

Robotic-assisted Cardiac Surgery without Aortic Cross-clamping: A Safe Alternative Approach

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Abstract

Background and Aim: Attempting to place an aortic cross-clamp may complicate surgery and post operative outcomes in patients who have mediastinal adhesions or in those with extensive aortic calcification. Although right sided cardiac surgery via thoracotomy is not a new technique in these patients, robotic-assisted intracardiac repair without cross-clamping was not reported in a large group of patients previously. In this study, the safety of robotic-assisted cardiac surgery without aortic cross-clamping was examined. **Methods:** From January 2010 to March 2020, 304 patients underwent robotic-assisted cardiac surgery in our center and in 25 of these patients (8.2%) with a mean age of 65.5 ± 20 years myocardial protection was succeeded with moderate hypothermic ventricular fibrillatory arrest. Severe pericardial adhesions or existence of highly calcified ascending aorta were the indications for fibrillatory arrest during robotic assistant surgery. **Results:** Most patients were in NYHA class [?]II (88.0%) and mean logistic Euroscore value was 18.5 ± 22.3 . The type of the operations were mitral/tricuspid valve repair/replacement, Cryoablation, ASD closure and pericardiectomy. CPB times were 141.5 ± 47 (min 77- max 252) minutes. There was no case of conversion to open thoracotomy or sternotomy. Hemiparesis was observed in one patient. Two patients with 78.2 and 81.9 Euroscore values had mesenteric ischemia and multi-organ failure, respectively, and died at postoperative period. **Conclusions:** Robotic-assisted cardiac surgery without cross-clamping may provide reasonable outcomes in patients with severe aortic calcification or mediastinal adhesions undergoing intracardiac repair. These acceptable outcomes may encourage surgeons to perform this approach in appropriate group of patients.

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Table 1: Perioperative Characteristics of Patients

Demographics		
	Min-Max	Mean-St
Age	6-92	65.5 ±20
Log Euroscore	2-82	18.5 ± 22.3
EF (%)	40-72	62.4±5.3
LVEDD (cm)	4.3-6.3	6.6±7.4
CPB Duration (min)	77-252	141.6±47.1
ICU Stay (hours)	2-138	34±36.2
	n=25	%
Female	14	56
NYHA Class 3-4	13	52
COPD	3	12
Hypertension	6	24
CAD	12	48
Preoperative AF	12	48

Table 2: Types of Robotic-assisted Operations Performed without Aortic Cross-clamping

Repair Techniques	n =25	%
Tricuspid Valve Replacement	7	28
Mitral Valve Repair	4	16
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Atrial Septal Defect Repair	3	12
Mitral Valve Replacement+ Cryoablation	2	8
Mitral Valve Replacement +Tricuspid Valve Repair	2	8
Tricuspid Valve Repair	1	4
Mitral Valve Repair+Tricuspid Valve Replacement	1	4
Pericardiectomy	1	4

Table 3: Perioperative Complications

Perioperative Complications	n=	%
Neurological Deficit		
• Permanent	0	0
• Transient	1	1.7
Revision for Bleeding	1	4
New onset AF	4	16
Post Pericardiotomy Syndrome	2	8
Pleural Efusion Needs Drainage	2	8
Renal Failure Needs Dialysis	2	8
Infective Endocarditis	1	4
Mesenteric Ischemia	1	4
Mortality	2	8