Leonard Y. Lee, J Clin Exp Cardiolog 2014, 5:3
http://dx.doi.org/10.4172/2155-9880.S1.021

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Clinical & Experimental Cardiology
April 14-16, 2014 Hilton San Antonio Airport, TX, USA

Minimally invasive aortic valve surgery: A comparison of approaches

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Objective: The small incisions of minimally invasive surgery have the proposed benefits of less surgical trauma, less pain, and an improved cosmetic outcome; all of which correspond to a faster postoperative recovery. Opponents claim smaller incisions lead to poor exposure, making the operation longer, more difficult and dangerous. Here, we report our experience performing minimally invasive aortic valve replacements, via a minimally invasive anterior thoracotomy or mini-sternotomy approach, in comparison to conventional sternotomy.

Methods: All data were collected from the Robert wood Johnson university hospital cardiac surgery database. A total of 189 aortic valve replacements were completed from January 2012 - December 2013 using one of the three techniques: 1) Mini-thoracotomy 2) Mini-sternotomy 3) Conventional sternotomy. Demographics such as age, preoperative comorbidities and aortic valve dysfunction were compared, along with operative morbidity and mortality, length of hospital stays, and postoperative complications.

Results: Of the 189 cases, 82 (43.4%) were mini-thoracotomy, 44 (23.3%) mini-sternotomy, 63 (33.3%) conventional sternotomy. Analysis of postoperative complications revealed that the mini-thoracotomy approach, When compared to the mini- sternotomy and conventional sternotomy, had a lower incidence of prolonged ventilator support [2.4% vs. 11.4% and 11.1%, respectively (p=0.054)]. Further, the mini-thoracotomy approach, compared to the mini- sternotomy and conventional sternotomy, required a shorter ICU stay [38.3 vs. 62.8 and 92.7 hours, respectively (p<0.054)] and shorter postoperative length of stay [6.5 vs. 9.4 and 9.3 days, respectively (p<0.05)], resulting in an overall shorter hospitalization [8.8 vs. 12.8 and 14.7 days, respectively (p<0.05)], Incidence of stroke [1.2% vs. 2.3% and 1.6%, respectively (p=1.0)], reoperation for bleeding [4.8% vs. 6.8% and 4.8%, respectively (p=0.84)], renal failure [6.1% vs. 9.1% and 6.4%, respectively (p=0.82)], and atrial fibrillation [21.9% vs. 34.1% and 23.8%, respectively (p=0.34)], were lower in the mini-thoracotomy group compared to the mini- sternotomy and conventional sternotomy; however, these differences were not statistically significant. Overall, minimally invasive techniques demonstrated a trend towards better survival [mini-thoracotomy 2.4%, mini-sternotomy 2.3%, and conventional sternotomy 4.8% 9p=0.77)]

Conclusion: Minimally invasive aortic valve replacement is a safe and effective alternative to conventional sternotomy. The mini-thoracotomy approach showed a decrease in postoperative ventilation time, a decrease in length of ICU stay, and a decrease in overall duration of hospitalization. Finally, postoperative morbidity and mortality trended towards being lower following mini- thoracotomy when compared to mini-sternotomy and conventional sternotomy.

Biography

Leonard Y. Lee is an Associate Professor and Chief of the Division of Cardiothoracic Surgery at UMDNJ-Robert Wood Johnson Medical School. He is dedicated to the most advance, innovative techniques and device to aid in the optimal care of his patients. Prior to this, He was a Chief of the Division of Cardiothoracic Surgery and the Surgical Director of the Heart & Vascular Hospital at Hackensack University Medical Center. He received his MD from University of medicine and Dentistry, New Jersey, Robert Wood Johnson Medical School and his B.A. from Lehigh University. His Residency in General Surgery was completed at St. Vincent's Hospital and Medical Center in New York City, where he served as a Chief Resident. He has been involved in numerous heart surgeries and heart disease clinical research trails. He has published numerous articles in peer-reviewed journals on gene therapy in Cardiology, and on all aspects of adult cardiac surgery.

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