

Aortic Valve Sparing Surgery in Marfan Syndrome Patients

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Background: Marfan syndrome patients are referred for cardiac surgery due to root aneurysm with or without aortic valve (AV) regurgitation. Because these are young patients frequently presenting with normal appearing aortic cusps, valve sparing is often recommended. However, due to the genetic nature of the disease, the durability of such surgery remains uncertain. We compared our mid- to long-term experience with valve sparing surgery in both Marfan and non-Marfan syndrome patients.

Patients and methods: From January 2004, 54 patients with Marfan syndrome underwent surgery in our department, of whom 27 underwent AV sparing surgery. We compared the early and late clinical outcomes to a group of 89 non-Marfan patients who had undergone surgery at the same time period. Marfan patients were significantly younger (33 ± 13 vs 56 ± 16 years), and had a higher percentage of root aneurysm, compared to ascending aorta aneurysm in the non-Marfan group. More patients in the non-Marfan group presented with acute aortic dissection ($p=0.023$).

Results: There was 1 early death in the Marfan group and 2 in the non-Marfan group ($p=NS$).

There was no significant difference in other early major complications, which were few in both groups. At follow-up (ranging up to 8 years with a mean of 34 ± 25 months), there were no late deaths in the Marfan group and 8 (9%) in the non-Marfan group. Ninety-three percent and 78% of the patients were in NYHA functional class I-II in the Marfan and non-Marfan groups respectively. 1 Marfan and 3 non-Marfan patients required re-operation during follow-up.

Freedom from recurrent AR $>3+$ was 92% in both groups.

Conclusions: AV sparing surgery in Marfan syndrome patients is safe and produces good mid- to long-term clinical outcomes in this group of patients.

Use of Both Internal Thoracic Artery Bifurcation Branches to Two Separate Target Coronary Vessels

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Background: Recent interest has focused on extensive ITA myocardial revascularization. Maximizing ITA availability, however, remains a challenge. We report a novel use of skeletonized ITA in which the native bifurcation is preserved and both end-branches are anastomosed to two separate respective target vessels.

Methods: In 15 consecutive selected patients undergoing skeletonized bilateral ITA grafting, in-situ bifurcated right ITA (RITA) was deployed on two separate coronary targets. Functional assessment of the bifurcated RITA graft was performed electively by cardiac computed tomographic angiography.

Results: RITA was routed retroaortic via the transverse sinus to the marginal (M) territory and through a pericardial opening to the posterior descending artery (PDA) in 13 and two patients, respectively. The following coronary pairs were anastomosed: M1-M2 (13/15), PDA-posterolateral (1/15) and diagonal-intermediate artery (1/15). The ITA grafts/patient ratio was 4.66 ± 0.90 . There were no early major adverse events (30-day mortality, myocardial infarction, stroke or sternal infection). Hypoperfusion syndromes were not documented. At mid-term follow-up (17 to 60 months, median 41), the respective incidence of re-angina, myocardial infarction and repeat revascularization was 7% (n=1), 7% (n=1) and 0%. 5-year survival and freedom from major adverse cardiac events (Kaplan-Meier) were 100% and 86%, respectively.

Conclusions: Provided the ITA and its distal branches, the superior epigastric and musculophrenic arteries, are skeletonized with adequate distal caliber and flow, selected use of bifurcated ITA appears feasible. This increases the versatility of ITA grafting and reduces the need for sequential grafts. These preliminary observations are currently restricted to the non-LAD territory and should be corroborated by larger datasets.

Retro-Aortic Right Internal Thoracic Artery Routed Via The Transverse Sinus

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Background: The left-sided bilateral internal thoracic artery (ITA) configuration of choice remains undetermined. Concerns over inaccessible retro-aortic bleeding from right ITA (RITA) side-branches or insufficient length renders this technique controversial. Outcome analysis and technical aspects are discussed.

Methods: Between 2006 and 2011, 301 patients underwent left-sided bilateral ITA grafting in whom a skeletonized RITA was routed via the transverse sinus to revascularize the circumflex territory. Included are patients in whom RITA was directed through the oblique sinus.

Results: In all patients side-branches of the retro-aortic RITA were regularly clipped without additional manipulations. Anastomoses were performed to ramus intermedius (n=37, 11.2%), first marginal (M1) (n=244, 73.9%), second marginal (M2) (n=43, 13%), third marginal (n=6, 1.8%) or to both M1-M2 (n=31, 9.4%). The respective number of grafts/ patient and ITA grafts/ patient was 3.9 ± 0.6 and 2.8 ± 0.7 , respectively. Re-exploration for bleeding was documented in 7 patients (2.3%), nevertheless, in neither was the source of bleeding the retro-aortic graft. The observed incidence of early mortality, myocardial infarction and stroke compared favorably with the literature.

Conclusions: In-situ retro-aortic skeletonized RITA, routed through the transverse sinus, appears feasible. Contradictory to T-grafts and ante-aortic RITA crossover this strategy provides two in-situ ITAs and avoids retro-sternal crossover ITA. These benefits may outweigh the risk of inaccessible retro-aortic bleeding. In the majority of patients the circumflex territory is readily accessible.

Concomitant Cardiac Surgery and Pulmonary Resection

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Background: Concomitant lesions of the heart and lung are uncommon, but when present they pose a challenge for cardiac and thoracic surgeons. Patients with lung cancer and heart disease are at high risk of postoperative death or severe cardiovascular complications. The aim of this study was to review the early results of concomitant radical lung resection for cancer with simultaneous cardiac surgery.

Methods: From 1994 to 2011, seventeen patients (13 men and 4 women, aged 49 to 85 years, mean age 69.6 yrs) with lung cancer or another lung disease and coronary disease and/or valve disorders, were operated. 11 patients underwent coronary artery bypass grafting, 3 patients underwent aortic valve replacement and 3 patients underwent other cardiac surgery procedure. The pulmonary resections consisted of pneumonectomy in 1 patient, lobectomy in 6 patients and wedge excision in 10 patients. The approach to the heart and lung were through median sternotomy. All cardiac procedure procedures were undergone on cardiopulmonary bypass. Lung resection was performed immediately after completion of cardiac procedure and after reversal of heparin. Follow-up was obtained on all 17 patients (mean follow-up 24 months; range 121 to 1 months).

Results: There were no postoperative deaths in this group of patients. In 15 patients pathologic examination confirmed lung malignancy. 2 patients were operated due to non-oncological pathology. Overall late survival was 88% and 67% at 1 and 5 years, respectively.

Conclusions: Lung resection carried out concomitant with cardiac surgery is a safe and effective. A combined procedure avoids the need for a second major thoracic procedure and may improve early clinical outcomes.

Preoperative Hemoglobin Predicts Adverse Events in Chronic Kidney Failure Patients Undergoing Cardiac Surgery

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Background: Preoperative anemia adversely impacts outcomes in cardiac surgery. However, in the population of chronic kidney disease (CKD), correcting anemia to a "normal" hemoglobin has been associated with increased risks of adverse cardiac & cerebrovascular events. The question whether preoperative hemoglobin independently influences outcomes of cardiac surgery in patients with significant CKD has not been previously explored. Study aims: address this specific question & determine if there was a cutoff level of preoperative hemoglobin, above which, adverse surgical outcomes decrease.

Methods & Results: This observational study included adult pts. CKD Stage III-V (eGFR < 60 ml/min /1.73 m²) undergoing cardiac surgery. 788 patients with a mean plasma Cr. 1.9 ± 1.5 mg/dl were evaluated, of them 22.5% had preoperative hemoglobin within the normal range (14-18 g/dl male & 12-16 g/dl female). Patients were stratified into 4 subgroups according to preoperative hemoglobin levels: < 10 g/dl, 10-11.9 g/dl, 12-13.9g/dl & >14 g/dl. Outcomes were: postop. Acute Kidney Injury requiring dialysis, mortality & major morbidities. A gradual increment in the incidence of all adverse postoperative outcomes was detected for every 2g/dl decrement of preoperative hemoglobin. Multivariate logistic regression analysis demonstrated a continuous increase in the frequency of all adverse postoperative outcomes from the highest to the lowest preoperative hemoglobin (OR=31.6, p <0.0001 mortality, OR=17.2, p <0.0001 sepsis, OR=16.9; p<0.03, CVA and OR=31, p =0.005 postoperative hemodialysis). Subgroup analyses revealed preoperative hemoglobin < 12 g/dl as an independent risk factor for postoperative mortality (OR 2.6; 95%, p = 0.04).

Conclusions: Preoperative anemia adversely impacts postoperative outcomes in patients with significant CKD. Target levels of preoperative hemoglobin in CKD patients undergoing cardiac surgery should be higher than currently recommended in the non surgical setting.

Effect of Age on Outcome of Patients Undergoing Bilateral Internal Thoracic Artery (BITA) Grafting

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Objective: The purpose of this study is to evaluate the effect of age on outcome of patients undergoing BITA grafting.

Methods: Between 1996 and 2001, 1714 consecutive patients underwent BITA grafting, of whom 748 were 65 years of age or younger, 688 were between 66 and 75 and 278 were 76 or older.

Results: Operative mortality of the three age groups (1.2%, 4.1% and 5.8%) was lower than the Euroscore predicted mortality (3.9%, 6.5%, 9.3%, respectively, $p < 0.001$). COPD ($p = 0.02$), preoperative old ($p = 0.04$) or acute ($p = 0.001$) MI, emergency operation ($p < 0.001$), increased age ($p = 0.01$), PVD ($p = 0.05$), and $EF < 25\%$ ($p = 0.05$), were independent predictors of operative mortality. Sternal infection occurred in 32 patients (1.9%). Repeat operation ($p < 0.001$), COPD ($p < 0.001$), PVD ($p = 0.04$), and Diabetes ($p = 0.001$), were identified as independent predictors of sternal wound infection. Mean follow-up was 11.5 years. Kaplan-Meier 10-year survival for patients < 65 , 66-75 and > 75 years of age were 85%, 65% and 40%, respectively ($p < 0.001$). They were better than the corresponding predicted Charlson Comorbidity Index survivals (68%, 37%, and 20%, respectively, $p < 0.001$ for all age groups), approaching survival of gender and age matched general population (90%, 70%, and 41%, respectively). Predictors of decreased survival (Cox model) were older age ($p < 0.001$), congestive heart failure ($p < 0.001$), diabetes ($p < 0.001$), COPD ($p < 0.001$), chronic renal failure ($p = 0.03$), $EF < 25\%$ ($p = 0.002$), repeat operation ($p = 0.01$), preoperative MI ($p = 0.03$), PVD ($p < 0.001$), and preoperative IABP support ($p = 0.005$).

Conclusions: BITA grafting should be considered in patients older than 65, despite increased early and late mortality, due to the significant survival benefit obtained with this surgical technique without additional risk of sternal wound infection related to age. It is recommended especially for patients without other risk factors.