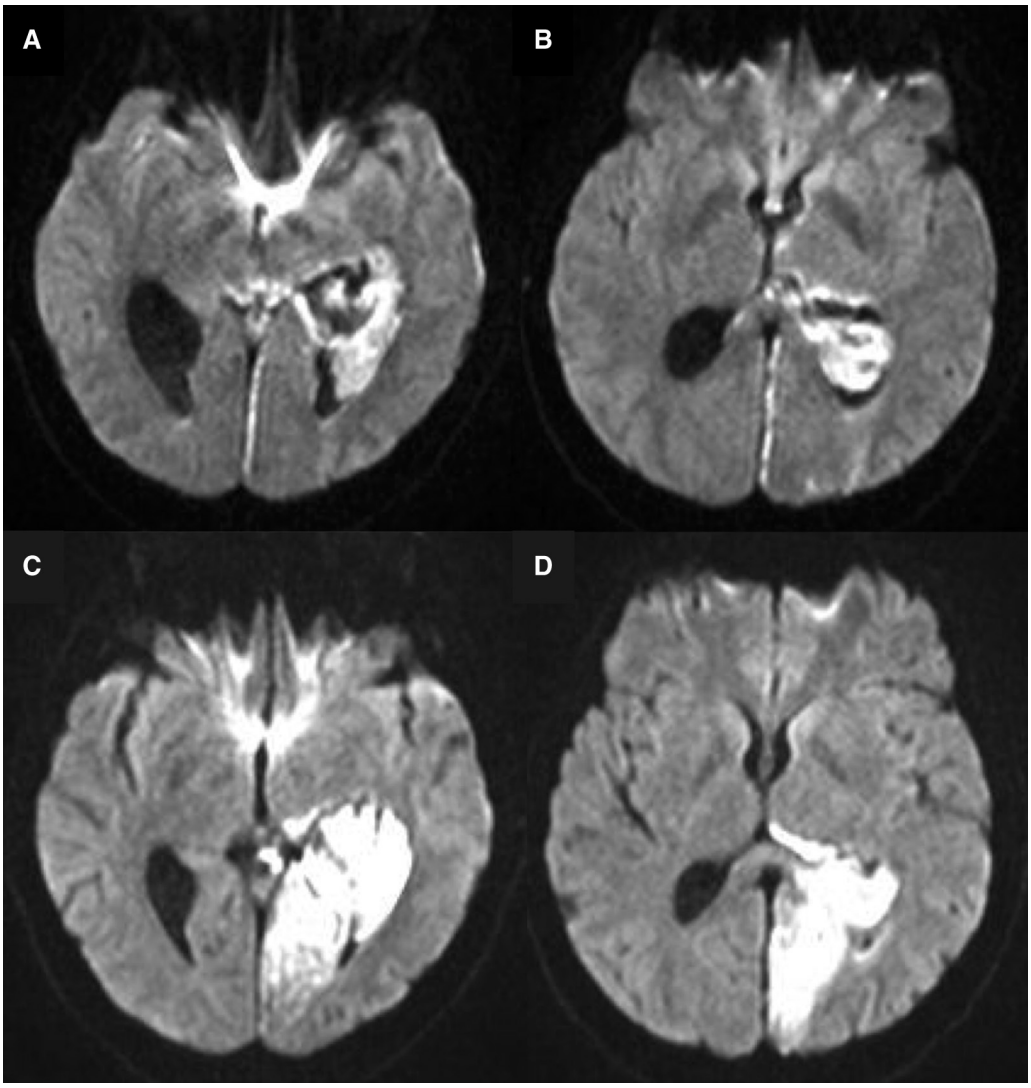

Fig. 4 Pre- and post-procedure diffusion-weighted images (DWI). (A and B) Preoperative DWI on day 0 shows hyperintensity around the choroidal fissure, including the hippocampus. (C and D) DWI on postoperative day 2 shows new ischemic lesions in the occipital and medial temporal lobes.

The LPChA anastomoses with the anterior choroidal artery in the choroid plexus.[9] Sufficient but minimal occlusion of the parent artery is essential to take full advantage of such collateral circulation. Since the target lesion in our case was located on a very distal and fine artery, we initially intended to navigate a flow-guided catheter to the left LPChA to occlude the lesion, including the parent artery (LPChA) with diluted Histoacryl (B. Braun). However, the tortuous course of the LPChA made it impossible to navigate it. Finally, using a slightly larger catheter, we were able to precisely reach the lesion and insert platinum coils to avoid distal glue penetration.

The intraoperative extravasation after embolization of the LPChA visualized in our patient could have occurred for two reasons. The first is that the extent of dissection was larger than initially estimated and could have reached the main trunk of the posterior cerebral artery (PCA). Using MRI and DSA, it is relatively easy to understand the extent of dissection in the case of large vessels. In this case, however, the affected artery was much narrower than the large vessels mentioned above, and was further narrowed by hematoma or early spasm, making it difficult to assess the exact extent of dissection. The second is that catheter manipulation could have caused vessel injury. The orifice of the LPChA was tortuous and we had difficulty navigating the microcatheter to the lesion. As a result, we had to occlude a longer section of the

artery than initially planned. Occlusion of the main trunk of the PCA was necessary to achieve hemostasis, which caused a large postoperative infarction. Our experience suggests the importance of determining the exact extent of dissection when treating dissecting aneurysms of small vessels.

Besides these points, greater emphasis should be placed on early diagnosis. This patient was sent to our hospital 12 hr after symptom onset. Sharing knowledge about such cases with obstetricians and other physicians beyond the relevant medical departments is also important.

Conclusion

We reported a rare case of SAH from suspected LPChA dissection during delivery. Though initial cerebral angiography could not reach the definite diagnosis, repeated angiography provided it, which opened the way to treatment. Repeated angiography is important to identify the source of hemorrhage. It is also important to recognize the difficulty in identifying the exact extent of dissection when treating dissections of small branches. Doctors who treat patients with stroke should try to educate obstetricians about the importance of rapidly performing radiographic examinations in pregnant women with neurological symptoms.

Patient's Permission

The patient's signed consent was obtained for publication of this case report and all accompanying images.

Conflicts of Interest Disclosure

The authors have no financial or other conflicts of interest in relation to this research.

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