# Ruptured Bilateral Pericallosal Artery Aneurysm in Mirror Position: Case Report

## *Aneurisma roto de artéria pericalosa bilateral em espelho: Relato de caso*

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**Abstract**

**Introduction** Pericallosal artery (PA) aneurysms represent 2 to 9% of all intracranial aneurysms, and their management remains difficult.

**Objective** The aim of the present study is to describe the case of an adult woman with subarachnoid hemorrhage and bilateral PA aneurysm in mirror position.

**Case Report** A 46-year-old woman was referred to our institution 20 days after a sudden severe headache. She informed that she was treating her arterial hypertension irregularly, and consumed ~ 20 cigarettes/day. The patient was neurologically intact at admission. A non-contrast computed tomography (CT) on the first day of the onset of the symptoms revealed hydrocephaly and subarachnoid hemorrhage (Fisher III). An angio-CT/digital subtraction arteriography showed bilateral PA aneurysms in mirror position. The patient was successfully treated with surgery via the right interhemispheric approach (because the surgeon is right-handed); the surgeon performed the proximal control with temporary clipping, and introduced an external ventricular drain at the end of the surgery. The patient was discharged on the fourth postoperative day without any additional neurological deficits or ventricular shunts.

**Conclusion** Ruptured PA aneurysm is a surgically challenging aneurysm due to the many anatomical nuances and risk of rebleeding. However, the operative management of ruptured bilateral PA aneurysms is feasible and effective.

**Keyword**

- pericallosal artery aneurysms

**Resumo**

**Introdução** Os aneurismas de artéria pericalosa (AP) representam 2 a 9% de todos os aneurismas e seu manejo permanece difícil.

**Objetivo** O objetivo do presente estudo é descrever o caso de uma mulher adulta com hemorragia subaracnóidea e aneurisma bilateral de AP em posição de espelho.

**Relato do Caso** Uma mulher de 46 anos foi encaminhada para nossa instituição 20 dias após dor de cabeça severa repentina. Ela informou que estava tratando sua hipertensão arterial de forma irregular e consumia 20 cigarros / dia. A paciente estava

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neurologicamente intacta na admissão. A tomografia computadorizada (TC) sem contraste no primeiro dia do início dos sintomas revelaram hidrocefalia e hemorragia subaracnóidea (Fisher III). Uma Angiotomografia de crânio e arteriografia por subtração digital mostraram aneurismas bilaterais de AP em espelho. O paciente foi tratado com sucesso por meio de cirurgia através de acesso inter-hemisférico pela direita (pois o cirurgião é destro); o cirurgião realizou o controle proximal com clipagem temporária e introduziu dreno ventricular externo no final da cirurgia. A paciente recebeu alta no quarto dia de pós-operatório sem déficits neurológicos adicionais ou shunts ventriculares.

**Conclusão** O aneurisma de AP roto é um aneurisma cirurgicamente desafiador devido às muitas nuances anatômicas e risco de ressangramento. No entanto, o manejo cirúrgico de aneurismas de AP bilateral roto é viável e eficaz.

**Palavra-chave**
► aneurisma de arteria pericalosa

## Introduction

Distal anterior cerebral artery aneurysms, also known as pericallosal artery (PA) aneurysms, are located on the anterior cerebral artery distal to the anterior communicating artery.[1] These aneurysms represent ~ 6% of all intracranial aneurysms and 4% of those that rupture.[2–6] Mirror aneurysms are paired aneurysms found with similar distributions on bilateral intracranial arteries. The frequency of mirror aneurysms is unknown. Estimates range from less than 5% of all patients with unruptured intracranial aneurysms to as many as 40% of patients with multiple unruptured intracranial aneurysms.[7,8] The most common distribution for mirror aneurysms is the middle cerebral artery (34%) followed by the non-cavernous internal carotid artery (32%), the posterior communicating artery (16%), the cavernous internal carotid artery (13%), the anterior cerebral artery/anterior communicating artery (3%), and the vertebrobasilar circulation (2%).[9] Bilateral PA aneurysm in mirror position is an extremely rare condition.

The aim of the present study is to describe the case of an adult woman with subarachnoid hemorrhage and bilateral PA aneurysm in mirror position.

## Case Report

A 46-year-old woman was referred to our institution 20 days after a sudden severe headache. She informed that she was treating her arterial hypertension irregularly, and consumed ~ 20 cigarettes/day. The patient was neurologically intact at admission. A non-contrast computed tomography (CT) on the first day of the onset of the symptoms revealed hydrocephaly and subarachnoid hemorrhage (Fisher III) (►**Fig. 1**). An angio-CT/digital subtraction arteriography showed bilateral PA aneurysms in mirror position (►**Fig. 2**, ►**Fig. 3**). The patient was successfully treated with surgery via the right interhemispheric approach (because the surgeon is right-handed); the surgeon performed the proximal control with temporary clipping, and introduced an external ventricular drain at the end of the surgery (►**Fig. 4**). The patient was discharged on the fourth postoperative day without any additional neurological deficits or ventricular shunts.

**Fig. 1** Non-contrast computed tomography with hydrocephaly and subarachnoid hemorrhage (Fisher III).

## Discussion

Pericallosal artery aneurysms represent ~ 6% of all intracranial aneurysms and 4% of those that rupture.[2–6] When associated with subarachnoid hemorrhage, PA aneurysms may be technically difficult to clip because of the narrow exposure afforded by an interhemispheric approach, and because of the difficulty to control the parent artery, as well as the fact that a bridging vein must be sacrificed in order for the adequate surgical exposure to be achieved. Furthermore, many patients suffer intraoperative hemorrhage. As a consequence, the surgical morbidity has been reported to be relatively high, with incidences ranging from 0 to 25%.[10–13]

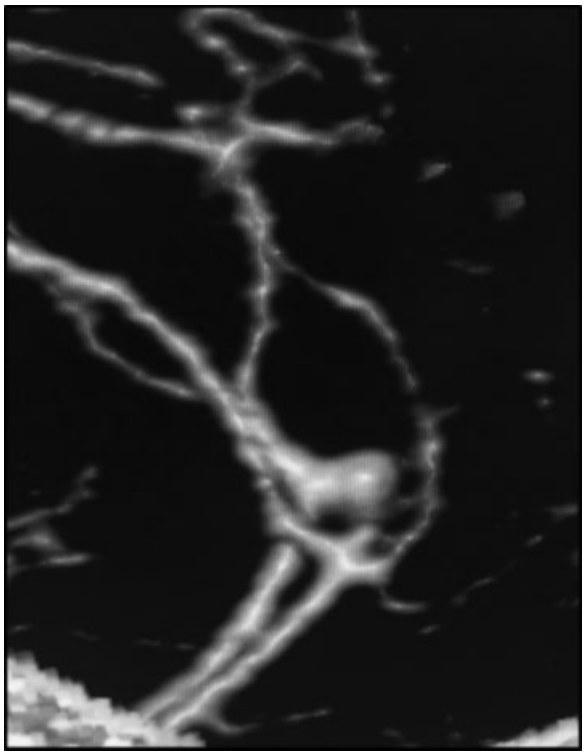

**Fig. 2** Angio-computed tomography showing bilateral pericallosal artery aneurysms in mirror position.

According to Lee and colleagues,[14] the successful surgical treatment of PA aneurysms depends on the precise understanding of their unique microsurgical anatomy, on the avoidance of pitfalls, and on the surgeon's experience. The performance of an atraumatic opening of the interhemispheric fissure, the preservation of major draining veins, the accurate localization of the aneurysm, and the early exposure of the proximal segment A2 of the anterior cerebral artery are all unavoidable and necessary steps for a safe and adequate clip placement. Additionally, Lehecka and colleagues[6] discussed the importance of meticulous dissection toward the aneurysm and of projecting the dome as relevant points for a successful operation.

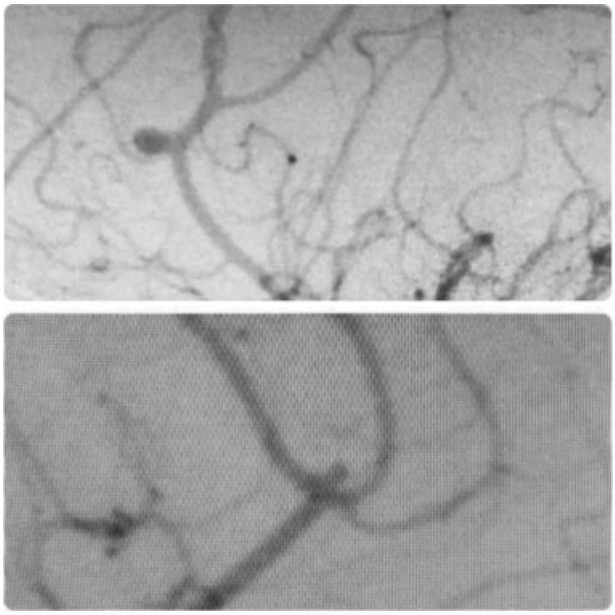

**Fig. 3** Arteriography showing bilateral pericallosal artery aneurysms in mirror position.

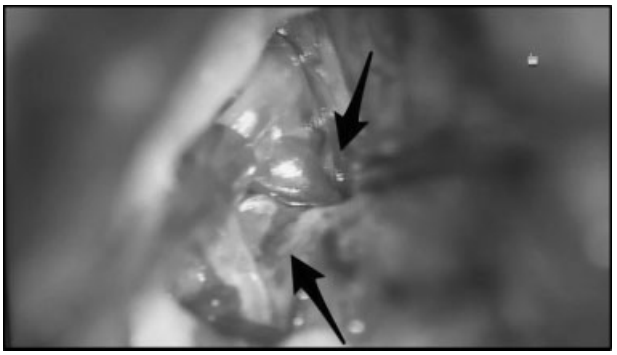

**Fig. 4** Intraoperative bilateral pericallosal artery aneurysms in mirror position.

Bilateral PA aneurysm in mirror position is an extremely uncommon situation. Niijima and colleagues,[15] in 1989, described the case of a 47-year-old woman who presented a ruptured bilateral PA aneurysm in mirror position that was successfully treated using the interhemispheric approach. The authors discussed that cigarette smoking and chronic uncontrolled arterial hypertension may be possible predisposing factors for bilateral intracranial aneurysm and rupture.

In the present investigation, we described the case of a 46-year-old woman who presented acute severe headache associated with subarachnoid hemorrhage and bilateral PA aneurysm in mirror position. She mentioned she was a heavy smoker (around 20 cigarettes/day) and treated her arterial hypertension irregularly. The patient was surgically treated via a right interhemispheric approach, and was discharged without any additional neurological deficits.

In conclusion, the authors highlight that ruptured bilateral PA aneurysm in mirror position is an extremely rare condition, and the success of the treatment depends on a meticulous microsurgical technique, on the surgeon's experience, and on the avoidance of unnecessary maneuvers.

### Conflict of Interests

The authors have none to disclose.

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