



Endovascular management of residual intracranial aneurysm after neurosurgical clipping: a case report

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Introduction and importance: Endovascular coiling can be used to treat residual intracranial aneurysms with prior neurosurgical clipping in aneurysmal subarachnoid haemorrhage. Aneurysmal subarachnoid haemorrhage is a rare subtype of stroke which can be life-threatening.

Case presentation: The authors herein report a case of successful management by endovascular coiling of residual intracranial aneurysm post-surgical clipping in a 60-year-old male who was previously diagnosed as diffuse subarachnoid haemorrhage (SAH) Fisher grade 4. On examination, he had a Glasgow Coma Scale 14/15 with verbal confusion present and was hypertensive.

Clinical discussion: Aneurysmal subarachnoid haemorrhage is a rare and serious type of stroke and may result in dependency. Endovascular coiling can be used to treat residual intracranial aneurysms with prior neurosurgical clipping. It further helps in decreasing dependency and mortality.

Conclusion: Endovascular coiling is a good treatment option for patients who have undergone neurosurgical clipping as their prior surgical attempt in aneurysmal subarachnoid haemorrhage. An endovascular approach may further lead to a better prognosis.

Keywords: endovascular aneurysm repair, intracranial aneurysm, subarachnoid haemorrhage

Introduction

Endovascular coiling can be used to treat residual intracranial aneurysms^[1]. Endovascular coiling of intracranial aneurysm reduces the risk of dependency and mortality in comparison to neurosurgical clipping^[2,3]. Aneurysmal subarachnoid haemorrhage is a rare subtype of stroke that can be life-threatening. It primarily affects the age of 55 years and may result in dependency^[4,5]. The second surgical attempt of clipping an aneurysm where its complete obliteration could not be achieved previously can be challenging. Despite the risk of complications, an additional surgical procedure should be carried out to achieve complete closure of the aneurysm, as the remaining remnants are considered to be potentially dangerous^[6].

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HIGHLIGHTS

- Endovascular coiling is safe to treat residual intracranial aneurysms in patients with prior neurosurgical clipping
- Aneurysmal subarachnoid haemorrhage is a rare and serious subset of stroke that primarily affects the age of 55 years and may result in dependency.
- Endovascular approach to residual intracranial aneurysm decreases dependency and mortality and adds substantial increase in quality of life.

Hereby, we report a case of successful management by endovascular coiling of residual intracranial aneurysm post-surgical clipping in a 60-year-old male who was previously diagnosed as diffuse Subarachnoid haemorrhage (SAH) Fisher grade 4. This case report was reported based on the SCARE guidelines^[7].

Case presentation

A 60-year-old moderately-built male presented to the emergency department of our tertiary care centre with complaints of headache and decreased level of consciousness for 5 days. It was associated with loss of appetite. He had no history of trauma, abnormal body movement, and bowel incontinence. He had a Foley's catheter *in situ*.

He had visited a health centre previously where he was diagnosed with diffuse subarachnoid haemorrhage Fisher grade 4 by non-contrast computed tomography (NCCT) of the head and had anterior communicating (ACoM) aneurysm on computed tomography angiogram (CTA). He also gave a past medical history of clipping of the ACoM aneurysm twelve years back. He was hypertensive and was under medications. He didn't smoke or

consume alcohol. He had no known history of food and drug allergies. There was no other medical and surgical history.

On examination, the patient was moderate-built. He was not well-oriented to time, place, and person. His body temperature was 98°F, blood pressure 148/92 mmHg, respiratory rate 20/min, pulse 80 beats per min, oxygen saturation 96% under room air, and general random blood sugar (GRBS) 187 mg/dl.

On neurological examination, he had a Glasgow Coma Scale (GCS) of 14/15 with verbal confusion present. Motor Power grade was 5/5 in all four limbs with normal bulk and tone. The

bilateral plantar reflex was normal. He had a normal bilateral pupil size of 2 mm. Cranial nerves were intact with the absence of focal deficit and signs of meningism.

The patient was sent for digital subtraction angiography (DSA) of the cerebral vessel which showed a small residual outpouching at the region of the anterior communicating artery measuring 2.6×1.8 mm with a neck measuring 1.3 mm (Fig. 1) Outpouching was located adjacent to the site of the previous clipping.

The patient underwent endovascular coiling of the aneurysmal sac. This resulted in clinical improvement. He was clinically and

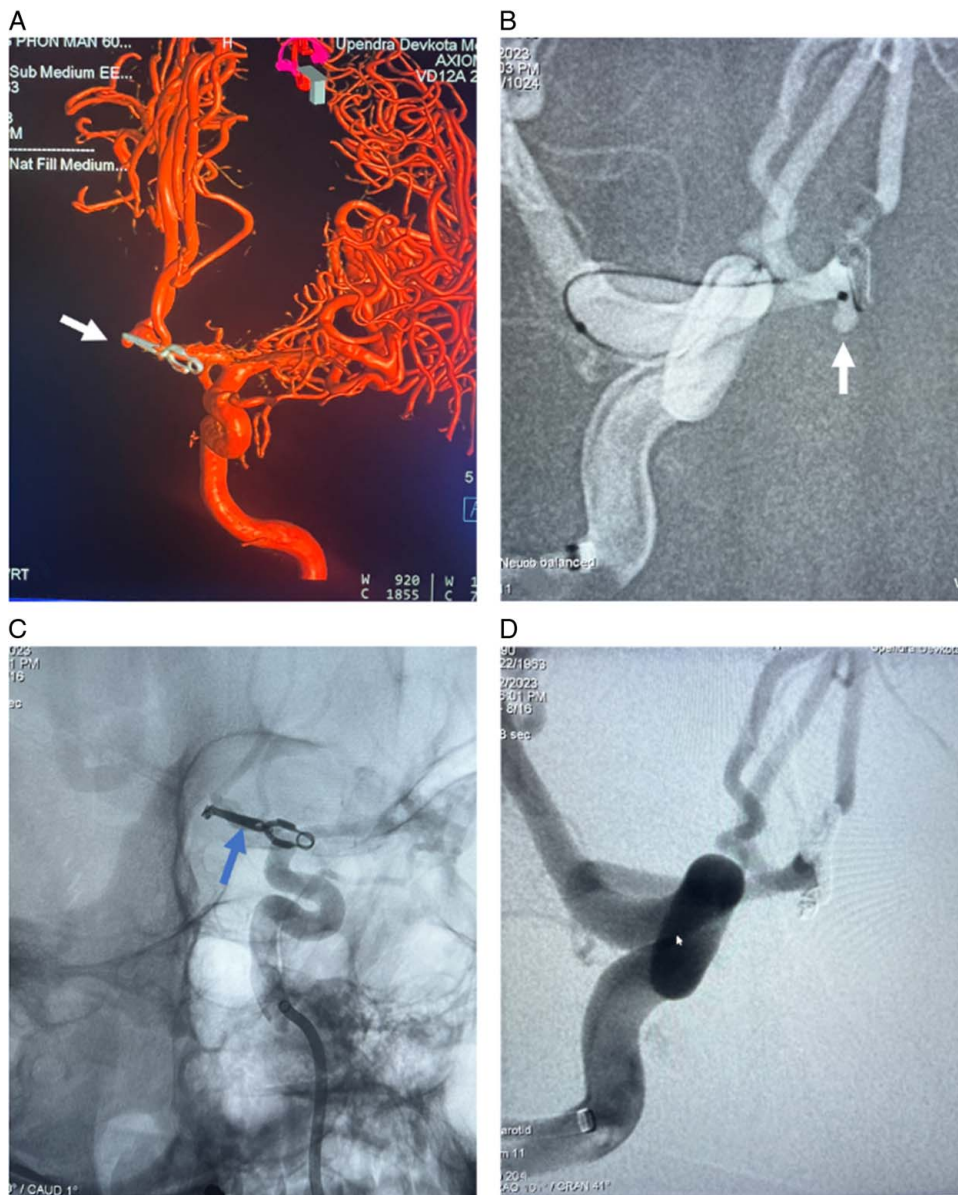


Figure 1. (A) Digital subtraction angiography (DSA) showing the clip *in situ* with residual aneurysm sac at the region of Anterior communicating artery (arrow). (B) Roadmap image showing microcatheter tip at the neck of the aneurysm (arrow). (C, D) Fluoroscopy and post-procedure DSA images showing the clip *in situ* and coil mass within the aneurysm sac (arrow).

hemodynamically stable during the postoperative period and hospital stay for 5 days. However, we could not do a long-term follow-up with the patient after he was discharged from the hospital.

Discussion

Subarachnoid haemorrhage is a subtype of stroke associated with hypertension^[4,5]. It is a rare and serious type of stroke that primarily affects the age of 55 years and may result in dependency. The rupture of an intracranial aneurysm is the main underlying cause^[5].

In our case report, the patient presented with chief complaints of headache and decreased level of consciousness for 5 days. He was hypertensive and under medication. As indicated by his past medical history, he underwent surgical clipping of his left anterior communicating aneurysm 12 years ago. Currently, his DSA revealed a small residual outpouching adjacent to the site of the previous clipping so the patient was subjected to endovascular coiling as a management approach without any further complications.

Treatment of residual or recurrent aneurysms following surgical clipping poses a challenge and most surgeons opt to refrain from undertaking a second surgical intervention^[1]. However, Drake *et al.*^[6] recommend that an additional surgical procedure should be carried out to achieve complete closure of the aneurysm, as the remaining remnants are considered to be potentially dangerous. Hence, the endovascular approach is a favourable treatment choice for patients who cannot achieve complete obliteration of the aneurysm through surgical clipping. The postoperative period after this intervention has been found to be uneventful in all patients and the angiograms conducted revealed that the aneurysms were completely obliterated without any signs of recanalization^[1].

For patients with ruptured intracranial aneurysms who are eligible for both, endovascular coiling is more likely to lead to independent survival compared to neurological clipping. This survival advantage persists for at least 7 years with a significant decrease in the relative risk of death or dependency^[2].

An 18-year follow-up of the UK cohort of the International Subarachnoid Aneurysm Trial (ISAT) revealed no notable differences in the rates of increased dependency alone between the two groups. Still, the possibility of death was significantly greater in the patients who underwent neurosurgical procedures compared to the endovascular group. Although there was a slightly higher likelihood of rebleeding following endovascular coiling, the risk was minimal and the probability of achieving disability-free survival at 10 years was considerably higher in the endovascular group compared to the neurosurgical^[3].

Despite advancements in clinical experience and technology, two common complications, intraprocedural aneurysm ruptures (IARs) and thromboembolic events still arise in the endovascular treatment of intracranial aneurysms. The occurrence of IAR during coiling is linked to an elevated risk of mortality, reaching rates as high as 40%^[8]. However, in our case study, no complications were observed after endovascular coiling of the residual intracranial aneurysm. Having said this, one of the limitations we had was unable to do the follow-up of the case.

Conclusion

Endovascular coiling is safe to treat residual intracranial aneurysms. It is a good treatment option for patients who have undergone neurosurgical clipping as their prior attempt in aneurysmal subarachnoid haemorrhage. This case study furthermore adds to the existing database of the safety of the endovascular approach which is found to decrease dependency and mortality hence, adding substantial increase in quality of life.

Ethical approval

Case reports are exempt from ethical approval in our institution, Upendra Devkota Memorial National Institute of Neurological and Allied Sciences, Kathmandu, Nepal.

Consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

P.P., S.S., and S.P. contributed equally to conceptualization, literature review, manuscript preparation, and manuscript editing. S.P. and P.P. performed endovascular coiling, and B.D., A.G., and N.Y. helped in editing and reviewing the case report. All the authors individually did the final proofreading of the manuscript before submission.

Conflicts of interest disclosure

The authors have no conflicts of interest.

Research registration unique identifying number (UIN)

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