

Case Report

Multiple Cerebral Mycotic Aneurysms Due to Left Atrial Myxoma: Are There Any Pitfalls for the Cardiac Surgeon?

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Acute cerebral embolism or cerebral aneurysm formation as a consequence of left atrial myxomas has been well documented, but the formation of multiple cerebral aneurysms resulting from atrial myxoma is a very rare neurological complication. We present the case of a 72-year-old-woman with a cardiac myxoma who suffered multiple cerebral mycotic aneurysms. After experiencing both vertigo and a sudden collapse accompanied by loss of consciousness, she underwent cerebral computed tomography (CT) and magnetic resonance imaging (MRI) examinations, which revealed multiple cerebral mycotic aneurysms of various dimensions and a large cyst, as a result of a previous haemorrhage. Embolisation was performed in large aneurysms of the circle of Willis but not in the one located in the periphery, and re-examination for a cardiac intervention a month later was indicated. The risk of cerebral haemorrhage was considered high; thus she was not operated on. Conservative treatment followed. Two years after the first diagnosis the patient remains healthy, suggesting that in such cases we should also consider conservative treatment. According to the literature, the risk is high when aneurysms are large, multiple and intractable. We propose that cerebral CT or MRI scan should be performed before operation in all patients with a cardiac myxoma, especially in those with left cardiac chamber localisation.

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The natural history and the pathogenesis of myxomatous aneurysms are not specifically defined. Josephson¹ reported a patient having unchanging myxomatous aneurysms, with the patient remaining asymptomatic for 8 years. It is rather rare for a patient to have both fusiform and saccular aneurysms at the same time. Lia et al³ presented a case of a 27-year-old woman with multiple cerebral aneurysms of different shape and dimension. There is no gold standard for the therapy of myxoma-related cerebral aneurysms. Cardiac surgery to remove the primary cardiac tumour usually relieves any early neurological symptoms, but cannot completely eliminate the risk of de-

layed cerebral aneurysm formation, presumably as a result of metastatic seeding before or during the surgery. For this reason, a follow up for the development of aneurysms is recommended after intervention for myxoma resection.⁴ Multiple cerebral mycotic aneurysms and intracranial haemorrhage can occur^{4,5} months after cardiac myxoma resection. There are many cases of researchers reporting and emphasising that size is an unquestionable factor when it comes to rupture risk. Furthermore, posterior circulation aneurysms have been noted to rupture more frequently than similar aneurysms in the anterior circulation. However, despite decades of observation, few studies have

been carried out to examine unruptured intracranial aneurysms in a prospective trial involving international centres and a heterogeneous population.^{6,7} Myxomas may occur rarely as part of familial and inherited disorders such as Carney's complex or Marfan syndrome;⁵ however, such findings were not diagnosed in the case of our patient.

Case presentation

A 72-year-old woman was admitted to our department for cardiac surgery because of a left atrial myxoma. In view of her past history of vertigo and collapse with loss of consciousness, she underwent cerebral computed tomography (CT) and magnetic resonance imaging (MRI) before surgery. These examinations revealed multiple cerebral mycotic aneurysms of various dimensions and a large cyst due to a previous cerebral haemorrhage (Figure 1). The neurosurgeon called for embolisation of the large aneurysms in the circle of Willis but not the one situated in the periphery, as well as re-examination for a delayed intervention a month later.

The patient underwent embolisation of the large central aneurysms but the peripheral aneurysms could not be treated. The neurosurgeon suggested avoiding open heart surgery because of the risk of massive ce-

rebral bleeding from systemic heparin administration during the extracorporeal circulation. The patient was informed about the risk involved, and declined a high-risk cardiac surgery operation; she agreed, however, to follow conservative treatment.

The patient remains alive and symptom-free two years later, and she is now under pharmaceutical therapy proposed by a neurosurgeon, a cardiologist and a cardiac surgeon. Neither any new episode of vertigo nor any peripheral embolus has occurred. The follow up CT scan illustrated the same picture without any new mycotic aneurysm formation.

Discussion

According to the literature, it is important to treat any cardiac myxoma soon after diagnosis, but sometimes care must be taken to avoid possible pitfalls, as in the case described here. Therefore, physicians should be aware of cardiac embolic sources in patients with cerebral embolism, even in the absence of cardiac auscultation abnormalities, because approximately 1 out of 3 patients with atrial myxoma lacks any cardiac signs.⁸ Myxoma may lead to constitutional symptoms, most likely because of interleukin-6 production.^{6,9} Embolisation of tumour particles or thrombotic material covered with tumour cells occurs in 30-45% of myxoma patients, most frequently in the cerebral arteries. Further neurological complications of myxomas are the formation of intracranial aneurysms, parenchymal brain metastases, and intracerebral or subarachnoidal bleeding because of a ruptured aneurysm.^{4,5}

The pathogenesis of myxoma-related aneurysms is unclear. Temporary occlusion of cerebral vessels by tumour emboli, leading to endothelial scarring and subsequent aneurysm formation, is one hypothesis. Another theory proposed in the literature^{3,6} assumes that tumour material from a cardiac myxoma embolises into the *vasa vasorum* of peripheral arteries and subsequently proliferates into the vessel wall, leading to a weakening of subintimal tissue, such as the internal elastic lamina, with subsequent aneurysm formation. In the latter mechanism, an inflammatory reaction and production of interleukin-6 by myxoma cells may play a pivotal role.^{6,9} Nussbaum et al⁸ discussed the management and outcomes of patients with intracranial aneurysms arising distal to the major branch points of the circle of Willis and vertebrobasilar system. Despite the fact that, in the authors' experience, these lesions were rarely treatable with simple



Figure 1. On a preoperative cerebral computed tomography scan multiple cerebral mycotic aneurysms of varying dimensions and a large cyst due to past cerebral haemorrhage can be seen.

clipping of the aneurysm neck or endovascular coil occlusion, preservation of the parent artery was possible in most cases, and the majority of patients had a good outcome.⁹

The case presented here underlines a possible pitfall for the cardiac surgeon: the massive cerebral bleeding in patients with multiple cerebral mycotic aneurysms. We recommend a long-term follow-up plan for patients with myxomatous aneurysms; enlarged aneurysms or intracranial bleeding may require invasive management.

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