

Long Term Results of Mitral Valve Repair Using Autologous Pericardium Annuloplasty

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Objectives: Use of autologous pericardium for annuloplasty during mitral valve is controversial. We therefore sought to evaluate our long-term results using this technique.

Methods: We retrospectively reviewed 173 consecutive patients aged 19 years to 92 years (59.6 ± 16.25 years) who underwent mitral valve repair complemented by annuloplasty between January 1998 and December 2003. Major causes of mitral regurgitation were annular dilatation and prolapse of the posterior leaflet. Annuloplasty was performed in all the patients using a strip of pericardium treated in glutaraldehyde 0.6% for 10 minutes. Two rows of continuous horizontal mattress Gore-Tex suture were used to secure the pericardium to the mitral annulus. Follow-up was performed in 100% of the patients, and the mean follow-up was 5.25 ± 1.62 years (range, 1.97 to 9.43 years).

Results: There were 3/173 (1.7%) 30 days deaths. Five (2.9%) patients with mitral regurgitation, with or without mitral stenosis underwent reoperation. Mean interval period between operation and reoperation was 3 ± 2.7 years. Actuarial survival rate was 92.5% at 7 years after operation. Freedom from reoperation was 97.1% at 7 years after the initial operation. Follow-up echocardiography was performed on in 160 of the 160 patients (100%). No mitral regurgitation was detected in 34 patients (21.2%), 88 (55%) had grade 1 mitral regurgitation, 35 (21.8%) had grade 2, 3 (1.8%) had grade 3 and none had grade 4.

Conclusions: Our results indicate that autologous pericardium mitral annuloplasty is an effective technique. It provides a durable, reproducible annuloplasty of the mitral valve and avoids the use of foreign materials.

Sternal Wound Infection and Mediastinitis – The End of the "Sternectomy and Muscle Flaps" Era

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BACKGROUND: Postoperative deep sternal wound infection carries a high mortality, a high morbidity, and a poor cure rate. The prevailing approach of sternectomy and pectoralis muscle or omental flaps coverage significantly disrupts the heart's natural chest wall protection and the patients' quality of life. Besides increased mortality and morbidity rates, nearly all patients find it cosmetically repulsive. We present our 5-year experience of a new conservative approach which was gradually developed to improve the outcome of these patients.

METHODS: From January 2003 to November 2007, 2.5% of our patients (n=112) were treated for sternal wound infection and mediastinitis following open heart surgery. We have gradually developed treatment protocol entailing: early hospitalization, drainage and debridement of the sternal wound using the vacuum assisted closing (VAC) system, IV antibiotics administration, macrophages injection into sternal wound margins, and home discharge with IV antibiotics and granulation promoting dressings.

RESULTS: Sternectomy rates dropped down from 43% (n=12) during 2003 to 5% (n=1) in 2007 ($P < 0.001$), macrophages administrations increased from 18% to 95% ($P < 0.001$), and the mortality of the patients with deep sternal infection and mediastinitis dropped down from 39% to 0% ($P < 0.001$).

CONCLUSION: Our newly developed standard conservative protocol for the treatment of deep sternal infections and mediastinitis is effective and highly recommended. It spares the sternum, cures the infection, and leaves the patient physically functional without the use of soft tissue flaps. This treatment was associated with a dramatic reduction in mortality and a significant improvement in patients' quality of life.

Increased Incidence of Early Acute Rejection and Earlier Development of Cardiac Allograft Vasculopathy after Heart Transplantation Due to Donor-Recipient Ethnic Mismatch

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Aim: To investigate the possible linkage between donor-recipient ethnic mismatch (DREM) and incidence of early rejection and cardiac allograft vasculopathy (CAV), a major cause of graft loss in heart transplanted patients.

Materials & Methods: We studied all 111 patients who underwent heart transplantation between 1990 and 2006. Data were retrieved from patient records. Recipients ethnicity: 97 Jewish, 7 Arabs, 6 non-Jewish Caucasians and 1 Hispanic. Donors ethnicity: 47 non-Jewish Caucasians, 46 Jewish, 8 Asians, 7 Arabs and 3 Hispanics. Rejection based on cardiac biopsy was defined as mild (ISHLT 1, 2) or moderate/severe (ISHLT 3A, 3B, 4). CAV was diagnosed by coronary angiography.

Results: DREM was found in 60, and ethnic matching in 51 patients. No rejection was found in 57.7% of 275 biopsies in the ethnic matched group vs. 40.4 % of 241 among DREM patients. Mild rejection was identified in 31.9% in the ethnic-matched vs. 48.7% in the DREM group ($p=0.0002$). Rate of moderate/severe rejection were similar (10.4% vs. 10.9%). No such linkage could be established 3 months after transplantation. CAV diagnosed in 26.2 % and 19.6% ($P=0.382$) for the DREM and ethnic-matched groups respectively during average 7 years (1-14) follow-up. Average time to develop CAV was significantly shorter in the DREM group (4.6 Vs. 7.7 years, $p=0.005$).

Conclusions: Appropriate donor-recipient ethnic matching is associated with a significant decrease in early acute rejection rate following heart transplantation. In contrast, ethnic mismatching seems to be a risk factor associated with early rejection episodes and earlier development of CAV in the transplanted hearts.

Stentless versus Stented Prosthesis for Primary Aortic Valve Replacement: Midterm Results of Morbidity, Mortality and Quality of Life

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Objective: To compare midterm morbidity, mortality and quality of life after primary AVR between stentless and stented prosthesis groups.

Methods: Between August 1996 and August 2006, 310 patients (156 female, 109 (35.2%) >80 years old) underwent primary biologic AVR with or without concomitant CABG due to aortic stenosis. Biologic prosthesis was implanted in all patients older than 65, and in younger patients with a specific request. Clinical assessment, quality of life evaluation (the MOS questionnaire scores) and echocardiography measurements were performed during follow-up (mean 35 months).

Results: Overall hospital mortality was 2.6 % (8/310). Stentless valves were implanted in 31.3% (97/310) of patients. Post operative mean gradients was 18.5 ± 7.5 for patients with stented valves vs 14.5 ± 6.7 for stentless valves ($p < 0.001$). Multivariate analysis revealed that late mortality was associated with hyperlipidemia (O.R. =2.5, $p=0.04$). Overall mortality was associated with age over 80 (O.R. =2.0, $p=0.003$), CHF (O.R. =2.1, $p=0.015$), IDDM (O.R. =4.4, $p=0.01$), and CAF (O.R. =2.3, $p=0.01$) but not with any type of prosthesis. In addition, poor quality of life assessment (higher scores in the MOS questionnaire) was associated with CHF (O.R.=4.2, $p=0.001$), moderate patient-prosthetic mismatch (O.R. =7.1, $p=0.036$) but not with any type of prosthesis.

Conclusions: although the use of stentless biologic prosthesis in the aortic position reduces post operative mean gradients more significantly, no difference in midterm morbidity, mortality or quality of life was seen between groups.

Postoperative Stroke after Cardiac Operations – Is there Light at the End of the Tunnel?

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Background: Ischemic stroke after cardiac operations is a devastating complication with an incidence that has remained constant during the past decade. Therapeutic options are limited since the increased risk for hemorrhagic complications with systemic thrombolytic therapy. Selective intra-arterial approach seems to be safer and more effective.

Patients and Methods: Three patients suffering acute ischemic stroke after surgery underwent emergency neuro-radiological interventions within a few hours from onset of symptoms.

Results: A 66 years old male underwent Mitral Valve Replacement and Tricuspid Valve Repair. On post-operative day (POD) 2 he developed sudden motor Aphasia and left hemiplegia. CT documented a thrombotic occlusion of the right middle cerebral artery. He underwent selective thrombolysis and balloon angioplasty 3 hours after onset of symptoms. Gradual resolution was documented.

The second patient, an 84 years old female, underwent Coronary Artery Bypass Grafting (CABG) and left carotid endarterectomy. On POD 2 she developed right hemiplegia. She underwent urgent carotid angiography and stenting of the left internal carotid artery within 90 minutes from onset of symptoms. Full neurological recovery was documented.

The third patient, a 78 years old female, underwent CABG and developed left hemiparesis on POD 4. She underwent selective thrombolysis and mechanical manipulation of a thrombus in the basilar artery within 6 hours from onset of symptoms. The thrombus was dislodged distally with no resolution of symptoms.

Discussion: Immediate neuro-radiological intervention has a role in the treatment of postoperative ischemic stroke. It may change the course of the disease and should be considered whenever feasible. Pros and cons of this approach will be discussed.

Mitral Regurgitation after Trans Aortic Myectomy for Hypertrophic Obstructive Cardiomyopathy

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Background: Systolic anterior motion of the mitral valve (SAM) causes left ventricular outflow obstruction and mitral regurgitation in hypertrophic obstructive cardiomyopathy (HOCM). It is therefore generally believed that effective relief of obstruction by transaortic septal myectomy (TSM) will subsequently result in resolution of mitral regurgitation (MR), even if significant.

Material and Methods: Between January 2004 and November 2007, 20 consecutive patients with HOCM and preoperative significant MR underwent TSM. We describe five patients in whom MR remained significant despite effective TSM. In all 5 patients a repairable cause of the residual MR was identified by intraoperative TEE and the MR was abolished in a second pump-run. In 3 of them, the additional repairable cause could have been detected by the preoperative study: in 1 patient it became apparent on the preoperative TEE only in hindsight, and in 1 patient the importance of the problem became apparent only after TSM. In 2 patients mitral valve replacement had to be performed in the absence of a detectable repairable cause, or due to intraoperative evidence of organic mitral valve disease unrelated to HOCM.

Conclusion: In up to 25% of the patients with HOCM and significant MR it may be difficult to predict whether abolishing SAM by TSM may also effectively abolish MR, because of: 1) intrinsic mitral valve abnormalities typical for HOCM – particularly leaflet redundancy; 2) changes in mitral valve configuration following TSM; and 3) the potential presence of coincidental organic mitral valve disease. Therefore, the mitral valve of patients with HOCM who are candidates for TSM should not only be carefully examined by preoperative TEE, but also by off-pump intraoperative TEE following TSM.

Tricuspid Valve Surgery in the Elderly : Is it Different ?

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Objective: We compared the outcomes of tricuspid valve [TV] surgery in the elderly and younger cohorts.

Methods: In a prospective observational study, all 130 consecutive patients undergoing TV surgery between October 2004 and July 2007 were considered in 2 groups: group 1 included patients aged below 70 years (mean 55.76 ± 10.6 yrs) and group 2 - patients aged 70 years or more (mean 77 ± 5.3 yrs). Preoperative, operative and all outcome parameters were compared.

Results: All patients needed intervention on the tricuspid valve because of, at least, moderate tricuspid regurgitation. In 120 patients an annuloplasty ring implantation was done. Tricuspid valve replacement was needed in 10 patients. In group 1, the main indication for surgery was severe mitral regurgitation due to degenerative mitral disease; while more patients had rheumatic mitral disease in group II. The primary procedure was mitral valve replacement in both groups. Elderly patients had significantly more hypertension, diabetes, higher Euroscore, postoperative atrial fibrillation and behavioral confusion. Mortality was similar in both groups (12.9% in group 1 vs. 13.3% in group 2, $P = 0.5$).

Conclusions: In our cohort, although elderly age reflects a sicker group of patients, association of TV surgery in the elderly didn't carry any additive mortality risk compared to younger patient group.

Mitral Valve Leaflet Augmentation for Ischemic Mitral Insufficiency

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BACKGROUND: Chronic Ischemic mitral regurgitation (IMR) is a common complex clinical entity, associated with poor long-term survival. Numerous surgical techniques have been developed for IMR, but none has resulted in clearly improved patient outcome. Leaflet augmentation allows excellent leaflet coaptation and relief of leaflet tethering. We report our experience of mitral valve repair with anterior or posterior leaflet augmentation.

METHODS: Between March 2006 and August 2007 we used mitral leaflet augmentation technique in eight patients (7 patients – anterior and 1 patient – posterior leaflet augmentation). A mean age was 65 ± 9.5 . The mitral valve leaflet was augmented with a patch of bovine pericardium. Non restricted annuloplasty with a semi rigid Physio ring was performed in all patients. Six patients presented preoperatively with severe MR and two had moderate MR. Annuloplasty ring size were 32 mm in 4 patients, 30 mm in 3 patients and 28 mm in one patient. Preoperative ejection fraction was 31.5 ± 11.7 % and NYHA class – 3.5 ± 0.5 . All patients underwent concomitant CABG with a mean of 3.25 grafts/patients. Additionally, tricuspid valve repair was performed in one patient.

RESULTS: There was no operative mortality. Echocardiography performed after surgery showed none or trivial mitral regurgitation in all patients. Hospital mortality was 25% (2 patients). One patient died 48 days post operatively due to ischemic complications of severe peripheral vascular disease, another one developed sepsis and bacterial endocarditis with severe mitral regurgitation and died 31 days after the operation.

CONCLUSIONS: Leaflet augmentation for Ischemic MR showed promising short term results. Further studies are needed to assess long term outcomes.

Combined Carotid Endarterectomy and CABG, Long Term Results

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Background: The surgical approach for the treatment of concomitant coronary and carotid artery disease is still controversial. The options are either staged approach - carotid endarterectomy (CEA) first followed by coronary artery bypass grafting (CABG), or simultaneous approach - CEA and CABG under the same anesthesia. The reverse approach - CABG first and then CEA, was abandoned because of inferior results. In view of the newer options now available, such as percutaneous carotid artery angioplasty and stenting, we have reviewed our short and long term experience with combined CEA and CABG operations.

Methods: From January 1993 to January 2007 we operated on 82 patients (65 men, age 69.2±6.3 years). Carotid endarterectomy always preceded myocardial revascularization, performed either with or without cardiopulmonary bypass.

Results: Operative mortality was 3.6%. Perioperative neurological complications (5%) included irreversible hemiparesis (2) and TIA (2). Perioperative myocardial infarction (MI) occurred in 3 patients. During mean follow up of 10±3.2 years (1-14 years), six patients (7.6%) had neurological events: hemiparesis (4) and TIA (2). Seventeen patients (21.5 %) had cardiac events: MI (1), CHF (3), ischemia (11), VT (2). Five-year and 10-year survival was 74%±5% and 62%±6%, respectively.

Conclusion: Although the short term results of the new therapeutic alternative, namely carotid artery stenting before CABG, are similar to our surgical results, there are limitations to carotid artery stenting: the need for aggressive anti-platelets therapy for at least one month, and the hemodynamic changes during the procedure (bradycardia, hypotension) may be unacceptable for patients with unstable coronary artery disease. Therefore there is still a role for concomitant surgical CEA and CABG, yielding good results towards which the results of the other option should be compared while making the decision regarding the management of combined coronary and carotid artery disease.

Atrial Fibrillation Detection with a Novel Device "AF Alarm" in Mid-term Follow-up After Successful Maze Procedure.

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Background: Currently, determination of sinus rhythm after AF ablation procedure is done by using ECG, Holter monitoring and patients' subjective complaints. These methods may underscore periodic atrial fibrillation (AF) events. Underscoring of AF has serious implications such as discontinuation of anticoagulation and anti-arrhythmic therapy. A novel device "AF Alarm" was developed recently for automatic detection of cardiac arrhythmia.

Methods: From February 2004 till November 2007 we performed surgical ablation of AF in 150 patients. We tried to detect episodes of AF at 6 months and more after surgery in patients who were in normal sinus rhythm according to follow-up done by Holter monitoring and at least two follow up visits. We employed the device "AF Alarm" (Medtronic Inc, USA). The device was attached to the patient for 7 days. It automatically detected and stored in its memory all arrhythmia occurring in this period.

Results: Preoperatively seventy-five patients had persistent atrial fibrillation (50%), 65 suffered from permanent AF (43%) and 10 had paroxysmal AF (7%). One hundred eleven patients underwent left atrial ablation and 39 had biatrial ablation. Eighty four percent of patients were in sinus rhythm at follow-up. "AF Alarm" device was used in part of the patients with "normal" sinus rhythm [according to Holter monitoring and follow up visits without any subjective complaints of arrhythmia at 6 months and more after procedure]. In half of them short episodes of AF were found.

Conclusion: Determination of success after AF ablation is controversial. Some patients considered to be in normal sinus rhythm after ablation still can have some silent episodes of AF. These events can influence anticoagulation and anti-arrhythmic protocols after ablation. This new device gives more precise estimation of procedural success.