

Ruptured Recurrent AVM and Intraventricular Hemorrhage in the Third Trimester: Perioperative Anesthetic Considerations for Cesarean Section

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BACKGROUND

- Cerebral arteriovenous malformation (AVM) in pregnancy is complex and requires multidisciplinary collaboration to coordinate the best care for the patient and her fetus.
- Based on location, severity, and timing of ruptured AVMs, anesthetic considerations include contraindications to neuraxial anesthesia, potential to labor vs. c-section, and BP goals.

CASE

- 38-year-old G1P0 at 31w2d with history of ruptured AVM status post clipping in 2009.
- Previously lost to follow up for definitive treatment with stereotactic radiosurgery (SRS).
- Presented to OSH with headache, aphasia, and right hemiparesis.
 - Found to have intracerebral and intraventricular hemorrhage secondary to recurrent ruptured venous aneurysm in the left frontal region (Fig 1).
- Transferred to our center and admitted to NEICU for EVD.
- MFM team was consulted, and patient was taken for angiogram.
 - Revealed Martin Spetzler grade 4 AVM (3.2 cm) and venous aneurysm with prior clipping.
- Due to location, NSGY agreed that resection would be high risk and SRS would be superior for definitive tx following delivery.
- In NEICU, met criteria for pre-eclampsia due to blood pressures.
- Planned to deliver @ 35w4d via c/s in setting of active AVM.
- Multidisciplinary discussion between NSGY, MFM and anesthesia teams occurred regarding delivery plan.
- Neuraxial anesthesia was not contraindicated due to stable neurological status and lack of elevated ICP. This is preferred over general to monitor neuro exam throughout procedure.
- Planned for CSE with arterial line placement for strict hemodynamic control.

CASE

- CSE was placed without complication with 1 mL hyperbaric 0.75% bupivacaine with 10 mcg fentanyl and 100 mcg morphine.
 - Block was tested and adequate without supplementation via epidural catheter.
- A line was not able to be achieved due to technical difficulty.
- PLTCS and BLT were performed without complication.
- Postoperative course was complicated by vasospasm, potentially d/t postpartum reversible cerebral vasoconstrictive syndrome (RCVS).
- She required intra-arterial verapamil with IR and later had an angiogram with partial AVM embolization.
- She has now completed 2 stages of SRS and recent follow up imaging is clear for disease recurrence.

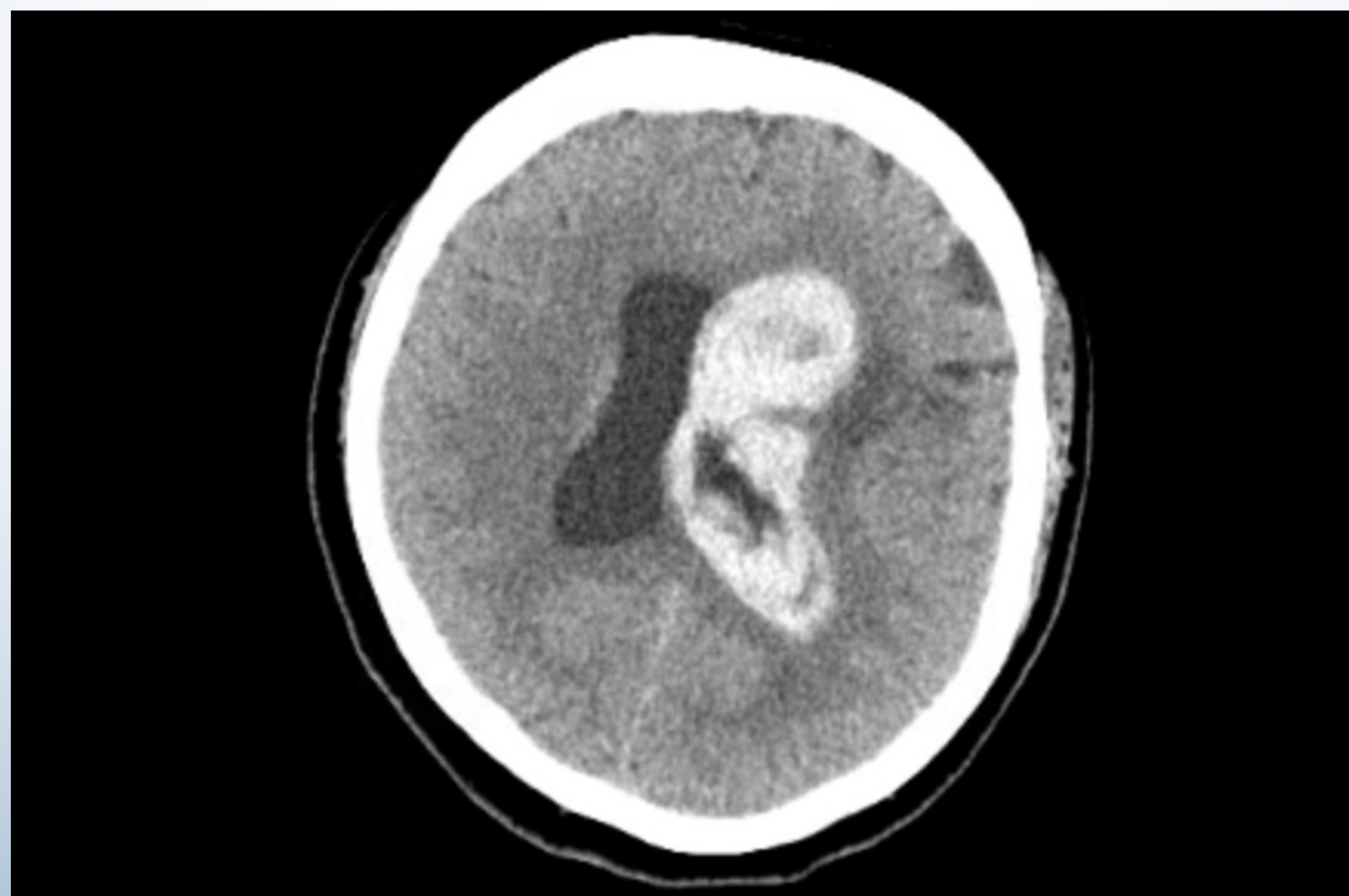


Fig 1. Large left periventricular hemorrhage with intraventricular hemorrhagic extension

DISCUSSION

- Literature is mixed in terms of AVM rupture risk in pregnancy.
- While most agree that pregnancy does not confer a higher risk for rupture, a recent cohort study found pregnancy and puerperium were associated with a greater than 3-fold risk of ICH.¹
- SRS for treatment of AVM confers radiation exposure that is exceedingly lower than the dose needed to confer risk for malformation or mortality.²
- RCVS is another complication to consider as prevalence is relatively high in the postpartum patient.
- RCVS is a clinical and radiological diagnosis characterized by recurrent thunderclap headache, with or without focal deficits due to multifocal arterial vasoconstriction and dilation.
- A systematic review and meta-analysis of RCVS in the postpartum period found that women have a lower threshold for developing RCVS compared to men, in part due to female reproductive hormones altering cerebral vascular tone and permeability in the blood brain barrier.³
 - 7-9% of patients had RCVS in the postpartum period (within one month from delivery).
- Treatment varies based on symptom severity and timeline.

REFERENCES

1. Lee S, et al. J Neurointerv Surg. 2021; 13: 707-10.
2. Nagayama, et al. Asian J Neurosurg. 2010; 5(2): 73-7
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