

Traumatic pericallosal artery aneurysm (TPA)

Etiology

The traumatic [pericallosal artery aneurysm](#) is a rare complication of [blunt head trauma](#).

The pericallosal artery is torn under the sharp edge of the rigid falx.

They account for up to 33% of all aneurysms encountered in a pediatric population. The most common location of such lesions in children is the pericallosal or adjacent branch of the anterior cerebral artery, where a head impact exerts sudden decelerating shearing forces on the arteries tethered on the brain surface against an immobile falx cerebri, weakening the arterial wall. This action can lead to dissection of the damaged vascular layers, with resultant expansion of the affected site into a fusiform aneurysm. Pericallosal aneurysms following a penetrating intracranial injury have also been described, and the resultant lesion in some cases can be a pseudoaneurysm. The incidence of iatrogenic pericallosal artery aneurysms, however, is extremely rare.

Traumatic pericallosal artery aneurysm (TPA) is typically seldom yet potentially lethal. Because of its rarity, also complicated by the unpredictable delayed-onset.

TPA is more difficult to be diagnosed promptly. Due to the sporadic reports and diverse opinions on the priority of surgical treatment, a consensus about effective management of TPA has not been reached.

Diagnosis

CT shows a typical hematoma in the corpus callosum.

Case reports

A 34-year-old man in coma was admitted after a motor vehicle accident. Brain computed tomographic scans revealed deep bifrontal, left intraventricular, and subarachnoid hemorrhages. Three-dimensional computed tomographic angiography and digital subtraction angiography revealed an aneurysm arising from the left pericallosal artery.

A massive intracerebral hematoma prompted to perform emergency surgical intervention. They immediately removed the hematoma and extirpated the aneurysm. After hematoma evacuation via the interhemispheric approach, a pulsating red sphere projecting from the pericallosal artery, with no obvious solid wall or neck, was encountered. While retracting the frontal lobe, it suddenly ruptured. Under temporary trapping of the parent artery, the point of bleeding was identified. No aneurysm wall or fibrous tissue was present, whereas a 1.5-mm laceration was observed at the pericallosal artery close to its branching point. The laceration was sutured with 10-0 nylon. Postoperative digital subtraction angiography confirmed patency of the pericallosal artery.

Although recent technologic advances of intravascular surgery have enabled successful treatment of traumatic pseudoaneurysms, open surgical intervention still has some advantages of providing definitive hemostasis, allowing for parent artery reconstruction, and facilitating mass reduction. The

case in the current study was quite unusual in that angiographic aneurysm had disrupted easily, leaving arterial laceration. This finding implies the probability of unavoidable parent artery occlusion when endovascular treatment is applied ¹⁾.

A 55 year-old male patient with TPA, who received an emergent craniotomy to clip the pseudoaneurysm and remove the hematoma under intense intracranial pressure (ICP) monitoring. A satisfactory clinical outcome was achieved at a 3-month follow-up ²⁾.

2007

Dunn et al. describe the first reported case of a traumatic pericallosal artery aneurysm following transcallosal surgery. This 6-year-old boy underwent resection of a hypothalamic pilocytic astrocytoma, which was approached via the transcallosal corridor. A follow-up magnetic resonance image obtained within 1 year of surgery disclosed a small flow void off the right pericallosal artery, which was initially interpreted as residual tumor. Serial investigations showed the lesion enlarging over time, and subsequent angiography revealed a round 7-mm pericallosal artery aneurysm with an irregularly shaped 2- to 3-mm lumen. The aneurysm was difficult to treat with clip reconstruction or suturing of the affected segment, and an excellent outcome was ultimately achieved with resection of the lesion and autogenous arterial graft interposition. The authors also discuss the likely pathophysiology of the aneurysm and the surgical procedures undertaken to treat it ³⁾.

¹⁾

Zhao MZ, Liu XY, Ding Y, Sugie A, Kobata H, Liu WD. Surgical repair of lacerated anterior cerebral artery presented with massive intracerebral hemorrhage. J Craniofac Surg. 2015 May;26(3):e270-2. doi: 10.1097/SCS.0000000000001330. PubMed PMID: 25915668.

²⁾

Sui M, Mei Q, Sun K. Surgical treatment achieves better outcome in severe traumatic pericallosal aneurysm: case report and literature review. Int J Clin Exp Med. 2015 Feb 15;8(2):1598-603. eCollection 2015. Review. PubMed PMID: 25932088; PubMed Central PMCID: PMC4402735.

³⁾

Dunn IF, Woodworth GF, Siddiqui AH, Smith ER, Vates GE, Day AL, Goumnerova LC. Traumatic pericallosal artery aneurysm: a rare complication of transcallosal surgery. Case report. J Neurosurg. 2007 Feb;106(2 Suppl):153-7. PubMed PMID: 17330545.

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