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The Annals of Thoracic Surgery

Gregoric ID, Bruckner BA, Jacob L, Kar B, Cohn WE, La Francesca S, Frazier OH. **Clinical experience with sternotomy versus subcostal approach for exchange of the HeartMate XVE to the HeartMate II ventricular assist device.** Ann Thorac Surg. 2008 May;85(5):1646-9.

BACKGROUND: Most patients undergoing destination therapy with a HeartMate XVE left ventricular assist device will eventually require pump exchange to continue long-term cardiac support. **METHODS:** To determine whether left ventricular assist device exchange can be accomplished with low morbidity and mortality, we retrospectively reviewed the records of 14 patients who experienced pump malfunction and subsequently required replacement of their HeartMate XVE left ventricular assist devices with HeartMate II axial-flow pumps. We collected data regarding duration of support and reasons for pump failure, perioperative characteristics, and operative approach. **RESULTS:** On average, patients were supported 473 +/- 233 days with HeartMate XVE pumps. Seven early patients required both subcostal and sternotomy incisions; 7 later patients had subcostal incisions only. Thirteen patients underwent successful exchange to the HeartMate II; 1 patient died in the operating room. Another patient died in the perioperative period (30-day mortality, 14% [2 of 14]). There were significant differences between the two groups. The patients who required only subcostal incisions had shorter operative times (187 versus 220 minutes; $p = 0.04$) and required fewer transfused blood products (packed red blood cells, 8.6 versus 28.7 units; $p = 0.03$; and fresh-frozen plasma, 12.4 versus 30.9 units; $p = 0.04$). Additionally, the patients with subcostal incisions had shorter postoperative intensive care unit stays (5.3 +/- 1.1 versus 8.4 +/- 3.1 days for redo sternotomy patients; $p = 0.03$). Of the survivors, average hospital stay was 22 +/- 14 days. Average long-term follow-up was 11.2 +/- 7.8 months; 71% (10 of 14) of patients are currently alive. **CONCLUSIONS:** Exchange of a HeartMate XVE to a HeartMate II can be accomplished with relatively low morbidity and mortality through a subcostal approach.

Akiyama M, Popović ZB, Kamohara K, Cingoz F, Daimon M, Ootaki C, Ootaki Y, Martin M, Liu J, Kopcak MW Jr, Dessoffy R, Fukamachi K. **Acute reduction of functional mitral regurgitation in canine model using an epicardial device.**

Ann Thorac Surg. 2008 May;85(5):1771-5.

PURPOSE: This study evaluated the short-term feasibility of a novel epicardial device that treats functional mitral regurgitation by simultaneously changing the mitral and the left ventricular geometry. **DESCRIPTION:** We implanted a prototype device that consists of 2 tissue anchors, a deflector, and a flexible tightening chord in 7 mongrel dogs with heart failure and functional mitral regurgitation induced by rapid ventricular pacing. Hemodynamic and echocardiographic data were obtained before and after device implantation. **EVALUATION:** The device acutely reduced the mitral regurgitation grade from 3.2 +/- 0.3 to 0.9 +/- 0.5 ($p < 0.001$). Left ventricular end-diastolic volume (79.6 +/- 23.6 to 61.2 +/- 16.9 mL; $p = 0.004$) and end-systolic volume (63.1 +/- 17.3 to 49.2 +/- 12.3 mL; $p = 0.006$) decreased substantially. End-systolic elastance significantly increased from 1.9 +/- 1.0 to 2.6 +/- 1.4 mm Hg/mL ($p = 0.02$). Device implantation did not alter coronary perfusion. **CONCLUSIONS:** The epicardial device acutely reduced functional mitral regurgitation and improved left ventricular geometry. Further studies are required to demonstrate the long-term safety and efficacy of this concept.

Mitnovetski S, Almeida AA, Barr A, Peters WS, Milsom FP, Ho B, Smith JA. **Extra-aortic implantable counterpulsation pump in chronic heart failure.**

Ann Thorac Surg. 2008 Jun;85(6):2122-5.

Extra-aortic counterpulsation for the management of chronic heart failure is a novel approach. We report the use of an extra-aortic implantable counterpulsation pump in the management of a 73-year-old patient with severe heart failure refractory to medical therapy. The implantable counterpulsation pump prolonged his life and greatly improved its quality. The patient lived almost 7 months after the implantation of the device and died of septic complications secondary to gas line infection.

Walsh MA, Benson LN, Dipchand AI, Redington AN, Caldarone CA, Van Arsdell GS, Kantor PF. **Surgical repair of the mitral valve in children with dilated cardiomyopathy and mitral regurgitation.**

Ann Thorac Surg. 2008 Jun;85(6):2085-8.

BACKGROUND: Significant mitral regurgitation is known to exacerbate left ventricular dysfunction in dilated cardiomyopathy. Although intervention on the regurgitant mitral valve is frequently described in adults, there is little pediatric data. **METHODS:** Five children (aged 3 months to 4 years) with dilated cardiomyopathy and mitral regurgitation underwent mitral valve repair between January 1999 and January 2007 at our institution. All had mitral regurgitation graded as moderate to severe, with ejection fractions of 35% to 60% (median 53%). **RESULTS:** There were no deaths; all children were weaned from cardiopulmonary bypass; 1 child required

cardiac transplantation 3 weeks after repair. After surgery, mitral regurgitation was moderate in 1 patient, mild in 2 patients, and trivial in 2 patients. The 4 successful cases showed an improvement in functional status at latest follow-up (range, 8 years to 4 months): all were asymptomatic (4 children had preoperative symptoms). Successful cases showed a decreased left atrial dimension (mean z-score 3.8 to 2.6) and a decreased left ventricular end-diastolic diameter (mean 6.9 +/- 1.6 to 5.4 +/- 1.2). Ejection fraction and left ventricular end-systolic index did not show an improvement and declined in some cases. **CONCLUSIONS:** We conclude that repair of the mitral valve is feasible in children with dilated cardiomyopathy and acquired mitral regurgitation. Most of the children demonstrated decreased left ventricular chamber sizes and an improved functional status. Although this operation improves symptoms, it is not clear whether it postpones or abrogates the need for cardiac transplantation.

Journal of Heart and Lung Transplantation

Reade CC, Morris RJ, Acker MA, Jessup M, Banbury MK, Woo YJ. **Acute myocardial infarction requiring mechanical bridge to transplantation in a patient with undiagnosed anti-phospholipid antibody syndrome.**

J Heart Lung Transplant. 2008 Jun;27(6):682-4. Epub 2008 Apr 28.

We present a young man who sustained an acute myocardial infarction with hemodynamic instability requiring placement of a left ventricular assist device and subsequent cardiac transplantation. Hematologic work-up revealed anti-phospholipid antibody syndrome. To our knowledge this is the first reported case of severe acute heart failure due to anti-phospholipid antibody syndrome in which the patient survived through assist device placement and successful transplantation.

Campos SV, Strabelli TM, Amato Neto V, Silva CP, Bacal F, Bocchi EA, Stolf NA. **Risk factors for Chagas' disease reactivation after heart transplantation.**

J Heart Lung Transplant. 2008 Jun;27(6):597-602. Epub 2008 Apr 24.

BACKGROUND: Chagas' disease is the illness caused by the protozoan *Trypanosoma cruzi* and it is still endemic in Latin America. Heart transplantation is a therapeutic option for patients with end-stage Chagas' cardiomyopathy. Nevertheless, reactivation may occur after transplantation, leading to higher morbidity and graft dysfunction. This study aimed to identify risk factors for Chagas' disease reactivation episodes. **METHODS:** This investigation is a retrospective cohort study of all Chagas' disease heart transplant recipients from September 1985 through September 2004. Clinical, microbiologic and histopathologic data were reviewed. Statistical analysis was performed with SPSS (version 13) software. **RESULTS:** Sixty-four (21.9%) patients with chronic Chagas' disease underwent heart transplantation during the study period. Seventeen patients (26.5%) had at least one episode of Chagas' disease

reactivation, and univariate analysis identified number of rejection episodes ($p = 0.013$) and development of neoplasms ($p = 0.040$) as factors associated with Chagas' disease reactivation episodes. Multivariate analysis showed that number of rejection episodes (hazard ratio = 1.31; 95% confidence interval [CI]: 1.06 to 1.62; $p = 0.011$), neoplasms (hazard ratio = 5.07; 95% CI: 1.49 to 17.20; $p = 0.009$) and use of mycophenolate mofetil (hazard ratio = 3.14; 95% CI: 1.00 to 9.84; $p = 0.049$) are independent determinants for reactivation after transplantation. Age ($p = 0.88$), male gender ($p = 0.15$), presence of rejection ($p = 0.17$), cytomegalovirus infection ($p = 0.79$) and mortality after hospital discharge ($p = 0.15$) showed no statistically significant difference. **CONCLUSIONS:** Our data suggest that events resulting in greater immunosuppression status contribute to Chagas' disease reactivation episodes after heart transplantation and should alert physicians to make an early diagnosis and perform pre-emptive therapy. Although reactivation led to a high rate of morbidity, a low mortality risk was observed.

European Journal of Cardiothoracic Surgery

Simmonds J, Burch M, Dawkins H, Tsang V. **Heart transplantation after congenital heart surgery: improving results and future goals.**
Eur J Cardiothorac Surg. 2008 May 23.

With growing numbers of children with complex congenital heart disease surviving initial surgical procedures, more patients are presenting in later childhood or early adulthood in cardiac failure. This presents an obvious increased burden on transplant centres, and a further strain on a limited donor pool. Historically, results for heart transplant following congenital heart disease (CHD) have been worse than those following cardiomyopathy. With increased surgical experience and intensive care expertise, the gap between the two aetiologies in our practice is decreasing. This article reviews the current protocols for transplantation in this setting, presenting a large single-centre experience over 20 years, and speculates on possible future advancements in this very challenging field.

Muñoz-Guijosa C, Ginel A, Montiel J, Padró JM. **Orthotopic heart transplantation in a patient with situs invs, transposition of the great arteries and Mustard operation.**
Eur J Cardiothorac Surg. 2008 May 14.

Orthotopic heart transplantation has become standard treatment for end-stage cardiomyopathy, but experience with this technique for complex congenital heart diseases is limited. We report a patient with viscerotrial situs invs, transposition of the great arteries and previous Mustard correction, who successfully underwent orthotopic heart transplantation.

Current Cardiology Reports

Brieke A, Cleveland J Jr, Lindenfeld J. **Mechanical support in acute and chronic heart failure.**

Curr Cardiol Rep. 2008 May;10(3):168-75.

Heart failure (HF) is the leading cause of hospital admissions in the United States in people over the age of 65 years. Major advancements in the medical therapy of HF, combined with automatic implantable cardioverter-defibrillators and cardiac resynchronization therapy, have substantially reduced the mortality and morbidity of chronic HF, but mortality remains high, and the availability of donor hearts for transplantation is limited. Thus, there has been and continues to be a need for alternative therapies to support the failing heart. The development of mechanical pumps designed to assist or replace cardiac function started three decades ago with the National Heart, Lung, and Blood Institute's request for proposals to develop an artificial heart. Significant progress has been made, with ventricular assist devices evolving from bulky extracorporeal devices to internalized miniaturized devices. Improvements in durability, thrombogenicity, ease of implantation, and patient selection have allowed expanding indications for these devices.

Levy WC, Linker DT. **Prediction of mortality in patients with heart failure and systolic dysfunction.**

Curr Cardiol Rep. 2008 May;10(3):198-205.

Systolic heart failure has a highly variable mortality that can be altered with medications and cardiac devices. This review focuses on recently published predictive models in heart failure. These models may help with difficult decisions such as listing for cardiac transplantation, selecting cardiac devices, and making end-of-life decisions. We discuss systolic heart failure risk models to estimate short- (30-day to 1-year) and longer-term (1- to 5-year) mortality in hospitalized and ambulatory heart failure patients.

Transplant Infectious Disease: an official journal of the Transplantation Society

Ramos A, Asensio A, Muñoz E, Torre-Cisneros J, Blanes M, Carratalá J, Segovia J, Munoz P, Cisneros JM, Bou G, Aguado JM, Cervera C, Gurgui MM.
Incisional surgical infection in heart transplantation.

Transpl Infect Dis. 2008 May 14.

Background. Incisional surgical site infections (ISSIs) are common bacterial infections in heart transplantation (HT). The purpose of this study was to determine the incidence, etiology, timing, and risk factors for ISSIs. **Methods.** A prospective study was performed, which included all heart transplants carried out in the participating hospitals (pertaining to the Spanish National Hospital Network RESITRA) between August 2003 and February 2005. A population of 292 consecutive patients was included (84.9% males). The definition of ISSI used in the study was based on the Centers for Disease Control criteria. **Results.** Seventeen episodes of ISSIs were recorded in 14 patients (4.8%; confidence interval [CI] 95% 2.7-7.7%). The median time from transplant to ISSI was 14 days (range 3-75). Two patients (14%) died; fatality was related to ISSI (mediastinitis) in 1 patient (7%). Coagulase-negative staphylococci (7 cases), methicillin-resistant *Staphylococcus aureus* (3 cases), *Proteus mirabilis*, extended-spectrum beta-lactamase-producing *Escherichia coli*, *Candida albicans*, and *Candida glabrata*, 1 case each, were the isolated pathogens. The duration of extracorporeal circulation was longer in patients with ISSI, although the difference did not reach statistical significance. Antibiotic prophylaxis with ciprofloxacin alone (odds ratio, 15.8; 95% CI, 1.2-216.9) was independently associated with the development of ISSI. **Conclusions.** ISSIs in HT are frequently caused by resistant bacteria and *Candida*, but are associated with good prognosis.

Journal of Cardiovascular Medicine

Potenza D, Vigna C, Massaro R, Russo A, Amico C, Cianfrone N, Fanelli R.
Double rhythm in double heart.
J Cardiovasc Med (Hagerstown). 2008 Jun;9(6):625-7.

We describe the case of a patient with heterotopic transplantation, sinus rhythm originating from the donor heart, ventricular fibrillation of the native heart and

right severe decompensation. The double rhythm was easily detected with a surface ECG and the transthoracic echocardiogram, both performed in the left conventional and in the right modified mode. The patient was successfully treated with direct current shock with quick restoration of native heart synchronization and clinical relief of symptoms.

Interactive Cardiovascular and Thoracic Surgery

Kindo M, Carranza D, Eisenmann B, Mazzucotelli JP. **Biventricular assist device implantation as bridge to heart transplantation concomitant with open repair of infrarenal aortic aneurysm.**

Interact Cardiovasc Thorac Surg. 2008 May 9.

Abdominal aortic aneurysm (AAA) is very frequently accompanied by coronary artery disease. Myocardial ischemia is the leading cause of mortality and morbidity in AAA repair. Therapeutic strategy, in presence of ischemic heart failure and AAA, is not well established. Actually, AAA is considered as a contraindication to ventricular assist device (VAD) support. We report a unique case of concomitant open AAA repair and biVAD implantation in a patient with severe ischemic heart failure. This case argues that AAA should no longer be considered a contraindication for VAD implantation, provided the AAA repair is made before or simultaneously with device placement. Keywords: Aneurysm; Circulatory assist devices; Heart failure; Transplantation, heart; Vascular disease.

Journal of Cardiothoracic Surgery

Atluri P, Hiesinger W, Gorman RC, Pochettino A, Jessup M, Acker MA, Morris RJ, Woo YJ. **Cardiac retransplantation is an efficacious therapy for primary cardiac allograft failure.**

J Cardiothorac Surg. 2008 May 7;3(1):26.

ABSTRACT: BACKGROUND: Although orthotopic heart transplantation has been an effective treatment for end-stage heart failure, the incidence of allograft failure has increased, necessitating treatment options. Cardiac retransplantation remains the only viable long-term solution for end-stage cardiac allograft failure. Given the limited number of available donor hearts, the long term results of this treatment option need to be evaluated. **Methods:** 709 heart transplants were performed

over a 20 year period at our institution. Repeat cardiac transplantation was performed in 15 patients (2.1%). A retrospective analysis was performed to determine the efficacy of cardiac retransplantation. Variables investigated included: 1 yr and 5 yr survival, length of hospitalization, post-operative complications, allograft failure, recipient and donor demographics, renal function, allograft ischemic time, UNOS listing status, blood group, allograft rejection, and hemodynamic function. Results: Etiology of primary graft failure included transplant arteriopathy (n=10), acute rejection (n=3), hyperacute rejection (n=1), and a post-transplant diagnosis of metastatic melanoma in the donor (n=1). Mean age at retransplantation was 45.5+/-9.7years. 1 and 5 year survival for retransplantation were 86.6% and 71.4% respectively, as compared to 90.9% and 79.1% for primary transplantation. Mean ejection fraction was 67.3+/-12.2% at a mean follow-up of 32.6+/-18.5mos post-retransplant; follow-up biopsy demonstrated either ISHLT grade 1A or 0 rejection (77.5+/-95.7mos post-transplant). Conclusion: Cardiac retransplantation is an efficacious treatment strategy for cardiac allograft failure.

Circulation Journal

Matsushima A, Nakamura H, Umemoto S, Matsuzaki M. **Regulation of Cardiac Regeneration by ACE Inhibition Following Donor Heart Myocardial Infarction After Heterotopic Transplantation in Tg Mice.** Circ J. 2008 May;72(5):793-9.

Background Experimental and clinical evidence have recently shown that pluripotent stem cells can be mobilized using granulocyte-colony stimulating factor (G-CSF) and may enhance myocardial regeneration after acute myocardial infarction (MI). The present study investigated the pharmacological role of angiotensin-converting enzyme inhibition on cardiac regeneration after MI using a mouse model of heterotopic cardiac transplantation and coronary ligation. Methods and Results Isogenic heterotopic cardiac transplantations and simultaneous coronary ligations were performed in green fluorescent protein (GFP) mice to produce MI in the donor heart. Five mice in the ligation group were treated with oral perindopril (PE) after the operation. Three mice in the ligation group were treated with subcutaneous G-CSF and 4 angiotensin II type1a receptor knockout (AT1aRKO) mice were used as well. At 60 days after the operation, the maximum GFP-positive cell counts in the G-CSF group were significantly higher than in the other 4 groups. The maximum GFP-positive cell counts in both the AT1aRKO and ligation & PE groups were significantly higher than in the sham and ligation groups. Conclusions Pharmacological modification for cardiac regeneration may provide an alternative treatment for subsequent cardiac remodeling in the late phase of MI. (Circ J 2008; 72: 793 -799).