

**Better Clinical Outcomes Using Sequential LIMA to LAD & Diagonal Compared to Diagonal & LAD Grafts**

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Objective: To maximize the use of left internal thoracic artery (LITA) in coronary artery bypass grafting (CABG), many surgeons revascularize the left anterior descending artery (LAD) and a Diagonal branch using a single sequential LITA. In the traditional procedure the Diagonal anastomosis is performed first and the distal portion of the LITA is connected to LAD. We have adopted a different strategy by grafting first the LAD and then the diagonal - "inverted J-configuration". We reviewed the safety and clinical efficacy of this approach.

Methods: 291 consecutive patients (240 men; mean age= 60.6 ) were operated between 2006 - 2009 . 149 patients underwent "traditional" procedure - Diagonal & LAD (Diagonal first) and 142 underwent "inverted J-configuration" - LAD & Diagonal (LAD first). Multivariate analysis was performed looking at composite patient outcomes of death stroke, myocardial infarction, reintervention and recurrent angina (MACCE) in both groups.

Results: Preoperative profiles were comparable in the two groups. Mean follow-up duration was  $30 \pm 12$  months. There was no significant statistical difference in the rate of death between the two groups ( $p=0.34$ ) however the rate of MACCE was significant lower using the "inverted J-configuration" (LAD first) ( $p=0.003$ ). The new approach was found to be protective (OR - 0.3,  $p=0.01$ ) in logistic regression multivariate analysis for composite end point.

Conclusions: Revascularization of the LAD and the diagonal arteries using a skeletonized left internal thoracic artery in "inverted J" configuration is safe and feasible and resulted in better clinical outcomes compare to traditional sequential anastomosis.

## **Quality Improvement Interventions Decreases Mortality after Cardiac Surgery**

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**Background:** The aim of the study was to evaluate the impact of newly appointed intensivist and introduction of quality improvement program by intensivist-directed team on the outcomes of patients after cardiac surgery.

**Method:** We performed an observational cohort study with historical controls in an eight-bed Cardiac Surgical ICU in a tertiary university medical center. The study period included from January 2005 to December 2010. For analysis we grouped patients into three periods, First period, before appointment of intensivist, from 2005-2006, Second period 2007-2008, after appointment of intensivist and beginning of implementation of the interventions, and Third period, 2009-2010, after interventions implementation. Quality improvement interventions include intermediate intensity glucose control protocol, sepsis treatment protocol and guidelines for the prevention of intravascular catheter-related infection. Also was introduced continuous RRT (renal replacement therapy) under full supervision of intensivist. In the third period we introduced computerized clinical information system.

**Results:** There were 1633, 1690 and 1543 patients investigated in each period respectively. Patient data were collected from the department's database. There was no significant difference in the mean of the standard and logistic scores between the 3 groups. Unadjusted in-hospital mortality decreased significantly from 6.37% (104 patients) to 3.3% (51 patients) in the Third period ( $p < 0.01$  See Tab 1), and ventilation time decreased significantly during the 3 periods as well ( $p < 0.01$ ).

**Conclusion:** Appointment of an intensivist-directed team model and introducing Quality improvement interventions were associated with decreased mortality and shorter postoperative ventilation time after cardiac surgery.

## **Multiple Arterial Grafts Improve Late Survival of CABG Patients: Analysis of 8,622 Multivessel Pts**

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**Objectives:** The use of the left internal mammary artery (IMA) in revascularization of multivessel coronary artery disease has been shown to improve survival following coronary artery bypass graft surgery (CABG), however the incremental survival benefit of multiple arterial grafts is still debated.

**Methods:** We reviewed outcome of 8,622 pt that had isolated primary CABG for multivessel disease from 1993 to 2009. Pt were stratified according to the number of arterial grafts; (1) single IMA plus saphenous vein (SV) IMA/SV group (n=7,435; 83% 3VD) and (2) multiple arterial (MultArt) group (n=1,187; 74% 3VD)

**Results:** Early mortality rate was 0.8% (n=10) in the MultArt group and 2.1% (n=154) in the IMA/SV group (P=0.004). However, the difference was not statistically significant (P=0.996) after adjusting for all differences in predictors of early mortality between groups in multivariate analysis. Late survival was significantly greater for the MultArt group compared to IMA/SV group (5-, 10- and 15-year survival rates were 95%, 84% and 71% versus 85%, 61% and 35% p<0.001). MultArt subgroups with the use of bilateral internal mammary artery (BIMA)/SV (n=589) and BIMA only (n=271), had significantly improved 15-years survival (97%, 86%, 76% and 94%, 82%, 75% at 5-, 10- and 15-years, p<0.001), and BIMA/RA (n=147) and LIMA/RA (n=169), had significantly greater 10-years survival (95%, 84% and 93%, 78% at 5- and 10-years, p<0.001) compared to IMA/SV group. In multivariate analysis, use of multiple arterial grafts remained a strong independent predictor of survival (HR=0.78, 95% CI 0.66 - 0.93, p=0.006).

**Conclusion:** Use of the right IMA or radial artery in addition to the left IMA is associated with significantly better overall and late survival compared with single IMA and saphenous vein in patients with two and three-vessel disease undergoing isolated CABG.

## **Extra Corporeal Membrane Oxygenation in Adults**

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**Objective:** The use of extra corporeal membrane oxygenation (ECMO) in children is widespread. However, its use in adults is less frequent. ECMO can be the only hope for patients with severe respiratory and/or cardiac failure that are anticipated to be reversible. We describe our recent experience for adult ECMO for both respiratory and cardiac failure.

**Methods and Results:** Between October 2008 and November 2011 we used 66 ECMO in 62 patients (2 patients received ECMO in 2 intervals, 2 patients were transferred from Veno-Veno ECMO (VV ECMO) to Veno-Arterial ECMO (VA ECMO). Indications for support were cardiac in 32 patients (myocarditis-6, acute myocardial infarction-6, post cardiectomy-5, post heart transplant-3, post LAVD-2, other-10), and respiratory in 30 patients (H1N1-9, trauma-4, pre lung transplant-6, post lung transplant-6, other-5). Median support time was 5 (range 1-21) days in the cardiac group and 7 (range 4-30) days in the respiratory group. Seventy one percent and 61% of patients were weaned from cardiac and respiratory ECMO, respectively. Thirty days and 1 year actuarial survival was 61% and 48% for cardiac patients, respectively, and it was 50% and 50% for respiratory patients, respectively. Complications included severe bleeding in 2, cerebral hemorrhage in 1, technical issues in 2, infections related to ECMO in 3, and limb ischemia in 1. Further analysis of data revealed that late referral for ECMO was associated with worse outcome.

**Conclusions:** ECMO is the last option for patients with fulminant otherwise reversible cardiac or respiratory failure. Its application may save life of patients who otherwise would die. With relatively low complication rate, earlier referral for ECMO is important to save more life.

## **Safety of rVIIa for Refractory Bleeding in Patients with Mechanical Circulatory Assist Device**

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Safety of Recombinant Activated Factor VII for the treatment of Refractory Bleeding in patients Supported by Mechanical Circulatory Assist Device.

Background: The use of Recombinant activated factor VII (rVIIa) has emerged in recent years as a safe and efficient mode for treating intractable massive bleeding, and reducing the need for allogenic blood transfusion after major cardiac operations. Patients under mechanical circulatory assist require anticoagulation. It is considered hazardous to discontinue anticoagulation in these patients. Little information exists regarding adult patients on mechanical circulatory support treated by rVIIa. Few studies report potentially fatal thromboembolic complications specifically when rVIIa is administered to these patients. The risk of circuit thrombosis or failure in patients with mechanical support is yet to be determined.

Methods: We conducted a retrospective analysis of patients supported by various assist devices and treated by rVIIa. Data included the amount of blood loss and transfusion requirements as well as any thromboembolic complications after rVIIa administration.

Results: Between the years 2009-2011 eight patients were treated by rVIIa while on mechanical circulatory support. The type of mechanical support was BIVAD (2 patients), LVAD (2 patients) and ECMO (4 patients). The indications for support varied from amniotic fluid emboli to graft failure after heart or lung transplantation and post cardiectomy heart failure. The haemostatic effect of rVIIa was significant - the blood loss was reduced significantly (445 ml/h Vs 171 ml/h). No thromboembolic complications were noted.

Conclusions: Administration of rVIIa to adult patients supported by circulatory assist device is safe and should be considered in cases of massive hemorrhage.