

Second Safety Measure during Cardiac Surgery

Tao Hong*

Department of Anesthesiology and Perioperative Medicine, Georgia Regents University, United States

***Corresponding Author:** Tao Hong, Department of Anesthesiology and Perioperative Medicine, Georgia Regents University, United States; E-mail: thong@gru.edu

The highly skilled and dedicated personal in cardiac ORs are human and will make errors. One third of deaths associated with Coronary Bypass Graft (CABG) operations may be preventable [1]. The two areas have been the focus: techniques and nontechnical skills such as communication, cooperation, coordination and leadership [2]. We call those the first safe Measure. Despite those efforts, there is little progress achieved in reducing or preventing errors 14 years after the Institution of Medicine report [1]. Therefore, the second safety measure is warranted. We present a case to highlight the needs of “second safety measure” during cardiac surgery.

Case Description

A 62 Year old male was admitted to the Surgical Intensive Care Unit (SICU) for septic shock secondary to Klebsiella from an infected right knee. Transesophageal Echocardiogram (TEE) demonstrated an enlarging mass on the atrial side of posterior mitral leaflet with severe mitral stenosis and severe mitral regurgitation. After 7 days of antibiotics treatment and resuscitation, the patient underwent mitral valve replacement in the operation room (OR). On Cardiopulmonary Bypass (CPB), the left atrium was open just behind the interatrial groove and Cosgrove retractors were placed to expose the mitral valve. The leaflets were excised and the annular abscesses were debrided. Horizontal mattress sutures were placed around the annulus and passed through the valve. However, the valve was placed in the

wrong orientation [Figure 1]. It was questioned by the attending anesthesiologist. The sutures were cut and the valve was put in the correct orientation. After totally de-aired, the patient came off CPB without problem. The patient was discharge home after one and half month of hospitalization.

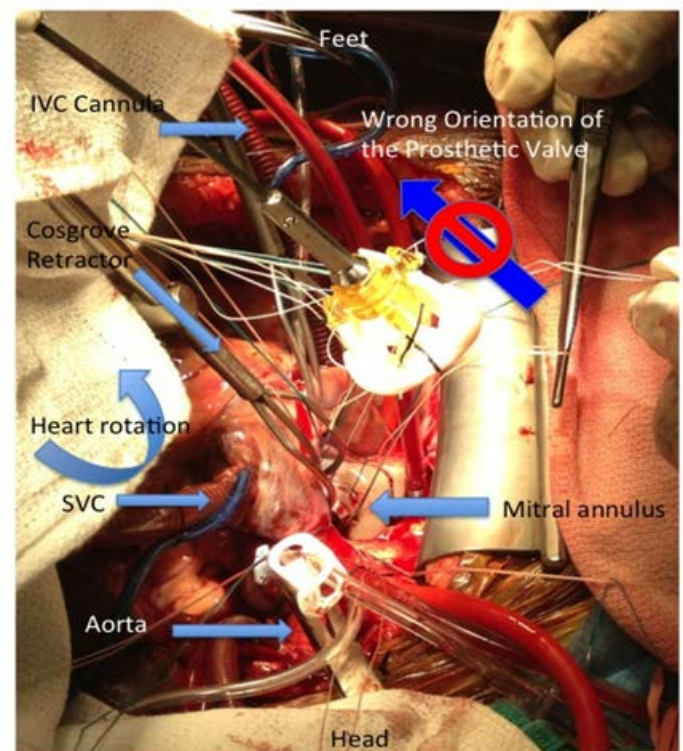


Figure 1: The Prosthetic Valve has been sutured into the mitral annulus. The dark blue arrow indicates the direction of the blood flow through the one-way prosthetic valve. The heart was rotated to the left, and the left atrium was open via the posterior approach and the mitral annulus was exposed with Cosgrove retractors. The left ventricle is located on the other side of the mitral annulus (not visible in the picture). Superior Vena Cava (SVC). Inferior Vena Cava (IVC).

Discussion

The potential complication in this case has not been described in the literature. The reported complications of mitral valve replacement are systemic embolization, valve obstruction due to thrombosis or pannus formation, endocarditis, structure deterioration, paravalvular regurgitation, hemolytic anemia and patient-prosthesis mismatch [3]. It is conceivable that there would be a complete mitral valve obstruction if the prosthetic valve had been placed in the wrong orientation. If return to cardiopulmonary bypass was delayed, multiple organ failure and possible death would have to follow.

We call the interdisciplinary approach the second safety measure. Even though some of the interdisciplinary measure, such as joint conferences among the anesthesia and CT surgery team, in place, practically few those efforts have been materialized in real world. With monumental responsibilities during the entire procedure, the surgeon can be distracted or miss to check the orientation of the valve. In addition, the orientation of aortic valve replacement is opposite of mitral valve replacement and the orientation of the prosthetic valve is not visible until the cap is off. Therefore, everyone in that operating room has the responsibility of second safety measure. There were two key components of the safety measure. Number one is to have good knowledge of the other specialty field; number two is that the people from different specialties is willing to accept recommendation from another specialty without territory dispute. Of course, the good communication skill and vigilance already mentioned in the first safety measure is necessary for good outcome. In this particular case, the vigilant anesthesiologist has good understanding of the surgical field and the surgeon accepted the recommendation from the anesthesiologist. As a result, the cardio surgical catastrophe was avoided.

Anesthesia like many of other specialties in medicine has become more and more multidisciplinary for the better care of our patients. For example, the TEE was sole performed by cardiologists. Intraoperative TEE mainly performed by anesthesiologist has evolved into a decision-making role, from *monere* to *decider* [4]. Recently, Wolfe et al showed that interdisciplinary ICU cardiac arrest debriefing improves survival outcomes [5]. The multidisciplinary team approach will improve patient safety and ultimately the cardiac surgery outcomes.

References

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