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Beating-Heart Coronary Artery Bypass Grafting in patients with End-Stage Renal Disease: an inner-city hospital experience in a socioeconomically challenged urban center

Abstract:

Background: End-Stage Renal Disease (ESRD) is more prevalent in socioeconomically impaired areas compared to their affluent counterparts. This is a multi-factorial problem owing to poorly controlled hypertension, diabetes, access to healthcare disparities, education, and so forth. Nonetheless, ESRD is an independent risk factor in outcomes for traditional coronary artery bypass grafting (TRAD-CAB) utilizing aortic cross clamping and cardioplegic arrest. Beating-Heart techniques-- Off-pump CABG (OP-CAB) and Pump-Assist Direct CABG (PAD-CAB) -- have been shown to improve outcomes in certain high-risk CABG patients, such as those with low ejection fraction. In order to determine if these Beating-Heart techniques offer similar benefits in patients with ESRD, a retrospective review was performed at a single socio-economically challenged urban institution.

Methods: Between March 2017 - October 2023, all ESRD patients underwent CABG using either OP-CAB or PAD-CAB. The STS Risk Assessment calculator was used to predict the mortality and morbidity. The STS predicted risk was compared to the actual outcomes.

Results: There were 55 patients: 52 PAD-CAB and 3 OP-CAB. There were 37 men and 18 women with a mean age of 61.5 years (41 - 77 years). The timing of surgery was the following: 16 Elective, 35 Urgent, and 4 Emergent. Case presentation included: 24 NSTEMI, 4 STEMI, 6 Unstable Angina, 7 CHF, 1 Cardiac Arrest, and 13 with a positive exercise stress test (EST) for renal transplant screening. The mean EF was 47% (range: 15 - 75%). The mean number of grafts was 2.4 (1 - 4) and CPB time was 78 minutes (0- 128 minutes). Study Demographics and Outcomes were compared to the STS as shown in the tables below:

Conclusions: The national profile of the STS database patients undergoing CABG are significantly different than the study center patients. The beating-heart techniques (OP-CAB and PAD-CAB) appears to demonstrate superior outcomes compared to the STS predicted risk for ESRD patients undergoing CABG. This technique may offer advances over the traditional CABG, particularly in those patients from socioeconomically challenged urban centers.

Biography

Samuels received his Undergraduate degree in Biology and Anthropology from the University of Rochester, NY. In 1983 received his Medical Degree from Hahnemann University in Philadelphia, PA. Dr. Samuels completed his General Surgery and Cardiothoracic Surgery Residencies at Hahnemann Hospital in 1995 and joined their faculty in the Department of Cardiothoracic Surgery. Dr. Samuels was appointed Director of Cardiac Transplantation and Mechanical Circulatory Support in 1999 and went on to perform the world's fifth totally implantable artificial heart in 2001. Dr. Samuels became Professor of Surgery at Thomas Jefferson University in 2012 and serves as the Chief of Cardiac Surgery at Jefferson-Einstein Medical Center in Philadelphia. He continues to contribute clinically and investigatively in ventricular assist device (VAD) technologies as well as beating heart coronary artery bypass grafting (CABG)