Anesthetic Management of Successful Labor After Fontan Procedure

Presenting Author: Jon S Williams MD
Presenting Author's Institution: Kansas University Medical Center - Kansas City, MO
Co-Authors: Grace H Shih MD - Kansas University Medical Center - Kansas City, KS

Introduction: The Fontan procedure is used to treat severe congenital cardiac abnormalities. With modifications, this procedure has allowed a marked increase in the number of these patients reaching reproductive age. We present a case of successful vaginal delivery in one such patient.

Case Report: 23-year-old G2P0 presented for induction of labor due to worsening cardiac symptoms at 33 5/7 WGA. The patient had a history of congenital pulmonary atresia and hypoplastic right ventricle. Blalock-Taussig shunt was placed in the neo-natal period. At the age of 15 years a lateral tunnel fontan procedure was performed. Two years later she underwent closure of a right to left coronary sinus shunt. ECHO showed mildly reduced LV systolic function, new mild aortic root dilation, and new borderline anterior mitral valve leaflet prolapse. Physical exam revealed a comfortable 75kg, 64” female. BP: 140/80, HR: 76, R: 16, SpO2: 87% on RA. Airway exam showed MP II, good ROM, and 6cm TM distance.

Induction of labor was started using misoprostol, after which epidural anesthesia and invasive arterial monitoring were begun. Of note, the patient refused CVP monitoring unless C/S was required. The epidural was initially dosed with 3ml of lidocaine 1% with epi followed by 5ml of bupivacaine 0.125% without incident or notable hypotension. After initial bolus dosing, the epidural infusion was started using bupivacaine 0.1% with fentanyl 2mcg/ml at a basal rate of 8ml/hr, PCA dose of 4ml/15min. Induction was then advanced with oxytocin gtt. The patient remained stable and comfortable throughout labor with this dosing. Within 12 hours the patient had advanced to complete dilation and was taken to the operating room for a planned vacuum-assisted delivery. With vacuum traction and mild pushing from the patient the infant was delivered during a single contraction without complication. EBL: 400ml, Infant wt 1664gm, APGARS 9/9.

Discussion: The Fontan procedure was initially developed for the treatment of tricuspid atresia. It has since been modified and is used for the treatment of congenital heart disease not conducive to biventricular repair. The repair creates a single ventricle circulation with pulmonary circulation dependent on passive flow. This passive flow is diminished by ventricular or valvular dysfunction, pulmonary hypertension, peripheral vascular dilation, dehydration and mechanical ventilation. Any anesthesia plan must therefore take into account the need for prevention of these physiologic responses to medications, NPO status, or laryngoscopy.

Conclusion: Patients with a Fontan repair are known to have a higher incidence of obstetric and cardiac complications. Management of these patients requires cardiac optimization and avoidance of factors that will decrease passive flow through the pulmonary circulation. This can best be achieved with regional anesthesia, slow incremental epidural dosing, and proper hydration.