

Perioperative Management of a Patient with Rheumatic Heart Disease Undergoing Emergency Laparotomy: A Case Report

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ABSTRACT

Valvular heart disease and resulting comorbidity, such as heart failure or atrial fibrillation, significantly increase the risk for perioperative adverse events. Appropriate preoperative assessment, adequate perioperative monitoring, and early intervention may help to prevent adverse events and improve patient outcome.⁴ We are presenting a case report of 30 year old lady who was a known case of rheumatic heart disease and underwent emergency laparotomy for acute intestinal obstruction.

Keywords: Rheumatic heart disease, Mitral stenosis, Mitral regurgitation, Anesthetic considerations, emergency laparotomy, perioperative management.

INTRODUCTION

Perioperative management of patients with preexisting rheumatic heart disease is challenging. These patients generally presents with mitral regurgitation and develop mitral stenosis by thickening, commissural fusion and increased rigidity of leaflets.^[1] Valvular disease is not so uncommon finding in patients undergoing emergency surgeries. Valvular heart disease and resulting comorbidity, such as heart failure or atrial fibrillation, significantly increase the risk for perioperative adverse events.^[2,3] Appropriate preoperative assessment, adequate perioperative monitoring, and early intervention may help to prevent adverse events and improve patient outcome.^[4] We are presenting a case report of 30 year old lady who was a known case of rheumatic heart disease and underwent emergency laparotomy for acute intestinal obstruction.

CASE REPORT

A 30 years old female, weighing 25kgs who was a known case rheumatic heart disease since 7 years

was scheduled to undergo mitral valve replacement but developed acute intestinal obstruction a day before elective surgery so underwent emergency exploratory laparotomy. Patient was on injection penicillin since 7 years. Patient had history of breathlessness while doing routine activities, dry cough and orthopnea since 20 days. Echocardiography of the patient showed ejection fraction 65%, mild to moderate mitral stenosis (mitral valve area 1.8cm²), dilated left atrium and left ventricle, severe mitral regurgitation and moderate pulmonary arterial hypertension. So patient was admitted for elective mitral valve repair. Patient was put on tab. lasilactone, tablet spironolactone, injection furosemide, tablet nimodipine, injection phenytoin, injection piperacilin plus tazobactam 2.25 mg 6 hourly iv. Two days prior to the scheduled surgery, patient had 2 episodes of cardiac arrest with atrial fibrillation and ventricular tachycardia during the episodes. Patient was successfully resuscitated and was put on ventilator after intubation. Inotropic support using injection dopamine at 5 mcg/kg/minute was started and inj. amiodarone at 1mg/min maintainence started after giving loading dose for ventricular tachycardia. Under all aseptic precautions right femoral arterial and venous cannulation was done. Patient extubated next day but developed abdominal pain. After proper investigations diagnosis of acute intestinal obstruction was made and surgeons decided to operate immediately.

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On physical examination, patient was afebrile with pulse rate 86/min, respiratory rate 20, blood pressure 96/50 mmHg on ionotropic support, SpO₂ 94% on oxygen and on auscultation bilateral coarse crepts present in chest. Systemic examination revealed mid diastolic murmur in mitral area. Her chest X-ray revealed cardiomegaly. Patient had derranged coagulation profile with INR of 2.3, so 4 units of fresh frozen plasma were arranged. Her preoperative laboratory evaluation reports are given in [Table 1]. After complete anesthetic evaluation we planned general anaesthesia with opioids.

In operating room, all routine monitors attached, IBP line connected and ionotropes continued. Induction done with injection fentanyl 200 µg iv, 50 mg of injection thiopentone diluted as 10mg/ml given slowly after proper preoxygenation. Inj. succinylcholine 50mg iv was given. Airway was secured with endotracheal tube of internal diameter 7mm under direct laryngoscopy. Anaesthesia was maintained using sevoflurane 1 to 2%, vecuronium 1mg iv when required. Ionotropes titrated according to the blood pressure. Adequate pain relief and relaxation was ensured to avoid tachycardia. Four units of fresh frozen plasma were transfused. Anaesthesia was smooth and uneventful. Total blood loss was 300ml. After the completion of surgery it was decided to electively ventilate the patient for 12hrs. So patient was shifted to cardiac ICU and extubated smoothly after 12hrs. Inj. tramadol iv 8hrly was advised for postoperative pain relief. Antibiotic cover using Inj. imepenam plus silastin 1gram iv 6hrly and inj. amikacin 250mg iv 12hrly were started.

Table 1: Laboratory Investigation Profile

Hemoglobin	12.5grams
TLC	9000/cm ³
Coagulation profile	Prothrombin time -33.1secs, control-14.2secs, ratio- 2.3, INR- 2.3
Blood urea	25mg%
Serum creatinine	0.6
Blood sugar	122mg%
Serum electrolytes	Sodium-143meq/l; potassium- 4meq/l

Table 2: Arterial Blood gas analysis

	Preoperative BGA	Postoperative BGA
PH	7.30	7.41
PO ₂	62.3mmHg	159.8mmHg
PCO ₂	20.5mmHg	36.3mmHg
HCO _{3a}	14.4mmol/l	27.1mmol/l
O ₂ Sat	93.9%	99.1%

DISCUSSION

A study by Carapentis et al estimated that up to 15.6 million people are affected by RHD worldwide.^[5] The most common cardiac manifestations of rheumatic heart disease is mitral stenosis followed by involvement of the aortic valve, either a stenotic or a regurgitant lesion. MS in these patients is a slow and progressive, usually over decades, although in

certain areas of the world, the stenosis can accelerate in part due to recurrent episodes of rheumatic carditis.^[6]

Anaesthetic management in patients of MS includes an understanding and appreciation of the pathophysiologic changes associated with MS. Main concerns are avoiding tachycardia, maintaining sinus rhythm, managing ventricular preload and coexisting pulmonary hypertension as well as diminished right and left ventricle function.^[1] Patients with MS already have elevated left atrial pressures, so that overly aggressive use of fluids can lead a patient in borderline CHF into florid pulmonary edema.^[7] While venodilatory effects of anesthetic drugs or gases and decrease in preload due to blood loss can lead to decrease in preload effecting cardiac output, stroke volume and tissue perfusion. Increase in pulmonary arterial pressures is avoided by preventing hypoxia, hypercardia, acidosis, lung hyperexpansion, and nitrous oxide. Oversedation in the preoperative period should be avoided to prevent respiratory depression. Management of right ventricular dysfunction includes optimizing acid-base balance and using hypocarbia, hyperoxia, and possibly vasodilators to decrease pulmonary vascular resistance. Inotropic support may be needed for patients with secondary right ventricular dysfunction or failure.^[1] Epinephrine and milrinone are good therapeutic options. Newer therapeutic options for treatment of refractory pulmonary hypertension include inhaled prostacyclin or nitric oxide.

The primary goal of anesthetic management in patients with MR is maintaining forward systemic flow. The heart rate should be maintained in the high-normal range, i.e. 80 to 100 beats/minute. Tachycardia decreases the regurgitant volume by shortening systole. Bradycardia has dual detrimental effects on MR: it increases the systolic period duration, thus prolonging regurgitation, and it increases the diastolic filling interval, which can lead to LV distention. A sinus rhythm is preferred. Afterload reduction in combination with mild preload augmentation will enhance forward cardiac output and blood pressure. Adequate anesthetic depth, systemic vasodilators, or inodilators and at times, mechanical reduction of aterload with an IABP may be clinical options, depending on the situation. Small dose of ephedrine may be a better choice, after which ionotropic support should be considered if a further need to increase pressure needed. Higher systolic pressures, as in hypertension, can increase the regurgitant volume in MR, while fluid overload with ventricular distension can lead to expansion of an already dilated mitral annulus and thus worsen MR.^[1]

CONCLUSION

We conclude that patients with valvular heart disease like mitral stenosis and mitral regurgitation planned

to undergo emergency surgeries require adequate anaesthesia depth, maintaining sinus rhythm, judicious use of fluids, preventing systemic vasodilatation, avoiding tachycardia but in high normal range (80-100) in case of MR. Hypoxia, hypercarbia is avoided and vasodilators are used to decrease pulmonary hypertension. Adequate monitoring and early intervention is crucial to avoid adverse events perioperatively. Postoperative monitoring and analgesia is also important in these patients.

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