

Mitral Valve Repair Outcomes in a Community Hospital: A Retrospective Analysis[☆]



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Received 27 July 2015; received in revised form 5 October 2015; accepted 19 October 2015; online published-ahead-of-print 2 November 2015

Background	The results of mitral valve repair operations conducted at community hospitals in rural states are not well studied or reported in the literature.
Methods	We retrospectively assessed consecutive patients who underwent isolated mitral valve repair operations performed by a single experienced cardiothoracic surgeon at a large community hospital from May 1, 2006 – April 30, 2010. Patients were monitored for up to three years (average 2.2 years) following surgery for a variety of surgical variables, including morbidity, mortality, and serial two-dimensional transthoracic echocardiographic findings. Comparisons were made with the Society of Thoracic Surgeons Adult Cardiac Surgery Database (ACSD).
Results	Sixty-three consecutive patients underwent isolated complex mitral repair operations. Echocardiographic and morbidity data demonstrated successful outcomes, with no operative mortality and a single cardiac-related death within three years postoperatively. Other variables, especially those that relate to post-repair outcomes, showed no significant differences between our patients and comparison data from the ASCD.
Conclusions	Our study demonstrates equivalent risks and outcomes for complex mitral valve repair performed in a community hospital setting as those found in a national database. The appropriate institutional setting for performing highly complex procedures has substantial implications for health policy, especially regarding access and quality issues.
Keywords	Mitral valve repair • Surgery • Complications • Health policy • Health professional affairs

Introduction

Mitral valve repair has become the preferred surgical procedure for isolated severe mitral valve regurgitation. Many of these operations are conducted at large academic centres

where typically excellent surgical outcomes have been demonstrated [1–4]. Given the complex nature of mitral valve repair and the desire to repair all amenable valves to avoid tissue or mechanical prosthetic valve replacement, the trend has been to refer patients to high volume centres with

[☆] Meeting Presentation: The data in the manuscript was presented as a poster at the UND School of Medicine Frank Low Research Day Poster Session in Grand Forks, ND in April, 2014.

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operations performed by high volume surgeons [5,6]. A variety of surgical and outcome data have been reported for various operations [7–9]; however, studies comparing surgeon volume and operative outcomes for mitral valve repair operations performed solely in the community hospital setting have not been well-reported in the literature. This warrants particular attention as mitral valve repair operations have become the standard treatment for isolated mitral valve prolapse with regurgitation, the most common mitral valvular abnormality in the United States [3]. Furthermore, despite widespread adoption and utilisation of the ACSD, there is a paucity of published reports analysing mitral valve repair outcomes performed in the community hospital setting, especially ones analysing a consecutive patient dataset. In our study we retrospectively analysed electronic health records (EHRs) from consecutive patients who underwent isolated mitral valve repair by a single experienced cardiac surgeon at the largest community hospital in North Dakota (retrospective Sanford Health Cohort, RSHC). The goals of our study were to: 1) demonstrate whether or not patients undergoing complex mitral valve repair in a community hospital demonstrated acceptable surgical outcomes with low morbidity and mortality; and 2) determine if those outcomes were comparable to an accepted national standard of care as documented by collated data compiled by the Society of Thoracic Surgeons in its Adult Cardiac Surgery Database (ACSD).

Patients and Methods

After institutional review board approval, a retrospective cohort was selected of all patients who underwent an isolated mitral valve repair operation from May 1, 2006 through April 30, 2010 (four-year period) performed by a single high-volume cardiothoracic surgeon (author RN) at a single community hospital in North Dakota. Our surgeon has been conducting mitral valve repairs at our hospital continuously since 1993 with greater than 300 cardiac procedures performed annually on average. Sanford Health (SH) is the largest hospital in the state and has an affiliation agreement with the University of North Dakota School of Medicine and Health Sciences, which is one of the 26 community-based medical schools in the United States that neither owns nor operates an affiliated hospital. Sanford Health is a community-based health care provider with 22% full-time medical school faculty members on staff. Patients were included in the retrospective Sanford Health Cohort (RSHC) if they underwent an isolated mitral valve repair operation following the diagnosis of severe mitral valve regurgitation. Patients were excluded if they had undergone previous mitral valve repair, or if they underwent a concomitant coronary artery bypass graft (CABG), aortotomy, or other valve procedure (tricuspid or aortic) at the time of their mitral valve repair operation. Patient records were reviewed for up to three years beyond the date of operation. All morbidity data were collected from thoroughly reviewed EHRs and included clinical and surgical notes from providers in

cardiology, cardiothoracic surgery, and primary care, as well as two-dimensional transthoracic echocardiographic (TTE) reports and data tables. For the RSHC, data from three sets of echocardiograms were abstracted: one obtained preoperatively (PRE, most recent echo preoperatively); one obtained postoperatively immediately following the procedure (POST, most immediate echo postoperatively); and one obtained postoperatively closest to three years postoperative (LATE, last echo performed within three years from procedure date). For comparisons of different time points in the RSHC, continuous variables were compared using mixed-model repeated measures methods. For comparisons between the ACSD and the RSHC, values from the ACSD were used as standards for RSHC comparison, and tests were performed assuming normality for the values in the ACSD.

Results

The RSHC was composed of 63 consecutive patients who underwent isolated mitral valve repair operations in the index period (Table 1). All patients underwent mitral valve annuloplasty and chordoplasty of the posterior and/or anterior leaflet with polytetrafluoroethylene sutures (Table 2). Forty-two patients underwent posterior leaflet plications, seven had posterior leaflet reconstructions, and four underwent edge-to-edge (Alfieri) stitching. None of the patients underwent a mitral valve procedure involving leaflet resection techniques (triangular or quadrangular), native chordal repair, sliding leaflet plasty, commisuroplasty, anterior leaflet cleft plication, or anterior leaflet reconstruction. Twenty-seven patients had at least some anterior leaflet pathology. All mitral valves were described as having pathologically thickened leaflets by the surgeon. Twenty-three patients underwent concomitant maze procedures using a monopolar Cardioblade pen with atrial appendage ligation. Pre- and postoperative echocardiogram data were compared (Table 3). In comparing the preoperative to immediate postoperative echocardiograms, patients

Table 1 Patient Preoperative Characteristics.

Variable	Mean ± SD (Range)
Total Patients	n = 63
Age at Operation (years)	57.7 ± 10.4 (32-80)
Weight (kg)	85.8 ± 19.1 (52.8-139.6)
Height (cm)	173.0 ± 9.3 (144.8-193.0)
Co-morbidities	n (%)
Hypertension	32 (51)
Diabetes Mellitus ^a	5 (8)
Chronic Pulmonary Disease	7 (11)
Renal Disease	3 (5)
Atrial Fibrillation	19 (30)
Other Arrhythmia	10 (16)

^a2 Type I, 3 type II.

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