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## Perioperative Fatal Embolic Stroke Associated With Iron Deficiency Anemia and Thrombocytosis

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**Case Presentation:** A 66-year-old man, American Society of Anesthesiologists physical status class 4, presented for revision of an open reduction internal fixation (ORIF) of the left clavicle. The patient had undergone a left apical chest desmoid tumor resection with clavicle osteotomy and ORIF 1 month prior. Other significant past medical history included hypertension, coronary artery disease, atrial fibrillation on anticoagulation, chronic obstructive pulmonary disease, obstructive sleep apnea, noninsulin-dependent diabetes, obesity, and hypothyroidism. Preoperative laboratory testing revealed iron-deficiency anemia with hemoglobin of 8.6 g/dL and hematocrit of 26% with reactive thrombocytosis of 433,000 platelets per µL. Induction of anesthesia was achieved using fentanyl 1 µg/kg, etomidate 0.4 mg/kg, and rocuronium 0.6 mg/kg followed by endotracheal intubation with Glidescope®. Anesthesia was maintained using sevoflurane 1 minimum alveolar concentration (MAC) with controlled ventilation. Vital signs remained stable throughout the procedure, with the exception of transient hypotension following induction of anesthesia; this responded to intravenous (IV) fluids and 100 µg IV phenylephrine. ORIF was completed uneventfully with estimated blood loss of 50 mL. After complete neuromuscular reversal with train-of-four > 0.7, the patient was spontaneously breathing approximately 20 breaths per minute with exhaled tidal volumes of 2 to 4 mL/kg. The patient remained intubated postoperatively because of poor respiratory effort and was transported to the surgical intensive care unit.

Approximately 3 hours later, the patient was noted to have evidence of left hemiplegia and right gaze preference. Further workup revealed a right internal carotid artery occlusion and an ischemic stroke in the right middle cerebral artery distribution with significant mass effect. The patient expired on postoperative day 5 with profound, progressive, intractable bradycardia unresponsive to current advanced cardiac life support protocol.

**Discussion:** Stroke in the perioperative period is an uncommon event with an estimated risk of 0.2% to 0.4% in patients aged 50 to 70 years. Larsen et al[1] demonstrated that stroke typically occurred within 5 to 26 days following noncardiac surgery and that these cases were *not* directly correlated to surgery and to anesthesia. Reactive thrombocytosis secondary to iron deficiency anemia is a rare *but* recognized cause of thrombosis and stroke. Cerebrovascular events in the presence of thrombocytosis may be the result of thrombosis, platelet emboli, or vasospasm, although the exact mechanism remains unknown.

**Conclusion:** Thrombocytosis is a well-known complication of iron deficiency

anemia. Although the exact mechanism is unknown, anemia and thrombocytosis may act synergistically to promote thrombus formation. Assessment of iron profile should be considered when microcytic anemia is found preoperatively, as evidence shows that platelet counts decrease to normal level with improvement of the anemia. Iron deficiency should be treated vigorously, esecially in patients with other significant thrombotic risk factors. The unique aspect of this patient's perioperative management raises the question of whether intra-arterial invasive blood pressure monitoring might have been indicated. Considering the patient's many comorbidities and the potential benefit of avoiding frequent cycling of a noninvasive blood pressure cuff, preoperative placement of intra- and postoperative blood pressure monitoring might have been helpful.

1. *Larsen SF, Zaric D, Boysen G. Postoperative cerebrovascular accidents in general surgery. Acta Anaesthesiol Scand 1988; 32:698–701.*