

Management of the Parturient Undergoing Vaginal Delivery Status Post VSD Repair

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Introduction

In general, patients with congenital heart disease (CHD) present potential significant challenges to anesthesia providers. Significant advancements have been made in surgical correction of congenital heart lesions. As a result, affected women are surviving longer and into childbearing ages. Despite clinical developments, cardiac disease remains the most common nonobstetric cause of death among parturients (See figure below). As the population of parturients with a history of CHD continues to grow, it remains important that anesthesia providers understand the management of such patients. Specifically, this case report illustrates the successful anesthetic management of a parturient s/p repair of a ventricular septal defect (VSD) undergoing vaginal delivery.

Case Presentation

A 30-year-old term G3P2 patient at 36 4/7 weeks gestation with a New York Heart Association Classification of I presented to labor and delivery unit for induction of labor. Her medical history was remarkable for a VSD in childhood requiring surgical correction. The patient reported good exertional tolerance; she had a history of two recent and uneventful vaginal deliveries without an epidural.

On examination, the patient had a weight and height of 68.9 kg and 63 inches respectively. Her baseline vital signs were as follows: blood pressure 114/56, pulse 66, respiratory rate 16, oxygen saturation 100% on room air. On auscultation, a soft systolic murmur was heard. A recent echocardiogram revealed normal left ventricular function with an ejection fraction of 65-69%. Pulmonary artery systolic pressures were 30 mmHg and minimal left to right shunting was reported. With the exception of the presence of anti-Kell antibodies, all laboratory studies were within normal limits.

After the patient's consent was obtained, preparations were made for safe labor epidural placement. Gastrointestinal and subacute endocarditis prophylaxis medications were administered. The patient was preloaded with 500 ml. Maintaining strict aseptic technique, the patient's ~L3L4 epidural space was uneventfully engaged via loss of resistance technique using saline at a depth of 5cm. An epidural catheter was easily threaded 4cm and secured. A negative test dose was confirmed, and the patient received a total of 12ml of 0.125% bupivacaine with 2 mcg/ml of fentanyl in incremental doses over a 20-minute period. Vital signs remained in close proximity to the patient's baseline. A T10-level bilaterally was achieved and a maintenance infusion was initiated at 10 ml/hr. The patient remained comfortable throughout the labor course and delivered vaginally a healthy 2560g female.

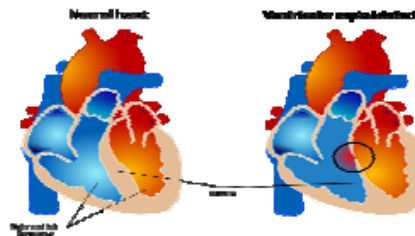
Throughout the labor course, the patient was with left uterine displacement, supplemental oxygen, and pulse oximetry. Vital signs were taken regularly. Additionally, a filter was placed in the intravenous tubing to avoid infusion of any air bubbles. Pressor support was immediately available but was not needed as the patient maintained hemodynamic stability throughout the labor and delivery course.

Discussion

Parturients with CHD now account for roughly 80% of the 0.2%-4% of pregnancies complicated by cardiac disease. Anesthesia providers must understand the complexity that can accompany the care of these patients. As many as 20% of these patients can experience severe cardiac complications (pulmonary edema, sustained dysrhythmias, stroke, cardiac arrest, or cardiac death) during the course of their pregnancies. Physiologic changes of pregnancy that are particularly relevant include increases in cardiac output, heart rate, and blood volume; decreases in SVR and PVR; and increases in myocardial oxygen consumption. Cardiac decompensation and death occur most commonly at the time of maximum hemodynamic stress, namely, during labor and delivery and in the immediate postpartum period.

VSD, a left-to-right acyanotic shunt, affects 7% of adults with CHD. Patients may be asymptomatic and pregnancy uneventful if the VSD is small or surgically corrected. With larger uncorrected VSD's, left-to-right shunting can markedly increase pulmonary blood flow and result in pulmonary hypertension. Physiologic changes of pregnancy can further exacerbate pulmonary hypertension and even cause left and right ventricular failure.

Anesthetic considerations include maintenance of SVR at or near baseline. Those conditions that may increase PVR and heart rate (i.e. hypoxemia, acidosis, hypercarbia, and pain) should be avoided. Supplemental oxygen should be provided and invasive monitoring applied as the clinical situation dictates. Epidural catheters should be placed via loss of resistance to saline techniques and all intravenous lines should be aggressively purged of air and monitored to avoid an air embolism.



Conclusion

The provision of anesthesia for parturients with a VSD as with other cardiac lesions requires extensive preparation, effective communication amongst caregivers, and early assessment with special attention to the severity of the patient's disease process. It may be possible to administer either regional or general anesthesia. No one anesthetic approach is absolutely indicated or contraindicated. Performance of a combined spinal-epidural with narcotics prevents decreases in SVR. Whatever anesthetic technique is performed, the primary goal of anesthetic management is to avoid and/or treat physiologic changes that can exacerbate existing disease. In this case, an anesthetic plan of care was carefully formulated and executed as described previously after thorough overall evaluation and risks-to-benefits discussion with the patient, her family, and the obstetrics team.

References

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