**CLINICAL VIGNETTE**

# Anesthesia for Cesarean Section in a Patient with Takayasu Arteritis

Peter G. Lee, M.D. and Fei Zheng-Ward, M.D.

***Case***

A 33-year-old female with past medical history significant for Takayasu Arteritis was scheduled for an elective repeat low transverse cesarean section at 39-weeks gestational age. Her obstetric history was significant for one prior pregnancy with cesarean delivery secondary to arrest of dilation nine years previously. Takayasu Arteritis was diagnosed five years previously after patient developed night sweats, fatigue, and "infectious" symptoms. Cumulative vascular involvement included severe stenosis of the distal abdominal aorta, left common carotid, and left subclavian artery, moderate stenosis of the iliac and femoral arteries, ectasias of the aortic arch, and saccular aneurysm of the left common carotid. Patient was closely followed by rheumatology clinic and maintained on oral prednisone 5mg per day. Prior to surgery, she was evaluated by cardiology and noted to be asymptomatic from cardiac standpoint and cleared for scheduled cesarean section. Cardiology recommended continuation of oral metoprolol 25mg twice daily and close blood pressure monitoring perioperatively to decrease risk of cardiovascular complications. Transthoracic echo was unremarkable with normal ejection fraction and no aortic root dilation.

On the day of scheduled surgery, preoperatively, patient received a stress dose of steroids, hydrocortisone 100mg intravenously, one liter of lactated ringers, and bicitra 30ml orally. Patient had missed her morning dose of metoprolol prior to arrival to hospital and her heart rate was elevated to 120-130 beats per minute. She was asymptomatic and metoprolol 5mg intravenously was titrated to a heart rate of 90 to 100 beats per minute. Initial blood pressure with blood pressure cuff on right arm was 142/84. Blood pressure with cuff on left arm measured 110/50, a difference attributed to known severe left subclavian stenosis. Patient was brought into the operating room and in addition to standard anesthesia monitors, a non-invasive continuous arterial blood pressure was monitored using the ClearSight System (Edwards Lifesciences EV1000 clinical platform utilizing finger cuff technology) with the finger cuff placed on the patient's right middle finger. Patient was then seated and an epidural catheter was placed at L3-4 utilizing loss of resistance technique. The epidural catheter was slowly dosed with 20ml of preservative-free 2% lidocaine plain administered in 5ml increments over fifteen minutes until a bilateral T4 sensory block to cold was achieved. During the epidural catheter, loading blood pressure and heart rate were continuously monitored and the patient remained hemodynamically stable without the need for blood pressure support. Phenylephrine was immediately available for treatment of hypotension that could occur with the sympathetic blockade. After confirmation of adequate surgical anesthesia level, surgery commenced with uneventful delivery eight minutes after initial skin incision and skin closure thirty-three minutes after delivery. An oxytocin infusion was started after delivery to stimulate uterine contraction. During surgery the patient received 2500ml of intravenous lactated ringers and urine output was 250ml. Estimated blood loss was 650ml. At the conclusion of surgery, 4mg of preservative-free morphine was administered into the epidural catheter for postoperative analgesia and the epidural catheter was subsequently pulled with the tip noted to be intact.

Patient was closely monitored in the post anesthesia care unit with continuous monitoring of blood pressures and heart rate. Her blood pressures and heart rate maintained within 20% of her baseline values in the post anesthesia care unit. The patient was discharged to the post-partum unit after resolution of her neuraxial blockade with pain well-controlled with epidural morphine given intraoperatively. The remaining post-operative course was unremarkable and she was discharged home on post-operative day three on a two-week steroid taper.

***Discussion***

Takayasu arteritis is a medical condition where patients exhibit chronic vasculitis with unknown etiology. Inflammation and cell-mediated mechanisms are thought to be causes for the disease. The majority of these patients are women with onset of the disease between 10 and 40 years of age. The disease affects primarily the aorta and its primary branches and the initial vascular lesions are found in the left subclavian artery. Thickening, stenosis, or dilation of the vasculature are common findings in affected individuals, resulting in hypertension and cardiac failure. These patients also have accelerated atherosclerosis and often exhibit non-specific symptoms such as fatigue, low-grade fever and weight loss. The most common presentation in these patients is pulselessness, [1] thus leading to cold extremities and pain with limb use secondary to claudication.

In patients with Takayasu, the anesthetic goals also focus on maintaining intravascular volume and using the appropriate monitors. A regional anesthetic technique is often used in these patients given the high likelihood of difficult airway and allowing for monitoring of their mental status and cerebral circulation[2]. Invasive and noninvasive monitors have been used to help guide anesthesiologist in managing Takayasu patients in the perioperative period. Invasive monitoring such as arterial catheter, central venous catheter and pulmonary artery catheter are used to guide the patients' hemodynamics and fluid status. Some would argue that a Swan-Ganz catheter be inserted in all patients with Takayasu.[1]

However, the benefits of invasive monitors should be weighed against the potential risks of inserting them. The Edwards Lifesciences ClearSight System using finger cuff technology and the EV1000 clinical platform, if available, can monitor continuous arterial blood pressure non-invasively and can be an alternative to invasive arterial pressure monitoring.[3] Noninvasive monitoring such as cerebral oxygen saturation (rScO2) monitoring has been used successfully for cerebral monitoring and protection in patients undergoing cesarean section.[5]

Adrenal gland suppression should be considered for patients on long-term steroid treatment and additional steroid supplementation may be needed in patients undergoing stressful situations such as surgery.[5]

Patients with Takayasu may also have involvement of their carotid arteries and movement of the neck should be handled carefully. Glidescope can be used for intubation, keeping the cervical spine neutral to reduce the risk of carotid artery obstruction from neck manipulation. Hemodynamic stability should be maintained and the patients are best kept at baseline values. Glidescope and narcotics can be used to achieve hemodynamic stability during intubation and short acting medications such as remifentanil, esmolol, and nitroprusside are best kept available for these patients in case of sudden surges in blood pressure or heart rate.[6]

For treating hypotension, one may consider fluids, placing the patient in Trendelenburg position, using nitrous in conjunction with volatile anesthetics instead of pure volatile anesthetics. However, some medications such as remifentanil or dexmedetomidine may not be an option due to their limited availability at some facilities, other medications can be used in their place as long as the patients' hemodynamics are closely monitored. If vasopressors such as ephedrine or phenylephrine must be used they should be titrated carefully while monitoring the patient's hemodynamics. Additionally, end-tidal carbon dioxide (EtCO2) should be maintained to avoid cerebral vasoconstriction from hyperventilation and hypocapnea.[5]

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