

Treatment of Intracranial Mycotic Aneurysm: Surgery or Not

A Case Report

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Summary

Mycotic intracranial aneurysms are of infectious origin and, even nowadays, their treatment remains controversial with advocates for either surgical or medical treatment.

We present the case of a 58-year-old patient who was admitted to the hospital with a left hemiparesis due to a large right parietal haematoma. An angiogram demonstrated a small vascular malformation localized on a distal parietal branch of the right Sylvian artery. The patient was operated on and recovered well. Nevertheless, a control angiogram demonstrated the disappearance of the previous malformation but showed a new saccular aneurysm localized on the right rolandic artery. At the same time the patient became septic and the diagnosis of endocarditis complicated by mycotic aneurysm was confirmed. The patient was then medically treated with antibiotics for two months and several angiograms showed the progressive disappearance of this aneurysm. Different treatments of intracranial mycotic aneurysms are finally reviewed and a therapeutic approach is discussed.

 ${\it Keywords}$: Intracerebral haemorrhage; cerebral mycotic aneurysm.

Introduction

Mycotic aneurysm is a saccular or fusiform arterial dilatation of infective origin. They are known to represent between 2 and 6.2% ^{7, 8} of all intracranial aneurysms. Furthermore, 3% of all cases of endocarditis are complicated by mycotic aneurysms².

Treatment of these lesions is rather controversial^{1—5, 7, 9}. Should they be considered only as infectious complications of a bacterial pathology responding to medical treatment or, on the contrary, as a vascular disease needing surgical intervention?

We are reporting here the case of a patient who presented with an intracerebral haemorrhage due to

such a vascular malformation, at first misdiagnosed as a congenital lesion and evacuated surgically. The real diagnosis was suggested by the discovery, on the control angiograms, of a second mycotic aneurysm which was medically treated.

Case Report

A 58-year-old patient was complaining for two months of asthenia, low temperature, 10 kgs weight-loss and intermittent diarrhoea. On the 31.3.1985 he presented with a sudden headache, principally localized at the right side and associated with weakness of his left arm and leg. On admission he was afebrile, conscious, well oriented in time and space but suffering from a left hemiparesis and hemiasomatognosia.

The optic fund were normal but a left lateral homonymous hemianopsia was found. No meningism was present, the general examination of the patient was normal, as were cardiac auscultation,

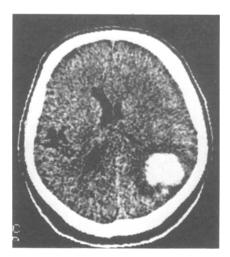
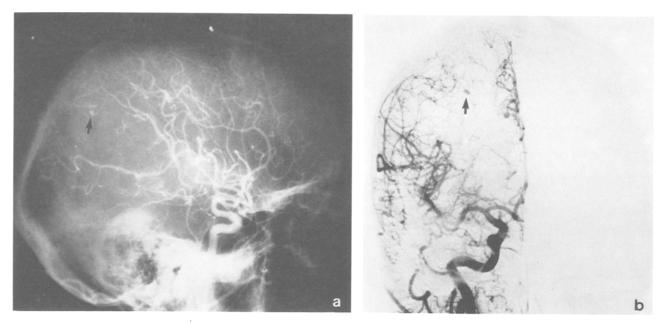
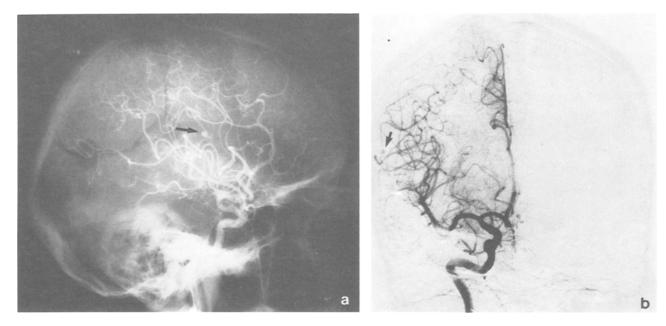


Fig. 1. Plan CT showing the parietal haematoma with the marked mass effect on the ventricular system



Figs. 2a and b. The first angiograms performed on the 3. 4. 1985 demonstrated a peripheral aneurysm, deeply situated on a parietal branch of the right sylvian artery



Figs. 3 a and b. Control angiography of the 6. 5. 1985; the previous malformation has been removed but a new aneurysm cortically situated has appeared on the right rolandic artery

chest- and skull X-rays. The blood tests were normal but for a sedimentation rate of 72 mm at the first hour. Cerebral CT performed without contrast showed a right posterior parietal hyperdense zone, with a marked mass effect on the ventricles and corresponding to an intraparenchymatous haematoma (Fig. 1). A cerebral angiogram performed on the 3. 4. 1985 demonstrated, beyond the vascular stretching due to the haematoma, a malformation situated on a distal parietal branch of the right middle cerebral artery (Figs. 2 a and b).

The patient's clinical status remained stable and he was operated on the 9. 4. 1985; a small vascular mass, partially thrombosed, was discovered and totally removed after evacuation of the haematoma. The patient did well after surgery and recovered in three weeks from his hemiparesis. A control angiogram was performed on the 6. 5. 1985 and revealed that a new saccular aneurysm was now present, located on the right rolandic artery (Figs. 3 a and b). A mycotic aneurysm was strongly suspected on discovery of these radiological findings.

The patient's general state worsened at this time. He became febrile (38.4°C) and dyspneic on the 7. 5. 1985. Cardiac auscultation revealed a new diastolic murmur $\binom{3}{6}$ over the aortic valve. No peripheral signs of endocarditis were found. Lung auscultation was

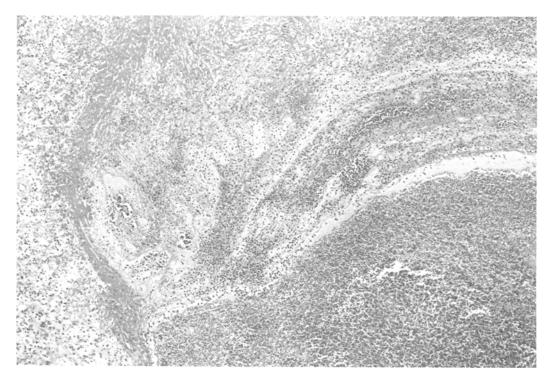


Fig. 4. Vascular wall infiltrated by inflammatory cells

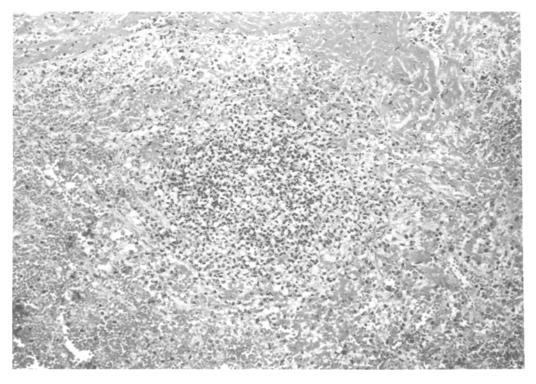


Fig. 5. Abscess and necrosis

normal; bloodcultures were positive for streptococcus bovis. Cardiac echography showed an aortic and mitral insufficiency without valvular vegetations. Endocarditis complicated by cerebral mycotic aneurysms was diagnosed. The histology of the vascular malformation previously removed was reviewed and showed an infiltration of

the aneurysmal wall by inflammatory cells with necrosis, suggesting a mycotic aneurysm (Figs. 4 and 5).

This new lesion being asymptomatic and localized to an artery supplying a highly sensitive area of cerebral cortex, no surgery was advised and the patient was treated from the 10. 5. 1985 by

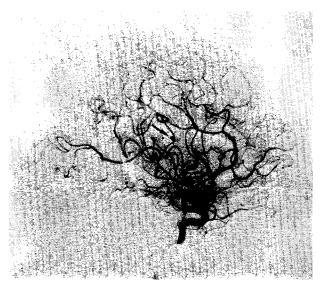


Fig. 6. 14. 5. 1985; Second control angiogram. No change in the size of the mycotic aneurysm

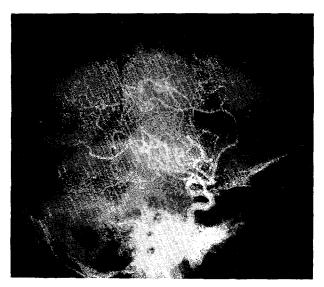


Fig. 8. Fourth control angiogram: disappearance of the vascular malformation (48th day of antibiotherapy)



Fig. 7. 29. 5. 1985: Third control angiogram: a considerable reduction of the size of the aneurysm is noted



Fig. 9. Ultimate control: absolute normality of the brain vessels

ceftriaxone*, given intravenously during the first week, and then intramuscularly for 7 weeks, at a dose of 2g/day. The patient became afebrile after 10 days of treatment.

Several angiograms were obtained to monitor the evolution of the rolandic mycotic aneurym. No change was evident on the 14. 5. 1985 (7 days after the first control angiogram and 5 days after beginning of antibiotic therapy) (Fig. 6). Furthermore, all the other cerebral vessels (right and left vertebral, left carotid arteries) were also normal. On the 29. 5. 1985 (20th day of antibiotictherapy), an intramural clot began to be seen in the vascular lesion (Fig. 7). A final right carotid arteriogram was performed on the 26. 6. 1985 (48th day of antibiotic-

therapy) and showed a total disappearance of the vascular malformation (Fig. 8). During the medical treatment, the patient complained of progressively growing neckaches radiating to the right shoulder. Digital pressure on the C_6 - C_7 level was painful. A technesium bone scan showed a low cervical lesion. CT scan of this region, completed by cervical tomographies showed a C_6 - C_7 spondylodiscitis. Because of this osteitis, antibiotictherapy antibiotic therapy was prolonged to 60 days. Pain disappeared totally after one month of medical treatment.

After two months of antibiotictherapy (10. 5, 1985–12, 7, 1985), the patient's general and neurological condition was very satisfactory. A final cardiac echography (19. 7, 1985) suggested the presence of two vegetations on the aortic valve associated with a mitral fluttering, contrasting with normal cardiac contraction.

^{*} This third generation cephalosporin was studied in a clinical trial.

A digestive tract lesion as a source of the Streptococcus bovis septicaemia was not discovered by barium enema, rectocolonoscopy and upper digestive tract studies.

When he left on the 19. 7. 1985, the patient just complained of a left wrist pain (due to a neuroalgodistrophy) and of weight loss of 20 kg.

An arteriogram, exploring the four cerebral vascular trunks was performed on the 25. 8. 1985 as an ultimate control and was entirely normal (Fig. 9).

The clinical status of the patient is unchanged 12 months after his neurological recover.

Discussion

The formation of mycotic aneurysm is not well defined: three different theories exist^{3, 5-8}:

- 1. An aneurysm may appear at the site of an infected embolus
- 2. the destruction of the vascular wall may begin in the layers adjacent to the vasa vasorum or to the Virschow-Robin space (Molinari: 5);
- 3. infections may spread to the arterial walls from a septic site external to the vessel.

The aneurysm appears on average 7 days after septic embolization⁵. It is initially of small size but progressive enlargement is produced by pulsations against the necrotic wall of the vessel. Generally, distally located on the artery^{7—9, 11} as it occurred in our case, the mycotic aneurysm may be localized on the circle of Willis. It is then difficult to distinguish from a congenital malformation if no septic condition is evident.

Clinical diagnosis is even more difficult because of the great variability of the symptoms 1, 3, 5, 10, 11. Endocarditis complicated by neurological signs (meningitis, subarachnoid haemorrhage, focal neurological deficits, seizures, headaches, psychiatric syndromes) must raise the possibility of the development of intracranial pathology and must lead to angiography³, CT not being the best examination in these cases⁶. The situation is different if neurological signs precede the infectious manifestations, as it happened with our patient, whose clinical signs of endocarditis and septicaemia occurred 37 days after the initial intracerebral bleeding. The true diagnosis is then only achieved after angiography or when septic condition finally becomes apparent, the association of endocarditis and neurologic signs making the presence of a mycotic aneurysm highly probable.

Treatment of these malformations is somewhat controversial ^{1-5, 7, 9}. Frazee⁵ suggests that treatment should consist of excision of the aneurysm as well as of antibiotic treatment whenever possible. The operative

mortality of his series of 13 patients treated by antibiotictherapy at least two days after their admission to the hospital is nil in the 5 patients who underwent surgery. Six of the 8 remaining patients treated medically only died because of aneurysmal rupture. He also thinks that surgery must be attempted in case of multiple aneurysms: if they are unilateral they should be excised in one operation. If they are bilateral, the largest or the one presumed to have bled should be removed first⁵. He is less enthusiastic concerning the proximal mycotic aneurysms; the high mortality (6 out of 10 patients) in medical treatment only forces him to consider carefully an operation in each case. Bingham1 does not see any advantage in surgery and suggests antibiotic therapy alone. In his series of 21 patients, there is a reduction of the size of the malformation in 6 patients and a total disappearance in 11 of them. 4 lesions remain unchanged and, in two cases, other aneurysms appear under medical treatment or even after it has been concluded. We believe that the most reasonable approach is the one proposed by Bingham¹, Leipzig⁷ and Bohmfalk³. These authors suggest that the diagnosis must be confirmed as quickly as possible by angiography (studying at least 3 arterial trunks) and that the patient has to be treated medically immediatedly. A very precise follow-up must be made by arteriography every 7-21 days and surgery should be undertaken if the size of the aneurysm remains unchanged (the risk of bleeding being high in this case) or if it increases.

Bisno² and Pecker⁹ agree with this scheme but ask for surgery in case of intra-parenchymatous lesions (haematomas, abscesses) so that the vascular malformation should be removed at the same time as the expanding mass. However, they think that early surgical treatment can be carried out on distal aneurysms, these being easily controlled surgically (with an exception of those placed in highly eloquent regions of the cereral cortex zones).

Bisno², Bohmfalk³ and Pecker⁹ prefer to firstly treat medically any proximal mycotic aneurysms, these being fibrotic enough to allow surgery to take place after antibiotical treatment has been completed.

The most important point in the management of these lesions, as indiced by Cantu⁴, consists in the early diagnosis of the malformation and in the precise follow-up by angiography carried out every 7–21 days. Treatment will then be guided by these radiological data and by the patient's general condition. Bingham's planning is certainly the one we should have adopted if we had not noted the disappearance of the mycotic aneurysm thanks to the use of antibiotics.

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