Neurovascular lessons from a pair of identical twins with cerebral aneurysms

P Sharma, M J Brown

Abstract
A pair of hypertensive identical twins are reported, one of whom was non-compliant with her antihypertension medication, and after a subarachnoid haemorrhage was found to have multiple cerebral aneurysms. The other asymptomatic compliant twin was noted to have only a single small cerebral aneurysm. As both identical twins are likely to share the same cerebral vascular architecture it is suggested that good control of blood pressure contributed to the cerebral vascular integrity of the asymptomatic twin. This is the first report on the role of blood pressure in the formation of cerebral aneurysms and provides insights for an alternative approach to the controversial management of asymptomatic cerebral aneurysms.

Keywords: cerebral aneurysm; identical twins; subarachnoid haemorrhage; hypertension

Subarachnoid haemorrhage (SAH) is a significant cause of stroke and is associated with a case fatality rate of 40%–50%.1 The angiographic prevalence for unruptured intracranial aneurysms varies between 3.7%–6%.2 Although smoking is an accepted risk factor, the role of hypertension has only recently been highlighted in a meta-analysis.1 These authors predicted that a reduction in blood pressure might result in a decreased incidence of SAH.1 Our case report demonstrates for the first time the importance of the role of hypertension in the formation and rupture of intracranial aneurysms.

Case report
A 44 year old white factory supervisor was referred for high blood pressure, apparently present since 29 years of age. Her mean clinic blood pressure was 177/99 mm Hg, random cholesterol 6.3 mmol/l, normal urea and electrolytes, vanillylmandelic acid 18.0 µmol/24 hours (normal range 12–44), with a normal electrocardiogram and renal ultrasound. Her identical twin sister and two elder brothers were all hypertensives. Their mother suffered from two strokes at 77 and 80 years of age. Antihypertensive treatment with β-blockade and calcium channel blockade was titrated until a clinic reading of 124/74 mm Hg was achieved on the combination of atenolol 50 mg and amlodipine 5 mg once daily.

The patient missed follow up appointments, and 18 months later was admitted with a SAH. Computed tomography confirmed a large right frontotemporal intracerebral haematoma and a conventional angiogram revealed a giant right (and a smaller left) middle cerebral artery aneurysm as well as a right internal carotid aneurysm (fig 1). The right middle cerebral artery aneurysm was clipped. On recovery the patient admitted complete non-compliance over several months with her antihypertensive medication.

The asymptomatic identical twin sister who was known to be more compliant with her medication was reviewed and noted to have a blood pressure of 125/70 mm Hg on treatment. In view of the multiple aneurysms in her sister, magnetic resonance arteriography (MRA) was undertaken on this patient which suggested a small aneurysm in the right cavernous sinus. A formal cerebral angiogram was inconclusive but a repeat arteriogram one year later identified a 2.8 mm aneurysm on the right
Learning points
- Careful control of blood pressure may reduce both the development and incidence of SAH in at-risk individuals.
- High blood pressure is a risk factor for SAH but the greatest risk is a family history.
- Intracranial aneurysms can occur in families with the most frequent relationship being index patient to sibling.
- Small intracranial aneurysms (<10 mm) have a much lower chance of rupture compared with larger ones.
- Screening for asymptomatic aneurysms is controversial and should be undertaken on a patient-to-patient basis after a detailed family history.

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References
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