

Management of Posterior Cervical Fusion in Patient with Severe Aortic Stenosis and Mitral Regurgitation

S. Randazzo, MD, L. Gilbertson, MD, C. Varner, MD, V. Zelman, MD, PhD, and E. Ayrian, MD

Keck Medical Center of USC, Department of Anesthesiology, Los Angeles, California 90033

Introduction:

Cervical laminectomies with spinal fusion in the prone position are common procedures for cervical stenosis and radiculopathy. Oftentimes, these patients present with comorbidities, particularly cardiac issues. In the prone position, patients almost universally develop a decrease in cardiac index (1). In patients with preexisting cardiac disease, studies show an average decrease in cardiac index of 24% (2).

Case Report :

A 68 yo M with severe aortic stenosis (0.9cm), mitral regurgitation, CAD post PCI x 3, HTN and a history of CVA presented for C4-C7 laminectomy and posterior spinal fusion. He had been experiencing progressively worsening weakness in his right upper and lower extremities. The patient's declined any valvular repair, and there was no further treatment available to optimize his cardiac status.

In the operating room, standard ASA monitors and an awake radial arterial line were placed. Induction and intubation was uneventful. A right IJ central line was placed as well as a pacing Swan Ganz catheter due to the patient having a left bundle branch block. The patient was maintained on a propofol/sufentanil infusion to allow for neuromonitoring. The patient's blood pressure was adequately maintained with a dobutamine infusion. As the procedure progressed, the PA pressures elevated to 50s/20s and the blood pressure trended down. The dobutamine drip was subsequently increased and a neosynephrine drip was started. During the procedure, the blood loss was 400cc with 2 units of PRBCs transfused. The patient was successfully extubated and closely monitored before transporting to the ICU. The patient was weaned off the dobutamine drip and continued on a neosynephrine drip to maintain the MAP above 85 for spinal perfusion. Neosynephrine was weaned off by POD #1. The patient had an uneventful course and was discharged on POD #4.

Discussion:

Studies have shown that patients with cardiac abnormalities undergoing major spinal surgery are at higher risk for cardiac arrest in the prone position (2). Even in healthy patients placed in the prone position, patients experience decreases in cardiac index and increases in systemic vascular resistance (3). The prone position causes an increase in intra-thoracic pressures, a decrease in arterial filling and an increase in sympathetic activity via the baroreceptor reflex. This leads to an increase in heart rate, total peripheral vascular resistance, and plasma noradrenaline (4). Reduced venous return and left ventricular compliance also contribute to the decrease in cardiac output (5). Additionally, obstruction of the IVC in the prone position has been shown to contribute to the decrease in cardiac output.

Therefore, in a patient with cardiac disease, especially with severe aortic stenosis in combination with CAD, prone position presents many significant difficulties. In our case, dobutamine was used to maintain cardiac contractility and cardiac output while neosynephrine was added when improved venous return was necessary.

Conclusion:

1. Cardiac condition should be optimized preoperatively
2. SG catheter and careful fluid management should be considered for patients with severe aortic stenosis in the prone position

References:

1. H. Edgcombe, et al: Anaesthesia in the prone position, *BJA*, 100 (2): 165–83, 2008.
2. Brown, et al: Cardiac arrest during surgery and ventilation in the prone position: a case report
3. Backofen, et al: Hemodynamic changes with prone position during general anaesthesia. *Anesthesia and Analgesia* 1985.
4. Pump B, et al: Effects of supine, prone, and lateral positions on cardiovascular and renal variables in humans. *Am J Physiol Regul Integr Comp Physiol* 2002.
5. Sudheer, et al: Haemodynamic effects of the prone position: a comparison of propofol total intravenous and inhalation anaesthesia. *Anaesthesia* 2006.