

## CASE REPORTS

# Successful Pregnancy Outcome after Coiling of Ruptured Intracranial Aneurysm

Richa Vatsa<sup>1</sup>, Jai Bhagwan Sharma<sup>2</sup>, Rinchen Zangmo<sup>1</sup>, Sunesh Kumar<sup>2</sup>, Anshu Yadav<sup>3</sup>

## Abstract

Rupture of intracranial aneurysm is a serious condition, prompt diagnosis and treatment may prevent potentially lethal complications in pregnancy and otherwise. Clipping and endovascular coiling are treatment modalities available. We accessed outcome of a pregnancy with ruptured intracranial aneurysm managed with endovascular coiling. We report a pregnant woman who suffered from SAH due to rupture of posterior cerebral artery aneurysm in third trimester. Endovascular coiling with Guglielmi detachable coil (GDC) followed by caesarean section done. She required coiling twice in pregnancy.

## Introduction

Ruptured cerebral aneurysm, which can present as acute subarachnoid haemorrhage (SAH), is a rare cause of maternal morbidity and mortality. Approximately 2% of adult population have an intracranial aneurysm. Rupture is a serious complication of these aneurysms, which depends on the size, occurs in 0.1% if size < 10 mm and in 1% for those > 10 mm.<sup>1</sup> The incidence of aneurysmal sub arachnoid haemorrhage (aSAH) for women in general is 11.5 per 100 000 person-years and increases with age. The incidence is similar in pregnancy. The risk being more in second half of pregnancy, only about 20% bleed in the first half, probably due to hemodynamic changes

which are more pronounced in second half.

Endovascular surgery with Guglielmi detachable coil (GDC) is a minimally invasive method for treating aneurysm during pregnancy or otherwise. We report a pregnant woman who suffered from SAH due to rupture of posterior cerebral artery aneurysm, effectively managed by GDC followed by caesarean section.

## Case Report

Mrs X, 25 year old primi gravida presented at 28 week pregnancy with sudden onset headache and recurrent vomiting. Her past history was not

significant. MRI brain showed SAH. After presentation digital subtraction angiography (DSA) revealed 9×6 mm aneurysm of P3 segment of left posterior cerebral artery (PCA) with neck of 2.9 mm (Figure 1). Ultrasound showed normally growing fetus of 28 weeks. Through right femoral catheterisation, coiling of left PCA dissecting aneurysm pseudo lobule was done. Control angiogram showed complete occlusion of the aneurysm with patent parent artery lumen. She was discharged on 6<sup>th</sup> post-operative day with mild residual headache, normal motor function, without any cranial nerve deficit. Medicines continued after discharge were levetiracetam 500 mg BD and nimodipine 60 mg 4 hourly. She remained asymptomatic for around 1.5 months when she again presented with vomiting, seizure and altered sensorium for 1 day at 36 weeks and 4 days period of gestation. NCCT head done was suggestive of SAH. Digital subtraction angiography (DSA) done under general anaesthesia which showed dissecting aneurysm with pseudolobule (size 5.8 × 5 mm) of left distal PCA, just distal to the previously coiled aneurysm. The was occluded and didn't show any recanalisation with mild medial shift probably due to new hematoma. Subsequently the parent aneurysm and the parent artery were coiled (Figure 2).

Patient remained intubated for the next 24 hrs. After stabilisation of patient's condition, in consultation with neonatologist decision for caesarean section (CS) was taken. CS was performed under general anaesthesia and a healthy male baby weighing 3058 gm with apgar score 8/10 and 9/10 at 1 and 5 minute was delivered. She was



Fig. 1: DSA showing aneurysm of P3 segment of posterior cerebral artery

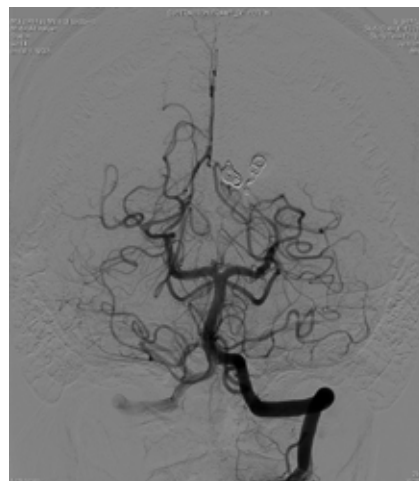


Fig. 2: DSA showing coil in aneurysm of left distal PCA, just distal to the previously coiled aneurysm

extubated on day 2. Patient improved in post-operative period. Her headache subsided. She was discharged on day 9 in good general condition. Her baby was also doing well at discharge. Repeat angiography done after 6 months showed no residual aneurysm of previously coiled left PCA but new bilateral small (3×2 mm) wide neck (3 mm) posterior communicating artery aneurysm. The patient is currently under follow up.

### Discussion

Rupture of intracranial aneurysm is a serious condition, prompt diagnosis and treatment may prevent potentially lethal complications. The reported maternal case-fatality from a SAH during pregnancy or puerperium is comparable with the 50% case-fatality of SAH in general.<sup>2</sup> The foetal case-fatality is approximately 17%.<sup>2</sup>

Options for aneurysm repair, for both ruptured and un-ruptured, are clipping or endovascular coil placement, former being traditional and time tested modality of treatment. The most commonly raised concern with coiling in pregnancy is radiation exposure to fetus. Marshall et al<sup>3</sup> reported an average effective dose equivalent to the patient of approximately 3.6 mSv in angiography, although no direct dosimetry for gravid uterus is available. Calculated dose to the uterus and fetus using the standard reference phantom was less than 0.1 mrad, far below the critical level outweighed by the benefits of the procedure to mother. Another problem with coiling is more chance of recanalisation compared to clipping. Nevertheless today coiling is an attractive option as it does not require opening of skull,

less time taking and early recovery of patient, less procedural morbidity and mortality. According to AHA for patients with ruptured aneurysms judged to be technically amenable to both endovascular coiling and neurosurgical clipping, endovascular coiling should be considered. A meta-analysis of randomized trials comparing endovascular coiling and surgical clipping did not show a significant difference between endovascular treatment and neurosurgical clipping in mortality but former was associated with higher rates of re-bleeding.<sup>4</sup> A follow up study of clipping versus coiling showed that the two groups were similar in rates of increased dependency alone but the probability of death or dependency was significantly greater in the neurosurgical group and re-bleeding was more likely after coiling.<sup>5</sup> The choice of procedure depends on judgment of both experienced cerebrovascular surgeons and endovascular specialists based on characteristics of the patient and the aneurysm. Clipping is possible for much wider spectrum of aneurysms including almost all those which are manageable by coiling.

It seems reasonable that for women near term, caesarean delivery followed by either method is a consideration. It is unclear whether the risk of aSAH is increased during pregnancy, labour and puerperium. A study done by Andreas T et al<sup>6</sup> showed that this risk is not increased. There appears to be no advantage to pregnancy termination unless there is associated preeclampsia. Vaginal delivery is safe if labour occurs remote from aneurysmal repair. The time period of "remote" is not defined,

although some recommend 2 month, time required for complete healing is not known. Caesarean delivery is preferred if bleeding occur near term as in the present case and in unrepaired cases who survive aSAH as these are the patients who should avoid bearing down. Our patient required coiling twice during pregnancy with second coiling performed at 36 week 4 days.

### Conclusion

Endovascular coiling is a minimally invasive treatment modality of ruptured or symptomatic un-ruptured intracranial aneurysm. This surgical modality has limited alteration in maternal- foetal physiology as compared to conventional neurosurgical procedure of clipping. Though less invasive, durability or long-term permanence of endovascular coiling is yet to be established.

### References

1. Smith WS, English JD, Johnston C: Cerebrovascular diseases. In Fauci AS, Braunwald E, Kasper DL, et al (eds): Harrison's Principles of Internal Medicine, 17th ed. McGraw-Hill, New York, 2008a, p 2513
2. Van GJ, Kerr RS, Rinkel GJ. Subarachnoid haemorrhage. *Lancet* 2007; 369:306–318.
3. Marshall NW, Noble J, Faulkner K. Patient and staff dosimetry in neuroradiological procedures. *Br J Radiol* 1995; 68:495–501.
4. Li H, Pan R, Wang H, et al. Clipping versus coiling for ruptured intracranial aneurysms: a systematic review and meta-analysis. *Stroke* 2013; 44:29–37.
5. Andrew JM, Jacqueline B, Alison C, Mary S, and Richard SCK. The durability of endovascular coiling versus neurosurgical clipping of ruptured cerebral aneurysms: 18 year follow-up of the UK cohort of the International Subarachnoid Aneurysm Trial (ISAT). *Lancet* 2015; 385:691–697.
6. Andreas TTG, Rinkel GJE, Bom JGvd, Algra A, Klijn CJM. The Risk of Aneurysmal Subarachnoid Hemorrhage During Pregnancy, Delivery, and the Puerperium in the Utrecht Population: Case-Crossover Study and Standardized Incidence Ratio Estimation. *Stroke* 2009; 40:1148–1151.