Noninvasive Hemodynamic Monitoring with Bioreactance During General Anesthesia for Cesarean Delivery: A More Relaxed Look at Tight Aortic Stenosis?

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Introduction: The management of women with severe aortic stenosis (AS) undergoing cesarean delivery (CD) remains controversial, and the safety of major regional anesthesia (RA) continues to be questioned. AS is thought to be associated with fixed cardiac output (CO), and changes in preload, afterload and heart rate may put these patients at risk. However, data from a nonpregnant population with severe AS suggest that careful vasodilation may in fact increase CO (1). As both valvar and peripheral resistance contribute to total resistance, a decrease in peripheral resistance will reduce total resistance, which may facilitate an increase in CO. The availability of new technologies of noninvasive hemodynamic monitoring may provide us with critical information on how pregnant patients respond to different anesthetic techniques. We describe the case of a woman with severe AS undergoing CD under general anesthesia (GA), in whom a noninvasive monitor based on bioreactance was used.

Case Report: A 29 year old woman with a congenital bicuspid aortic valve and AS, NYHA II, presented for CD at 36 and 4/7 weeks gestation for premature rupture of membranes and transverse lie. Echocardiogram showed an aortic valve area of 0.75 cm² and a maximal transvalvar gradient of 64 mmHg. Left ventricular size and function were normal. GA was induced with etomidate and fentanyl and maintained with sevoflurane and morphine. An epidural catheter was used for postoperative analgesia. Noninvasive CO monitoring (NICOM) based on bioreactance was used throughout the procedure. CO was stable from induction to delivery. Upon delivery and administration of a low-dose oxytocin infusion (20 IU/L, 500 mIU bolus followed by 40 mIU/min), there was a decrease in systemic vascular resistance. Concurrently, stroke volume (SV) increased and stroke volume variation decreased, while heart rate remained unchanged. Increased SV, likely associated with decreased afterload and increased preload, contributed to an increase in CO from 7 to 12 L/min.

Discussion: Contrary to popular belief, and in keeping with data from non-pregnant individuals, pregnant women with severe AS may increase CO under certain circumstances. These findings may explain the good Results reported in the literature on the use of RA in this high risk group. The use of noninvasive CO monitoring may improve patient safety by allowing precise hemodynamic assessment and management with both RA and GA.


Extra Files: