Subarachnoid Haemorrhage from a Large Cerebral Aneurysm Visible only on Repeat Angiography

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Summary

We report the case of a 49-year-old woman with a massive subarachnoid haemorrhage in conjunction with trauma. The initial cerebral angiography was normal. Three weeks later she had a second subarachnoid haemorrhage. A repeat angiography demonstrated an eight mm aneurysm of the internal carotid artery bifurcation, a region clearly normal in the previous angiography.

Case Report

A 49-year-old woman was found beside her bicycle, presumably after an accident. There was no evidence of severe trauma. She was disorientated and upon arrival at the hospital had seizures and a decreased level of consciousness. A brain CT scan performed before admission to our institution (figure 1) revealed a subarachnoid haemorrhage (SAH), with blood in the basal cisterns as well as in the Sylvian fissures –more on the right side- and cortical sulci. In addition there was a right frontal intracerebral haematoma.

On suspicion of aneurysmal SAH the patient underwent four-vessel cerebral angiography the following day. However, the study was negative (figure 2A and B). Nine days after the haemorrhage a control CT scan (figure 3) showed that most of the subarachnoid blood had been resorbed. Thirty-three days after the

initial bleeding the patient was found unresponsive in the ward, with spontaneous movements of the right arm and a dilated left pupil. A new CT scan (figure 4) showed a fresh SAH with most of the blood in the right Sylvian fissure. Due to her poor clinical condition a second cerebral angiography was delayed until ten days later when she had recovered sufficiently. The second angiography (figure 5A and B) revealed an eight mm large aneurysm of the right internal carotid artery bifurcation, in a region well examined and clearly normal in the previous angiography. A ventricular drainage was inserted and the aneurysm was clipped. Postoperatively she developed an infarction corresponding to the territory of the right frontal ascending artery. She also had a myocardial infarction. There was no postoperative angiography.

Discussion

Intracranial aneurysms are the primary cause of spontaneous SAH and they are usually demonstrated on cerebral angiography.¹ In some cases (6 to 30%) the initial angiography does not show any aneurysm.² In those cases it is not uncommon to repeat the angiography, usually after about two weeks. In published series repeat angiography has demonstrated an aneurysm not seen in the first examination in 1.8 to 36% of the patients^{2,3}. This may be due to a variety of different reasons, the most widely

Figure 1 CT scan at admission revealed a subarachnoid haemorrhage with blood in the basal cisterns, Sylvian fissures and cortical sulci and a right frontal intracerebral haematoma. In the right Sylvian fissure there appears to be a rounded object with a peripheral density slightly higher than the surrounding blood.

accepted being vasospasm, clotting of the aneurysm at the time of bleeding and last but probably not least interpretative errors and image quality problems^{1,2,4-7}. Mass effect from haematomas

has also been postulated as a possible cause⁸ but it does not seem likely that a haematoma could compress an arterial aneurysm, since it would have to create a pressure superior to the arterial pressure.

In our case we observed no vasospasm, the intracerebral haematoma was small and the main portion was not immediately adjacent to the aneurysm. Additionally, despite a technically good angiography there was no contrast filling of the aneurysm on the first angiogram.

Thus, the aneurysm either was not present during the first angiography and developed later, or it did not fill with contrast media. Since neither the aneurysm location⁹, nor the distribution of the SAH suggest a traumatic origin, the latter explanation appears more probable. In addition, a rupture of an aneurysm at the top of the ICA siphon could very well be the origin of the frontal intracerebral haematoma. Also, in the first CT scan, performed without contrast injection, a rounded shape is faintly visible in the same location (figure 1).

Consequently it seems likely that the aneurysm thrombosed spontaneously after the first SAH and then recanalized and ruptured a second time. One could speculate about an ongoing vascular dysplastic process with a haemorrhage, late emergence of an aneurysm and re-haemorrhage. However, apart from the unusual patient history there was no indication of such a process.

There are reports that MRI may be useful in the work-up of patients with SAH and normal

Figure 2 A,B) Cerebral angiography PA and lateral view. Injection into the right internal carotid artery at admission demonstrated a normal carotid bifurcation.

Figure 3 Control CT scan performed nine days after the first haemorrhage showed partial resorption of the SAH and oedema around the frontal haematoma. There is a rounded structure with X-ray attenuation similar to thrombosis in the place where the ICA bifurcation aneurysm was found during the subsequent angiography.

Figure 4 A CT scan performed three weeks after the first haemorrhage demonstrated a second subarachnoid haemorrhage. There was also blood in the olfactory sulcus.

angiography¹⁰⁻¹². This patient was however never investigated with MRI.

In conclusion even a high quality angiography may occasionally be insufficient to demonstrate

even a fairly large aneurysm. In those cases where there is a strong clinical suspicion of aneurysmal haemorrhage further investigation with MRI and repeat angiography may be warranted.

Figure 5 A,B) Cerebral angiography PA and lateral view. Injection into the right internal carotid artery demonstrated the 8mm large aneurysm at the ICA bifurcation.

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