## 1108-23 Factors Affecting Regression of Ischemic Mitral Regurgitation Following Isolated Coronary Artery Bypass Surgery

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Background: Fate of ischemic mitral regurgitation (IMR) following coronary artery bypass surgery (CABG) alone is variable. Lack of its regression increases short and long term morbidity and mortality. Predictors of persistence or regression of IMR are not well understood.

Methods: The prospective surgical registry at our institution was searched for patients undergoing CABG who also had IMR on the preoperative echocardiogram. Of the 523 patients identified, 93 had 3+ (n=65) or 4+ (n=28) IMR on a 1-4 scale, and no surgical intervention to the mitral valve was performed. Patient characteristics: age 70±10 years, 61% male, EF 38±14%. A postoperative echocardiogram was obtained after a mean of 473 days following CABG. IMR grade regression was computed and related to clinical, operative and echocardiographic variables.

Results: The mean IMR grades before and after CABG was 3.3±0.5 and 2.3±1.2 respectively. Of the 65 patients with 3+ IMR preoperatively, 20 (31%) had 3+ and 8 (12%) had 4+ IMR postoperatively. Of the 28 patients with 4+ preoperative IMR, 3 (11%) and 11 (39%) patients, respectively, had residual 3 or 4+ IMR following CABG. Regression of MR was significantly associated with postoperative reductions in LV end-diastolic (-5±9mm vs 2±7 mm, p=0.006) and end-systolic (-7±1mm vs 4±1mm, p=0.0005) dimensions, improvement in EF (8% vs -1%, p=0.01) and longer cross clamp time (85±38minutes vs 67±33minutes, p=0.006) needed to correct greater number diseased vessels. Vascular disease elsewhere like CVA, suggesting a greater atherosclerotic burden, was associated with IMR nonregression (p=0.01). None of the preoperative echocardiographic or angiographic variables could predict IMR regression.

Conclusions: 1) About 50% of 3-4+ IMR does not regress with CABG alone. 2) Regression of IMR is related to LV size reduction and function improvement secondary to myocardial revascularization. 3) Presence of myocardial viability and adequacy of revascularization may be critical for IMR regression following CABG alone.

## 1108-24 Influence of Patch Material Stiffness on Stroke Volume With Surgical Anterior Ventricular Endocardial Restoration in Ischemic Cardiomyopathy: A Finite Element Model Study

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**Background**: Surgical anterior ventricular endocardial restoration (SAVER) is a novel approach to the treatment of ischemic cardiomyopathy (ICM) following anterior wall infarction that excludes visibly akinetic segments of the dilated LV behind a stiff patch. The goal was to evaluate the effects of SAVER using a realistic mathematical model and to test the hypothesis that patch stiffness affects stroke volume (SV).

**Methods**: A mathematical (finite element) model of LV mechanics with akinetic elements (contractility only 50% normal) was created from an ovine echocardiogram. The surface area of the akinetic region at the apex was halved, and the akinetic myocardium was doubled in thickness to simulate the overlap of tissue over the patch in SAVER. 1mm-thick patches of varying stiffness from 1.2 to 500 kPa were used, where .876 and 1.2 kPa reflect healthy and depressed myocardium, respectively. The model was subjected to a range of physiologic intraventricular pressures. A cardiac cycle with an end-systolic pressure of 100mmHg and end-diastolic pressure of 20mmHg was simulated.

**Results**: SAVER was unable to improve SV in our simulations. Depressed function, however, is positively correlated with patch material stiffness

The effect of patch stiffness on LV function

| | End-Diastolic Volume (cc) | End-Systolic Volume (cc) | Stroke Volume (cc) | Ejection Fraction |
|---|---|---|---|---|
| Pre-surgical heart with ICM | 56.2 | 46.5 | 9.70 | 17.3% |
| SAVER, C=1.2 kPa | 45.7 | 38.0 | 7.70 | 16.8% |
| SAVER, C=10 kPa | 43.9 | 37.0 | 6.90 | 15.7% |
| SAVER, C=50 kPa | 42.3 | 35.8 | 6.50 | 15.4% |
| SAVER, C=100 kPa | 41.9 | 35.4 | 6.50 | 15.5% |
| SAVER, C=500 kPa | 40.9 | 34.5 | 6.40 | 15.6% |

**Conclusions**: Our results suggest that excessive patch stiffness in SAVER reduces SV in ICM. However, SAVER decreased SV in all cases simulated. To date, this is the only mathematical model of SAVER and new simulations can be conducted to study other aspects of SAVER or other remodeling surgeries.

## 1108-25 Outcomes After Various Surgical Strategies for Patients With Severe Ischemic Cardiomyopathy and Moderate Mitral Regurgitation

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**Background**

Mitral regurgitation (MR) is common among patients with LV systolic dysfunction who require coronary artery bypass grafting (CABG). Current strategies for treating moderate MR are controversial.

**Methods**

We performed a retrospective analysis of patients with LV dysfunction (EF% ≤ 35%), and moderate MR undergoing CABG alone, CABG + mitral annuloplasty, CABG + mitral valve reconstruction, or CABG + mitral valve replacement from 1998-2001 using the Society of Thoracic Surgeons (STS) national database. Patients aged < 20 years or with primary valve stenosis were excluded.

Unadjusted and risk adjusted 30-day mortality rates were calculated for each of the four treatment strategies.

**Results**

Our study cohort included 4,173 patients. Patients undergoing valve repair or replacement in addition to CABG were older (p<0.0001), more likely female (p<0.0001) and had a higher EF% (p<0.0001). The outcome results are in the table below.

There were no significant differences in 30-day mortality among patients undergoing CABG alone versus those receiving additional annuloplasty or mitral valve reconstruction. Outcomes of patients undergoing annuloplasty or reconstruction were not different from each other (p = 0.75). Mitral valve replacement was associated with a significantly worse survival at 30-days.

**Conclusions**

Among patients with ischemic cardiomyopathy and moderate MR, mitral valve annuloplasty or valve reconstruction is associated with similar short term mortality versus CABG alone.

Principal Results

| Treatment (n) | 30-day Mortality | Adjusted OR (95% CI) |
|---|---|---|
| CABG (2700) | 9.2% | -- |
| CABG + Ring Annuloplasty (829) | 8.44% | 1.16 (0.86,1.55) |
| CABG + mitral valve reconstruction (169) | 7.69% | 1.01 (0.55,1.85) |
| CABG + mitral valve replacement (475) | 14.32% | 2.28 (1.67,3.12) |

## 1108-26 Delayed Revascularization Has an Adverse Effect on Outcome in Patients With Viable Myocardium

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**Background:** Improvement in function and long-term prognosis after revascularization has been demonstrated in patients with ischemic cardiomyopathy and viable myocardium. However, preliminary data suggest that delayed revascularization has an adverse effect on outcome after revascularization. The aim of the study was to evaluate the impact of timing of revascularization on outcome of patients with ischemic cardiomyopathy and viable myocardium.

**Methods:** Consecutive patients (n=90) with ischemic cardiomyopathy and substantial viability (>25% of the left ventricle) on dobutamine echocardiography underwent surgical revascularization. Patients were divided into 2 groups: early revascularization (<1 month of viability testing) and delayed revascularization (>1 month of testing). Left ventricular ejection fraction (LVEF) was assessed before and 6-9 months after revascularization by radionuclide ventriculography.

**Results:** 42 patients underwent early (23±8 days) and 48 delayed (78±53 days) revascularization. Baseline characteristics of the 2 groups were comparable. The number of dysfunctional but viable segments was 5.1±3.7 in the early group and 4.9±4.1 in the delayed group. The number of scar segments was also comparable (3.9±3.2 versus 3.8±3.1) in the 2 groups. LVEF improved from 29±11% to 41±14% (P<0.01) in the early group, whereas LVEF deteriorated in the delayed group (from 28±7% to 24±12%, P<0.05). No patients died before revascularization in the early group, as compared to 2 in the delayed group. Survival at 2 years was 89% in the early group as compared to 74% in the delayed group.

**Conclusion:** delayed revascularization of patients with ischemic cardiomyopathy and viable myocardium is associated with worse outcome, as compared to early revascularization.