Cerebral Myxomatous Aneurysm Treated by M2-M2 Bypass: A Case Report

Hee Jun Yoo, Jaewoo Chung, Jae Sung Ahn

Department of Neurosurgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea

Corresponding author:
Jae Sung Ahn
Department of Neurosurgery, Asan Medical Center, University of Ulsan College of Medicine, 88, Olympic-ro 43-gil, Songpa-gu, Seoul 05505, Republic of Korea
Tel: +82-2-3010-3550
Fax: +82-2-476-6738
E-mail: jsahn@amc.seoul.kr

Received: September 9, 2018
Revised: September 13, 2018
Accepted: September 17, 2018

Key Words: Cardiac surgical procedures; Heart atria; Intracranial aneurysm; Myxoma

INTRODUCTION

Intracranial aneurysms associated with atrial myxoma have been reported and termed “myxomatous aneurysms.” We present a case of cerebral myxomatous aneurysms treated by M2-M2 bypass surgery. A 20-year-old woman was admitted for evaluation and management of multiple cerebral aneurysms found incidentally. She had a history of right middle cerebral artery (MCA) territory infarction. At that time, cardiac myxoma was incidentally found and surgically removed. In cerebral angiography, multiple cerebral aneurysms were identified. Among them, a right MCA fusiform aneurysm was the largest, with a diameter of 19.5 mm; notably, this developed at the site of previous MCA occlusion. Through surgical exploration, an MCA bifurcation aneurysm was observed, with a permanently occluded inferior trunk toward the temporal lobe. M2-M2 end-to-end anastomosis with resection of aneurysm was successfully performed, and biopsy showed dilation and thickening of the aneurysmal wall without any evidence of tumor invasion. The outcome of this case shows that surgical resection with bypass surgery is a useful option for the treatment of cerebral myxomatous aneurysms.

DISCUSSION

Cardiac myxoma is the most common primary heart neoplasm, constituting 50% of all cardiac tumors; its incidence is approximately 0.5 cases per 1,000,000 population per year. There are two main types. Most myxomas are smooth, firm masses that can be calcified or ossified. A small proportion of myxomas are soft, gelatinous tumors with irregular fronds; these often embolize. Although they are benign tumors with a classical risk of metastasis, such embolization can cause is-
Neurologic complications associated with cardiac myxoma are observed in up to 35% of patients. In the literature, symptoms of stroke or peripheral ischemia due to embolization are reported in approximately 22% of myxoma cases. The incidence of embolization is not related to the size of the tumor.
but is instead related to tumor mobility and friability\(^1,10\).

Myxomatous aneurysms, intracranial aneurysms associated with cardiac myxoma, are less common; their true incidence is unknown, but reports of such aneurysms are increasing with improvements in cardiac and neurovascular imaging that facilitate early detection of disease\(^9\). The mechanism for the formation of intracranial aneurysms in conjunction with cardiac myxomas is not well-established, but some hypotheses have been proposed: (1) Myxomatous emboli can block the vasa vasorum, destroying the normal architecture of the vessel, similar to mechanism of mycotic aneurysms; the vessel wall becomes vulnerable to ischemic injury and subsequent dilatation, which lead to aneurysm formation\(^2,8\); (2) Myxomatous emboli produce vascular occlusion, causing scarring and pseudaneurysm formation; (3) Tumor cells can proliferate and penetrate the wall; either mechanism can lead to scarring of the vessel wall and pseudaneurysm formation\(^2,8\). The angiographic characteristics of myxomatous aneurysms are multiplicity, fusiform appearance, and distal location. These features are similar to those of immunodeficiency-associated aneurysms and septic emboli-causing aneurysms\(^5,7,10\).

Treatment options for myxomatous aneurysms are conservative care, endovascular methods, or surgery. These aneurysms may remain stable for many years; additionally, spontaneous regression of intracranial myxomatous aneurysms has been frequently reported\(^9,12,14\). Therefore, without a specific risk factor, conservative treatment with serial MR imaging or angiography follow-up can be a reasonable strategy, especially when the risk of surgical treatment is high\(^1,9\). Cases of ruptured aneurysm are generally considered urgent surgical candidates. Because of the fusiform shape of most myxomatous aneurysms, it is difficult to perform conventional clipping of the aneurysm while maintaining the flow of the parent artery; bypass surgery is a reasonable option when sacrifice of the feeding artery may be required. In this case, M2-M2 end-to-end anastomosis was performed with complete resection of the myxomatous aneurysm. However, bypass surgery is technically challenging, compared with other options, and is limited because it is difficult to apply in a variety of locations. Additional case studies are needed regarding the location of myxomatous aneurysms and successful surgical approaches. Endovascular treatment is a reasonable treatment option. Because of the fusiform shape, coil embolization with stenting could be necessary\(^7\). There remains much debate regarding the possibility that chemotherapeutics can stabilize myxomatous aneurysms when surgery or endovascular procedure is not possible\(^3\).

In conclusion, our case shows that surgical resection with bypass surgery is a useful option for the treatment of cerebral myxomatous aneurysms.

**CONFLICTS OF INTEREST**

No potential conflict of interest relevant to this article was reported.

**REFERENCES**