Left Ventricular Aneurysm in a Three Year Old Presenting with Embolic Stroke

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Background

Although pediatric stroke is a rare event with a reported incidence of 2-3 per 100,000 children per year it is associated with significant morbidity when diagnosis and treatment are delayed (1). Cardiomyopathy complicated by left ventricular aneurysm and thromboembolism is rare in pediatric patients but poses a significant risk for anesthesia. An understanding of the anesthetic implications in pediatric stroke patients and an appropriate preoperative evaluation are critical in the safe management of these patients.

Case Report

A three year old previously healthy 13 kg male presented with aphasia, right sided weakness, and facial droop. Workup including CT scan, CBC, BMP and urine toxicology were unremarkable. Medical evaluation was negative except for a CXR which revealed cardiomegaly, and an EKG showed sinus rhythm, PVC’s and interventricular conduction delay without BBB. Our stroke protocol was activated and anesthesia was called to perform sedation in the MRI suite within one hour. A propofol infusion was initiated and maintained at 200/ug/kg/min. Brain MRI demonstrated bilateral arterial ischemic brain lesions in the LMCA and right parietal regions.

The patient was transported to PICU, started on intravenous heparin and a cardiac echo revealed a severely dilated left ventricle with a thin rim of myocardium. LVEF of 17% and a bicuspid aortic valve were documented. Intravenous milrinone to improve myocardial function was initiated. The next day the patient was scheduled for a cardiac MRI which showed a large left ventricular aneurysm involving the lateral mid-ventricular region down to the apex and severely decreased LV systolic function (EF 18%). The patient was diagnosed with idiopathic cardiomyopathy secondary to LV aneurysm and subsequently placed on the heart transplant list. He has made a full neurologic recovery and is awaiting a heart transplant.

Discussion

Etiology of ventricular aneurysms include trauma, congenital malformation, connective tissue disease, anomalous origin of the left coronary artery and myocarditis. Most commonly LV aneurysms develop from unknown causes (2). It is estimated that 60% of patients are symptomatic, most with heart failure. Typical symptoms include thrombus/stroke, acute atrial fibrillation, cardiac arrhythmias, and sudden death (3). While thrombus formation is common in LV aneurysms, the risk of cerebral embolization is considered to be low (4). Undiagnosed cardiomyopathy can lead to sudden cardiac arrest under anesthesia. The Pediatric Cardiomyopathy Registry estimates the incidence of pediatric cardiomyopathy at 1.13 cases per 100,000 children per year. Depending on the cause of cardiomyopathy, heart failure is present 6-84% at diagnosis and 10 year survival 29-94% (5). Anesthetic goals are to optimize myocardial function by maintaining the patient’s baseline preload, afterload, heart rate and contractility while considering the risk of ventricular rupture. In this case, the patient was sedated with a propofol infusion per our stroke protocol to help ensure a quick emergence from anesthesia and immediate neurological monitoring post procedure. Although this technique typically allows for hemodynamic stability with no change in cardiac function, patients with hypertrophic cardiomyopathy dependent on an adequate afterload may be at increased risk with this technique.

Conclusion

It is critical for the patient undergoing anesthesia for stroke protocols to have a thorough workup prior to receiving their anesthetic and cardiac surgeries of stroke must be considered prior to the administration of anesthetic to prevent catastrophic events under anesthesia.

References