Reminder of important clinical lesson

Subarachnoid haemorrhage in undiagnosed secondary hypertension: back to basics

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Summary

Aortic coarctation (AC) is a significant cause of secondary hypertension and is diagnosed in childhood in the vast majority of patients. Mild or moderate coarctation may exist undetected into adult life, when it usually presents due to its sequelae. The authors present the case of a 20-year-old woman, previously extensively investigated for severe hypertension, who was admitted following severe, sudden-onset headache. CT scanning of the head showed the presence of subarachnoid blood (SAH), with subsequent CT angiography revealing two intracerebral aneurysms as the source. On attempting to catheterise the femoral artery her pulses were noted to be weak and during passage of the catheter she was found to have significant AC. The aneurysms were duly treated with detachable coils and the clinical course with regard to the SAH was unremarkably safe for high-pressure headache.

BACKGROUND

Data suggest that aortic coarctation (AC) is a significant risk factor for subarachnoid haemorrhage in young patients; the incidence of subarachnoid blood (SAH) in patients with AC is reported as 12–23%. The effects of SAH range from the trivial to the fatal and treatment of AC with subsequent control of blood pressure, may reduce the risk of SAH. Young patients with subarachnoid haemorrhage should be thoroughly investigated particularly if they have other associated features such as hypertension as in our case. If missed, it can lead to long-term disability in young age. Our patient was thoroughly investigated by the physicians and obstetricians (during her pregnancies) and was diagnosed as having essential hypertension and pre-eclampsia.

CASE PRESENTATION

A 20-year-old woman was admitted following a sudden onset, occipital headache that reached maximal intensity within seconds and was not relieved by simple analgesia. She had presented with similar symptoms to a different unit 2 weeks ago and had been discharged with a diagnosis of migraine. Her Glasgow coma scale score was 15 and examination on admission was reported as normal.

Her medical history was of essential hypertension, extensively investigated and pre-eclampsia during both of her two pregnancies. Current medication was doxazosin, verapamil and nifedipine. She was a smoker of 10–20 cigarettes per day. There was no known family history relevant to this case.

INVESTIGATIONS

Routine observations showed her systolic blood pressure to be between 150 and 180 mm Hg on the day of admission. Routine blood tests, including full blood count, renal function and electrolytes and coagulation screen, were normal.

CT scan showed blood in the subarachnoid space; CT intracerebral angiogram revealed an aneurysm of the posterior communicating artery (PCOM) and she was scheduled for coiling. At the start of the procedure on clinical examination it was noted that patient had weak femoral pulses and on passage of the catheter through the aorta an obstruction was encountered, demonstrated to be a coarctation. Cerebral angiography again showed the right PCOM aneurysm and in addition a small pericallosal aneurysm. The PCOM aneurysm was treated with detachable coils. The patient experienced headache following the procedure and therapeutic lumbar puncture was performed on four occasions, each demonstrating raised cerebrospinal fluid pressure. Echocardiogram (ECHO) revealed simple coarctation, with a pressure gradient of 107 mm Hg and a bicuspid aortic valve. Magnetic resonance angiogram (MRA) of the thoracic aorta was performed (figure 1).

Since 2006, investigations have included renal ultrasound scan, serum glucocorticoid, mineralocorticoid and catecholamine levels, ECHO, dexamethasone suppression test, 24-h urinary norepinephrine, metadrenaline and cortisol levels, and MRA of the renal vessels. Aside from left ventricular hypertrophy and mitral regurgitation on ECHO and retinal haemorrhage on funduscopy, investigations were normal.

TREATMENT

Nifedipine was stopped and the patient was commenced on four-hourly nimodipine. Coiling of the PCOM aneurysm was performed successfully. Therapeutic lumbar puncture relieved the headache on four occasions; after the last, the headache was treated with opioid analgesia. Specialist review of the MRA (thoracic aorta) is awaited – following which, surgical or endovascular intervention is planned. Lisinopril and bisoprolol were added to the antihypertensive

Figure 1 Showing coarctation of aorta distal to origin of left subclavian artery; 3D images demonstrated a very tight, almost pinhole coarctation in the typical site just beyond the left subclavian artery. The arch also looks slightly hypoplastic with a luminal diameter of around 16 mm. At level of coarctation, there are prominent collateral vessels confirming this to be haemodynamically significant. Immediately post the coarctation, there is slight ectasia of the aorta measuring up to just under 19 mm. High-grade stenosis approximately 2–3 cm distal to left subclavian artery origin. Very difficult to identify the lumen because of the degree of stenosis. Prominent collaterals inserting into the proximal descending aorta immediately beyond its stenosis. Arch is relatively hypoplastic. Measurements are as follows: ascending aorta 3.25 cm, arch 15 mm, site of minimal lumen approximately 4 mm. Immediately distal to the stenosis proximal descending aorta measures around 18 mm.

regimen with good effect. On the day of discharge the systolic blood pressure was 130–140 mm Hg.

OUTCOME AND FOLLOW-UP

Follow-up was arranged with the cardiologists, who will follow-up the patient for further treatment of her coarctation and associated hypertension.

DISCUSSION

Data suggest that AC is a significant risk factor for subarachnoid haemorrhage in young patients; the incidence of SAH in patients with AC is reported as 12–23%. The effects of SAH range from the trivial to the fatal, and treatment of AC,

with subsequent control of blood pressure, may reduce the risk of SAH.

While the association of AC and intracerebral aneurysms is well known, this case is unusual in that the patient was extensively investigated for hypertension for 2.5 years prior to subarachnoid haemorrhage, finally being diagnosed with essential hypertension. What is more surprising is that patient underwent two pregnancies, giving birth to two healthy babies during which she was labelled with pre-eclampsia. The case illustrates the dangers of labelling hypertension in young patients as ‘essential’ especially when attempts at control with multiple therapies are only partly successful.

Hypertension is the major risk factor. Patients with AC have 12–23% risk of having bleed from intracerebral aneurysm; in contrast, 1.9% of the patients who present with subarachnoid haemorrhage have AC.^{1 2} Subarachnoid haemorrhage is more common at an early age in patients with coexistent AC with mean age of 25 years.³

Coarctation of aorta is classified in three main types.⁴

- ▶ Type A: distal to left subclavian artery.
- ▶ Type B: between left carotid artery and left subclavian artery.
- ▶ Type C: proximal to left carotid artery.

Type B is the most common where as the type C is the rarest one. Coarctation of aorta is mostly associated with the other coexistent cardiac anomalies. Our case is unique as MRA showed isolated type C coarctation with no coexistent cardiac anomalies confirmed by ECHO and MRA.

Learning points

- ▶ Patients presenting with uncontrolled hypertension at a young age should be thoroughly examined clinically with special attention to be given to distal pulses and difference in blood pressure.
- ▶ Patient should be thoroughly investigated to find the cause of hypertension and should not be labelled as essential hypertensive till every possible cause has been ruled out.
- ▶ Clinical examination still remains the gold standard in order to direct one towards the diagnosis.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Mercado R**, López S, Cantú C, *et al*. Intracranial aneurysms associated with unsuspected aortic coarctation. *J Neurosurg* 2002;**97**:1221–5.
2. **Matson DD**. Intracranial arterial aneurysms in childhood. *J Neurosurg* 1965;**23**:578–83.
3. **Serizawa T**, Satoh A, Miyata A, *et al*. Ruptured cerebral aneurysm associated with coarctation of the aorta—report of two cases. *Neural Med Chir (Tokyo)* 1992;**32**:342–5.
4. **Sibley E**, Doroshov RW, Milliken JC, *et al*. Subarachnoid hemorrhage and isolated atresia of the aortic arch. *J Emerg Med* 2002;**22**:179–83.

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