

C-29 Management of Anticipated and/or Unanticipated Intraoperative Bleeding During Craniotomy

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Objective

After completion of this session, the participant will be able to:

- Develop a systematic approach to managing intraoperative bleeding during craniotomy.

Case Stem Question

A 62-year-old female presents for an elective craniotomy for the resection of a large parasagittal meningioma.

Imaging: the tumor is highly vascularized, 4.5 cm x 4 cm x 3.5 cm and abuts the superior sagittal sinus.

Past medical history: The patient has a history of atrial fibrillation.

Medications: Rivaroxaban (a direct oral anticoagulant, DOAC) and Aspirin for stroke prevention. Rivaroxaban was discontinued 48 hours before surgery, but aspirin was continued until 5 days before the procedure.

Vitals: Pulse 95bpm, BP: 142/82mm Hg, RR 16, T 37°C. Preop EKG: Sinus with Q waves in leads II, III, and aVF.

Lab values: Hb 9.5 gm/dl, Platelet count 125,000 platelets/microliter, INR 1.4

Guiding Questions for Discussion

1. What are the key elements of the preoperative evaluation for a patient undergoing craniotomy?
2. How should anticoagulation and antiplatelet therapy be managed in the perioperative period?
3. What are the risks of continuing versus discontinuing aspirin and DOACs in this patient?
4. How can preoperative imaging help anticipate bleeding risks?
5. What monitors would you decide to use on this patient? Would you place an arterial line? Why/why not? Would you add a CVP monitor? What access would you like?
6. What is your choice of maintenance of general anesthesia for this patient?
7. What are the immediate steps to take when significant intraoperative bleeding occurs?
8. How can the surgical team maintain visibility in the operative field during active bleeding?
9. What are the options for controlling bleeding from a dural sinus?
10. How should the anesthesiologist manage hemodynamic instability?
11. What is the mechanism of action of rivaroxaban, and how does it affect hemostasis?
12. What are the options for reversing DOACs in an emergent setting?
13. What are the indications, dosing, and potential complications of andexanet alpha?

14. How does andexanet alpha compare to other reversal agents?
15. What are the limitations of conventional coagulation tests (e.g., INR, aPTT)?
16. How can TEG/ROTEM be used to diagnose specific coagulation abnormalities?
17. What is the role of TEG/ROTEM in guiding targeted transfusion therapy?
18. What are the evidence-based transfusion thresholds for neurosurgical patients?
19. What is the role of tranexamic acid (TXA) in reducing bleeding?
20. What are the potential complications of significant intraoperative bleeding?
21. How should the patient be monitored post-operatively in the ICU?
22. What are the long-term implications of intraoperative bleeding on patient outcomes?

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