

## An Incidence of MACE (Major Adverse Cardiac Event): How we managed it

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### ABSTRACT

Major adverse cardiovascular events (MACE) are ever evolving, which has a significant heterogeneity with composite endpoint of adverse cardiovascular outcomes which is frequently used in cardiovascular research. Early recognition and management is important in treatment of these patients.

We hereby report a successfully managed case of 64 -year-old male patient with a history of Rheumatic Heart Disease with Severe Mitral Stenosis & Severe Aortic Stenosis in Atrial Fibrillation with type 2 DM & HTN who underwent DVR (Mitral Valve Replacement & Aortic Valve Replacement) through median sternotomy approach under General Anesthesia & Cardio Pulmonary Bypass (CPB) who had MACE during early postoperative period

A great awareness of MACE and its variable presentations, timely identification and definitive management of such life-threatening complication is vital to avoid death which is a night mare for the Anaesthesiologist and the patient.

**Key words:** Major Adverse Cardiac Event (MACE), Aortic valve replacement (AVR), Mitral Valve replacement (MVR), Coronary Artery Disease (CAD).

### INTRODUCTION

Patients with a history of cardiovascular disease are at high risk of developing secondary major adverse cardiac events (MACE). This case report aims to identify independent predictors of MACE after hospital admission which could be used to identify high-risk patients

### CASE REPORT

A 64-year-old gentleman with history of chronic Rheumatic Heart Disease with Severe Mitral Stenosis & Severe Aortic Stenosis in Atrial Fibrillation with history of type 2 DM & HTN on regular treatment. He was admitted in ICCU with Symptoms of Palpitations, DOE of NYHA II-III since 09 months Pre syncopal attacks 2-3 episodes in a month since 2 months and progressively deteriorated. No h/o Angina, TIA,

fever. Investigations revealed AF rhythm, Rt axis deviation and Atrial enlargement in ECG with Prominent aortic knuckle, Mitralisation of left heart border, Enlargement of LA, Double shadows (of the atria) Prominent bronchopulmonary vascular Markings-Antler's sign in CXR.

- Echo revealed
- Severe MS with MVA=0.9cm<sup>2</sup>
- Gradients = 25/10 mmHg, RVSP= RAP + 45 mmHg,
- Severe AS, Gradients= 84/54mmHg, Ao FV= 4.5 m/sec
- And moderate AR. However, CAG was normal.
- No history of COPD, Asthma, thyroid illness. No history of previous surgeries.

Patient was planned for DVR (Mitral and Aortic Valve Replacement) through median sternotomy approach with Cardiopulmonary bypass (CPB) under general anaesthesia. Patient was taken to operation theatre, after attaching ASA standard monitoring, right radial artery cannulation was done under strict aseptic conditions and patient was induced with injection Etomidate 0.2 mg per kg, inj Fentanyl 2 microgram per kg and intubation was facilitated with injection rocuronium 0.6 mg/kg.

After induction Rt IJV CVC catheter and rt femoral artery cannulation was done. Patient underwent surgery-Median sternotomy was done and went on CPB and DVR (MVR followed by AVR) was completed and came off CPB as we normally do. Pacing wires anchored, hemostasis ensured, drains placed and sternotomy closed.

Post OP management: Patient was shifted to the intensive cardiac care unit (ICCU), stabilized and rewarmed. Extubation was planned, so sedation was stopped. With NTG and 40-degree head end up, BP was under control. While taking Post Op Chest X ray there was Sudden gush of blood through the chest tubes approximately 1.5 L of blood in the ICD within half

a min. BP was crashed to 65/40mmHg and patient collapsed in ICCU.

Immediate lifesaving management was initiated with flushing of IV fluids and blood products at high speed and started on vasopressor support. Immediate re-exploration was performed.

**FINDINGS:** After quick assessment of the field, it was found that an atherosclerotic patch in the aorta had given away, blood spurting from it & Heart was empty and it was barely beating on the brink of giving up contraction. Two fingers placed on the leak & with another hand cardiac massage was started. BP was not sustaining; intravenous fluids and all available blood & blood products were pushed.

The patient was sinking, so an injection of phenylephrine bolus, an infusion of noradrenaline, and pushing of colloid and crystalloid were performed with the sole goal of maintaining a MAP of at least 45 to 55 mm of Hg Patient was shifted to operation theatre (OT) with patient's chest open and surgeons' finger in-situ on the leaking plaque Patient was taken on a CPB.

This duration was about 15 and 20 minutes. During this time, MAP was maintained by rapidly pushing fluid and using vasoconstrictors. Once the patient was on the CPB, the patient was cooled to 30 degrees for cerebral protection. The plaque was recognized and fixed with plaquets.

Since we had transfused nearly eight to ten units of PRBC and other blood products, the risk of transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO) existed, so hemofiltration was performed after cardiopulmonary bypass and patient was cooled to 32-degree celcius.

Patient was shifted back to ICCU on average inotropes. Hemodynamically stable. After being tapered off inotropes and having his neurological status assessed on the third post-op day, patient was extubated. The condition of the patient improved and he was discharged with a healthy healing wound. On the ninth post-op day, he was back on his feet and walked home.



## DISCUSSION

cardiovascular disease is one of the leading causes of mortality and morbidity. The commonest manifestations attributed to this study found an overall higher prevalence of MACE among patients with atherosclerosis. Understanding the incidence rates and comparative risk of MACE based on atherosclerotic disease characteristics may greatly aid efforts to better treat such patients. This suggests the risk of MACE may be modified through medical management affecting disease outcomes (1). The analysis performed was aimed at demonstrating MACE (Major Adverse Cardiac Event) occurrence, how we managed it and preventing death resulting from such life-threatening complication (2). When clearly analyzed for various treatment options, we are of the firm opinion that there are significant variations in the number of MACE events. Major adverse cardiovascular events incidence increased considerably over time and when multiple vascular beds were involved (3)

In this large, contemporary real-world study of patients with established atherosclerosis or at high risk for atherosclerotic complications, the proportion of patients experiencing MACE increased by nearly 5-fold from year 1 to 4 of follow-up (4).

In addition, we discovered that a patient's health status, comorbidities, and many other factors that have not yet been investigated influence MACE incidence. The endpoint of study was major adverse cardiovascular outcome which was explained in the presented case study explained that timely identification and definitive intervention of such major complication, Wide spread patient education, adequate pre-Op evaluation and optimization, well preparedness of the team &

quick action ,readily availability of the instruments & equipments will help to prevent morbidity and mortality associated with MACE in high risk individuals(5) .After being tapered off inotropes and having his neurological status assessed on the third post-op day, the patient was extubated . On the ninth post-op day, he was back on his feet and walked home.

The incidence of MACE is erratic, but the rate of occurrence could be reduced with the right treatment strategy (6). Analyzing the effects of various management strategies on lowering the incidence of MACE requires additional research. In order to determine both the long-term and short-term outcomes, it is necessary to make comparisons between the current and previous controlling strategies, even in the face of cutting-edge techniques and technologies. There is a need for continued improvement in the prevention and treatment of patients with or at risk of atherosclerosis. (7)

## **MACE: PREDICTORS & RISK FACTORS**

- Atherosclerotic diseases
- One vascular bed vs Two Vs three vascular beds
- DM-II
- Diabetic nephropathy
- Hypercholesterolemia
- Carotid stenosis
- HTN.
- Advanced age
- Smoking
- Natural history of Aortic and Mitral valve disease
- A progressive disease
- Slow, stable course in the early years followed by an accelerated course later in life
- Latent period of 20-40 years from the occurrence of rheumatic fever/degeneration to the onset of symptoms.

## **NATURAL HISTORY OF AORTIC AND MITRAL VALVE DISEASE.**

- A progressive disease
- Slow, stable course in the early years followed by an accelerated course later in life
- Latent period of 20-40 years from the occurrence of rheumatic fever/degeneration to the onset of symptoms

## **CONCLUSION:**

In conclusion, our case report adds to the fact that this substantial risk for MACE in patients with established valvular

heart disease with atherosclerotic disease and multiple risk factors can occur in patients undergoing major cardiac surgery during post-operative period and may cause serious problems for the Anaesthesiologist due to the nature and perioperative complications associated with it. Hence, the Anaesthesia provider should be more vigilant in anticipating and preventing such MACE in patients.

Anaesthetic management of this case was mainly focused on maintenance of hemodynamic stability and perfusion to vital organs by administering iv fluids, blood and blood products, inotropes and prevention of ongoing blood loss, hypothermia and complications related to TRALI and TACO.

Moreover, we emphasize the timely identification and definitive management of such complication helps in decreasing the peri operative morbidity and mortality associated with major cardiac surgeries and need for continued improvement in the prevention and treatment of patients with or at risk of atherosclerosis.

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