Case Report

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A Multidisciplinary Approach to Anesthetic Management of a Patient with Severe Aortic Stenosis for Bipolar Hemiarthroplasty: A Case Report

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Abstract

The increase in geriatric population with preexisting cardiac disease presenting for non-cardiac surgery is in escalating numbers. Aortic stenosis is a significant risk factor for the development of cardiac complications after non-cardiac surgery. According to the American college of cardiology recommendations, it is advisable to postpone any elective surgery in patients with aortic stenosis without proper optimization. We report about a 79-year-old female with severe aortic stenosis with left sided fracture neck of femur for bipolar hemiarthroplasty. Procedure was done under general anesthesia with fascia iliac block and intraoperative and postoperative course was uneventful.

Keywords: Aortic stenosis; Anesthesia; Non cardiac surgery.

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Introduction[1,2]

Patients with severe Aortic stenosis who require non-cardiac surgery poses a challenge to the anesthesiologist. The prevalence rates for severe AS range from 3.4% in subjects more than 75 years to 18% in older than 90 years.[3] The incidence of severe AS in patients who need surgery for hip fracture is between 5% and 10%.[6] Although after hip surgery 30-day mortality in severe AS is between 7% and 14%,[7-9] these data may be an underestimate since the diagnosis of AS is not uncommonly missed before surgery.[4] For these to undergo aortic valve replacement before the elective non-cardiac surgery the risk associated with the non cardiac surgery should be greater than the valve replacement procedure. AS most commonly occurs as an acquired condition but can occur as a congenital disease as well. Congenital bicuspid aortic valve are more prone for calcification with eventual stenosis.[5]

Case Report

A 79 year old female was admitted with left sided fracture neck of femur and was planned for bipolar hemiarthroplasty. Her weight was 60 kg. She was a known case of severe aortic stenosis. She was a diabetic for 7 years after having undergone Whipple's procedure for ca pancreas and on metformin. On examination she was conscious, her HR was 62/min, BP-140/100 mm Hg, SpO_2 - of 95% in Room air and Respiratory rate-15/min.

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She was edentulous with an interincisor gap of less than 2 fingers. There was an ejection systolic murmur not conducted to the carotids. There were no basal crepitations. Examination of other systems were normal.

Her routine blood investigations were within normal limits. Prothrombin time was 13.8, INR-1.1. ECG showed sinus rhythm with left axis deviation and ST segment depression in II, V1–V5. Echocardiography showed severe calcified aortic valve with pressure gradient 108.7 mm hg, and aortic valve area of 1 cm 2 mild AR and concentric left ventricular hypertrophy. Cardiologist opinion was sought and fitness was given under ASA III. T. Clopidogrel was stopped 5 days prior to the surgery.

In the OR the patient was noted to have an HR of 62/min with sinus rhythm, NIBP-156/62 mm hg, SpO^2 -97% in Room air. Inj phenylephrine, nor adrenaline infusions, defibrillator pads and airway crash cart were kept ready. Under aseptic precautions at injecting 2% lignocaine skin infiltration left radial artery was cannulated and secured for beat to beat BP monitoring. Preoxygenation was done for 3 minutes and premedicated with Inj ondansetron and Inj fentanyl 60 mcg, and induced with Inj etomidate 12 mg and Inj atracurium 30 mg, after giving 3 ml of 2% xylocard iv and lignocaine spray over the cords she was intubated and depth of anesthesia was achieved with oxygen, nitrous oxide and sevofluorane. Blood pressure dropped to 90/60 mm hg and hypotension was managed with Inj phenylephrine bolus dose of 30 mcg. Under ultrasound guidance fascia iliaca block was given with Inj 0.2% ropivacaine 15 ml + Inj lignocaine 2% 15 ml + distilled water 10 ml. intraoperatively HR was 57/min IBP-136/52 mm hg, SpO_2-100%, Urine output -40 ml/hr and $ETCO_2$ -37. There were no episodes of hypotension and no significant blood loss. The procedure lasted for around an hour. The patient was extubated fully awake after taking adequate precautions to prevent extubation response by giving 3 ml of 2% lignocaine iv and shifted to ICU for observation. She was shifted from ICU to ward the next day and discharged on postoperative day 4.

Discussion

Patients with severe AS have a low fixed Cardiac output and avoidance of hypotension is the critical step in the management of the case. Hypotension can initiate a cascade of events which can lead to cardiac arrest. If there is sudden decrease in contractility chest compressions will not maintain cardiac output.[6] Due to diastolic dysfunction and impaired relaxation of left ventricle the atrial contribution which accounts for nearly 40% of the cardiac output should be preserved. Ischemia leads to reducedcardiac output and decreased blood pressure further compromising coronary perfusion.[5] All possible attempts are to be taken to maintain sinus rhythm to maintain atrial kick. Any tachycardia and bradycardia should be avoided. Bradycardia is avoided because cardiac output becomes low in fixed aortic orifice state. Tachycardia can jeopardize diastolic filling time and increased left ventricular strain increasing oxygen demand.

General anesthesia is often preferred to epidural or spinal anesthesia because the sympathetic blockade produced by regional anesthesia causing hypotension leading to reduced coronary perfusion. Induction can be accomplished with an intravenous induction drug that does not decrease the systemic vascular resistance. An opioid induction agent may be useful if left ventricular function is compromised. Ketamine induces tachycardia and should be avoided.

Maintenance of anesthesia can be accomplished with a combination of nitrous oxide and volatile anesthetic agent and opioids or with opioids alone. Muscle relaxants with minimal hemodyanamic effects are best. Intravascular fluid volume should be maintained at normal levels since these patients are preload dependent.

Meticulous attention to hypotension is to be given and treated with alpha agonists such as phenylephrine that do not cause tachycardia and therefore maintain diastolic filling time. Persistent tachycardia is to be treated with beta blockers such as esmolol. Supraventricular tachycardia should be treated by cardioversion. Lignocaine, amiodarone and a defibrillator should be kept ready in the operating room since these patients have a propensity to develop ventricular dysrhythmias.

Patients of valvular heart disease may often be found on various medications like antibiotic prophylaxis for infective endocarditis, especially in patients with congenital heart disease, cardiac transplantation[8–10] anticoagulants, betablockers, statins, nesiritide etc. This patient was on T. clopidogrel. Patients with valvular heart disease often require anticoagulation for associated finding such as atrial fibrillation. Non-cardiac surgery in prosthetic valve patients poses risk of IE, bleeding and acute and subacute valve thrombosis with interrupted anticoagulation. The current guidelines recommend withdrawal of oral anticoagulation

72h before surgery to lower the INR to <1.5 and maintain anticoagulation with unfractionated heparin. The APTT is maintained twice the control value.[11] The use of beta-blocker in patients with stenotic valvular lesions has to be made on case-to-case basis and correlated with hemodynamic variables.[12] Statins exert their effect by plaque stabilization, anti-atherosclerotic, anti-thrombotic, vasodilative and anti-inflammatory properties.[13,14] Although there are no conclusive data to suggest the benefit of statin therapy in valvular heart disease, discontinuation of statin therapy is associated with worsened outcome.[14,15] Nesiritide is a recombinant brain-type natriuretic peptide (BNP), which decreases PA pressures and myocardial oxygen consumption while increasing coronary flow and urine output.[16]

Conclusion

Severe AS mandates a meticulous planning with thorough preoperative work up to make a rationale choice of management. General anesthesia is preferred in such cases to provide hemodynamic stability. Advantages of using fascia iliac block over neuraxial technique would be avoidance of hemodynamic stability, as a form of postoperative analgesia, better patient statisfaction and reduced number of complications. Identifying potential intraoperative problems and timely intervention is important in achieving desired goals.[7]

References

1. McSwain JR, Matos JR, Henderson BL, Wilson SH. Hip hemiarthroplasty in two patients with severe aortic stenosis: Ethical questions from Anesthesiologist's perspective. A A Case Rep. 2015 Dec 15;5(12):213-5.
2. Kawano H, Matsumoto T. Anesthesia for a very elderly patient with aortic stenosis. Masui. 2012 Dec;61(12):1352–5.
3. Kennon S, Archbold A. Guidelines For The Management Of Patients With Aortic Stenosis Undergoing Noncardiac Surgery: Out Of Date And Overly Prescriptive. Interventional cardiology review. 2017;12(2): 133–6.
4. Rostagno C, Ranalli C, Polidori G, *et al*. Outcome in elderly patients with aortic stenosis undergoing hip fracture surgery. Results may suggest a different postoperative strategy?. Trauma Surg Acute Care Open. 2019;4(1):e000218. Published 2019 Jan 12. doi:10.1136/tsaco-2018–000218
5. Yao and Artusio's Anesthesiology; 8th edition valvular heart disease.
6. Paul A, Das S. Valvular heart disease and anesthesia. Indian J Anaesth. 2017;61:721–7.
7. Stoelting anesthesia and co-existing disease, second south Asian edition, valvular heart disease. 2014.pp.40–41.
8. Steckelberg JM, Wilson WR. Risk factors for infective endocarditis. Infect Dis Clin North Am. 1993 Mar;7(1):9-19.
9. Mylonakis E, Calderwood SB. Infective endocarditis in adults. N Engl J Med. 2001;345(1); 318–30.
10. Allen U. Infective endocarditis: Updated guidelines. Can J Infect Dis Med Microbiol. 2010;21:74–7.
11. Ortel TL. Perioperative management of patients on chronic antithrombotic therapy. Blood. 2012;120:4699–705.
12. Fleisher LA, Beckman JA, Brown KA, *et al.* ACC/AHA 2006 guideline update on perioperative cardiovascular evaluation for noncardiac surgery: Focused update on perioperative beta-blocker therapy: A report.Circulation. 2006 Jun 6;113(22):2662-74.
13. Folkeringa RJ, Van Kraaij DJ, Tieleman RG, *et al.* Statins associated with reduced mortality in patients admitted for congestive heart failure. J Card Fail. 2006;12:134–8.
14. Fukuta H, Sane DC, Brucks S, *et al.* Statin therapy may be associated with lower mortality in patients with diastolic heart failure: A preliminary report. Circulation. 2005;112:357–63.
15. Le Manach Y, Godet G, Coriat P, *et al.* The impact of postoperative discontinuation or continuation of chronic statin therapy on cardiac outcome after major vascular surgery. Anesth Analg. 2007;104:1326–33.
16. Salzberg SP, Filsoufi F, Anyanwu A, *et al.* High-risk mitral valve surgery: Perioperative hemodynamic optimization with nesiritide (BNP). Ann Thorac Surg. 2005;80:502–6.