Left Middle Cerebral Artery Branch Clipping s/p Subarachnoid Hemorrhage in Neonate with recent Norwood repair for Type B Interrupted Aortic Arch

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Abstract

Neonatal cerebral aneurysms are extremely rare with few abstracts in the neurosurgical literature exist. Associated with technical difficulty and high risk for postoperative deficits, most are considered non operative with single lesion. We present a neonate with cerebral aneurysm with recent Norwood for interrupted aortic arch for surgical clipping with favorable outcome. Conflicting hemodynamic goals existed and a priority given to the heart which was needed for survival.

Introduction

The incidence of cerebral aneurysms is extremely rare in neonates and few case reports exist in neurosurgical literature[1]. We report a favorable outcome after neonatal left cerebral aneurysm clipping s/p subarachnoid hemorrhage in a neonate with type B interrupted aortic arch who had an uncomplicated Norwood with Sano 17 days prior.

Discussion

This case exemplifies conflicting management goals of two disease processes and the importance of a multidisciplinary consensus to provide an optimal outcome. A decision was made to prioritize the needs of the heart and monitor neurological status for signs for vasospasm and stroke. A literature review revealed only 16 reported cases of neonatal aneurysms, but none in a child with interrupted aortic arch or even a child that had a Norwood repair[1]

References


Case Presentation

A 3 week old female developed seizures and altered mental status. A CT demonstrated an aneurysm of the left middle cerebral artery. Multidisciplinary rounds lead to a decision to clip the aneurysm, although the procedure carried significant risk. The goals of intraoperative management to prevent cerebral vasospasm, i.e. triple H therapy, would not be tolerated by a neonate with Norwood physiology. It was decided to optimize respiratory and hemodynamic parameters for the heart and let the brain be a secondary consideration. The patient was induced and maintained using a balanced narcotic/paralytic technique. Near Infrared Spectroscopy was used to monitor bilateral cerebral and renal perfusion intraoperatively and readings never dipped below preoperative values. Hemodynamic stability was maintained on milrinone and fluids, Hematocrit was kept in the 40s. Ventilation was adjusted to maintain normocarbia. Oxygen saturations ranged from 78 to 91. The patient remained normothermic and urine output was adequate throughout case. Intraoperative steroids were given and mannitol withheld. After arterial aneurysm clipping and closure, the patient was transported to the pediatric ICU with an unchanged neurological eye exam. Ventilation with room air was adjusted to maintain normocarbia and prevent respiratory acidosis. While triple H therapy is known to improve outcome after aneurysm surgery by preventing vasospasm, hemodilution, hypertension, and hypervolemia were not utilized in this neonate. Post-operatively, neurological exam revealed no deficits. She was extubated three days later without complications, moving all extremities and seizures were well-controlled.