



ANAESTHETIC MANAGEMENT OF RIGHT VENTRICULAR MASS WITH PULMONARY ARTERY THROMBUS WITH RIGHT VENTRICULAR ASSISTED DEVICE IMPLANTATION

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ABSTRACT

A case of Right Ventricular Mass with Pulmonary Artery Thrombus presented a challenge as during anaesthesia the risk of tumor embolization and pulmonary obstruction during anesthesia induction or at any stage thereafter and This case demonstrates the utility of TEE in the perioperative management of post cardiectomy RVF and implantation of temporary RVAD. A 17-year-old female patient presented with the complaints of near-syncope attacks and worsening dyspnea on exertion for 2 years in our institution.

KEYWORDS: Right Ventricular Mass, Right Ventricular Assisted Device, TEE.

Introduction

Cardiac masses pose a unique challenge for anesthesiologists. Myxomas are the most common cardiac tumors in adults, but are rare during infancy and childhood. The prevalence of cardiac myxomas varies between 0.0017% and 0.19% in autopsy studies[1]. Patients may present to the operating room for resection or the catheterization lab for biopsy of these lesions. Only 5% of these tumors are found in the right ventricle (RV)[2]. Cardiac tumors originating from the right ventricular outflow tract (RVOT) present unusual diagnostic and therapeutic challenges. The symptoms are dependent on the size and location of the tumor. Such tumors are capable of generating major clinical consequences. A comprehensive evaluation with emphasis on the echocardiographic findings must be done before any intervention in order to give the anesthesiologist an understanding of the size, location, and nature of the mass. Potential complications from such masses, depending on location, include valvular

compromise, ventricular outflow obstruction, arrhythmias, embolization, tamponade and sudden death.

Case Report

We report a case of Right ventricular mass extending upto right ventricular outflow tract along with Pulmonary artery thrombus and moderate Tricuspid Regurgitation (TR).

A 17-year-old female, with the history of postural hypotension, near-syncope attacks and worsening dyspnea on exertion for 2 years. There was no family history of myxoma. On admission, her pulse rate was 100 beats/minute and blood pressure was 100/60mmHg. She had no signs of congestive cardiac failure.

Anaesthetic Management

On Preanaesthetic evaluation BMI=15.6kg/m² and no pallor, cyanosis or jaundice. Airway examination showed mallampati grade 2. Systemic examination showed a grade

4/6 harsh ejection systolic murmur at lower left sternal border.

All blood investigations were within normal limits. ECG showed normal sinus rhythm, right atrial enlargement, right axis deviation, ST segment depression in leads V1-V6 with right ventricular hypertrophy.

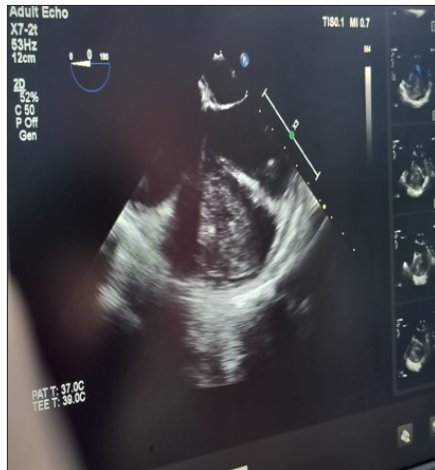


Figure 1. TEE showing RV mass

Transthoracic echocardiography showing large 52×24mm RV mass attached to RVOT impinging on Tricuspid valve. The tumor was causing an obstruction of the RVOT. RVOT gradient was 50mmHg. Her echocardiography showed right atrium RA and RV dilatation, moderate TR with right atrial pressure at 58mmHg. TEE revealed a large mass with lobular contours in the RV with Main Pulmonary Artery thrombus.

A Sternotomy and removal of RV mass VSD repair and TR repair was planned. Preoperatively tab Alprazolam 0.5mg HS given. On the day of surgery in preparation room, premedicated with inj Morphine 5mg and inj Phenargan 12.5mg IM 45min prior to induction. In OT, vitals were attached (HR-100bpm, BP-100/60mmHg, Spo2-92%). One peripheral IV line 20G taken, Ringer lactate drip started @5ml/hr. Pt. was premedicated with inj. midazolam 3mg i/v, inj fentanyl 200mcg i/v, preoxygenated with 100% oxygen for 3-5 min. Induction was done by inj etomidate 20mg i/v and inj rocuronium 50mg i/v. PPV was done for 90 sec and under direct laryngoscopy, patient was intubated with 7.5 mm cuffed ET tube. Bilateral air entry checked and equal, tube fixed at 20th mark. During induction, ECG showed tachyarrhythmias, inj Esmolol (0.5mg/kg) given. An arterial line inserted in the right femoral artery for IBP monitoring and arterial blood gas analysis. An ABG was performed preoperatively which showed pH of 7.43, PaO2 87mmHg, PaCO2 37mmHg, HCO3- 22.8mmol/L, Na+ 143.3, K+ 3.54mmol/L, Cl- 109mmol/L, Hb 11.9g/dl, Hct33%. A triple lumen central venous line was inserted in right Internal jugular vein. Nasogastric tube was inserted. Nasopharyngeal temperature probe placed in to monitor core body temperature. TEE probe was placed to confirm preop findings and also for intraoperative monitoring and

management. Patient catheterised with 16F foley catheter to monitor urine output. Maintenance of anaesthesia by inj vecuronium 1mg i/v, inj midazolam 0.1mg i/v and inj fentanyl 10mcg iv every 30 min, with fresh gas flow of 100% oxygen @ 2l/min and sevoflurane @ 1-2%.

Surgical Management

After skin incision midline sternotomy was performed. Inj heparin 150mg given IV. ACT checked after 5 minutes which was >480 sec. Patient was taken on Cardiopulmonary bypass cannulation with arterial cannulation of the aorta and two separate venous cannulas in the IVC and SVC. The ventilation was stopped. After going on CPB, aortic cross-clamping and cardioplegia administration, myocardial protection was achieved using antegrade Delnido blood cardioplegia. The right heart was opened. Operative findings revealed a gelatinous 50×20mm mass, originating 1cm below the pulmonary valve and attached to the RVOT on its septal surface. The mass was completely removed and VSD repair done. The mass along with the tricuspid valve was excised and sent to pathology. Meanwhile, serial ABGs and ACT was done by perfusionist team and correction done accordingly. Intraoperative hydration and vitals were maintained. The diagnosis of myxoma was confirmed by histology.



Figure 2. RV mass

The aortic clamp was removed and the heart was vented to remove air. After completion of the valve replacement, we tried to take patient off bypass but patient shows signs of right ventricular dysfunction- tachycardia, central venous pressure >20mmHg, mean arterial pressure <60 mmHg and low cardiac index <2.2 l/min/m. with maximum inotropic support of epinephrine, dobutamine and milrinone. it was difficult to coming off bypass inspite of all inotropic support and efforts. so surgeons planned to implant a temporary right ventricular assist device in view of RVF. RVAD was kept for 8 days until the right ventricle has fully recovered.



Figure 3. Right ventricular assisted Device

Discussion

Usually patients benefit from premedication to avoid anxiety induced tachycardia; however concomitant oversedation should be avoided to prevent an increase in PVR. The anaesthetic agents used should not cause significant chronotropic action. Supraventricular tachyarrhythmias and ventricular tachyarrhythmias can occur during induction. In our case we injected inj esmolol. 5mg/kg bolus to treat it. so ECG should be carefully monitored. Defibrillators must be ready prior to induction of anaesthesia to end arrhythmias that may be associated with hemodynamic instability. IV beta blockers and amiodarone, may help restore sinus rhythms of clinically stable pre-excited tachycardia. IV adenosine can be used for narrow QRS complex tachycardia. There are several case reports of delayed intravenous induction by pooling of anaesthetics in the large right atrium. Therefore, careful dosing and patience are required to avoid overdose of anaesthetics. The large right atrium also acts as a reservoir to delay the release of drug, prolonging the duration of action. This delay can also result in the delivery of much larger doses of the drug.

Patients with fixed cardiac output are very sensitive to the myocardial depressant effect of IV induction agents. We induced our Pt. with inj Etomidate to avoid decrease in cardiac output. The hypercapnia can reduce the myocardial contractility and lower the threshold for arrhythmias. In our patient, we maintained the EtCO₂ at 28 -32 mmHg by adjusting the ventilator settings to minimize the possibility of hypercapnia After intubation, access to the artery and central veins was made. TEE helps identify the anatomy of the tricuspid valve, the mechanism of TR, and evaluate biventricular function. After the initiation of the bypass, the surgeon examined the tricuspid valve to determine the feasibility and type of valve repair[1]. TEE also helps optimize preload, postoperative RV and LV function and guides the use of inotropes.

TR causes RA and RV volume overload, resulting in RA dilation and modest RV functional impairment. Inotropic support and RV afterload reduction are helpful in the immediate post bypass period. PVR should be minimized . In

our patient, we started inj nitroglycerine (1mcg/kg/min) , inj milrinone (0.5mcg/kg/min) and inj adrenaline (0.1mcg/kg/min) infusion. Acidemia, hypoxia, and hypercarbia, which are all reversible causes of elevated PVR, were avoided. To reduce blood loss and the need for transfusions, anti-fibrinolytic medication tranexamic acid was administered after correct heparin reversal with protamine. To avoid arrhythmia exacerbation, electrolytes and acid base gases were closely monitored and rectified as needed.

Conclusion

This case shows the anaesthetic management of Right Ventricular mass with RVAD implantation in perioperative RVF and also demonstrates the utility of TEE in the perioperative management of such a patient.

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