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A COMPLICATED CASE OF AN INTRACRANIAL EPIDERMOID CYST

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ABSTRACT

Intracranial vasospasm and ischaemic cerebrovascular accident (CVA) following surgical removal of intracranial tumours are rare. To our knowledge, vasospasm has been reported in only two cases following surgery, with one occurring two weeks post-surgery and the other after four days. However, ischaemic CVA following surgery has not been previously reported. We present a case in which vasospasm resulted in cerebral infarction immediately postoperatively. MRI and serial magnetic resonance angiography (MRA) revealed no flow in the internal carotid artery and middle cerebral artery, with ultrasound showing multiple thrombi in the internal carotid artery and stenotic features in the left middle cerebral artery.

KEYWORDS

Epidermoid cyst, intracranial, vasospasm, cerebrovascular injury

LEARNING POINTS

- Intracranial vasospasm and ischaemic cerebrovascular accident (CVA) following surgical removal of intracranial tumours are rare.
- We report a case of ischaemic CVA and vasospasm following resection of an intracranial epidermoid cyst. Although the tumour was completely resected, vasospasm and ischaemic injury led to significant neurological deficits.
- Perioperative corticosteroids may be beneficial in reducing the incidence of vasospasm and ischaemic events, though their efficacy can vary.

INTRODUCTION

Epidermoid cysts are benign, congenital tumours of ectodermal origin, typically found in the intradural space, particularly in the cerebellopontine angle. Although these tumours are rare, comprising approximately 0.3–1.8% of primary intracranial tumours, they often pose significant challenges during surgical resection due to their propensity to adhere to critical neurovascular structures[1-2]. The content of the cyst consists of acellular keratin debris and cholesterol inclusions. Despite their slow growth, they are

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associated with a higher risk of complications such as aseptic meningitis, hydrocephalus, neural deficits and vascular injury, often resulting from the manipulation and breakdown of cystic contents during resection[3-4]. The treatment of choice is radical surgical resection, although complete removal is only possible in 50–80% of cases, with recurrence rates ranging from 1–54%[5-6].

CASE DESCRIPTION

A 41-year-old female with a history of hypertension and congenital epidermoid cyst was referred to our institution two weeks post-craniotomy. The cyst had been monitored via serial MRI over the years, with the last MRI conducted in June 2023 revealing a suprasellar intradural extra-axial cystic lesion. The lesion caused displacement of the right frontal horn of the lateral ventricle with minimal mass effect on the third ventricle. The decision to proceed with resection was made following the patient's report of visual disturbances.

Surgery was performed in July 2023 via a pterional-transsylvian approach. The operation was complicated by haemorrhage, requiring the transfusion of packed red blood cells, platelets and fresh frozen plasma. The excision was only partial due to the location of the lesion behind the internal carotid artery, and due to bleeding complications. Histopathologic analysis revealed lamellated keratin material without epithelial elements, consistent with an epidermoid cyst.



Figure 1. CT confirmed residual tumour causing mass effect and right frontal infarction.

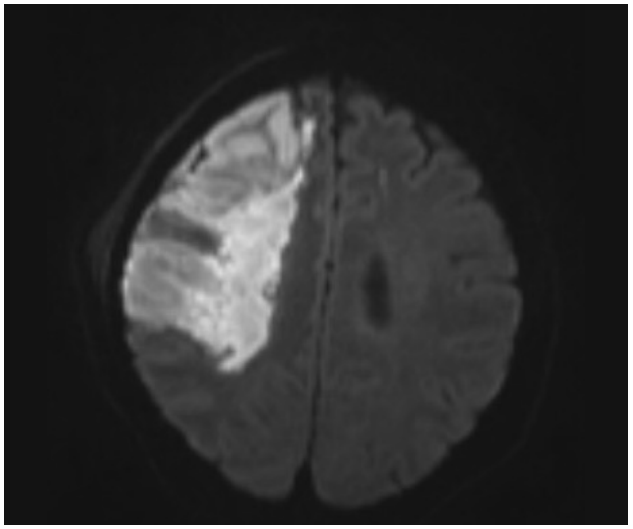


Figure 2. MRI showing thrombosis of the petrous segment of the right middle internal carotid artery, diffusion restriction in the right cerebral hemisphere suggestive of ischaemia, and minimal subarachnoid haemorrhage.

Postoperatively, the patient was admitted to the ICU, where she was found to have left upper extremity weakness. A CT of the brain showed a postoperative cystic lesion suggestive of an abscess or residual tumour, along with possible right frontal infarction. Two days later, the patient developed left-sided hemiplegia, and a repeated CT confirmed a residual tumour causing mass effect and right frontal infarction *(Fig. 1)*. An urgent craniotomy was performed at our institution on 16 July 2023, where the brain was noted to be under tension. A collection under the muscle was drained, and the ear was internally lacerated. Debulking was performed, but the internal cerebral vein was infarcted.

On postoperative day one, an MRI of the brain with MRA and magnetic resonance venography (MRV) was performed. The MRI showed thrombosis of the petrous segment of the right middle internal carotid artery, diffusion restriction in the right cerebral hemisphere suggestive of ischaemia and minimal subarachnoid haemorrhage *(Fig. 2)*. MRA/MRV revealed significantly reduced flow in the right middle cerebral artery and right internal carotid artery, as well as stenosis in the left middle cerebral artery and both anterior cerebral arteries *(Fig. 3)*. Therapeutic anticoagulation with nimodipine was initiated. Autoimmune workup was negative except for positive SSA and RO-52 antibodies. Hypercoagulable workup, including factor V Leiden and MTHFR mutations, was negative, though tests for protein C and protein S were pending.

DISCUSSION

Intracranial epidermoid tumours account for approximately 1% of all intracranial tumours and are benign but slow growing. Surgical resection remains the treatment of choice, despite challenges due to the tumour's proximity to critical neurovascular structures[7]. Postoperative complications are common and include aseptic meningitis, cranial nerve VII and VIII paresis, pseudomeningocele, dysarthria, acute subdural haematoma and subdural hygroma[8].

Vasospasm is an extremely rare complication post-surgery for epidermoid cysts. In a case reported by Aw et al., a 43-year-old with left cerebellopontine angle epidermoid tumour developed vasospasm two weeks after surgery, leading to hemiparesis and confusion[9]. In contrast, our patient presented with symptomatic vasospasm on the first postoperative day, despite complete resection. Although Housley et al. reported a similar case of vasospasm in a 10-year-old post-epidermoid cyst resection, where symptoms resolved after steroid administration, our patient did not respond to steroids[10].

The risk of ischaemic events post-surgery is increased when vasospasm is present. Our case highlights the importance of

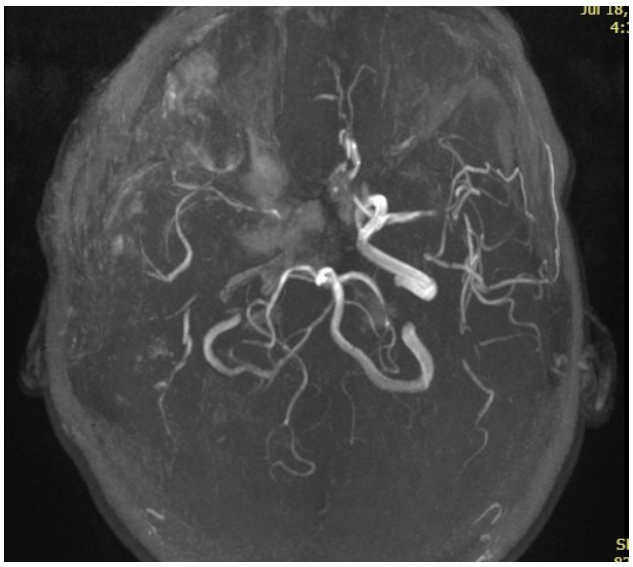


Figure 3. MRV/MRA revealed significantly reduced flow in the right middle cerebral artery and right internal carotid artery, as well as stenosis in the left middle cerebral artery and both anterior cerebral arteries.

early identification and management of vasospasm. In such cases, early intervention with steroids may help mitigate the risk of ischaemic damage, as they can reduce inflammation and potentially limit the severity of vascular constriction. A review of the literature suggests that perioperative corticosteroid use may be beneficial in preventing or reducing postoperative vasospasm, particularly in patients undergoing neurosurgical resection of tumours near critical vascular structures. Studies have shown that steroids help in managing vascular inflammation and improving cerebral blood flow[11-12]. This benefit, however, requires careful monitoring as not all patients will respond, as seen in our case.

CONCLUSION

This case demonstrates a rare and severe complication of ischaemic CVA and vasospasm following resection of an intracranial epidermoid cyst. Although the tumour was completely resected, vasospasm and ischaemic injury led to significant neurological deficits. Perioperative corticosteroids may be beneficial in reducing the incidence of vasospasm and ischaemic events, though their efficacy can vary. This case underscores the importance of vigilant monitoring in the postoperative period to identify and treat vasospasm early, thus improving patient outcomes.

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