

POSTER SESSION

**1010 Valvular Operations: Improving Outcomes of Valve Repair or Replacement**

Sunday, March 07, 2004, 9:00 a.m.-11:00 a.m.  
 Morial Convention Center, Hall G  
 Presentation Hour: 9:00 a.m.-10:00 a.m.

**1010-135 Clopidogrel Increases Post Cardiac Surgery Bleeding Only if Given Within Three Days of Surgery**

Rashed S. Bakri, Ali A. Haydar, Nabil M. Hujairi, Antoine Abche, David J. Goldsmith, American University of Beirut, Beirut, Lebanon, Guy's Hospital, London, United Kingdom

**Background:**

Clopidogrel (CL) in addition to aspirin is now standard care for treatment of acute coronary syndromes and for coronary stent thrombosis prevention. If this fails and patients need coronary artery bypass grafting (CABG), the irreversible effect of clopidogrel on platelet function is a concern. This study aimed to evaluate the role of preoperative use of CL in bleeding after CABG.

**Methods:**

A total of 462 patients who underwent CABG in a single surgical centre in 2001-2003 were studied. Patients exposed to CL within 3 days (n=67) (group A), between 3 and 7 days (n=34) (group B), and people not taking CL (n=361) (group C) prior to surgery were all compared. Bleeding index (BI), a modified TIMI criterion, which is a composite of drop in hemoglobin and number of blood units transfused after surgery, was the primary outcome measured. Mortality, acute myocardial infarction, and re-exploration for bleeding were the secondary outcomes.

**Results:**

Our data showed that group A have a higher mean BI and more TIMI major bleeding (BI>5 g/dl) than either group B or C (p=0.009 and 0.03 respectively for inter-groups comparison). There were no differences in the secondary outcomes occurrence among the three groups. See table.

**Conclusion:** In this largest-to-date study we have shown that clopidogrel increased the risk of major post-CABG bleeding **only** if taken within three days of surgery. This has major implications for future use of clopidogrel.

\* Inter-groups comparison

† Groups A and C comparison

‡ Groups B and C comparison

	Group A N=67	Group B N=34	Group C N=361	P-value
"Bleeding index" g/dl	5.42 ± 2.22	4.39 ± 1.81	4.49 ± 2.05	0.009* 0.002† 0.905‡
Bleeding index more than 5 g/dl	56.7%	38.2%	39.6%	0.03* 0.009† 0.875‡
Mortality	1.5%	5.4%	1.9%	0.342
AMI	1.5%	0%	1.1%	0.776
Re-exploration	1.5%	2.8%	1.6%	0.869

**1010-136 Torsional Deformation in Ischemic and Remote Left Ventricular Regions During Acute Circumflex and Anterior Descending Coronary Occlusion**

Filberto Rodriguez, Tomasz A. Timek, Frank Langer, David Liang, George T. Daughters, Neil B. Ingels, Jr., D. Craig Miller, Stanford University, Stanford, CA, Palo Alto Medical Foundation, Palo Alto, CA

**Background:** Contraction of helically oriented fibers in the left ventricle (LV) results in systolic torsion, reducing transmural fiber strain gradients and oxygen demand. Acute ischemia decreases torsion in the ischemic region, but effects in remote regions are unknown. We investigated alterations in local and remote LV torsional deformation during acute ischemia in two different territories.

**Methods:** Six sheep had radiopaque markers implanted on the LV to measure fractional area shrinkage (FAS = 100\*(regional area<sub>max</sub> - regional area<sub>min</sub>)/regional area<sub>max</sub>) and maximal regional systolic torsion (Φ<sub>max</sub>) using biplane videofluoroscopy one week after surgery, before and during acute anterior wall ischemia (proximal left anterior descending [LAD] occlusion) or acute posterior wall ischemia (distal left circumflex [LCx] occlusion). Color Doppler transeophageal echocardiography graded mitral regurgitation (MR).

**Results:** Acute LAD and distal LCx occlusions caused similar hemodynamic insults (Table). Acute LAD occlusion decreased septal FAS and anterior Φ<sub>max</sub>, whereas acute distal LCx occlusion reduced free wall FAS and posterior Φ<sub>max</sub>, but interestingly increased anterior and lateral Φ<sub>max</sub>.

**Conclusion:** This paradoxical increase in regional free wall systolic torsion in non-ischemic sites suggests a compensatory unloading of remote myocardium and highlights regional differences between various ischemic injuries. Such findings may influence approaches for ventricular remodeling surgery.

	LAD		Distal LCx	
HEMODYNAMICS	preischemia	ischemia	preischemia	ischemia
HR (min <sup>-1</sup> )	99±11	107±9	102±12	102±12
LV dP/dt <sub>max</sub> (mmHg/sec)	1450±460	1040±292*	1700±433	1140±455*
SV (ml)	44±4	31±4*	44±9	34±5*
LVESP (mmHg)	82±15	63±13*	87±21	75±24*
MR (0-4+ scale)	0.8±0.8	0.9±0.7	0.8±0.8	1.2±1.1
FRACTIONAL AREA SHORTENING				
Anteroseptal (%)	19±4	7±2*	22±5	22±6
Posteroseptal (%)	25±4	14±4*	26±4	19±5*
Anterolateral (%)	18±4	16±4	18±5	14±4*
Posterolateral (%)	20±6	21±4	20±4	11±3*
MAXIMAL SYSTOLIC TORSION				
Anterior Wall Φ <sub>max</sub> (degrees)	2.73±3.82	-0.55±3.00*	4.21±3.96	7.09±3.46*
Lateral Wall Φ <sub>max</sub> (degrees)	5.04±3.37	3.29±2.20	4.94±2.44	7.79±2.66*
Posterior Wall Φ <sub>max</sub> (degrees)	2.65±4.05	4.82±2.12	2.86±2.85	1.48±2.95*

\* p<0.05, ischemia vs. pre-ischemia, t-test for paired observations. Data expressed as Mean±1SD.

**1010-137 Intravascular Ultrasound and Valved Stent for Beating Heart Valve Implantation: Is There Really a Need for Angiography?**

Christoph H. Huber, Bettina Marty, Pierrgiorgio Tozzi, Antonio F. Corno, L.K. von Segesser, University Hospital Lausanne, Lausanne, Switzerland

**BACKGROUND:** We evaluated feasibility of intravascular ultrasound (IVUS) guided off-pump aortic (AVR) and pulmonary valve implantation (PVR) using a new self-expanding Valved Stent without angiography.

**METHODS:** Six pigs (62.5±8.7 Kg) underwent either off-pump A) AVR (n=3) or B) PVR (n=3) using a self-expanding Valved Stent. After left sided thoracotomy, purse-string sutures were placed on either ventricular apex. Under fluoroscopy, a guide wire was inserted through the apex and advanced over the A) aortic or B) pulmonary valves respectively. A wire-guided IVUS catheter transducer (6F, 12.5MHZ) was inserted and the original A) aortic and B) pulmonary valves identified, the valve diameter and the A) root or B) trunk length were measured. Target site was identified and marked by needles on the body surface. After removal of the IVUS, the Valved Stent delivery system was introduced over the guide wire under fluoroscopy and the Valved Stent deployed over the native valves. Assessment was performed using invasive pressure measurements, IVUS and intracardiac ultrasound including: leaflet motion, planimetric valve orifice, transvalvular gradient, regurgitation and paravalvular leaking. Macroscopic analyse was performed at necropsy.

**RESULTS:** Both groups showed good valvular function, with full valvular opening and closing. In B) one paravalvular leak was found due to size mismatch. Coronary flow was not impaired in A). At necropsy in A) all, in B) two Valved Stent were correctly placed and safely anchored to the vessel wall.

**CONCLUSION:** IVUS guided beating heart aortic and pulmonary valve implantation using a self-expanding Valved Stent is feasible and might eliminate the need for per-procedural angiography.

**1010-138 Prosthetic Endocarditis: Which Therapy for Which Patient?**

Gilbert H. Habib, Christophe Tribouilloy, Franck Thuny, Amel Brahim, Murielle Amazou, Georges Nadji, Jean-François Avierinos, Jean-Paul Casalta, François Covicieux, Pierre Ambrosi, La Timone Hospital, Marseille, France, Hospital Sud, Amiens, France

**Background.** Prosthetic valve infective endocarditis (PVIE) still carries an unacceptable mortality risk and the best therapeutic option (medical vs surgical) is still controversial. Past studies were limited by the small number of pts and gave discordant results.

**Objectives:** to assess the prognostic markers of outcome and the influence of therapy in a large series of pts with PVIE

**Methods.** One hundred and four consecutive pts from 2 centers (65 biological -39 mechanical, 20 early-84 late) fulfilled Duke criteria for PVIE and underwent evaluation and follow-up. Among them, 34 (33%) were caused by *Streptococci*, 25 (24%) by *Staphylococci*, 25 (24%) had negative BC. Major end-points were in hospital and long-term mortality.

**Results.**

Among 104 pts, 22 (21%) died in-hospital. Factors associated with death were comorbidity (p=.07), severe regurgitation (p=.006), *S aureus* infection (p<.001), "complicated" PVIE (p=.07), and CHF (p<.001). By multivariate analysis, CHF (OR=5.5), and *S aureus* (OR =6.1) were the only independent predictors of death.

Fifty-one (49%) pts underwent surgery during the acute phase. For the entire population, in-hospital mortality was not significantly different in operated and non-operated patients (17% vs 25% ,p=ns). However, mortality was lower in operated than in non-operated patients among 25 pts with *S aureus* PVIE, (27 vs 73%, p=.03) and among 43 pts with more than one risk factors (31 vs 71%, p=.02).

Among 82 in-hospital survivors, 21 (26%) new deaths occurred during late follow-up. Pre-

dictors of long-term mortality were early PVIE (RR = 2.14), comorbidity (RR = 3), CHF (RR = 4.19), and *S aureus* (RR = 2). After a mean 32 months follow-up, only 61 (58%) pts are still alive.

#### Conclusion.

- 1 - PVIE is still associated with high in-hospital and long-term mortality and needs close follow-up after the initial in-hospital stay.
- 2 - CHF, *S aureus*, severe regurgitation, and complicated PVE are associated with poor outcome.
- 3 - Half PVIE can be treated without surgery with similar mortality than operated pts.
- 4 - However, surgery during the acute phase is associated with a better outcome in pts with *S aureus* infection and in pts with > 1 prognostic marker. Early surgical therapy is mandatory in these pts.

#### 1010-139 Echocardiographic Characteristics Predictive of Successful Repair in Patients With Isolated Tricuspid Aortic Valve Regurgitation

Patrick J. Nash, Eugene Vitvitsky, Delos M. Cosgrove, III, Gosta Pettersson, Richard A. Grimm, Cleveland Clinic Foundation, Cleveland, OH

**Background:** There is increasing interest in valve sparing operations for patients with isolated severe aortic regurgitation (AR). Features that are predictive of repair of tricuspid aortic valves with intrinsic cusp pathology are not well defined.

**Methods:** We reviewed all intraoperative transoesophageal echos performed on patients with isolated AR and trileaflet valves undergoing surgery at our institution over a three-year period (2000- 2002). Those with evidence of aortic dissection, primary ascending aortic root dilatation and those where endocarditis was the primary etiologic factor were excluded.

**Results:** We identified 114 patients (Mean age 59+/-15yrs; 79% male), 39 (34.2%) had isolated aortic cusp prolapse and 73 (64%) had restricted cusp motion as the primary mechanism of AR. Valve repair was performed in 26 (22.8%). Two of these patients had failed repairs requiring valve replacement. Repair was more likely in younger patients, those with leaflet prolapse, tless leaflet edge thickening and less commissural calcification. By multivariate analysis, eccentric AR jet direction and less leaflet edge thickening ( $\leq 3$ mm), emerged as independent determinants of likelihood of successful valve repair

**Conclusions:** A number of echo features predict valve reparability in patients with trileaflet aortic valves, intrinsic valve pathology and primary isolated AR, with eccentric regurgitant jet direction and less leaflet edge thickness being the most important.

	Repair	Replacement	
Age	50 +/- 15	62 +/- 14	p = 0.006
Mechanism - Prolapse	66.6%	25.6%	p = 0.002
Mechanism - Central Defect/Restricted leaflet motion	29.1%	70.8%	p = 0.002
Jet Direction - Eccentric	65.2%	29.6%	p = 0.002
Leaflet Edge thickness of < 0.3cm	38.1%	93.5%	p < 0.0001
Commissural Calcium	14.3%	70.3%	p < 0.0001

#### 1010-140 Influence of Surgical Treatment of Atrial Fibrillation on Late Morbi-Mortality After Correction of Mitral Valve Lesions Associated With Chronic Atrial Fibrillation

Renato A.k. Kalil, Gustavo G. Lima, Daniel L. Faria-Corrêa, Rogério Abrahão, Maurice Formigheri, Marcelo Miglioransa, Gustavo Vanni, Paulo R. Prates, João R.M. Sant'Anna, Ivo A. Nesralla, Institute of Cardiology of Rio Grande do Sul / FUC, Porto Alegre, RS, Brazil

**Background:** Atrial Fibrillation (AF) has been associated with increased morbi-mortality. Surgical treatment has been delivering consistent benefits. We intended to evaluate the benefit, in long term, of the maintenance of the sinus rhythm achieved by surgical treatment of AF associated with mitral valve correction.

**Methodology:** Retrospective study of 138 patients with chronic AF and mitral valve disease, operated between 1994 and 2002. Sixty-one patients underwent isolated mitral valve surgery, 51 associated with modified COX procedure and 26 associated with isolation of pulmonary veins (IPV) by an elliptical incision around all their 4 orifices, by simple "cut and sew" technique. The mean age was 50±12 years and the average follow up was 49±26 months in isolated mitral valve surgery, 55±28 months on mod-COX group and 26±10 months on IPV. Death from cardiovascular cause was analyzed, as well as thromboembolism, hemorrhage, arrhythmia and reoperation at late follow-up.

**Results:** At 24 months of follow up, the rhythm was sinus in 87.5% on IPV, 72.7% on mod-COX and 23.3% on mitral alone (p<0.001). As for the morbi-mortality, 30 (21.9%) patients had some event: 13.9% of the patients on sinus rhythm and 30.8% on non-sinus (p=0.014). Thrombo-hemorrhagic events occurred in 1.4% of the sinus rhythm patients and in 18.5% of those not in sinus rhythm (p<0.001).

**Conclusion:** IPV and mod-COX groups had a larger reversion rate to sinus rhythm at 24 months. Patients on sinus rhythm had less long term thrombo-hemorrhagic events. There is objective benefit expressed in lower morbi-mortality when surgical treatment of AF is added to mitral valve surgery.

#### POSTER SESSION

### 1030 Defining the Clinical Outcome in Patients With Valvular Heart Disease

Sunday, March 07, 2004, Noon-2:00 p.m.

Morial Convention Center, Hall G

Presentation Hour: 1:00 p.m.-2:00 p.m.

#### 1030-135 Impact of Wide Pulse Pressure With and Without High Systolic Blood Pressure on Clinical Outcomes in Chronic Severe Aortic Regurgitation

Phyllis G. Supino, Jeffrey S. Borer, Jacek Preibisz, Clare Hochreiter, Karlheinz Schuleri, Richard B. Devereux, Mary J. Roman, Paul Klugfield, Amanda D. Konstam, Weill Medical College of Cornell University, New York, NY

**Background:** For over a century, pulse pressure has been recognized as a clinical sign of the severity of aortic regurgitation (AR) but its predictive value remains unclear. We previously showed that systolic hypertension predicts adverse outcomes among patients (pts) with chronic severe AR. However, the relative prognostic importance of the systolic (SBP), diastolic (DBP), and pulse (SBP-DBP [PP]) pressures is undefined. **Methods:** Therefore, among 64 pts with chronic severe AR (83% male, age at entry: 44±15 yrs, 87% non-rheumatic) who were asymptomatic with nl LV ejection fraction (EF) at rest by radionuclide cineangiography at study entry and were followed 7±4 event-free yrs, we related SBP, DBP and PP, defined during physical exam at study entry, and their interactions, to subsequent cardiac events (CE). **Results:** During followup, 2 pts died suddenly, 15 pts developed heart failure(CHF)±LV dysfunction, and 5 developed LV dysfunction alone. By univariate analysis, both SBP (p=.009) and PP (p<.02), but not DBP (NS) predicted CE. Multivariate analysis revealed a positive interaction between SBP and PP indicating a synergistic effect on outcomes even when adjusted for age, gender and rheumatic vs nonrheumatic etiology (p=.0002). Thus, pts with both SBP>140 and PP ≥ 82 (N=16) had a 5-fold increased risk of CE (Avg. Annual Risk [AAR]=15.6) vs. pts with SBP>140 and PP<82 (N=9, AAR=3.2, p<.03); no PP-associated risk was found among the 39 pts with SBP≤140 (NS). **Conclusions:** SBP and PP each predict CE risk among asymptomatic pts with severe AR and nl LVEF<sub>rest</sub> irrespective of etiology. Wide PP in the setting of high SBP further concentrates this risk but DBP does not affect risk. Further research must determine the relation of pp to other prognostically important variables and whether currently available therapeutic interventions to lower pp and/or sbp are clinically beneficial in this population.

#### 1030-136 Echocardiographic Presence of Mitral Annular Calcification Predicts Increased Mortality in Patients With Normal Left Ventricular Ejection Fraction

Gustavo Cardenas, Mark X. Jiang, Nirankar V. Metha, Richard Milani, Christian S. Breburda, Heart and Vascular Institute, Ochsner Clinic Fdn, New Orleans, LA

Mitral annular calcification is frequently noted on echocardiographic examinations, however its prognostic significance is not well defined in patients with normal left ventricular function. We sought to investigate the correlation of echocardiographic mitral annular calcification (MAC) and overall mortality in a large clinical population. We hypothesized that presence and degree of MAC in patients with normal left ventricular ejection fraction does adversely affect mortality.

**Methods:** 52,129 patients, referred to our institution for echocardiographic examinations were evaluated. MAC was graded as absent, mild (spotty calcification of the annulus), or as marked (extensive circumferential calcium protruding into the mitral annular plane) by qualitative visual analysis. The observation period for mortality rate was 5 years.

**Results:** Mean age was 60.8 ± 15 years (48% m, 52% f), mean BMI was 29.5 ± 18 kg/cm<sup>2</sup>, mean EF was 61 ± 4 %. MAC was absent in 43,496 patients (83%), was mild in 7825 pts (15%) and was marked in 808 pts (1.55 %). During the observation period overall mortality rate was 6.47 %, was 5.4 % in the absence of MAC, was 11.5 % with mild MAC (chi<sup>2</sup> = 424, p less than 0.0001), odds ratio (OR) = 2.3 (2.11-2.48), and was 16.34 % with marked MAC (chi<sup>2</sup> = 181, p less than 0.0001), OR 3.43 (2.83-4.16).

A multivariate logistic regression model revealed MAC (OR = 1.5), age (OR = 1.03), male gender (OR = 0.82) and ejection fraction (OR = 0.96) as significant independent predictors for mortality (chi<sup>2</sup> = 1053, p less than 0.0001).

**Conclusion:** Echocardiographic presence and degree of mitral annular calcification in patients with normal left ventricular ejection fraction constitutes a significant independent and the strongest predictor of mortality, when compared with age, male gender, BMI and left ventricular ejection fraction.

#### 1030-137 Clinical Presentation and Outcome of Tricuspid Regurgitation Due to Flail Leaflets

David Messika-Zeitoun, Helen Thomas, Michael Bellamy, Christopher Scott, Christophe Tribouilloy, Joseph Dearani, A. Jamil Tajik, Hartzell Schaff, Maurice Enriquez-Sarano, Mayo Clinic, Rochester, MN

**Background:** Tricuspid regurgitation (TR) has the reputation of being well tolerated but most studies have focused on functional TR. Little is known about TR due to organic valve disease particularly regarding prognosis. Tricuspid flail leaflet (FL) is an important causative mechanism of organic TR as it causes uniformly high degree of regurgitation and can be easily diagnosed by 2D-echocardiography.

**Methods:** We analyzed etiology and clinical outcome of TR due to FL diagnosed by 2D-echocardiography in 60 patients between 1980 and 2000.