Anesthetic Management for the Clipping of a Large Intracranial Carotid Artery Aneurysm with Thrombosis in an Infant
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Objectives: Intracranial aneurysms in patients younger than 18 years are reported to account for only 0.005–2% of all diagnosed aneurysms. The incidence appears to be particularly low in the neonate (younger than 4 weeks) and infant (younger than 2 years) populations. The most common cause is secondary to trauma. Reports for the anesthetic management of such cases is generally lacking in the literature. This is a case report describing the management of an infant with a large intracranial aneurysm.

Background: Our patient was a male born at 36 weeks by emergency cesarean section secondary to placenta abruption from trauma. At birth he required resuscitation and 23 hours later, he had a seizure. At 3 months of age he had another traumatic brain injury requiring resuscitation. This event resulted in multiple intracranial and intraventricular hemorrhages as well as bilateral subdural hygromas requiring subdural peritoneal shunting. Later, a large left carotid artery intracranial aneurysm was found. Due to the age of the patient and large size of the aneurysm, the surgeon felt it was crucial to treat surgically by clipping to prevent further subarachnoid hemorrhage. The plan was to use extracranial-intracranial saphenous vein graft bypass.

Case Description: At 8 months of age and 6.7 kg, the patient underwent a left-sided craniotomy for clipping of a 1.5 cm left suprarenaloid ICA terminus aneurysm with thrombus, attempted extracranial-intracranial bypass with saphenous vein grafting, and external ventricular drain placement. Induction of anesthesia was uneventful. Anesthesia was maintained with Sevoflurane, Dexmedetomidine, and intermittent boluses of Rocuronium and Fentanyl. A one-time dose of Levetiracetam was given for seizure prophylaxis. Prior to craniotomy, the patient was hyperventilated to maintain PaCO₂ in the low 30’s. Mannitol was used during the craniotomy. Surgery was done without intracranial-extracranial bypass due to two separate grafts to thrombosing. A s Igle bolus of Propofol at 4.5 mg/kg was given in addition to a Propofol infusion for burst suppression before aneurysm clipping. At that time, an Epinephrine drip was necessary to increase and maintain blood pressures during clamping. Heparin was dosed at 90 Units per kilogram and later reversed with Protamine. After Doppler and angiogram revealed good flow through the carotid artery and MCA without filling of the aneurysm, closure began and a Morphine drip was started. Blood loss was 300 cc which required red blood cell transfusion as well as a combination of colloid and crystalloid replacement. The proposed procedure was successfully completed without extracranial-intracranial bypass and the patient was transferred to the PICU maintained on Sevoflurane, Epinephrine, and Morphine. He was extubated the following day. On post-operative day 4, he was transferred to the regular nursing floor where neurological exam found him to be completely intact. He was discharged home on day 6 in stable condition. On his 3 month follow up appointment he was doing very well, seizure free, and making slow developmental improvements.

Discussion: The incidence of subarachnoid hemorrhage from intracranial aneurysms are extremely rare in pediatrics, however, both coiling and clipping have been done with overall success. Multiple factors are considered important in the perioperative management of patients with cerebral aneurysms. These include blood pressure on the normal to high side, slight hypocarbia, and brain relaxation with Mannitol, lumbar drainage, and/or Propofol. The brain should also be protected by decreasing the CMRO₂ with EEG burst suppression. Propofol decreases CBF and cerebral blood volume causing a decrease in intracranial pressure and cerebral metabolic rate. It also does not impair autoregulation. We increased blood pressure with epinephrine during clipping, as well as maintained a lower CO₂ with concomitant use of Mannitol. Propofol was used for burst suppression. Surgery was successful without perioperative or postoperative complications.

Conclusion: Due to the exceedingly low incidence of intracranial aneurysms in the pediatric age group, very little information on best care management for infants requiring clipping of intracranial aneurysm exists. This is a case report showing successful anesthetic and surgical management for direct surgical clipping of an internal carotid artery aneurysm without bypass.

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