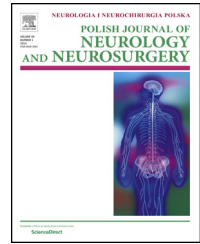


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Original research article

Diagnosis and treatment of pericallosal artery aneurysms

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ABSTRACT

Objective: Pericallosal artery aneurysms are not common clinically. The microsurgery and endovascular therapy are surgically challenging operations. The objective of the study is to summarize their clinical symptoms and optimal treatment strategies of pericallosal artery aneurysms.

Methods: Nine cases of pericallosal artery aneurysms detected by digital subtraction angiography (DSA) were reviewed. The clinical manifestation, brain imaging characteristics, and optimal treatment methods were summarized.

Results: Patients with spontaneous aneurysm had good clinical outcomes after endovascular coiling or microsurgical clipping treatment. There were no any neurological function deficits in five patients. One patient suffered from permanent neurological function deficits. Patients with traumatic aneurysm pericallosal had relatively poor outcomes, including two patients showing disturbed consciousness and the paralysis of the lower limbs with slow recovery, and one patient was dead after the surgery.

Conclusion: Spontaneous subarachnoid hemorrhage and interhemispheric fissure hematoma suggest spontaneously pericallosal aneurysm, while traumatic corpus callosum hematoma as well the accompanying embryo of intraventricular hemorrhage suggest traumatic pericallosal aneurysm. Endovascular embolization is the primary surgical treatment for pericallosal aneurysm, while patients with pericallosal aneurysm are not suitable for surgical treatment. Microsurgical clipping treatment may be a choice. However, both of these treatment strategies have high risk.

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1. Introduction

Pericallosal artery aneurysms are uncommon clinical disease, accounting for about 5% of intracranial tumors [1–3]. It can be divided into two types: spontaneously pericallosal aneurysm and traumatic pericallosal aneurysm. Pericallosal aneurysm has special anatomical location and low incidence. The clinical manifestations, imaging symptoms and treatment strategies are different from conventional skull base aneurysm. It is also easy to be misdiagnosed and delayed in the clinical treatment, which will result in disability, death because of recurrent bleeding. Once discovered, pericallosal aneurysm should be actively treated. The direct surgical clipping of these aneurysms via an interhemispheric approach [4–7] or endovascular treatment of cerebral aneurysms using detachable coils were always choose [1–3,8,9]. However, the direct surgical clipping approach is challenging due to the limited surgical exposure [3–5], especially within the swollen brain after subarachnoid hemorrhage. It is necessary to sacrifice a bridging vein for adequate surgical exposure, and thus postoperative morbidity has been reported in a relative high frequency (with an incidence risk of 0–25%). In recent years, with the development of microcatheters, guidewires and coil materials, the performance of intracranial intravascular operation has been improved greatly. However, coiling of pericallosal artery aneurysms is also not possible in some cases owing to the distal location [1,2,9].

In this study, we reported the clinical and angiographic results of nine patients with spontaneous or traumatic pericallosal artery aneurysms, who were treated with endovascular embolotherapy or microsurgical clipping operation.

2. Materials and methods

2.1. Patients

The clinical data of nine patients with pericallosal aneurysms (six males and three females), were comprehensively reviewed. The aged from 18 to 62 years (mean ages of 37.2 years). Among them, six patients suffered from spontaneity pericallosal aneurysm, including five patients arising from spontaneous subarachnoid hemorrhage, and one patient discovered from MRA scanning due to chronic headache. Three patients suffered from traumatic pericallosal aneurysms, including two patients arising from traffic accident injuries, and one patient due to falling injuries, manifesting as disturbance of consciousness after traumatic brain injury, traumatic intracranial hematoma, and ventricular casting. Five patients (3 patients with traumatic pericallosal aneurysms, two patients with spontaneity pericallosal aneurysm) showed coma, varying degrees of intracranial hypertension and were manifested as severe headache accompanied by vomiting. Three patients with spontaneous pericallosal aneurysm were in the state of between somnolence and lethargy and without coma. One patient with unruptured aneurysms week had clear mind state.

According the definition of Hunt-Hess grades, (1) Grade I: one patient; (2) Grand II: three patients; (3) Grand III: four

patients; (4) Grand IV: one patient. Six patients had different degrees of unilateral or bilateral paraparesis. Four patients had sphincter dysfunction, manifested as urinary incontinence. Two patients had varying degrees of mental symptoms manifested as being indifferent to external reaction and cognitive dysfunction. Most of patients with traumatic pericallosal aneurysm showed bleeding-hematoma and organizing-rebleeding patterns.

2.2. Imaging examination and treatment

For the patients with Hunt-Hess I-II, digital subtraction angiography was examined in acute bleeding stage (1–3 days after subarachnoid hemorrhage) to confirm it and the operation was carried out immediately. For the patients with Hunt-Hess III-IV, digital subtraction angiography was examined in acute bleeding stage (1–3 days after subarachnoid hemorrhage) to confirm it, but the operation were carried out after the peak of cerebral vasospasm. Three patients with traumatic pericallosal aneurysms and four patients with spontaneous pericallosal aneurysm received endovascular embolotherapy. Among them, two cases of traumatic pericallosal aneurysm and three cases of spontaneous pericallosal aneurysm received only coils intratumoral therapy, while one case of traumatic pericallosal aneurysm also received detachable balloon to occlude pericallosal artery that is close to aneurysms due to thin parent artery the one patient with pericallosal artery and callosomarginal artery bifurcation distal spontaneous aneurysms received detachable balloon to occlude pericallosal artery which is close to aneurysms. One patient with spontaneous pericallosal aneurysm received the therapy through clipping of pericallosal aneurysm by interhemispheric approach. And the remaining one patient with multiple aneurysms received aneurysm clipping surgery by the left-wing point and longitudinal joint approach.

3. Results

According to the CT examination, patients with spontaneous pericallosal aneurysm (Fig. 1A) had a small amount of spontaneous subarachnoid hemorrhage and interhemispheric fissure hematoma, mainly locating in the front of the corpus callosum. Patients with traumatic pericallosal aneurysm (Fig. 1D) had interhemispheric fissure hematoma, accompanied with recurrent intraventricular hemorrhage in a law of bleeding-hematoma formation and machine-rebleeding.

Digital subtraction angiography (DSA) examination revealed that all patients had pericallosal aneurysm and ten aneurysms were detected in total. Eight cases had solitary aneurysm, while one case had multiple aneurysms, which was cystic. The pericallosal aneurysms for six cases were located in the bifurcation of pericallosal artery and callosomarginal artery. In two cases, it was located in the anterior cerebral artery and frontopolar artery bifurcation aneurysm. For one case, it was located in the pericallosal artery and callosomarginal artery bifurcation distal aneurysm. Three cases were left-side pericallosal aneurysm, while six cases were right side of the corpus of peripheral aneurysm. The diameter of aneurysm was 3–10 mm in size. The case with multiple aneurysms had

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