Summary: This case will discuss the surgical correction of the bifid sternum and its respective anesthetic challenges.

Case Report: A 6 week old, ASA PS II, 5.7 kg full term male infant with bifid cleft sternum (with partial fusion of the xiphisternum) as well as two small VSDs and an ASD was scheduled for elective bifid sternum repair. The surgical plan was for a midline cervicothoracic incision with sternal bar dissection. A fused portion of lower sternum with intact vascular supply will be rotated cephalad. After sternal closure the pectoralis muscles will be advanced over the reconstructed sternum.

The patient underwent an uneventful inhalation induction and intubation with standard ASA monitors. Two peripheral IVs as well as an arterial line and femoral central venous line and TEE probe were placed. The patient remained hemodynamically stable during and after sternal approximation. No changes were noted in peak airway pressures, heart rate, blood pressure, central venous pressure, oxygenation or cardiac function. The plan was to take the patient to the neonatal intensive care unit with the endotracheal tube in place. Post-operative pain control was via systemic opioids and the patient was extubated on POD 1. There were no untoward sequelae and the patient was discharged home on POD 4.

Discussion: A sternal cleft is a rare congenital anomaly. An association with ectopia cordis drastically lowers survival. The severity of the cleft sternum can vary from complete to incomplete (bifid). The bifid sternum is usually not associated with large structural cardiac abnormalities and is covered with a normal layer of skin. It is generally asymptomatic and found at birth. Surgical correction is to protect the exposed heart, great vessels and lungs. Repair is preferable in the neonatal age group because the compliance and flexibility of the skeletal, cartilaginous, and cardiopulmonary structures are maximal then.

The surgical correction of the bifid sternum presents distinct challenges to the anesthesiologist including neonatal risks as well as injury to the heart, great vessels, nerves and lungs. One must be prepared for rapid changes in cardiopulmonary dynamics ranging from rapid blood loss, cardiac dysfunction, arrhythmias or pneumothorax. Cardiovascular compromise upon sternal closure exists from direct compression with reduction in chamber sizes and filling volumes. While this risk is lower as a neonate, the cardiopulmonary system begins to accommodate to the size of the thoracic cavity at 3 months. Arterial and central venous monitoring is useful as well as TEE. Close observation of ventilator parameters is also indicated. Epinephrine and blood products should be available. The bifid sternum represents a distinct challenge to the pediatric anesthesiologist as a unique case of a rare congenital anomaly with significant anesthetic implications.

References: