

Anaesthetic Management for Cholecystectomy in a Patient with Prosthetic Mitral Valve due to Cardiac Amyloidosis and Mitral Valve Prolapse

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Abstract: A case of amyloidosis of cardiac origin along with mitral valve prolapse in a young patient is a rare phenomenon. It poses a challenge to the anaesthesiologist when they present for noncardiac surgery under emergency. We discuss a case of a young patient with prosthetic mitral valve on anticoagulants posted for an emergency laparoscopic /open cholecystectomy and its anaesthetic management.

Keywords: cardiac amyloidosis, mitral valve prolapse, prosthetic mitral valve, laparoscopic cholecystectomy

1. Introduction

Mitral valve prolapse, also known as floppy mitral valve syndrome, systolic click murmur syndrome, and billowing mitral leaflets, or Barlow syndrome, is a valvular heart disease, which is benign and asymptomatic many a time but can also present with symptoms of mitral regurgitation, subacute bacterial endocarditis and cardiac failure. It is generally diagnosed on routine clinical examination and confirmed by echocardiography, but only symptomatic patients require mitral valve repair surgery. Mitral regurgitation is the most common lesion noted in patients with idiopathic mitral valve prolapse.

Amyloidosis is a group of diseases characterized by extracellular deposition of insoluble protein aggregates disrupting normal tissue and function. The disease spectrum may be inherited, acquired, localized or systemic, life threatening or can just be an incidental finding. Amyloidosis involving the heart has a poor prognosis due to the high incidence of prevailing cardiomyopathy and cardiac failure. There are 5 different types of amyloidosis of which cardiac amyloidosis in the young belongs to either AL or AA Type.

A patient with prosthetic valve on anticoagulants is always a challenge to the anesthesiologists, especially when they are posted for non-cardiac emergency surgeries for acute abdomen. The challenges are mainly in adequate preop preparation within a short frame of time, the need for changing over to parenteral anticoagulants from oral anticoagulants, possibility of enhanced blood loss and restrictions in the choice of options for comprehensive post-operative analgesia.

2. Case Report

A 23 years old female patient of Indian origin, with history of mitral valve replacement and left ventricular apical tumor excision 6 months back, was planned for emergency laparoscopic /open cholecystectomy due to persistent pain

abdomen following cholelithiasis. She had a past history of tuberculosis abdomen for which she took antitubercular treatment for 1 year long before her open-heart surgery.

2.1 History

Prior to her valve replacement surgery, she presented with history of dyspnea on exertion with severe anemia to a private hospital. On further evaluation, her echocardiography showed – a 4.9 square millimeter of large suspicious clot in the left ventricle (**Figure 1**) along with mitral valve prolapse associated with moderate pulmonary artery hypertension and severe mitral regurgitation. She was operated, in which the left ventricular apical tumor was resected and the mitral valve was replaced with SJM (ST. JUDE



Figure 1: Echocardiographic report showing mitral valve regurgitation with left ventricular apical tumour

Medical) Prosthetic Valve (mechanical bi-leaflet prosthetic valve) of size 29mm. Post operatively she was started on oral nicoumalone 1mg/2mg once daily on alternative days along with tablet digoxin 0.25mg (5/7). The histopathological report of left ventricular tumor showed amyloidosis (**figure 2**). The patient on regular treatment and constant follow up with coagulation profile to avoid thrombosis or bleeding. She was fine and was on regular follow up at the concerned hospital.

2.2 Preoperative Evaluation

Six months later she presented to the casualty of our hospital with severe acute abdomen, guarding in the right hypochondrium, vomiting and abdominal distension and was evaluated to have cholecystitis with cholelithiasis.

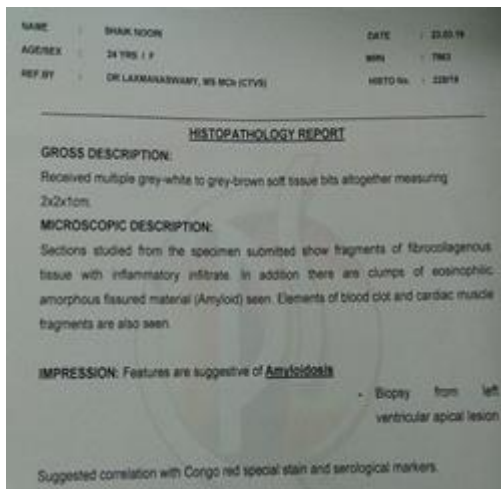


Figure 2: Histopathology showing amyloidosis. the biopsy was taken from the tumour removed from left ventricular apex

As she was not improving with conservative management, 12 hours after the admission to our hospital, a decision was taken by the surgical team to go in for an explorative laparotomy. On physical examination, her general condition was fair, she was hemodynamically stable with regular pulse rate at 98/min, respiratory rate of 20/min, blood pressure of 130/80 mmHg and room air saturation was 98%. Systemic examination showed systolic click in mitral area. Rest of the systems were examined to be normal. Her chest x-ray AP view showed mitral valve prosthesis in situ and normal lung parenchyma. Her echocardiography on admission showed mitral valve prosthesis in situ, no para valvular leaks, normal left ventricular systolic function. The preoperative pulmonary function test showed mild restrictive pattern. Her preoperative laboratory values are cited in table 1 below.

Table 1: Preoperative laboratory values

Parameters	Laboratory Values
hemoglobin	10.9 g/dl
Hematocrit	35%
Total leukocyte count	WBC- $7.7 \times 10^9/l$ GRA- $3.9 \times 10^9/l$ LYM- $3 \times 10^9/l$
Fasting blood sugar	110g/dl
Blood urea	18 mg/dl
Serum creatinine	0.6 mg/dl
Total bilirubin	-1.2 mg/dl
Direct-	-0.4 mg/dl

Indirect-	-0.8mg/dl
SGOT	41U/L
SGPT	20U/L
Alkaline Phosphatase	131 U/L
Serum electrolytes	
Sodium	-137 mmol/L
Potassium	-4.4 mmol/L
Chloride	-106 mmol/L
Coagulation profile	
Platelets-	$199 \times 10^9/l$
PT	15.9sec
INR	1.27
APTT	31.8sec

Since the patient with a prior cardiac surgery was planned for an emergency laparoscopic cholecystectomy due to severe acute abdomen, no adequate time was available for optimization of the patient. Due to emergency, the coagulation profile which showed altered PT INR was corrected using injection vitamin k1-phytonadione 3mg intravenously given. Blood and fresh frozen plasma were arranged.

2.2 Intraoperative Management

The patient was shifted to operation theatre after taking informed high-risk consent from the patient's attenders. Orogastric tube aspiration of gastric content was done and antibiotic coverage was given 30 mins prior to skin incision. Anesthesia was on conventional lines. Injection pantoprazole 40mg, ondansetron 4mg, midazolam 1 mg and injection glycopyrrolate 0.2mg were given intravenously before induction. Preoxygenation with 100% oxygen was given by face mask for 5 mins. Patient was Induced with injection nalbuphine 30mg intravenously, thiopentone sodium 200 mg, intravenous lignocaine 100mg and suxamethonium 100mg intravenous. Patient intubated with Sellick's maneuver and intubation was uneventful. Subsequent anesthesia was maintained with oxygen 66% with nitrous oxide 33%, sevoflurane and atracurium as muscle relaxant agent in the closed circuit with circle absorber. The intraoperative monitoring was on conventional lines with ecg, NIBP, SPO2, temperature, urine output and EtCO2 for the entire operative procedure. The surgery was started as Laparoscopic procedure to remove the gall bladder, but the procedure could not be continued as there were adhesions and poor visibility in the abdomen. Hence the procedure was converted to open laparotomy and cholecystectomy was done. Hemostasis was secured. Abdomen was closed and tube drains were kept. The total blood loss was around 200ml and no plasma or platelets were transfused during the procedure.

2.3 Post Operative Management

For postoperative analgesia, the surgical wound was infiltrated with 30ml of 0.125% bupivacaine with 8mg of dexamethasone. Injection nalbuphine 20mg was used intravenously, every 8th hourly for post-operative analgesia. Extubation was done at the end of surgery after reversal with neostigmine and glycopyrrolate and was uneventful. The post-operative period was uneventful and the patient was discharged on 14th post-operative day.

3. Discussion

Management of a case with prosthetic mitral valve on anticoagulant, posted for emergency laparoscopic cholecystectomy, needs attention to many anaesthetic concerns. The patient's previous surgery reports additionally showed that, a left ventricular apical tumor was also removed during mitral valve replacement with mechanical prosthesis. The biopsy report of the specimen removed showed Amyloidosis in histopathology study. A case of amyloidosis of cardiac origin in a young female is a rare phenomenon. The etiology could be traced to the history of abdominal tuberculosis, for which the patient had completed her antituberculosis regimen as secondary amyloidosis or could be idiopathic as well. Past history of tuberculosis of abdomen could have caused the adhesions which lead to conversion of surgery from laparoscopic to open cholecystectomy.



Three months prior to the emergency, the patient had a routine PFT which showed a restrictive lung pattern. A repeat evaluation of PFT was not possible before the emergency surgery in view of the acute abdomen. there was no sufficient time to switch over to synthetic / soluble heparins from oral anticoagulants. Vitamin K was used to quickly correct whatever coagulation abnormalities were present before surgery. Bleeding time, clotting time, PT, INR and APTT were analyzed before going ahead with surgery.

For post-operative analgesia, epidural analgesia could not be planned due to history of anticoagulant use till the day before surgery. Non-steroidal anti-inflammatory drugs like ketorolac, diclofenac and piroxicam were not considered for post-operative analgesia in view of their effects on bleeding time and clotting time. Among opioids, injection nalbuphine was chosen over other opioids as it has the least chances of causing sphincter of Oddi spasm unlike fentanyl (which is the most notorious to cause spasm of sphincter of Oddi). The post-operative period was thus uneventful and the patient was started on her usual anticoagulant drugs along with advice to use incentive spirometry and chest physiotherapy to avoid post-operative pulmonary complications.

4. Conclusion

Anesthesia for patients with amyloidosis and prosthetic mitral valve in situ presenting for acute abdomen is an unknown challenge as they have the potential to present with dysfunction of multiple organs in the body viz heart, lung, liver, kidney and gastrointestinal tract. Hence the anesthesia has to be planned and calculated as in case of emergencies like acute abdomen. Anesthesia should be confined to basic principles without resorting to flashy flamboyant techniques for per operative maintenance and post-operative analgesia and management. The aim should be to prevent post-operative pulmonary complications with resumption of anticoagulant therapy by the parenteral / oral route whichever is feasible.

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