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ANAESTHETIC CONSIDERATIONS IN AORTIC STENOSIS: A CASE REPORT

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ABSTRACT Aortic stenosis is one of the most common and poses serious challenges for an anaesthetic. Such patients are at an increased risk of perioperative clinical deterioration and patient mortality. Anaesthesia approach in such patients is guided by the degree of stenosis, the symptoms related to valve pathology, the systolic function of the LV, and the presence of other valvular lesions. Both general and neuraxial anaesthesia have successfully employed. We here describe the successful management of an elderly patient with combined spinal-epidural anaesthesia (CSEA) without any hemodynamic/neurologic complications or pain. Anaesthetists face many challenges in the operating room and must anticipate and appropriately manage known, expected, or foreseeable events and complications of the patient's disease, the surgery, and the planned anaesthetic approach.

KEYWORDS : Aortic stenosis, general anaesthesia, neuraxial anaesthesia, spinal anaesthesia, epidural anaesthesia etc.

Background:

The classic symptoms of aortic stenosis (AS) are angina, syncope, dyspnoea on exertion, and congestive heart failure (1). The perioperative risk associated with aortic stenosis during noncardiac surgery depends upon its severity, clinical status, and type of surgical procedure. Severe AS is a known risk factor for perioperative mortality and morbidity (2). AS can lead to sudden cardiac death. Patients with AS have a low fixed cardiac output. Thus, adequate systemic perfusion by external cardiac massage is not obtainable in such patients in cases of sudden cardiac arrest (3). An anaesthesiologist must consider multiple risk factors in a severe AS patient, including severe hypotension, ischemic heart disease, and cerebral hypoperfusion.

The goals of anaesthetic care in such cases are to maintain preload, maintain or increase afterload, maintain sinus rhythm, avoid any possible arrythmia, avoid bradycardia as well as tachycardia, and maintain contractility (3). The use of neuraxial anaesthesia (NA) is avoided in AS patients (4, 5). But for AS patients undergoing spinal surgeries that are performed in a prone position, general anaesthesia (GA) can be riskier than NA. It is known that prone position decreases preload and increases afterload, which causes major reductions in cardiac output (CO) and stroke volume (6, 7). These changes can cause significant hemodynamic compromise in AS patients with diminished cardiac reserve. Muscle relaxation in GA and positive-pressure ventilation further compromise the CO by interfering with venous return and reducing the vascular tone, thus rendering AS patients vulnerable to uncompensated circulatory effects.

We here describe the successful management of an elderly patient with combined spinal-epidural anaesthesia (CSEA) without any hemodynamic/neurologic complications or pain. The patient provided her written consent for the publication.

Case History: A patient suffering from a fracture of the neck of the right femur was sent for a pre-anesthesia checkup by the Department of Orthopaedics on 3/3/2023. The patient was a well-built adult male with no history of angina, cardiac failure, syncope, exercise intolerance, dyspnoea, paroxysmal nocturnal dyspnoea, or orthopnoea. The on-duty anaesthetist elicited a systolic murmur on auscultation of the chest, T-wave inversion in leads I, II, V_4 V_5 V_6 ST elevation in V_1, V2, and V3, and a broad QRS in lead II on the ECG. A 2-dimensional echo was sought. AS and concentric LV hypertrophy were discovered with normal LV contractility, stroke volume, and ejection fraction and with no LV outlet obstruction. Considering the potential risks of GA that can occur in AS patients, the patient's cardiac condition and functional capacity, and the characteristics of the operation, the anaesthetic team decided to proceed with CSEA. The patient was premedicated with oral Alprazolam 0.25 mg to avoid tachycardia due to anxiety. Her blood pressure (BP) and heart rate (HR) were recorded as 142/74 mmHg and 90 bpm, respectively. The patient was adequately hydrated by infusing 500 ml of lactated Ringer's solution. The patient was catheterized. Electrocardiography, pulse oximetry, and continuous invasive arterial BP were monitored. Cardiac drugs, including phenylephrine and epinephrine, were kept ready. Oxygen was administered by nasal prongs at 2 L/min. The patient was placed in a sitting position, and after sterilisation and numbing of the skin with local anaesthesia, an 18-gauge Tuohy needle was placed at the L3–4 intervertebral space. After the epidural space was identified using the loss-of-resistance technique, a catheter was inserted 4 cm in the cephalad direction, and a test dose of 2% lignocaine and adrenaline (1:2,00,000) in 3 ml was injected via the catheter. Subsequently, a 25-gauge spinal needle was inserted at the L4-5 intervertebral space, and 0.5% hyperbaric bupivacaine (3 ml) was injected into the subarachnoid space. The patient was then immediately turned to a supine position. Within a few minutes, the sensory block had reached the T8 dermatome, and his BP and HR were 130/70 mmHg and 82 bpm, respectively. After 1 hour, 0.125% ropivacaine (6 ml) was administered in titrated doses through the epidural catheter. Throughout the surgery, the patient did not complain of pain, and his vital signs were stable. The duration of the operation was 110 minutes. Her blood loss was 150 ml, and her urine output was about 500 ml. One litre of crystalloid solution was administered. His cardiac enzyme levels were normal on postoperative day 1. The patient was discharged without any hemodynamic instability or cardiovascular/neurologic complications.

Discussion: As compared to SA, in EA the neural blockade is less intense, but there is a gradual onset of peripheral sympathetic nervous system blockade in AS patients. CSEA has the advantages of both EA and SA. Administration of local anaesthetics can cause hemodynamic changes and consequent cardiovascular complications. However, some authors opine that such complications can be reduced by slow and gradual administration of local in such patients (8, 9,10). HO MC et al. demonstrated the safety and efficacy of hypotensive epidural anaesthesia in 22 patients with noncritical asymptomatic AS having complete hip replacement surgery (11). Considering hemodynamic stability, epidural anaesthesia (EA) is preferred to spinal anaesthesia (SA) due to the gradual onset of peripheral sympathetic nervous system blockade in AS patients. However, the neural blockade from EA is less intense than that from SA, and there is a greater chance of missed segments. Also, there has been 1 report of the successful application of continuous SA with a slow, gradual onset of neural blockade like that associated with EA in AS patients (12). Therefore, we selected CSEA for our patient's anaesthesia since it has the

advantages of both EA and SA. GA was also an option for our patient. But general anaesthetics may cause induction-triggered hypotension, wide hemodynamic fluctuations, pulmonary complications, and cardiac dysrhythmias (13). CSEA also produces vasodilatation below the level of the block, resulting in hypotension, which may be compromising and can have negative effects in patients with severe AS. With close monitoring of BP, HR, ECG, pulse oximetry, end-tidal carbon dioxide, and temperature, CSEA was cautiously, albeit successfully, performed in our patient.

Anaesthetists face many challenges in the operating room and must anticipate and appropriately manage known, expected, or foreseeable events and complications of the patient's disease, the surgery, and the planned anaesthetic approach. In patients with AS, vasoconstrictors, drugs to maintain the systemic vascular tone, such as norepinephrine and phenylephrine, must be kept handy, and the need for maintenance of sinus rhythm, adequate intravascular volume to ensure ventricular filling, and prompt reversal of arrhythmias must always be borne in mind.

Conclusion: Symptoms such as decreased exercise tolerance, exertional dyspnoea, angina, congestive heart failure, syncope complemented by detailed physical examination and ECHO, can elicit the diagnosis of AS. However, as was in our case symptoms may not correlate to the severity of the stenosis and some patients can be asymptomatic. Complications are possible with NA as well as GA. However, anaesthetist should be prudent in his individual assessment on cases to case basis.

REFERENCES:

1. Herrera A. Valvular heart disease. In: RL Hines, KE Marschall, editors. Stoelting's anesthesia and co-existing disease (6th ed.). PA: Philadelphia, Saunders; 2012. p. 40−42.
2. Pislaru SV, Abel MD, Schaff HV, Pellikka PA. Aortic Stenosis and Noncardiac Surgery: Managing the Risk. Curr Probl Cardiol. 2015;40(11):483-503. doi:10.1016/j.cpcardiol.2015.06.003.
3. Paul A, Das S. Valvular heart disease and anaesthesia. Indian J Anaesth. 2017;61(9):721-727. doi:10.4103/ija.IJA_378_17.
4. McDonald SB. Is neuraxial blockade contraindicated in the patient with aortic stenosis?. Reg Anesth Pain Med. 2004;29(5):496-502. doi:10.1016/j.rapm.2004.06.010
5. Dawson JS. Epidurals in aortic stenosis. Reg Anesth Pain Med. 2008;33(6):573.
6. Dharmavaram S, Jellish WS, Nockels RP, et al. Effect of prone positioning systems on hemodynamic and cardiac function during lumbar spine surgery: an echocardiographic study. Spine (Phila Pa 1976). 2006;31(12):1388-1394. doi:10.1097/01.brs.0000218485.96713.44
7. Edgcombe H, Carter K, Yarrow S. Anaesthesia in the prone position. British Journal of Anaesthesia. 2008;100(2):165-183. doi:10.1093/bja/aem380.
8. Xia VW, Messerlian AK, Mackley J, Calmes SH, Matevosian R. Successful epidural anesthesia for cesarean section in a parturient with severe aortic stenosis and a recent history of pulmonary edema--a case report. J Clin Anesth. 2006;18(2):142-144. doi:10.1016/j.jclinane.2005.06.007
9. Bundgaard-Nielsen M, Foss NB, Kristensen BB. Use of epidural blockade in a patient with hip fracture and aortic stenosis. Eur J Anaesthesiol. 2005;22(6):471-472. doi:10.1017/s0265021505210815
10. Boso EB. A case for combined spinal-epidural anesthesia for Cesarean section in a patient with aortic stenosis. W V Med J. 2008;104(2):20-21.
11. Ho MC, Beathe JC, Sharrock NE. Hypotensive epidural anesthesia in patients with aortic stenosis undergoing total hip replacement. Reg Anesth Pain Med. 2008;33(2):129-133. doi:10.1016/j.rapm.2007.09.008.
12. Collard CD, Eappen S, Lynch EP, Concepcion M. Continuous spinal anesthesia with invasive hemodynamic monitoring for surgical repair of the hip in two patients with severe aortic stenosis. Anesth Analg. 1995;81(1):195-198. doi:10.1097/00000539-199507000-00042.
13. Coviello A, Ianniello M, Spasari E, et al. Low-dose spinal and opioid-free anesthesia in patient with Severe Aortic Stenosis and SARS-CoV-2 infection: Case report. Clin Case Rep. 2021;9(8):e04192. Published 2021 Aug 21. doi:10.1002/ccr3.4192