CASE REPORT

Subarachnoid haemorrhage from the rupture of two intracranial aneurysms in the same day: a rare occurrence, not a myth

Jerome Laval Cyril Dubois, Otto Major

Department of Neurosurgery,
Royal Victoria Infirmary,
Newcastle Upon Tyne, UK

Correspondence to
Dr Jerome Laval Cyril Dubois,
cyril7@doctors.org.uk

Accepted 30 January 2016

SUMMARY

The incidence of intracranial aneurysms is approximately 6% throughout the world, although it can be more prevalent in some populations than others. Subarachnoid haemorrhage from a single aneurysm rupture can be devastating, with approximately 35% of patients not regaining consciousness after the initial bleed. In some cases, patients will have two or more aneurysms at presentation, and only one of them will have bled. Having two or more aneurysms that have bled within a few minutes or few hours of one another, is almost unheard of. Our case report is based on a patient who presented with subarachnoid haemorrhage from two ruptured aneurysms, confirmed intraoperatively and corroborated by the available, preoperative, standard head CT scan, which can be performed in any hospital with CT scanning facilities, and CT angiogram.

BACKGROUND

Acute aneurysmal subarachnoid haemorrhage is a significant event which, in addition to being life-threatening, can also be life-changing. In most cases, a single aneurysm is found on angiography, but up to 20% of patients with subarachnoid haemorrhage have multiple aneurysms.¹ On CT imaging and subsequent angiography in the latter cases, one aneurysm is found to have ruptured, and the other (s) happen to be incidental. The incidence of two ruptured aneurysms during the same presentation in healthy individuals is extremely rare. It is so rare that to many, it is a myth, illustrated by the fact that only two case reports have been published to date on this subject in the past 40 years. The majority of cases in many countries are now treated endovascularly, and this form of treatment does not allow the direct visual confirmation of whether an aneurysm has ruptured or not, because it does not show the actual rupture point on the aneurysm sac or neck. With surgical clipping procedures on the other hand, the rupture point can be seen clearly through the operating microscope. As a result, with endovascular treatment, it is possible to miss an aneurysm that has ruptured and this makes the awareness that a patient can present with two ruptured aneurysms at the same time even more important.

CASE PRESENTATION

We present the case of a fit and well, 51-year-old-woman, who was on no regular medication and had no family history of note, and no

family history of subarachnoid haemorrhage. She was referred to our tertiary referral centre with a classical history of sudden onset, severe, occipital and bi-frontal headaches and vomiting. Her Glasgow coma scale (GCS) score in the referring district hospital was 14, losing a point for slight confusion (V4).

INVESTIGATIONS

A CT scan showed a subarachnoid haemorrhage (figure 1), and a left temporal intracerebral haematoma.

She was urgently transferred to our centre. On arrival, her GCS was 10 (E3 V1 M5), and it was evident that she had become aphasic. An urgent repeat CT scan of her head showed evidence of further bleeding, with an increase in the size of the left temporal intracerebral haematoma, (figure 2).

An urgent CT angiogram was performed at the same time and demonstrated a left middle cerebral artery (MCA) aneurysm and a left posterior communicating artery (Pcomm) aneurysm, (figure 3).

TREATMENT

Our patient deteriorated fairly quickly to a GCS of 7 (E2 V1 M4), with very little movement of her

Figure 1 Unenhanced CT scan showing subarachnoid haemorrhage.

To cite: Dubois JLC,
Major O. *BMJ Case Rep*
Published online: [please
include Day Month Year]
doi:10.1136/bcr-2015-
213027

Figure 2 Repeat CT scan showing evidence of a moderately large, left temporal intracerebral haematoma.

right side, and regular apnoeic episodes. She was intubated and ventilated and taken urgently to the operating theatre through the night. A left pterional craniotomy was performed, and the intracerebral haematoma decompressed. In addition to the preoperative imaging, under the operating microscope, there was unequivocal evidence that the left MCA aneurysm had ruptured during the day: it was clipped. Throughout the clipping procedure, the systolic blood pressure never exceeded 100 mm Hg. As the position of the clip was examined to ascertain no undue stenosis of the distal arteries and no aneurysmal neck remnant, there was a sudden and profuse gush of arterial blood that required a second sucker to allow visualisation of the point of bleeding. This turned out to be from the left Pcomm aneurysm, which until then, was not suspected to have bled. Intraoperatively however, there was fresh evidence that it had

Figure 3 Blood distribution around left middle cerebral artery and left posterior communicating artery aneurysms.

ruptured during the same day, and an aneurysm clip was successfully applied across its neck.

OUTCOME AND FOLLOW-UP

On waking up, our patient obeyed commands, and was able to move her right side better, but it was still weak. A review of the preoperative imaging showed that the bulk of the left temporal intracerebral haematoma originated from the left MCA aneurysm (figures 1–3). In addition, it also showed a small intracerebral haematoma around the left Pcomm aneurysm (figures 1 and 3). This was initially construed to represent subarachnoid blood tracking around the outline of the Pcomm aneurysm, but with the unequivocal finding of the rupture of that aneurysm during surgery, we realised that our patient had had 2 different aneurysms that ruptured simultaneously, or within a few minutes of each other.

DISCUSSION

After the Pcomm aneurysm had been clipped, the hole in the fundus representing the site of rupture was examined. The wall was thinned-out around the hole, and there was thrombus adherent to both the internal and external aspects of the wall. The thrombus was very stuck to the wall especially on one side of the hole, on both the inside and outside, and could not be easily removed with our small suction. On that side, it also spanned the hole in the fundus: the thrombus stuck to the outside wall seemed to be joined with the thrombus inside. This convinced us that it could not just be a thrombus caused by the subarachnoid blood, that came from the left MCA aneurysm, adhering to the wall of the left Pcomm aneurysm; it would not have got inside the Pcomm aneurysm as well. The way it was organised and adherent to the wall suggested to us that it had been there for some time, and could not have been formed during the operation. When we reviewed the preoperative pictures, we became convinced that the Pcomm aneurysm had in all likelihood ruptured at some point during the day, and not just during the operation. The rupture during the operation, at

Learning points

- ▶ The old adage that a subarachnoid haemorrhage can only come from the rupture of one aneurysm, in the presence of multiple aneurysms in the same patient, is true in the vast majority of cases. However, in a small minority of cases, it is not correct.
- ▶ With modern high-definition imaging modalities, it is easier to identify areas of bleeding that would have been difficult to distinguish on old CT scans or MRI scans and also easier to identify multiple intracranial aneurysms. Accordingly, more cases may well come to light.
- ▶ Most aneurysms are now treated endovascularly and in the presence of subarachnoid haemorrhage, this method of treatment does not allow unequivocal confirmation that an aneurysm has not ruptured.
- ▶ In the presence of multiple aneurysms, decisions to treat some aneurysms and not others, must be made carefully, and with a thorough review of the imaging available, for more than one aneurysm could be the cause of a particular bleeding pattern, and deciding to treat one aneurysm and not another that has also ruptured, can mean the difference between life or death and between a good or a poor quality of life.

a lower than normal systolic blood pressure, was because there had already been a breach in the integrity of the aneurysm wall during the course of the day.

Although most patients who present with aneurysmal subarachnoid haemorrhage have a single aneurysm on angiography, there are still an appreciable number who will have multiple aneurysms at presentation, but with only one aneurysm that has bled during any single presentation.¹ Having two aneurysms that have bled during the same presentation is extremely rare.

There are only two published cases of simultaneous rupture of two intracranial aneurysms in the literature from 1980 to 2015, in non-syndromic patients. Tsurushima *et al*² report on the case of a 68-year-old-man who presented with a ruptured anterior communicating artery aneurysm and ruptured MCA aneurysm, confirmed intraoperatively, after initial suggestions by imaging modalities, which revealed multiple other aneurysms. They point out that the assumption of a single aneurysm rupture in a patient with multiple aneurysms may be erroneous. Havakeshian *et al*³ report on a patient who presented with two MCA aneurysms, with two separately-localised aneurysm-associated intracerebral haemorrhages. Rupture of both

aneurysms was again confirmed during surgery and both aneurysms were clipped.

There are syndromes that predispose patients to having multiple aneurysms which can rupture during their existence, for example, in autosomal dominant polycystic kidney disease. However, even in these syndromes, the ruptures do not occur at the same time, or in the same presentation. Our patient had no such syndrome. In fact, she was perfectly fit and well.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Nehls DG, Flom RA, Carter LP, *et al*. Multiple intracranial aneurysms: determining the site of rupture. *J Neurosurg* 1985;63:342–8.
- 2 Tsurushima H, Meguro K, Narushima K, *et al*. [Simultaneous rupture of multiple intracranial aneurysms: a case report]. *No Shinkei Geka* 1996;24:385–8.
- 3 Havakeshian S, Bozinov O, Burkhardt JK. Simultaneous rupture of two middle cerebral artery aneurysms presented with two aneurysm-associated intracerebral hemorrhages. *J Neurol Surg A Cent Eur Neurosurg* 2013;74(Suppl 1):e233–6.

Copyright 2016 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow