Prognostic Value of Predictors for Prolonged Mechanical Ventilation after Cardiac Surgery

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Background: Prolonged mechanical ventilation after cardiac surgery is associated with higher mortality and morbidity. Identification of preoperative variables, which may lead to prolonged mechanical ventilation, may help develop better strategies for postoperative ICU management. The aim of our study was to identify risk factors for prolonged postoperative mechanical ventilation.

Methods: Four hundred and eight consecutive patients who underwent coronary artery bypass grafting (CABG) with or without aortic valve replacement (AVR) composed the study population. Patients were classified as those ventilated less than 48 hours – group I (396 patients) and those ventilated more than 48 hours – group II -prolonged ventilation (12 patients). Multivariable analysis was used for risk factors identification.

Results: Postoperative mortality for patients in group I was 1.8% compared with 42% for group II ($p<0.001$). Preoperative predictors for prolonged mechanical ventilation included older age (OR=1.1, p=0.03), emergency surgery (OR=4, p=0.02), and lower ejection fraction (OR=1.1, $p<0.001$). The addition of intraoperative variables to the model adds combined CABG and AVR as a predictor for prolonged ventilation (OR=6, p=0.04).

Conclusions: The ability to identify patients at increased risk for prolonged mechanical ventilation may allow the development of pre-emptive strategies to optimize patient's condition and ICU management.

Preoperative Hemoglobin Level as a Predictor for Outcome after Cardiac Surgery

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Background: Anemia is a known risk factor in many fields of medicine. The purpose of this study was to assess how pre-operative hemoglobin levels affect the outcome after cardiac surgery.

Methods: The data set includes 408 consecutive patients who underwent coronary artery bypass surgery in our institution. We studied the patients according to their preoperative hemoglobin (Hb) levels, Group A (Hb<=11 mg/dl, 41 patients), Group B (Hb>11 mg/dl, 367 patients). Endpoints studied were perioperative mortality, prolonged ICU stay (>72 hours), and prolonged hospital stay (>10 days).

Results: There were more females in group A (18% vs. 8%, p=0.007), and more hypertension (12 vs. 6, p=0.04). Patients in group A were older (69±11 vs. 66±10, p=0.04), and had reduced preoperative creatinine clearance (59±34, 85±25, p<0.01).

Perioperative mortality was higher in group A, 12% compared with 3% in group B (p=0.02). More patients in group A had Prolonged ICU stay, 16% compared with 6% in group B (0.05). More patients in group A had Prolonged hospital stay, 23% compared with 5% in group B (<0.001). After adjustment for other confounding factors, multivariable logistic regression analysis identified Hb<11 mg/dl as an independent predictor for perioperative mortality (OR=5.6, p=0.001).

Conclusions: Hb<11 mg/dl is an independent predictor for perioperative mortality and prolonged length of stay after cardiac surgery. Hemoglobin Correction should be considered prior surgery.

Successful Treatment of Disseminated Cutaneous Trichosporon Asahii Infection with Voriconazole in a Heart Transplant Recipient: The Importance of Multidisciplinary Approach.

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Purpose: Infections with uncommon fungal pathogens are more frequently reported in immunocompromised hosts, particularly among hematological patients and transplant recipients. We report what we believe to be the first case of successful management of disseminated cutaneous Trichosporon asahii infection with orally administered voriconazole in a heart transplant recipient.

Methods and Materials: A 59-year-old man with end-stage non ischemic cardiomyopathy was ventilated and supported with high doses of inotropes and an intra-aortic balloon pump for 3 days before he underwent a successful orthotopic heart transplantation at April 12th 2007. His pre-transplant assessment revealed reversible elevated pulmonary vascular resistance and pre-renal azotemia. His immediate post operative recovery was complicated with worsening signs of right ventricular failure despite NO, sildenafil and diuretic therapy. His kidney function deteriorated requiring emergent hemodialysis. A biopsy proven acute rejection was treated with high dose steroids. While in the cardiac intensive unit, a black skin lesion was seen in his right leg diagnosed by the dermatologist as small necrosis of the skin due to the long standing severe edema. As the skin lesion enlarged, culture from a punch biopsy of the lesion showed growth of Trichosporpn Asahii. Oral voriconazole 200 mg twice a day was started.

Results: Despite continuous treatment with the recommended voriconazole dose, local progression of the skin lesion was not halted. Below knee amputation was considered but eventually not done due to rapid dissemination of the fungal infection to both inner thighs and left hand. The mycophenolate moefetil was suspended and as the Immuknow levels were low trough levels of tacrolimus were maintained low. The voriconazole dosage was doubled after blood samples sent abroad found low levels of the drug. During the next days the dissemination of the lesions stopped. Due to improvement in is renal function, the hemo-dialysis was suspended, the right ventricle gradually recovered and the edema resolved. Surgical debridment was done and homograft skin was transplanted. Two weeks later, autologous skin grafts were taken from the outer right thigh and all the wounds were covered. This last skin grafting was very successful and by August 7th the patient was sent home. The voriconazole dose was reduced to 600 mg a day but MMF was not re-introduced yet (20th Sept. 2007).

Conclusions: The first case of successful management of disseminated cutaneous Trichosporon asahii infection with orally administered voriconazole in a heart transplant recipient is described. The multi disciplinary approach was essential for achieving this favorable outcome.

Surgery for Hypertrophic Obstructive Cardiomyopathy

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BACKGROUND: Surgical treatment of patients with obstructive cardiomyopathy (HOCM) includes relief of left ventricular outflow tract (LVOT) obstruction and correction of mitral regurgitation and is indicated when disabling symptoms refractory to maximal medical management are present. Transaortic septal myectomy (Morrow procedure) is regarded as a standard surgical approach for this condition. Recent advances in understanding the anatomy and physiology of LVOT obstruction resulted in several changes in surgical strategies. Standard myectomy can be performed in combination with one of several techniques of mitral valve repair for correction of structural abnormalities of the mitral apparatus in patients with HOCM.

We review our experience of surgical management of patients these using several techniques for different mitral pathologies.

METHODS: Four patients with HOCM were operated between September and October 2006. Mean age was 63.5 years. All patients had typical marked systolic anterior motion (SAM) resulting in severe LVOT obstruction and severe mitral regurgitation. Transesophageal echocardiography was used in all patients preoperatively and postoperatively to guide and assess adequacy of resection, LVOT gradient and mitral valve function. Concomitant coronary artery bypass grafting was performed in two patients.

In two cases septal myectomy was done through standard transaortic approach. The others two patients had additional pathologic changes of the mitral valve, (ruptured chords to the posterior leaflet, anterior leaflet enlargement) requiring surgical intervention on the mitral valve. In one the patients, we used transatrial transmitral approach to the LVOT with temporary detachment of the anterior mitral leaflet that proved to be very helpful for extended myectomy. Mitral valve repair included resection of posterior leaflet due to ruptured chords, anterior leaflet extension and annuloplasty. In the other case we applied the edge-to-edge Alfieri stitch technique, which eliminated the SAM, LVOT gradient, as well as the MR.

RESULTS: All four patients survived surgery. No ventricular septal perforation occurred, and none of the patient needed permanent cardiac pacing. Serial postoperative echocardiography demonstrated that the LVOT gradient, mitral regurgitation and SAM of the mitral valve were significantly reduced if not eliminated.

CONCLUSIONS: Surgical relieve of LVOT obstruction produce significant hemodynamic improvement in patients with severe symptomatic HOCM. Choice of the surgical method depends on the anatomic and physiologic derangement of the LVOT and the underlying pathology of mitral regurgitation. Transatrial-transmitral approach to the LVOT proved to be very helpful for extended myectomy.

Stents and CABG: Financial Impact.

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Background: Coronary artery revascularization with either angioplasty/stent implantation (PCI) or bypass surgery (CABG) is common, and clinical results have been comparable. However, the burden on health care systems has not been widely studied.

Methods: Our departmental database was queried for all patients undergoing pure CABG between 2000-2006 (group 1). Subsequently, all patients undergoing first time coronary intervention (PCI or CABG) at Shaare Zedek Medical Center between 2002-2004 were enrolled (group 2). Hospital records as well as outpatient records were reviewed to document utilization of health care facilities and cost.

Results: In group 1 there were 1121 patients. Of these, 315 had prior PCI and 22 had prior CABG. The mean interval between PCI-CABG was 2.4 years, in 116 (37%) within 1 year of the initial procedure. The mean interval between CABG-CABG was13 years, in 2 (9%) within 1 year. Group 2 included 432 patients: 180 received a bare metal stent (BMS), 71 a drug-eluting stent (DES), and 181 underwent CABG. Data from a pilot group of 25 patients was available 1 year after intervention: 9 BMS, 9 DES and 7 CABG. Six (33%) patients in the PCI group required a repeat procedure, compared to none in the CABG group. Initial cost of hospitalization per patient was $11643 for CABG compared with $6329 for PCI. By 1 year the cost per patient was unchanged for CABG and increased to $9344 for PCI, due to re-intervention. Utilization and costs of ambulatory services were similar in both groups.

Conclusions: While initial cost of CABG is higher than that of PCI, patients undergoing PCI require more repeat interventions and at shorter intervals. At longer follow-up we may expect to see more need for re-intervention in both groups. With limited resources available, the choice of procedure should take into account not only clinical benefit, but also long term financial considerations.

Implementing a Novel Integrated Heart Failure Disease Management Program in Israel

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Background: Heart failure (HF) is associated with frequent hospital admissions, impaired quality of life (QoL), high mortality and high healthcare costs.
Objectives: To design and implement a disease management (DM) program aiming to reduce mortality and hospital re-admissions, and improve patients' QoL while containing costs of healthcare.
Eligibility: Patients (NYHA class III-IV), hospitalized for HF.
Program Design: The program is implemented nationwide, within the framework of Maccabi Healthcare Services. It includes two main components:

- Regional HF centers
- A national call-center

Eligible patients are evaluated at the HF centers by cardiologists and HF nurse specialists. A drug therapy plan is delineated by cardiologists and self-care education is delivered by nurses. Patients are provided with telemetric equipment for home-monitoring of weight, heart-rate and blood-pressure. Between subsequent visits to the HF centers, DM is given by nurse specialists at the HF centers and the call-center, guided by the treatment plan, tele-monitoring information, and designated protocols. DM activities include lifestyle counseling, titration of drug therapy, monitoring of adherence and side-effects, and problem-solving in the case of acute events.
Program evaluation: Evaluation is carried out using a randomized controlled trial design. Patients allocated to the usual-care (control) arm are followed exclusively by their primary practitioners and cardiologists. After recruitment, patients in both study arms (DM and usual-care) are re-evaluated every 6 months for process and outcome measures.
Outcome Measures: Hospital re-admissions, QoL, all-cause mortality, and costs of care.
Current Program Status: A national call-center and four regional HF centers are currently operating and patients are being recruited.

Marked Transient Reduction of HDL and Other Lipoproteins in Acute Peri-Myocarditis

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Background

Acute peri-myocarditis is a major inflammatory disease that may lead to impaired cardiac function. Although the disease is well recognized, the clinical picture may be confused with myocardial infarction (MI). While, alterations in plasma lipoproteins concentration are known to take place in trauma, severe sepsis and even acute MI, the lipoprotein levels in acute peri-myocarditis have not been studied. The purpose of this study was to investigate the lipoprotein levels in patients with Acute peri-myocarditis .

Methods

Thirty consecutive patients 29 (96.6%) males age 31±10, with first episode of acute peri-myocarditis were enrolled in the study. Acute peri-myocarditis diagnosis was confirmed by the following: clinical history, ST ↑ or PR ↓ on EKG, elevated inflammation markers and echocardiographic findings. Patients' detailed medical history, EKG, Echocardiography and blood tests including lipid profile were obtained within 24 hours from admission. Follow up examination repeating the same parameters were obtained upon recovery.

Results

Low levels of lipoproteins were found upon admission. Markedly decreased level of HDL was observed, 82% of the patients had HDL < 40, 39% had extremely low level of HDL < 25 mg/dl. After recovery HDL level increased in 96% of patients (average change 114.7%). Significant changes in the levels of LDL and TG were also observed.

mg/dl	Admission	Follow-up	Average change	P value
Total Cholesterol	130.35±21.05	157.04±41.43	23.46%	≤0.001
HDL	27.16±13.58	44.06±11.88	114.72%	≤0.001
LDL	77.2±20.9	93.19±27.29	21.18%	0.004
TG	119.1±78.37	147.32±79.97	59.33%	0.024

Conclusions

Low lipid profile was found during acute peri-myocarditis.

Marked reduction of HDL levels during acute peri-myocarditis is a new marker for the disease, and may assist in differentiating acute peri-myocarditis from acute coronary syndrome.

Importance of Interventricular Septal Motion for the Remodeling of the Right and Left Ventricles in Patients with Coronary Artery Disease – an Echocardiographic Study

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Background: The interventricular septum (IVS) is an important part of both the right and left ventricles (RV and LV) but there is little information about its influence on biventricular remodeling.

Methods: Included in our analysis 179 stable ambulatory patients with history of coronary artery disease (myocardial infarction and or CABG). Patients with LBBB and significant valvular dysfunction were excluded. Echocardiograms were analyzed to obtain long and short axis dimensions of LV and RV (sphericity index (SI) was calculated as their ratio). Patients were stratified into 4 groups according to quantitative analysis of IVS motion (groups 1-4; normal, mild, moderate and severe impairment). Comparison among groups was performed using ANOVA.

Results: LV ejection fraction decreased from 49% (group 1) to 26% (group 4). LV long axis was (mm) 78, 82, 84 and 91 for groups 1-4 respectively, $p<0.0001$. Similarly short axis was 47, 50, 55 and 63 respectively, $p<0.0001$). The SI was 1.66, 1.66, 1.54 and 1.46 respectively, $p<0.0001$. Values for RV were: long axis – 74, 78, 79 and 84 respectively, $p<0.0001$; short axis – 39, 41, 41 and 46 respectively, $p<0.0001$; SI – 1.92, 1.95, 2.01 and 1.85, respectively, p=NS. Mild degree of IVS motion abnormality was already associated with LV remodeling while RV remodeling occurred only at a later stage (the RV SI decreased only in group 4). RV dysfunction and remodeling correlated with LV dysfunction (and remodeling), with IVS motion abnormality, but not with pulmonary artery pressure.

Conclusions: LV and RV remodeling were strongly related to the degree of IVS motion abnormality. RV dimensions increase even with mild degree of IVS motion abnormality while the RV SI decreases only at a later stage. RV function and remodeling is related to IVS motion (ventricular interaction) and not to pressure overload.

Therapeutic Hypothermia for Comatose Patients: VF Versus Other Initial Rhythm – does it Matter?

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Background: Unconscious adults after out-of-hospital cardiac arrest (OHCA) should be treated with mild induced hypothermia (MIH) when the initial rhythm was ventricular fibrillation (VF) (ILCOR 2003). No data and no recommendations exist regarding other rhythms. We conducted a current practice survey in order to assess efficacy of MIH in patients after OHCA due to non-VF rhythm.

Methods: Eighty six consecutive OHCA patients (68 VF, 18 non-VF) were cooled by MTRE Criti Cool™ external cooling system. Patients were analyzed according to their initial rhythm and according to their neurological outcome on discharge, defined by their cerebral performance category (CPC).

Results: Out of sixty-eight patients with VF 42 patients (62%) had favorable outcome (CPC 1-2) and 32% died. Among the non-VF group 4 patients (22%) had favorable outcome ($p<0.001$ versus VF) and 67% died ($p=0.008$ versus VF). Differences in baseline characteristics between the favorable and unfavorable non-VF groups were in age and severe co morbidities. Outcome was worse when time from collapse to return of spontaneous circulation (ROSC) was more than 25 minutes or (a trend to worse outcome) when the patient was presented to the emergency room with convulsions or hemodynamic instability.

Conclusions: In our experience, MIH is less efficient in non-VF compared to VF patients. Factors that seem to influence their outcome are: age, co morbidities, time duration from collapse to ROSC, convulsions and hemodynamic instability at presentation.

The Value of Troponin-I Curve after Primary PCI for ST Elevation Myocardial Infarction

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Background: After thrombolysis in ST elevation myocardial infarction (STEMI), cardiac troponin-I (CTnI) curve demonstrated two peaks. The ratio between the early to late peak has been shown to carry important prognostic value. The magnitude and course of troponin after reperfusion with primary percutaneous intervention (PPCI) have never been investigated.
Methods: The study comprised 73 consecutive STEMI patients in whom PPCI was performed within 12 hours of pain onset. CTnI and creatinine kinase (CK) were prospectively determined every 4 hours during the first 24 hours and every 24 hours during the next 3 days. Data regarding clinical course, echocardiography and angiography were prospectively collected.
Results: 73 patients were followed (79% male, mean age 60±13 years). In contrast to thrombolysis, after PPCI there was only one peak after 4-8 hours from admission in most of the patients (73%). Late troponin peak (> 8h) was associated with a late arrival of >6h from pain onset, unsuccessful re-vascularization, distal embolization or re-ischemia. When patients were stratified into two groups using the median peak CTnI value as a cut off point (53.7 μg/L), patients with higher troponin levels had a higher rate of decrement left ventricular function (ejection fraction ≤45%), (67% versus 43%, p=0.005).
Conclusions: The characteristics of CTnI curve in acute STEMI patients undergoing PPCI differs from that of thrombolysis with a single peak after 4-8 hours, demonstrating a sharp 50% decline within 24 hours of admission. Higher peak levels correlate with worse ventricular function.