



ANESTHETIC MANAGEMENT OF A PATIENT WITH PROSTHETIC HEART VALVE FOR NON-CARDIAC SURGERY: A CASE REPORT

Dr Ashok Sehgal

Department of Anaesthesiology and critical care ,Command Hospital ,Panchkula.

Dr (Maj) Shibu Sasidharan*

Department of Anaesthesiology and critical care ,Command Hospital ,Panchkula.*Corresponding Author

ABSTRACT

BACKGROUND: Patients with prosthetic heart valves are a challenge to any anesthesiologist due to the risk of infective endocarditis, bleeding and thrombosis.

CASE PRESENTATION: We present anesthetic management of a 68-year-old Indian lady with a prosthetic (Bioprosthetic) heart valve who underwent Open reduction internal fixation with PFN.

CONCLUSION: Patients with prosthetic heart valves, are prone for thrombosis and resultant complications if anticoagulation is not maintained properly. However, when they are scheduled for major surgery, they can be best managed by normalizing the coagulation profile immediately prior to surgery and restarting the anticoagulation as early as possible.

KEYWORDS :

INTRODUCTION

Management of patients with prosthetic heart valves for non-cardiac surgery involves cardiac assessment for valvular function, residual pathology, infective endocarditis and functional status; assessment of the status of anticoagulation, any risk of bleeding, preparation for reversal of anticoagulants if needed intraoperatively; and neurological evaluation for detecting any impairment due to thromboembolism

We present successful anesthetic management of a lady with prosthetic mitral valve who underwent open reduction and internal fixation for left Femur intertrochanteric fracture.

CASE PRESENTATION

A 58-year-old Indian lady, a known case of rheumatic heart disease, cerebral vascular accident (Rt MCA-2014) who had undergone a successful mitral valve replacement surgery on 07 August 2018, sustained fracture of her left Femur after got slipped on the floor of kitchen . She was scheduled for open reduction and internal fixation with proximal Femur nailing. She was a known case of CVA – RT MCA TERRITORY .Her past history revealed that prior to the valve replacement, she used to get breathless even while doing routine daily activities. Presently, she could climb two flights of stairs without any syncope, palpitations, fatigue, chest pain or breathlessness prior to the trauma. She was receiving oral warfarin 1 mg once daily.

Physical examination revealed her to be afebrile, with an irregularly irregular pulse-92 beats per minute, respiratory rate 18 breaths per minute and blood pressure 156/86 mmHg. Her systemic examination did not reveal any Pathology except upperlimb weakness. Patient's electrocardiogram showed atrial fibrillation with a heart rate of 90 per minute. Her ECHO showed 30% ejection fraction, moderate PAH, normally functioning valves, no paravalvular leak and confirmed absence of vegetations and clots. The chest X ray revealed mitral valve prosthesis, sternotomy sutures and cardiomegaly (Fig 1).

NCCT HEAD suggestive of ill defined hypodense area noted in right frontal and right gangliocapsular region – likely sequelae of old infarct.

Her Preoperative Laboratory Evaluation Reports Are Given In Table 1.

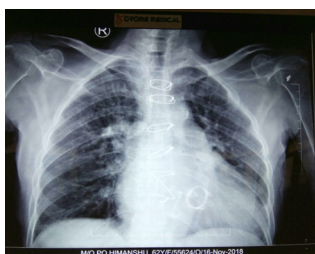


Figure 1 CXR Showing Mitral Valve Prosthesis

Haemoglobin	11.9 gm%
Total leukocyte count	11900
Differential leukocyte count	P85,L7.5,M5.2,E0,B0.3
Platelet count	342000
PT/PTTK/INR	13/33/1.0
RBS	111 mg/dl
Fasting	90
Post prandial	106
Blood urea	19 mg/dl
Serum creatinine	1.0 mg/dl
S-Na+/k+	135/3.6

We advised the patient to discontinue warfarin for four days and started on LMWH 60 mg subcutaneously twice a day. On the day of surgery, the last dose of heparin was administered 6 h prior to surgical incision and the coagulation studies prior to starting the surgery revealed PT 14 (patient) and 13 (control) with a INR 1.1, APTT 34(patient) and 33(control). Two units of packed red blood cells, Fresh frozen plasma and protamine were reserved for emergency use in case of undue blood loss during the surgery. she was kept fasting as per the standard guidelines. She received ampicillin 1.5 g and gentamicin 80 mg intravenously as infective endocarditis prophylaxis 30 minutes prior to skin incision. General anesthesia was planned. Apart from the standard monitoring, invasive blood pressure monitoring was also instituted. Patient was induced with midazolam 1 mg, fentanyl 100 mcg, thiopentone sodium 175 mg in titrated dose to induce sleep. patient intubated using vecuronium 6mg. Anesthesia was maintained with mixture of oxygen and sevoflurane. Neuromuscular blockade was maintained with vecuronium. The operation resulted in 300 ml blood loss which was replaced with crystalloids. Anesthesia was smooth and uneventful. total duration of surgery was 2 hours 30 minutes. After tracheal extubation the patient was shifted to high dependency unit for monitoring. Patient was re started on LMWH in the evening. From next day morning, she was also started on warfarin and PT and APTT were repeated daily. By fourth day LMWH was stopped and warfarin continued as before and an ECHO was done which revealed normal functioning valves with no clot or vegetation. Now, ten days after the procedure, she is ready to be discharged home.

DISCUSSION

Our present case had three major problems ; severe systolic dysfunction (EF 30%), prosthetic mitral valve, PAH, AF. The goals for anaesthetic management were prevention of thrombosis, prevention of infective endocarditis, adequate analgesia, avoidance of drug induced myocardial depression, maintenance of normovolemia and prevention of increased ventricular afterload¹.

Patients with prosthetic heart valves are exposed to a significant threat of thromboembolism and valve dysfunction if proper anticoagulation is not achieved. This will be a tricky situation for the anesthesiologist

to face as discontinuation of anticoagulation in the perioperative period can precipitate life threatening thromboembolism whereas continuation may cause significant bleeding during surgery. The risk of thromboembolism by withholding warfarin in patients with mechanical valve prostheses with atrial fibrillation is found to vary between 1% to 20% in various studies [1-5].

The prosthetic valve itself may get occluded by thrombus in 1–13% cases⁶. There are no large randomized studies that compare different perioperative anticoagulant regimens for patients with mechanical heart valves undergoing surgery. Because of the high risk of hemorrhage, the INR should be within the normal range before the procedure. In patients with heart valves, both the European Society of Cardiology and the Fourth American College of Chest Physicians Consensus Conference on Antithrombotic Therapy have recommended perioperative heparinization to minimize the risk of thrombosis resulting from the return to a normal INR [7,8]. Oral anticoagulation should be discontinued at least three days before any major surgery and as a compromise between no anticoagulation and intravenous heparin, subcutaneous conventional heparin or low-molecular weight heparin in prophylactic doses is substituted preoperatively.

A dose of heparin should be given 3–6 h preoperatively in patients at high risk of thromboembolic events and heparin should be restarted as soon as possible post operatively (preferably within 12 h). Warfarin is restarted 24 hours postoperatively or when patients can start oral intake. Heparin should be continued till the INR is in the therapeutic range for at least 48 h, to enable a reduction in all the vitamin-K-dependent clotting factors⁹.

In emergency surgery, the effect of warfarin needs to be neutralized by FFP, the dose of which depends upon the individual and this is titrated till INR < 1.5. In addition to this, vitamin K may also be given intravenously in small doses as large doses may lead to resistance to warfarin when it is restarted following surgery.

PERIOPERATIVE MANAGEMENT

In case of elective surgery, it is essential to have adequate medical control of heart failure for at least a duration of one week. But in emergency/semiemergency cases there would be no time to optimize the heart failure. In such cases, any arrhythmia should be appropriately treated. If the patient is already in atrial fibrillation (AF), rate control is very important and this is achieved with drugs and by correcting the electrolyte imbalance; hypokalemia and hypomagnesemia are corrected¹⁰. The degree of ventricular impairment and valvular dysfunction is assessed by echocardiography. Whenever feasible and possible, consideration should be given to the use of regional or local anesthesia. Regional anesthesia used alone or in combination with general anesthesia has the advantage of reducing the afterload which can improve cardiac output.⁶

However, hypotension must be prevented to avoid myocardial hypoperfusion. Treatment of arterial pressure changes should be considered if >10% decrease in systolic pressures occurs. Vasodilators and/or vasopressors are to be used to maintain hemodynamic stability.

Invasive hemodynamic monitoring using direct arterial pressure and central venous pressure is indicated in unstable patients, prolonged surgical procedure, especially in emergency situation. Intraoperative TEE is recommended to evaluate dynamic changes in cardiac performance and the response to inotropes and fluid loading. During anesthesia, avoidance of tachycardia is an additional goal. Inotropic support if required during and after surgery can be provided by the use of a variety of agents including dobutamine, dopamine. It may be necessary to counteract some of the peripheral vasodilator effects of general anesthetic agents to assist coronary perfusion. This is achieved with the cautious use of norepinephrine which increases systemic vascular resistance and maintains mean arterial pressure¹¹. Hence dobutamine and noradrenaline were kept ready in this case to improve biventricular function and to prevent further increase in pulmonary pressure and support the circulation, in view of the compromised cardiac status of this patient.

Extubation should be as smooth as intubation. It should be attempted only when the patient is hemodynamically stable, the core body temperature has returned to normal and electrolytes and ABG are within normal limits.

CONCLUSION

To conclude, the main purpose of presenting this case is to emphasize the need for special attention towards maintaining stable rhythm and anticoagulation in patients with LVSD due to valvular heart disease. This is in addition to other factors like a thorough preoperative assessment, optimizing the cardiac status, proper anesthetic plan, intraoperative and postoperative monitoring and prompt recognition and management of Complications

COMPETING INTEREST

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All of the authors were involved in the management of the case and finalizing the article. All of the authors were involved in the process of editing, correcting, and finalizing the manuscript. All authors have read and approved the final manuscript.

CONSENT

The patient and the patient's relatives are pleased to give written consent for publishing this particular case scenario.

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REFERENCES

1. Kearon C, Hirsh J: Management of anticoagulation before and after elective surgery. *N Engl J Med* 1997, 336:1506-11.
2. Gohlke-Bärwolf C: Anticoagulation in valvular heart disease: new aspects and management during non-cardiac surgery. *Heart* 2000, 84:567-72.
3. Cannegieter SC, Rosendaal FR, Briet E: Thromboembolic and bleeding complications in patients with mechanical heart valve prostheses. *Circulation* 1994, 89:635-41.
4. Larson BJ, Zumberg MS, Kitchens CS: A feasibility study of continuing dose-reduced warfarin for invasive procedures in patients with high thromboembolic risk. *Chest* 2005, 127:922-7.
5. Douketis JD, Crowther MA, Chertan SS, Kearon CB: Physician preferences for perioperative anticoagulation in patients with a mechanical heart valve, who are undergoing elective non-cardiac surgery. *Chest* 1999, 116:1240-6.
6. Sharma N, Grover A, Radotra BD: Prosthetic cardiac valve replacement: management problems. *Asian Cardiovasc Thorac Ann* 1998, 6:179-82.
7. Cannegieter SC, Rosendaal FR, Wintzen AR, Meer FJM van de, Vandenbroucke JP, Briet E: Optimal anticoagulation therapy in patients with mechanical heart valves. *N Engl J Med* 1995, 333:11-17.
8. Ad Hoc committee of the Working Group on Valvular Heart Disease. European Society of Cardiology. Guidelines for the prevention of thromboembolic events in valvular heart disease. *J Heart Valve Dis* 1993, 2:398-410.
9. Ansell J, Hirsh J, Dalen J, Bussey H, Anderson D, Poller L, et al.: Managing oral anticoagulant therapy. *Chest* 2001, 119(1suppl):22S-38S.
10. Ceremuzynski L, Gebalska J, Wolk R, Makowska E: Hypomagnesemia in heart failure with ventricular arrhythmias. Beneficial effects of magnesium supplementation. *Journal of Internal Medicine* 2000; 247(1):78-86.
11. Prashan HT, Thiagarajah S, Elizabeth AMF: Anaesthetic considerations in patients with cardiomyopathies. *MEJ Anaesth* 2009 Oct; 20(3): 347-54