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RESEARCH STUDIES

Abstract No: OA-ECMO/ECLS-001

Extracorporeal membrane oxygenation for cardiogenic shock after cardiac surgery: predictors of early mortality and outcome from 21 patients

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Background: We report our experience in the setting of venoarterial extracorporeal membrane oxygenation (VA-ECMO) system support as treatment for postcardiotomy cardiogenic shock and ARDS.

Methods: Between 2010 and 2013, 21 patients received ECMO support at our clinic. There were nine males (47.6%) and the mean age was 33.3±33.2 years (range 0.1-67 years). Cardiac surgery included: (n=19); valve surgery (n=2), coronary artery bypass grafting (CABG) (n=4), Bentall procedures (n=1), Congenital cardiac surgery (n=12). Non-cardiac surgery; ARDS (n=1), Cardiac arrest (n=1). The CentriMag ECMO support was installed centrally in six patients and peripherally in fifteen. Twenty patients in cardiac patient were placed on venoarterial ECLS using a heparin-bonded circuit. One patient in cardiac patient were placed on venovenous ECLS using a heparin-bonded circuit.

Results: Median duration of support was three days (range 1-7 days). Eleven patients were weaned from ECMO (52.3%), whereas seven patients died while on support mainly because of multiple organ failure (63.6%). Ten patients died on ECMO support because of multiple organ failure (47.6%). Four (14.6%) patients were successfully discharged home. Complications included leg ischemia (n=2), bleeding (n=16), renal failure (n=3).

Conclusion: Extracorporeal life support has complications unique to itself, but with time, these are likely to be overcome. The system was easy to install and manage.

Abstract No: OA-ECMO/ECLS-002

Effect of a miniaturized versus standard extracorporeal circulation system for coronary artery bypass surgery in high risk patients

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Background: Miniaturized extracorporeal circulation (MECC) is a promising perfusion technology taking the advantage of an extracorporeal circulation while having a significantly reduced priming volume. The aim of this prospective our studies is to evaluate the results of a MECC versus standard extracorporeal circulation (SECC) for coronary artery bypass surgery in patients with high-risk.

Methods: In a prospective study, 20 patients with high-risk underwent elective coronary bypass either SECC system (n=10, group A) or with the MECC system (n=10, group B). Myocardial protection and the left vent were identical for the two groups. However, the intrapericardial suction device was never used and only the cell saver device was used in the group B.

Results: No significant differences were noted in patient characteristics and operative data between groups. Operative mortality was not in two groups. In the postoperative periode, the proinflamatuar sitokin, interleukin were significantly lower in group B than in group A. The MECC system was associated with platellet and renal function preservation, ventilation time and intensive care unite stay was shorter in the MECC group.

Conclusion: The MECC system is safe. This system is more biocompatible than SECC and provides a good postoperative biologic profile and good clinical results particularly for high-risk patients.

Abstract No: OA-ECMO/ECLS-003

Temporary mechanical circulatory support (levitronix-centrimag®) in patients with cardiogenic shock: Futile or does it really worth it?

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Background: Mortality in acute decompansating heart failure patients with cardiogenic shock is clearly high. As new technologies in mechanical circulatory support devices are emerging, different treatment options and strategies are expanding. In this study we report a 3-year single center experience with temporary mechanical circulatory support for the treatment of patients in acute decompansating heart failure presenting with cardiogenic shock.

Methods: This study is a retrospective review of 23 patients in whom a short-term mechanical device (Levitronix-CentriMag®) was used with later to conversion to durable options. In the situation of cardiogenic shock, Centrimag was used as a bridge to decision strategy device. In all patients the inflow cannula was inserted to left atrium via right superior pulmonary vein. The outflow cannula was inserted to ascending aorta. All of the operations were off-pump procedures.

Results: From January 2011 to September 2013, 23 patients suffering from cardiogenic shock due to acute decompansating heart failure were admitted to our department. Four of the patients were female (17%) and 19 of the patients were male (83%). The mean age was 34.9 (15-60 years). The etiology of heart failure was ischemic in origin in 3 patients (11%). The remaining 20 patients (89%) had non-ischemic cardiomyopathy. All of the patients were mechanically ventilated and had an intraaortic balloon pump inserted. The initial approach utilized was CentriMag® in all of the patients.

Four of the patients were bridged to a more durable device (17%). Two to Berlin Heart Excor® as a BiVAD and two to HVAD (HeartWare®) as a LVAD device. All of the four patients are still alive. Three of them are still in waiting list and 1 with Berlin Heart

Excor had been already transplanted. Five (22%) patients had been transplanted successfully while on the temporary MCS device. The remaining 14 patients died (61%) due to multiple organ failure, sepsis or stroke.

Conclusion: In our experience 39% of the patients in cardiogenic shock due to acute decompansating heart failure survived. We were able to destinate them to either heart transplantation or more durable devices as bridge to transplantation strategy. We recommend the usage of temporary MCS devices as a bridge to decision in INTERMACS-1 patients and don't think it is futile.

Abstract No: OA-ECMO/ECLS-004

Venoarterial extracorporeal life support for salvaging refractory cardiogenic shock

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Background: Venoarterial extracorporeal life support (VA-ECLS) systems have been intestigated as salvage treatment for patients with refractory cardiogenic shock (RCS).

Methods: Between Jan 2010 and November 2013, 32 consecutive adult patients with RCS were supported on RotaFlow (n=14; Maquet, Jostra Medizintechnik AG, Hirrlingen, Germany), the Levitronix CentriMag (n=15; Levitronix LCC, Waltham, MA), and Medos (n=2; Medos, Germany) at our institution. Twenty were men (age 40.6±16.3, range 21-63 years) and 12 were female (age 45.2±20.1, range 31-68 years). Indications for ECLS were: acute myocardial infarction CS (n=4); RCS in chronic heart failure (n=14); acute myocarditis (n=1); postpartum cardiomyopathy (n=1); donor graft failure (n=1); late rejection after heart transplantion (n=1); LVAD thrombosis (n=1); acute pulmonary venous obstruction (n=1); cardiorespiratory arrest (n=2); failure to wean from cardiopulmonary bypass in the setting of postcardiotomy (n=6). ECLS was established in the operating room (OR) in 18 patients and intensive care unit (ICU) in 14 patients. The blood lactate levels were measured during the course of VA-ECLS and pump flows were arranged accordingly.

Results: Peripheral ECLS setting was established in all patients except one who had central ECLS. Overall mean support time was 11.9±9.7 (range 1-34) days. Mean duration of support was 14±11 days. Six patients were weaned from VA-ECLS without further mechanical support. One patient was bridged to long-term ventricular assist device (3.6%), one was bridged to total artificial heart implantation (3.6%), and one was bridged to heart transplantation (3.6%), one patient is awaiting urgent cardiac donor.

Conclusion: Patients with RCS may benefit from VA-ECLS at either in OR or ICU setting. Inadequate tissue perfusion could reliably be assessed using serial blood lactate levels.

Abstract No: OA-ECMO/ECLS-005

Results of graft cannulation technique for venoarterial extracorporeal membrane oxygenation

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Background: Patients who underwent VA-ECMO in our clinic, we present limb complications and early results of arterial cannulation with Dacron straight graft.

Methods: In this study 22 patients who underwent ECMO support in our clinic between May 2011 and August 2013 were included. These patients' arterial cannulations were performed via graft. In these patients, 21 of them underwent cardiac surgery, 20 of them were post cardiaotomy syndrome, 1 patient had pneumonia, ARDS and low cardiac output, 1 patient was per partum cardiomyopathy. The mean age was 58.3±13.8 (23-78); 11 were (50%) men and 11 were (50%) women. Cardiac surgery procedures were isolate CABG (Coronary artery bypass brafting) (n=8), CABG with valve surgery (n=4), valve surgery (n=3), ascending aorta replacement (n=2), valve surgery with ascending aorta replacement (n=1), post-MI VSD repair (n=1), Benthall procedure and CABG (n=1), ascending, arcus aorta replacement and CABG (n=1). The mean EUROSCORE 2 value was 12.3±10.7. ECMO arterial cannulations were via peripheral in 20 patients and via central in 2 patients. Peripheral arterial cannula performed via right and left femoral artery in 16 (80%) patients and via right subclavian artery in 4 (20%) patients by 8 mm Dacron graft. ECMO vein cannulation was performed via femoral vein by purse suture in patients who femoral artery cannulation was performed. And vein cannulation was performed percutaneously in patients who subclavian and ascending aorta cannulation was performed.

Results: Average ECMO support duration was 5.81±4.19 days. Fifteen patients (68%) were wean from ECMO successfully. Thirty day mortality rate was 41% (n=9) and three months mortality rate was 50% (n=11). Eleven patients have been following up currently. Mortality reasons were multiorgan failure in four patients, consumption coagulopathy in three patients, acute renal failure in three patients and pulmonary complication in one patient. In one patient, during ECMO vein cannula performing iliac vein ruptured occurred. In this patient right atrial cannulation performed. There were no surgical complications or pathology occurred in related extremity.

Conclusion: ECMO is using for temporary cardiopulmonary support in postcardiotomy syndrome, cardiogenic shock, pneumonia, cardiac or respiratory failure for variety of reasons. ECMO could be performed via peripheral vessels safely without any complications in the extremities. Extremity complications that are seen up to 25% in the literature can be prevented by graft cannulation technique.

Abstract No: OA-LVAD/TAH-006

Extended bridge to transplant: 4 year outcomes with 3rd generation LVADs in an ERA of restricted transplantation

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Background: Mechanical circulatory support is well established as a bridge to transplant (BTT) for patients in end-stage heart failure. In recent clinical trials BTT rates are approximately 30% at 6 months. In the UK however there is still a significant discrepancy between the number of patients on the transplant waiting list and availability of donor hearts.

Methods: A review outcomes for 102 consecutive patients receiving a 3rd generation LVAD between January 2009 and September 2013.

Results: Consecutive patients (n=102; female 13; mean age 47±13) with 3rd generation LVADs (Ventrassist, n=6 and HeartWare). Diagnosis: ischaemic n=40, idiopathic n=53, adult congenital n=7, and restrictive n=2. Intermacs: 1 n=6, 2 n=37, 3 n=25 and 4 n=34. Median follow up was 620±462 days with a median duration of support of 445±422 days. All cause mortality was 26% and 37% at one and two years respectively and survival on device was 75% and 68% for the same time points. Older age (>50) was the most significant factor related to reduced survival ($p<0.05$), and this was predominantly related to death within the first 90 days. Intermacs groups 1+2 had a borderline worse outcome at 90 days compared to Intermacs 3+4 ($p=0.06$) There was no significant difference in survival related to diagnosis, gender or those who had VAD thrombosis (n=23). In our cohort only 14/102 patients were transplanted at a median of 334±347 days, and only 3 were transplanted in the first 6 months.

Conclusion: In this single centre cohort of BTT 3rd generation VAD implants with a low rate of transplantation we demonstrate excellent survival with up to 4.5 years follow up. This extended bridge to transplantation practice argues strongly in favour of adoption of destination therapy in the UK.

Abstract No: OA-LVAD/TAH-007

Left ventricle thrombus, is it a risk factor for LVAD implantation?

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Background: Left ventricle (LV) thrombus is a common complication in heart failure patients which is one of the cause of ishemic neurological event and early pump thrombosis after LVAD implantation. Our aim is to analyze the postoperative results of LVAD patients with LV thrombus.

Methods: Between October 2010 and November 2013, 83 patients have been treated with LVAD (continous-flowpump) implantation due to end-stage heart failure. Mean age was 48 years and 14 patients were female. In 17 patients left ventricle thrombus have seen. Two patients had a history of left ventricular aneurysm repair. LV thrombia were removed carefully before apical cannula insertion.

Results: Mean cardiopulmonary bypass time was 72 mins. Cross clamp was not needed in any patient. Unfractioned heparin was started earlier and target APTT was higher than the other patients. Ischemic neurological event was not seen in any patient. Suspected pump thrombosis findings as a slight increase in pump power or consistent pump disfunction were not seen.

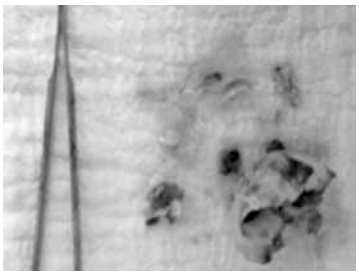

Figure 1. Huge thrombia removed from LV cannula site.

Conclusion: LV thrombus is a challenging condition in LVAD implantation. Careful excision of thrombia without regarding for the duration of cardiopulmonary bypass time may reduce the risk of early neurological event and pump thrombosis.

Abstract No: OA-LVAD/TAH-008

Effects of implantable centrifugal pumps on pulmonary hypertension

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Background: Pulmonary hypertension is often presented with severe heart failure, and it increases the risk of morbidity and mortality after heart transplantation. Therefore, we aimed to present the effects of the implantable left ventricular assist devices on pulmonary hypertension in heart transplant candidates.

Methods: Ten patients have been enrolled to the study who has been implanted HeartWare HVAD centrifugal pump in our hospital between April 2012 and September 2013. Six patients presented with pulmonary hypertension. Echocardiographic pulmonary artery pressures of these six patients were compared before and 1 month after left ventricular assist device.

Results: Patients with pulmonary hypertension (preLVAD mean EF=18.8±3.2%, preLVAD mean PAB=43.3±19.1 mmHg, postLVAD mean PAB=29.2±10.2) a significant ($p=0.03$) decrease in pulmonary artery pressure was observed after left ventricular assist device implantation.

Conclusion: We believe that; the reducing of pulmonary hypertension due to congestive heart failure is important for a successful heart transplant.

Abstract No: OA-LVAD/TAH-009

Long-term ventricular assist device and total artificial heart experience of Akdeniz University

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Background: Heart transplantation is the most effective treatment for end-stage heart failure. But heart transplantation can be applied to the limited number of patient because prolongation of candidate waiting list and duration, increasing number of emergent patients and limited donor supply. Today, in order to perform bridge to transplantation (BTT), bridge to recovery (BTR) and destination therapy (DT), serious progress has been made in use of Ventricular Assist Device (VAD), which is alternative treatment for heart failure. Until a suitable donor is found from heart transplant list, VAD can be lifesaving. We present our experience with the mechanical circulatory support and its clinical outcome.

Methods: Between January 2011 and October 2013, 60 patients underwent long term ventricular assist device and 3 patients underwent total artificial heart in Akdeniz University Department of Cardiovascular Surgery. These patients were analyzed retrospectively.

Results: Sixty-three (54 males, 86% and 9 females, 14%) with a mean age of 49.6±1.12 years (18-75) were included in this study. The etiology of end stage heart failure in 34 patients (54%) was ischemic cardiomyopathy and in 29 patients (46%) was non-ischemic cardiomyopathy. 44 patients of long term ventricular assist device were applied heartware and 16 patients

were applied HeartMate II. CardioWest was performed for 3 total artificial heart patients. Bridge to transplantation was planned for 51 patients while destination therapy was planned for 12 patients. For all patients, 1, 2, 3, 4, 5, 6, 7 intermacs levels were 7 (11.1%), 18 (28.6%), 26 (41.3%), 9 (14.2%), 3 (4.8%), 0, 0 respectively. Average Intermacs level of patients was 2.73. The mean duration of mechanical support was 434.28±42.1 days. Three patients (4.8%) were bridged to heart transplantation. Early mortality (in-hospital mortality) rate was 20.6% (13/63). Patients discharged 3, 6, 12 and 18 months survival rates were found 95%, 91%, 79% and 71% respectively by Kaplan-Meier analysis. Causes of mortality were right ventricular failure (28%), multi organ failure (20%), sepsis (16%), cerebral hemorrhage (12%), cerebrovascular event (8%), cancer (8%), intraoperative hemorrhage (4%), gastrointestinal system hemorrhage (4%).

Conclusions: Taking into consideration of limited donor supply in patient with end stage heart failure, VAD can be used as a safe alternative.

Abstract No: OA-LVAD/TAH-010

Total artificial heart experience

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Backround: We aimed to share total artificial heart implantation patients interms of survey and early complications. End-stage heart failure represents a highly morbid condition for the patient with limited treatment options. From surgical perspective, the treatment options for effective long-term survival are usually limited to heart transplantation or implantation of a destination mechanical circulatory support device. The patient is subject to shortages in donor organ availability and thus possible decompensation and potential death while awaiting transplantation. Devices for patients requiring long-term biventricular support remain limited. Implantation of a total artificial heart (TAH) currently represents one for long-term surgical treatment option for patients requring biventricular mechanical circulatory support as a bridge to transplant.

Methods and Results: Five patients underwent to TAH implantation between 20.11.2012 / 26.09.2013. Of these two of them had chronic renal insufficiency. Cerebro-vasculer disease seen in three patiens as a complication after surgical intervention. One of this patients had a abdominal aort aneurysm and old cerebro vascular attack history additively. EVAR performed to this patient after six months following TAH implantation. Mortality was seen in three patients. Two patients died due to the multi-organ failure and sepsis secondary to SVO. The other patient pre-operative clinic condition was similar to pre-exitus (intact cerebral functions but end-organ failure signs) and never awake after operation. Two patient discharged and is still alive and under control.

Conclusion: The total artificial heart is rapidly becoming the treatment of best choice for bridging to transplantation and end-stage therapy in biventricular failure patients. In the light of this information, the importance of the post-operative early complications as SVO which is the potent predictor of mortality, becomes more significant and guides to clinicians to be alert and ready for this unpleasant condition.

Abstract No: OA-LVAD/TAH-011

Preoperative risk factors for right ventricular failure after left ventricular assist device implantation

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Background: The aim of this study is to evaluate parametrics which enables to foresee right ventricular (RV) failure in patients undergoing left ventricular assist device (LVAD) implantation. Clinical evaluation alone seems insufficient for predicting RV failure, an important cause of morbidity and mortality after LVAD implantation.

Methods: Clinical, hemodynamic, and echocardiographic data were collected retrospectively on 100 patients undergoing LVAD implantation. RV failure was defined as the need for placement of temporary or long-term RV support with an devices, or the use of inotropic agents more than 14 days.

Results: RV failure occurred in 29 of 100 patients (29%). In a forward stepwise multipl logistic regression analysis intraaortic baloon pump (IABP) (OR=46,370), preoperative high creatinin level (≥1.7 mg/dl) (OR=11,951), tricuspid annular plane systolic excursion (≥12 mm) (OR=8,104), abdominal aside (OR=51,036), postoperatif bleeding (greater than 1000cc in first 24 h) (OR=19,665), severe tricuspit valve regurgitation (OR=9,052) are independent predictors of RV failure. IABP (OR=5,015), hiponatremia (OR=4,953), high creatinine (OR=6,397) and postoperative bleeding (OR=8,848) are independent risk factors for 30 day mortality.

Conclusions: RV failure is the most fatal complication after LVAD implantation. To act before RVF is crucial for better outcomes. The findings of this paper may lead to better patient selection and timing for isolated LVAD implantation.

Abstract No: OA-LVAD/TAH-012

Right ventricular failure after left ventricle assist device implantation

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Background: Insertion of an implantable left ventricle asist device (LVAD) complicated by early right ventricular failure has a poor prognosis and is largely unpredictable. Prediction of RV failure after LVAD placement would lead to more precise patient selection and optimal device selection. In this study, we aimed to share our experience with right ventricular dysfunction after LVAD implantation.

Methods: 25 LVAD recipients were analyzed in our clinic between 21.12.2010 / 16.07.2013. Right ventricle function was evaluated preoperatively in all cases. PAB (pulmonary artery pressure), EF (ejection fraction), right ventricle diameters and wall thickness, right atrial dimension, TAPSE (tricuspid annular plane systolic excursion), TEI index (RV myocardial performance index), Sta (tricuspid annular longiditunal velocity) were analyzed. Right EF >30%, PAB <40 mmHg, TAPSe >15 mm, Sta >13 cm/sc, TEI index >0.25 in all patients who underwent LVAD implantation.

Results: Average age was 52 (43-57 years). After device implantation, right ventricular dysfunction (RVD) occured in six patients (24%). One patient recovered after proper medical support and five patients died. First patient developed RVD during postoperative period and although medical support with inotropic agents and after levitronix implantation, we couldnt stop the mortal progression. Mortality seen in postoperative fifth month due to the RVD in second patient. Third patient consulted with drive-line infection. The specific pathogen eradicated with proper antibiotics but probably RVD occurred secondary to systemic infection. In fourth patient, RVD occured due to the blood transfussion and acute lung injury. Fifth patient was succesfully treated with cardiotonic agents and levosimendan and mortality seen because of hemorrhagic SVO while planning the discharge of patient. Sixth patient was consulted with acute lung edema and infection. Specific antibiotic theraphy and inotropic support started and clinical follow-up's shown that the recovery completed succesfully in laboratory, echocardiographic and radiologic findings.

Conclusion: Right ventricle dysfunction is still a serious problem in patients receiving left ventricular asist device (LVAD) although all encouraging improvements about the prediction of right ventricular failure.

Abstract No: OA-LVAD/TAH-013

Selective plasma exchange therapy for right heart failure and acute liver dysfunction

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Background: The left ventricular assist device (LVAD) is becoming an increasingly common treatment option for patients with end-stage heart failure. Today, patient survival with the newer generation continuous-flow pumps approaches 80% at one year and 70% at two years. Despite these improvements, right ventricular failure (RVF) continues to be a major cause of mortality and morbidity after LVAD implantation. RVF complicates 20-50% of LVAD implantation cases and contributes to increased postoperative morbidity and mortality. Therapeutic plasmapheresis has been introduced for different RVF clinical scenarios refractory to conventional medical therapy. However, there have been no controlled trials proving the effectiveness of selective plasma exchange therapy (SEPET) for treating acute liver failure. The aim of this report was to investigate the clinical results of SEPET for patients with RVF.

Methods: We evaluated five consecutive patients with RVF and liver dysfunction (3 males, 2 females) treated with SEPET between June 2012 and September 2013 at our institution. The median age of patients was 55 years (range 26-58 years). Indications were post-LVAD RVF (n=2), antibody-mediated rejection following heart transplantation (n=2), and systemic inflammatory response syndrome (n=1). One patient was also on extra-corporeal life support. Baseline average total bilirubin levels was between 2.21 and 20.74 mg/dl, international normalized ratio (INR) of more than 1.2 and C-reactive protein (CRP) levels were between 42 and 243 mg/L. The SEPET was carried out serially six to nine times daily. Each of the sessions continued for 4 hours and the blood flow rate was 100 mL/min. We used 2% human albumin solutions as the replacement fluid.

Results: After repetetive sessions of SEPET, adequate decrement in lactate, bilirubin, INR and CRP levels were achieved. No bleeding complications and procedural morbidity were encountered in this cohort. Survival at 6 months was 60%.

After repetetive sessions of SEPET, adequate decrement in lactate, bilirubin, INR and CRP levels were achieved. The mean bilirubin decrement was 42.6% and INR level decreased by 49.9%. A decrease in mean CRP levels was also observed (30.2%). No bleeding complications and procedural morbidity were encountered in this cohort. Survival at 6 months was 60%.

Conclusion: Selective plasma exchange therapy produced satisfiying clinical results in this cohort of high risk patients with RVF and liver dysfunction.

Abstract No: OA-HTX-014

Heart transplantation experience of Akdeniz University

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Background: In the literature posttransplantation survival rates suggest heart transplantation as an effective form of treatment. Today, heart transplantation is being performed in our country successfully and it is also carried out more than 14 years in our clinic with self-sacrifice. In our national literature, although there are different studies about heart transplantation, there is not a study that patients are categorized more than one or their parameters are compared with multivariate descriptive analysis. Additionally, data about risk factors that affect mortality and morbidity is not sufficient enough.

Methods: Between August 1998 and February 2013, 53 patients underwent biatrial orthotopic heart transplantation in Akdeniz University Faculty of Medicine, Department of Cardiovascular Surgery. In this study, patients who underwent biatrial orthotopic heart transplantation are seperated into three different categories; first according to their etiology, second between exitus and alive transplantation groups, third between early and long-term mortality groups. These are comperatively and retrospectively analyzed. Also mortality, morbidity and survival rates are evaluated. Included in the study 53 patients' (44 men, 83% and 9 women, 17%), mean age is 45.2±10.4 years (19-64). The etiology of end stage heart failure in 23 patients (43.4%) was ischemic cardiomyopathy and in 30 patients (56.6%) was non-ischemic cardiomyopathy. Two of the patients were transplanted both heart and kidney simultaneously.

Results: Average follow-up period of 53 patients those have biatrial orthotopic heart transplantation was 61.4±8.3 months. Total ischemic time was 137.5±50.7 minutes (80-280), the total cross-clamp time was 95.5±22.3 minutes (65-165), total cardiopulmonary bypass (CPB) time 168±100.2 min (100-710), respectively. Overall mortality in the entire population was 35.8% (19/53). Early mortality (in-hospital mortality) rate was 13.2% (7/53), late mortality rate was 22.6% (12/53). For all patients; 1, 2, 3, 5 ve 10 year survival rates were found 97%, 89%, 81%, 62% ve 50% respectively by Kaplan-Meier analysis. Annual survival rates are found significantly lower in ischemic cardiomyopathy group than nonischemic cardiomyopathy group (p=0.02).

By the help of multiple logistic regression analysis, high ischemic time and postoperative high pulmonary arterial pressure were found as an independent risk factors those have effect on survival more than one year. According to comparison analysis of the groups, parameters like; donor age, obesity, gender, preoperative LDL, high PCO_2, preoperative anemia, AF, LVEF, left ventricular diameters, Euroskor, CPB time, ischemia time, hemofilter, transfusion of blood products, need for postoperative inotrope, CVP, PAP levels, duration of intubation, length of stay at ICU were found to be statistically significant risk factors.

Conclusion: Since the limited donor supply and the deaths in waiting lists, donor hearts should be used in a most efficient manner. The success of heart transplantation is evaluated with survival rate, quality of life and long-term complication rate. Better analysis of risk factors for mortality and morbidity and taking the necessary precautions in early stage are the most important factors affecting prognosis.

Key words: Heart transplantation, etiology, mortality, risk factors, survival analysis.

Abstract No: OA-HTX-015

The results of training needs assessment survey in Turkey within the project entitled "technical assistance for alignment in organ donation"

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Background: The overall objective of the project Technical Assistance for Alignment in Organ Donation is to contribute to the harmonization with and implementation of the EU acquis communautaire in the area of public health, specifically focusing on increasing rates of cadaveric organ donation in Turkey. In the context of the activity Training of Health Personnel, training programme for 160 future trainers of 1,500 health personnel will be designed and conducted. TNA Study was developed in order to identify gaps and barriers in the performance, skills, and knowledge of health care professionals involved in the Turkish donor programme.

Methods: Both qualitative (focus group interviews with informed informants) and quantitative (questionnaires) research methods were used as complementary tools.

Results: A substantive amount of data was qualitatively and quantitatively analyzed. Results were classified around 6 generic themes: 1) General aspects of organ donation (personal stands, organization, system, legislation); 2) Living donation (mechanisms assuring transparency and patients rights); 3) Deceased donation; 4) Communication skills; 5) Socio-religious and ethical aspects of organ donation; 6) Training skills. Participants in the presented study were not very experienced in brain death determination: 22% of doctors were unable to determine the brain death. Study revealed that major barriers in deceased donation performance are brain death determination, unsupportive legislation, religious and personal reservations, lack of communication skills and lack of team work during family interviews, and lack of motivation for work performance.

Conclusion: The TNA survey results justify a need for additional training for health care professionals involved in Turkish donor programme.

Abstract No: OA-LTX-016

ECMO-lung transplantation: the maintenance of hemodynamic stability

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Background: Extracorporeal membrane oxygenization (ECMO) has a prepotent role both in intraoperative hemodynamic and respiratuary instability-critical in lung transplantation-by providing circulatory support and in treatment of early primary graft insufficiency. Our study analysis the data and results of ECMO application in lung transplantation.

Methods: Between February 2012 October 2013, 17 patients underwent lung transplantation. Nine of these patients were operated on ECMO and they were analysed according to indications, ECMO modality and complications.

Results: Lung transplantation indications were COPD in two patients, bronchiectasis in four patients, sarcoidosis, intertitial lung disease and silicosis in one patient. ECMO cannulations were through femoral route in seven patients and central cannulation were done in two patients. Mean systolic pulmonary arterial pressure was -68.8 mmHg (min 40, max 93 mmHg) with mean diastolic pressure as 25.6 mmHg (min 16, max 32 mmHg) in eight patients with intraoperative VA-ECMO support. In the postoperative period three patients received ECMO support; one patient who was bridged to lung transplantation and two patients for postoperative hemodynamic support. Postoperative ECMO support for primary graft failure was not required in any of our patients. One patient with patent foramen ovale was decannulated without any complication. Complications were as peroperative increased hemorrhage in three patients, trombocytopenia in five patients (3 reversible trombocytopenia), acute renal failure in four patients and ventricular unloading with pulmonary edema in one patient. After VA-ECMO support four of our patients were under follow up after bilateral lung transplantation.

Conclusion: Hemodynamic and respiratory parameters are variable in the preoperative and especially in the peroperative period in lung transplantation. End-stage lung disease implicates additive technical diffuculties due to the endemic circumstances. VA-ECMO technique needs close and cautious follow up of parameters. VA-ECMO has becomed a modality that regulates the hemodynamic instability progressing over respiratory insufficieny during lung transplantation thereby repalcing the role of cardiopulmonary bypass.

Abstract No: OA-BS-017

Endothelial progenitor cell differentiation of induced pluripotent stem cells in vitro for advanced heart failure

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Background: End-term differentiated somatic cells can be converted to a pluripotent state through transduction of four transcription factors, namely Oct4, Klf4, Sox2 and cMyc. These induced pluripotent stem cells (iPS cells) resemble embryonic stem cells in many aspects while avoiding general ethical concerns. Autologous iPS cells after reprogrammed into endothelial progenitor cell (EPC) may offer several advantages in the treatment of end-stage heart failure because of their vasculogenic and cardiomyogenic differentiation potential. To reach that purpose, we reprogrammed and then characterized mouse fibroblast-driven iPS cells into Flk-1/KDR+ (vascular endothelial growth factor receptor-2), a well-recognized EPC marker. Further maturation of EPC was characterized by the expression of CD31 and VE-cadherin, both of which are well-known endothelial cell-specific adhesion molecules.

Methods: In the current work, Puromycin-resistant iPS cells (Ng-20D-17) were expanded in culture on the mouse embryonic fibroblasts (MEFs) and then purified from MEFs. Purified iPS cells were differentiated into Flk-1+ cells with the use of differentiation medium (α-minimum essential medium supplemented with 10% fetal calf serum and 5x10-5 M 2-mercaptoethanol) in the absence of leukemia inhibitory factor (LIF) on type IV collagen-coated dishes. We then analyzed Flk-1 gene expression and protein levels with quantitative real-time PCR (qRT-PCR), Western blot and immunocytochemical methods on days 2, 3, 4 and 5. Morphological changes were evaluated during differentiation process using confocal and scanning electron microscopy. As a first step, Flk-1 expressing cells were selected by fluorescence activated cell sorting (FACS) in each culture day. In the second step, FACS-purified Flk-1+ cells were cultured on type IV collagen-coated dishes in differentiation medium with 100ng/mL human VEGF165 (vascular endothelial growth factor) to induce EPC formation. On day two and three following induction, CD31 and VE-cadherin gene expression and protein levels were analyzed with qRT-PCR, Western blot and immunocytochemical methods.

Results: As a result of the first step we found that Flk-1 expressing cell number reached to a peak level (24%) on day 4 followed by a progressive decline subsequently. In the second step, CD31 and VE-cadherin positive cells were generated and enriched during day 2-3 of induction. We concluded that optimal time for harvesting Flk-1+ cells on by FACS was is day four of initial differentiation. Following isolation of Flk-1+ progenitor cells they were are further matured into functional EPCs by VEGF165 within 2-3 days of induction.

Conclusion: We showed that EPCs could be successfully derived from mouse fibroblast-driven iPS cells. iPS cells may therefore play be used in an important role in the treatment of ischemic cardiomyopathy by remodeling the blood vessels and/or cardiac regeneration and could be considered for an in vivo model for the translational research.

Key words: iPS cell; endothelial progenitor cells; angiogenesis; revascularization.

Abstract No: OA-BS-018

Cell fusion of cardiomyocytes and mesenchymal stem cells may promote cardiac regeneration in end-stage heart failure

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Background: Adult cardiomyocytes have limited proliferative capacity. Loss of cardiomyocytes after injury may lead to advanced heart failure. Stem cell research focusing on cardiovascular regeneration aims to achieve stem cell mediated angiogenesis/cardiomyogenesis leading to sistolic and diastolic cardiac functional improvement and/or development of new, functional cardiac tissue. Fusion of mesenchymal stem cells (MSCs) and host cardiomyocytes has been proposed as one of the mechanisms for cardiac regeneration. However, the mechanisms and the functional consequences of cell fusion remain undefined. The aim of this study is to elucidate the role of fusion in cardiac reprogramming characteristics of MSCs with microarray methodology.

Methods: We established an in vitro model that stimulates the fusion of human mesenchymal stem cells (h-MSCs) and human cardiomyocytes (hCM/AC16), which allowed functional evaluation of hybrid cells. Firstly, fusion between hMSCs/hCMs was induced with PEG (polyetilenglicol). Maximal fusion between hMSCs/hCMs was achieved on 15th day of culture. Hybrid cells were selected and re-cultured for another 15 days. After this period, hybrid cells were examined for their karyotype analysis, immunohistochemical and electrophysiological characteristics. Gene expression changes between hMKH, hCM and hybride cells were analysed with microarray methodology. Cardiac markers alpha-sarcomeric actin, cardiac troponin, laminin, desmin) and MSC positive surface markers (CD90, CD73, CD29, CD105) were examined.

Results: Hybrid cells were positive for both MKH and CM markers. Thus, hybride cells maintained the characteristics of both cell types. As a part of electrophysiological studies, calcium channels were also examined by patch-clamp. No significant difference was found between hybrides and human cardiomyocytes regarding response to ATP and caffeine. According to microarray results, 1494 and 139 genes were found to be expressed differently (4 fold or more) between MKH/hybride cells and AC16/hybride cells respectively. To investigate the upregulation or downregulation of specific cellular pathways, genes present on the array were assigned to 23 groups, based on their biological function. As an example, in the group of Chemokine signal pathway, cytokine-cytokine interaction pathway, focal adhesion pathway, TGF-beta signal pathway, NOD-like receptor signal pathway a significant proportion of genes was differently-regulated in hybride cells after fusion.

Conclusion: Hybrid cells maintain the cardiomyocyte characteristics. MSCs support cardiomyocytes in a way to promote their differentiation to cardiomyocytes. Progress in cellular therapy for cardiovascular diseases can be achieved by further analysis of cells with cardiac differentiation and fusion capacity. This study shows immunohistochemical and electrophysiologic similarities between hybrid cells following co-culture of hMSC/hCM and original hCMs. Cell fusion can be an important therapeutic mechanism in cardiovascular regeneration and also can be applied to translational science.

Key words: Cardiomyocyte; cell fusion; mesenchymal stem cells; microarray.

Abstract No: OA-ECMO/ECLS-019

Heparin induced thrombocytopenia during extracorporeal membrane oxygenation: a report of 40 patients

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Background: Extracorporeal memrane oxygenation (ECMO) can be a life-saving therapeutic option in patients severe cardiopulmonary failure. Extracorporeal circulation requires effective systemic anticoagulation with heparin to prevent thrombosis in the system and thromboembolic complications. Heparin induced thrombocytopenia (HIT) is an immune-mediated adverse effect of heparin therapy. We report our institutional experience with ECMO and HIT.

Methods: We report 40 patients (20 congenital and 20 adult cases) who recieved ECMO during the years 2010-2013. The mean age in the congenital group was 13 months (range 0.1-3 years) and in the adult group was 45±12 years. The type of the operations performed are listed at Table 1. The types of ECMO devices, types of cannulation, demographic, peri and postoperative findings of the patients were analyzed retrospectively.

Results: Median duration of support was 6 days (range 1-13 days). 16 of the patiens could be weaned from ECMO (40%), whereas 24 patients died during support. The aim of analysis was to focus on the thrombocytopenia during ECMO support. HIT was seen in 74% of the patients. The change in platelet levels can be seen at Figure 1. Similiar analysis were done anlayzed according to duffy antygen and Rh factor (Figure 2, 3, 4). Decrease in platelet counts started at the operation day and increased after the 7th day. Comparison of Rh factors and blood groups, did not show any significant difference.

Conclusion: The ECMO use in severe cardiopulmonary failure can be life saving but has risk of severe thrombocytopenia. Our results did not show any significant risk factor for HIT. The number of institutional experience can be considered small to reveal significant results. The ECMO teams should follow-up thrombocyte levels daily regarding the possiblity of high incidence of HIT.

Table 1.

	Type of operation	Counts
Pediatric	Arterial switch	5
	Fanton procedure	3
	VSD	3
	ECMO (only)	5
	Reconstriction of hypoplastic arcus	1
	TVR	1
	ALCAPA repair	1
Adult	CABG	11
	Thoracoabdominal aort aneursym repair	1
	AVR	1
	Cardiac transplantation	1
	VSD	1
	ECMO (only)	4

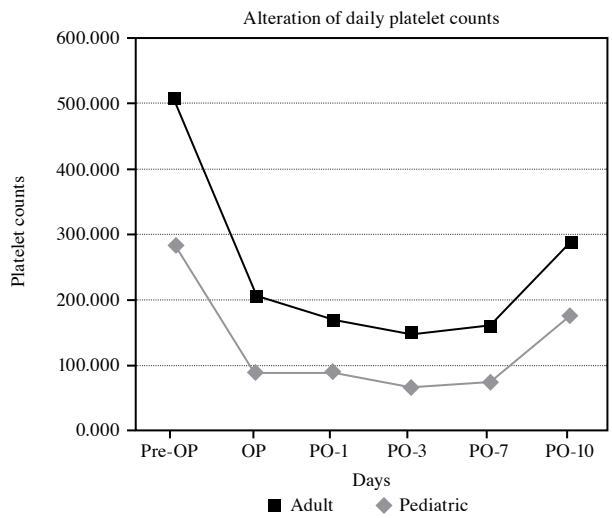

Figure 1.

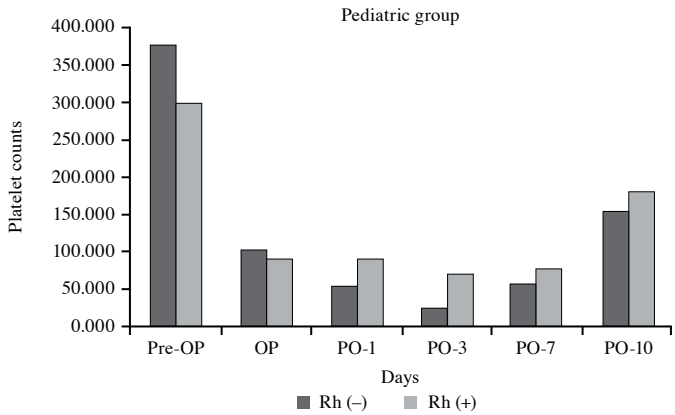

Figure 2.

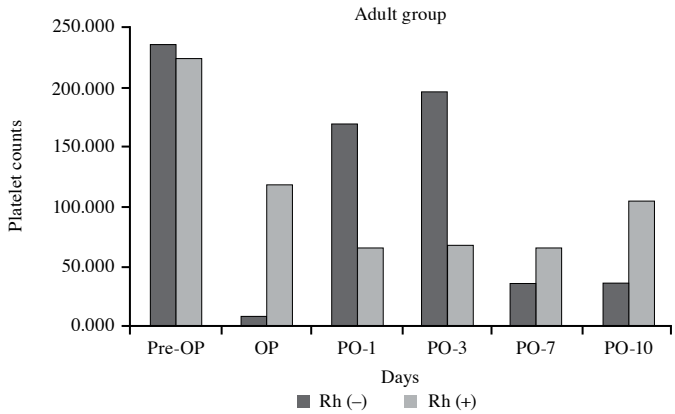

Figure 3.

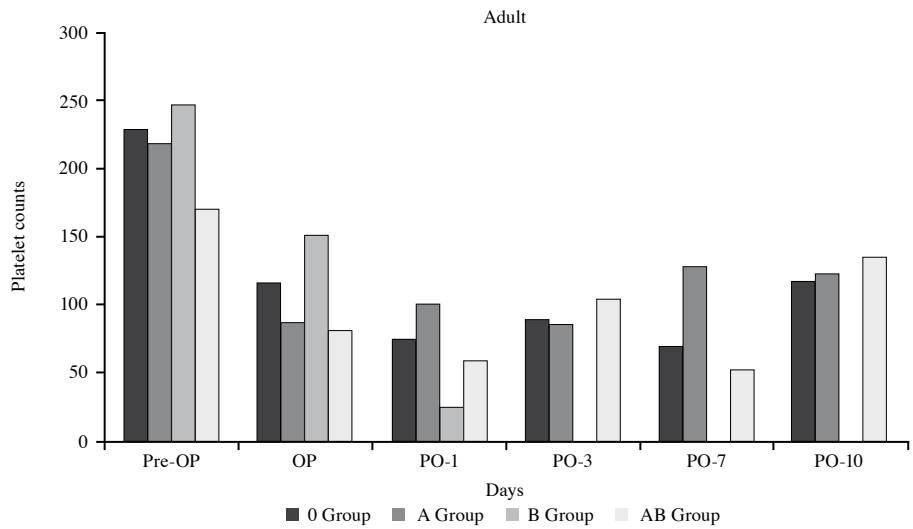

Figure 4.

CASE REPORTS

Abstract No: CR-001

A BI-VAD story

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Background: Although more experience is gained on mechanical circulatory systems everyday, postoperative right ventricular failure (RVF) is an ongoing problem. With this paper, we want to present a case that suffered from RVF after left ventricular assist device (LVAD) implantation and was treated with biventricular assist device implantation.

Case: Twenty-six-year-old male having symptoms of swelling legs and fatigue for the last year underwent ICD implantation one year ago due to ventricular arrhythmia. He was using betablocker, diuretics (furosemide and spironolactone) and low molecular weighted heparine. On physical examination, there was gallop rhythm, bilateral basal rales and significant pretibial edema. He was in INTERMACS Class 3. The operation was planned two days after his hospitalization. Although he showed no signals of deterioration preoperatively right ventricular function was impaired in the operating room. Cardiac arrest occurred prior to cannulation and emergent cardiopulmonary bypass was performed with aortobicaval cannulation. After closure of patent foramen ovale, LVAD implantation (HeartWare VAD) and tricuspid ring annuloplasty (Edwards), we were unable to wean the patient from the cardiopulmonary bypass despite of high dose inotropes and left ventricular mechanical support. Right ventricle was extremely thin and fibrotic. To support right ventricle, extracorporeal membrane oxygenator (ECMO, Maquet) was implanted via femoral vein and pulmonary artery with a remaining portion of HeartWare inflow graft. To avoid cardiac depression sternum was left open. Heparin drip was administered for anticoagulation. On the third day of ECMO support as there was no sign of recovery, right ventricular assist device (RVAD) implantation was planned. Under ECMO support, right ventricular free wall was used for inflow and the Dacron graft of ECMO for outflow cannulation. The graft was tapered to avoid pulmonary overflow and edema. After RVAD implantation, it became possible to wean the patient from mechanical ventilator and inotropes. On the fifth postoperative day of BiVAD implantation, the patient transferred from the intensive care unit.

Postoperative period was uneventful and he was discharged from the hospital on the 28th postoperative day. After the uncomplicated three months, the patient was successfully bridged to transplantation. He is on routine follow-up without any adverse event.

Conclusion: Right ventricular failure is one of the most important postoperative problems. ECMO is a good option for bridge-to-decision. Although outcome of biventricular support seems to be poor, it may be life saving in particular conditions. We believe that timing has a critical importance with these patients.

Abstract No: CR-002

A successful heart transplantation after treatment of stubborn infection in a patient with Excor implantation

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Background: Excor (Berlin Heart) pulsatile device implantation is used for biventricular failure and especially on pediatric cases for bridging to transplantation successfully. Although bad prognosis of the development of sepsis on follow-up of patients after Excor; there may be possible chance for transplantation with persistent and determined clinical follow-up. The infection after excor implantation had been treated successfully in our 10-year-old male patient with dilated cardiomyopathy and the heart transplantation was performed subsequently.

Case: 10-year-old male patient was admitted to our clinic with decompensated heart failure while he followed up for dilated cardiomyopathy for 2 years by in an external clinical center. He was in INTERMACS Class 1 and required inotropic support and mechanical ventilation intensive care unit. Later, the biventricular excor (Berlin Heart) pulsatile device implanted to the patient. After long period of fever, Staph aureus was isolated from blood culture on 57th day of implantation. The patient responded to the antibiotic treatment. Orthotropic heart transplantation was performed successfully on the 112nd day of biventricular excor implantation. His recovery from heart transplantation was uneventful and discharged from the hospital.

Conclusion: Excor pulsatile support device is a system preferred on biventricular failure and especially on pediatric age group. Bleeding, infection and the thromboembolism cases are most common complications. These complications often limit the bridging to the transplantation. Excor pulsatile device provide a strong circulatory support for biventricular failure and it is possible to consummate the patient for convalescence by successful follow-up and treatment period.

Abstract No: CR-003

Treatment of rectum cancer after HeartMate II implantation

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Background: The mechanical perfusion support systems are being used successfully for end-stage heart failure. Even its high cost limits the usage, the implantation is being used all around world and usage is increasing day by day and most of the patients may return their daily life. Returning to the normal life is the reason of facing with new problems for clinicians. Our patient developed rectum cancer following LVAD implantation and treated successfully under support of HeartMate II.

Case: 55-year-old male patient was following up for dilated cardiomyopathy and HeartMate II left ventricular support device was implanted as the aim of bridging to the transplantation. He applied to our clinic with rectal bleeding complaint 3 months after implantation. The diagnosis was rectum ca by laboratory examinations. The case operated as abdominal surgery with tumor resection (low anterior resection) under general anesthesia and the support of HeartMate II. After all he was discharged from the hospital uneventfully.

Conclusion: The end-stage heart failure is an important healthcare problem recently. The left ventricular support systems intended for use either bridge or destination therapy is raising the survival rates of patients. The rectum ca growing on survival period may be treated successfully with careful and systematic approach although its hard managing.

Abstract No: CR-004

Temporary LVAD bridging to permanent LVAD in postcardiotomy cardiogenic shock

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Background: Ventricular assist devices are effective treatment methods for heart failure patients who are waiting for cardiac transplantation. Incidence of postcardiotomy cardiogenic shock after cardiac surgery is 2-6%. Mechanical circulatory support systems are feasible options and increasingly being used for the patients who do not benefit from IABP and intensive medical treatment.

Case: We present a case who was treated with left ventricular assist device following ECMO for the treatment of postcardiotomy cardiogenic shock. Forty-two-year-old female patient had undergone CABG due to acute MI and coronary dissection, 13 days before the transportation to our center. After failure of weaning from CPB, IABP and intensive inotropic treatment was administered. ECMO treatment was required after the clinical status of the patient did not improve and the patient was referred to our hospital by ECMO and inotropic therapy. LVAD (HeartWare HVAD) was implanted. ECMO support was ceased gradually. Inotropic therapy was stopped after an eight-day intensive care course. Patient was discharged with an eventless ward follow up period.

Conclusion: The use of implantable mechanical circulatory support is beneficial for the treatment of post-cardiotomy cardiogenic shock in the failure of IABP and inotrope treatment, and applications are increasing.

Abstract No: CR-005

Combined cardiac surgery with LVAD implantation

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Background: Surgical repair of a dissected aortic aneurysm is quite challenging and controversial especially in a cardiac transplantation candidate.

Case: We present a case in which a combined surgical procedure was performed to avoid the risk of rupture of a large aneurysm and to bridge to cardiac transplantation. Large dissected aortic aneurysm in ascending aorta was diagnosed in a 50-year-old male patient who had a previous aortic valve replacement (AVR). LVAD (HeartWare HVAD) was implanted to the patient as a bridge operation as he was taken into the heart transplantation waiting list. In the operation, previous mechanical aortic valve was replaced with a biological valve, and a supra coronary graft interposition was performed simultaneously. Output of the assist device was anastomosed to the aorta in an end-to-side fashion. Patient was discharged 14 days after surgery. Ninety-day follow-up was eventless and the patient is still waiting in elective heart recipient list.

Conclusion: Although a combination of a cardiac operation and LVAD increases the operative risk, it may be helpful in preventing the clinical deterioration in selected patient group by providing discharge from the hospital and keeping the chance to be in the cardiac transplantation waiting list in these high risk group of patients.

Abstract No: CR-006

A successful case of bilateral lung transplantation from a donor with previous aortic valve surgery

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Background: British Transplantation Society (BTS) states that previous chest surgery in a donor constitutes a contraindication to lung retrieval.

Case: We report a case of a 32-year-old female who had previous cardiac surgery at 18 years of age for congenital bicuspid aortic stenosis. At that time, she underwent an aortic valve replacement with a mechanical prosthesis. During her pregnancy on this admission, therapeutic anticoagulation was achieved with low molecular weight heparin (LMWH). Despite the administration of therapeutic thromboprophylaxis, the patient developed an ischemic stroke at 38 weeks of gestation. The LMWH was then converted to intravenous heparin, which unfortunately resulted in an acute hemorrhagic conversion of the ischemic stroke. An urgent caesarean section was performed for delivery and additional measures were instituted for maternal support. However, the patient was diagnosed with brainstem death 10 days post partum. After her family consented for organ donation, there was a discussion among several cardiothoracic centers with regards to the suitability and timing of retrieval on a redo donor. The decision that ensued involved the general surgeons harvesting the abdominal organs initially until the commencement of visceral perfusion. Following that, a redo-median sternotomy was performed. Thoracic dissection was difficult due to multiple adhesions. In particular, the lungs were strongly adherent to the chest wall and mediastinal structures. The recipient center was informed to start the recipient procedure once both lungs were examined ex-vivo in detail with no post retrieval complications. The lungs were then transported promptly and successfully implanted with no significant complications and the postoperative recovery was uneventful.

Conclusion: We recommend that previous chest surgery should not be considered as an absolute contraindication for lung donation, as it is feasible to explant the lungs in patients with previous isolated

aortic valve surgery. This case highlights that it can be an addition to the extended donor criteria for lung retrieval.

Key words: Redo-sternotomy; lung retrieval; extended donor criteria.

Abstract No: CR-007

Selective plasma exchange therapy: a promising support for the treatment of post- LVAD right ventricular failure

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Background: Right ventricular failure (RVF) occurring after the implantation of left ventricular assist device (LVAD) ranges from 9 to 44% and remains a major cause of morbidity and mortality. Although early RV function improves after LVAD implantation since reduced RV afterload by amelioration of pulmonary venous hypertension; in some patients, increased RV preload and decreased left ventricular pressures can cause a leftward shift of the inter-ventricular septum which may adversely affect RV function and mechanics RV dilatation and volume overload may result in tricuspid annular dilatation, distortion of subvalvular apparatus leading to significant tricuspid regurgitation (TR). Also elevated preoperative non-specific neurohumoral markers of heart failure, such as N-terminal pro-brain natriuretic peptide and neopterin, and the inflammatory markers procalcitonin and endothelin-1 were found in patients developing RVF post-LVAD. Medical treatment options are inotropic agents, pulmonary vasodilators, and diuresis. Refractory cases may require mechanical support such as changing the pump speed under echocardiography guidance, temporary right ventricular assist device, ECMO, biventricular assist device and total artificial heart. Effects of selective plasma apheresis (SPA) on humoral and inflammatory mechanisms of post-LVAD RVF may be beneficial but there is no recent report about the use of this method in RVF after LVAD implantation. We report the recovery of refractory RVF symptoms and signs in a patient with LVAD who was treated with selective plasma apheresis and ultrafiltration.

Case: A 44-year-old female patient with dilated cardiomyopathy underwent LVAD (HeartMate II) implantation. She presented with vomiting and gastric discomfort required urgent readmission 3 months after discharge. O/E hepatosplenomegali, peripheral edema and jugular venous congestion were detected. Blood tests showed elevated levels of total bilirubin (11.3 mg/dl), AST (1008 U/L), ALT (450 U/L) and LDH (9567 U/L). Echocardiography and catheter evaluation revealed increased right-sided (RA: 16 mmHg; RV: 38/13 mmHg) and mean pulmonary artery pressures (mPAP: 45 mmHg) and normal wedge pressures (PCWP: 18 mmHg) accompanied by 2-3th degree tricuspid regurgitation and septal shift. Computed tomography showed the absence of an abdominal pathology or thrombosis within the device. Inotropic medication was commenced including milrinone, dopamine and dobutamine in addition to furosemide infusion. LVAD flow was reduced under echocardiography guidance to correct the septal shift. At the 5th day of treatment there were no improvement in symptoms and signs of RVF and the daytime urine output decreased with elevated creatinine levels. Thereby, selective plasma apheresis and ultrafiltration procedure was commenced. The improvement in RVF signs and echocardiographic measurements on the 1st, 3rd and 5th day of application is summarized on Table. By the clinical symptoms such as dyspnea, vomiting and gastric discomfort reduced completely on the 7th day of SPA and ultrafiltration. The patient was discharged at the 20th day of admission with appropriate medication.

Discussion: Patients presenting RVF following LVAD implantation still suffer a high postoperative morbidity and mortality rates. Cardiac index (CI) values less than 2,2 L/min/m^2, central venous pressure (CVP) of 18-22 mmHg, the need for postoperative inotropic support for more than 14 days and inhaled nitric oxide for more than 48 hours, right sided circulatory support such as RVAD and absence of other causes explaining circulatory failure are the basic evidences of right ventricular failure in patients with LVAD. High CVP/PCWP ratio, low right ventricular stroke work and high PVR are the additional hemodynamic signs for RVF after LVAD implantation.

Matthews, Fitzpatrick and Drakos described preoperative risk scores for post-LVAD RVF, including the clinical and hemodynamic factors such as vasopressor and IABP use, cardiac index, PVR, right ventricular stroke work index (RVSWI) and the levels of creatinine, bilirubin and transaminases. Currently available treatment alternatives improve the hemodynamics of RVF by reducing RV overload and improving the RV contractility. Although the neurohumoral etiology of post-LVAD RVF is unclear, some reports revealed the importance of neurohumoral mechanisms in post-LVAD RVF and suggested the question of if the neurohumoral component of RVF should be treated. Specialists are still studying on to come up with a new choice for management of RVF after LVAD implantation which should be an alternative treatment to conventional approaches such as inotropic support, pulmonary vasodilators and assist devices. Last studies showed the advantages of selective plasmapheresis in patients with dilated cardiomyopathy by the elimination of cardio-depressant autoantibodies result in significant improvement in mortality rates. We have seen the beneficial effects of SPA associated with ultrafiltration in a

Table 1. Findings at baseline and following selective plasma apheresis

	Baseline	1st day	3rd day	5th day
AST/ALT/LDH	5069 / 1050 / 12852	4213 / 751 / 11509	1711 / 243 / 9567	208 / 21 / 2033
Creatinin (mg/dL)	1.84	1.52	1.22	0.84
Urine output (mL/day)	1700	2000	2500	3200
Ultrafiltration (mL/day)	–	1000	1000	1000
CVP (mmHg)	16	14	11	6
Mean PAP (mmHg)	45	45	40	35
PCWP (mmHg)	21	20	17	14
RVP (S/D) (mmHg)	38/13	35/14	30/10	26/8
LVAD pump flow (L/min)	3.1	3.5	4.2	5.2

LVAD recipient with delayed RVF and believe that this treatment will be a supportive treatment option following LVAD and heart transplantation.

Abstract No: CR-008

Bridge to transplantation-a case of left ventricular assist device (LVAD) implantation in end stage heart failure

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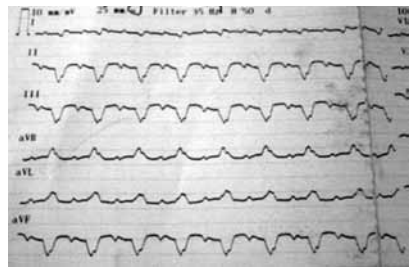
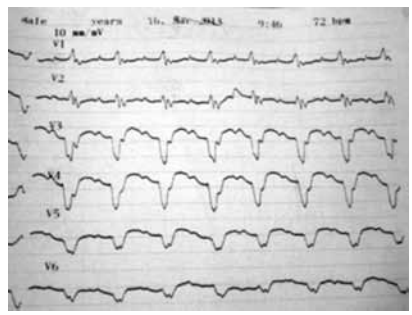
Case Report: A 42-year-old male patient was admitted to the emergency room (E.R) with dyspnea, weakness, fatigue complaints. After a first physical examination in E.R. the patient was accepted to the Cardiology Intensive Care Unit (ICU) with a diagnosis of acute decompensated heart failure. Previous medical history consisted of two myocardial infarctions in 2010 and 2013. The coronary angiogram done in another hospital showed 100% stenosis in left anterior descending coronary artery (LAD) and 80% in circumflex coronary artery (Cx). The left ventricular ejection fraction (LVEF) was found 20% in ventriculography. He had been implanted ICD and discharged with an advice of CABG surgery.

The ECG showed negative P waves in DII-DIII-aVF derivations which is consistent with "down atrial rhythm". It also showed 1st degree AV block and "Masquerading Bundle Branch Block" which is defined as right bundle branch block (RBBB) in precordial derivations and left bundle branch block (LBBB) in extremity derivations.

On echocardiography, LVEF was found to be 18% with modified Simpson method, severe mitral regurgitation and moderate-severe tricuspid regurgitation and SPAP was found 70 mmHg. Right ventricular (RV) systolic functions were depressed as TAPSE was 12 mm and RV-Sm was 8 cm/s. In the left ventricle apex an hyperechogenicity consistent with a mobile thrombus was seen. Parenteral loop diuretics were administered as soon as decompensation findings were seen on physical examination. The β-blockade therapy the patient has been taking was continued with half the dose reduction. As the patient hadn't had symptomatic relief under strict fluid restriction and parenteral diuretics, parenteral levosimendan infusion had been started without discontinuation of β-blocker therapy. Although a small relief of symptoms were seen, in the fourth day of clinical follow-up patient's blood pressure started to decrease and a dual inotropic therapy with dopamine and dobutamine was needed. The patient was evaluated for revascularization and as there wasn't angina and the LVEF was low, a myocardial viability testing found to be appropriate. In spite of the fact that the patient had LV apical thrombus and acute decompensated heart failure which are strict contraindications for viability test, no test were done for viability with a result of the patient's being inappropriate for revascularization. The patient was also evaluated for cardiac resynchronization therapy (CRT) but because of NYHA IV functional class nonambulatory and severe orthopnea, CRT implantation wasn't possible either. The patient was found to be appropriate for left ventricular asist device (LVAD) implantation with properties of LVEF <25%, RV systolic dysfunction, inothropy dependence and three recurrent hospitalization in last one year period. In further investigation the patient hadn't had any contraindications for heart transplantation, so with a classification of INTERMACS class-II he was found suitable for LVAD implantation as a "bridge to transplantation''. The patient transferred to the Cardiovascular Surgery Intensive Care Unit (CVS-ICU) after right heart catheterization in which 50 mmHg of mean pulmonary arterial pressure (PAP) and 12 mmHg of trans-pulmonary gradient (TPG) was found. Early after acceptation to the CVS-ICU, he had acute pulmonary edema and was found to be in INTERMACS class-I ("crash and burn'') and he had been administered an intra aortic balloon pump (IABP) for bridging to LVAD therapy. As the hemodynamic stabilization was obtained and pulmonary edema regression was found after IABP and he had "Heart Ware" LVAD implantation for bridge to transplantation. No complications were seen after surgery. After cardiac rehabilitation and device education he had been discharged from the hospital to be followed in the heart transplantation list.



ECG-1



ECG-2

Table 1. Echocardiography

LVedd - 6.5 cm	TAPSE - 12 mm
LVesd- 6.2 cm	RV Sm - 8 cm/s
LVEF 18% (modified Simpson method)	Right ventricular (RV) systolic functions were depressed
Severe mitral regurgitation	Moderate-severe tricuspit regurgitation
Left ventricul apex an hyperechogenicity consistent with a mobile thrombus was seen (1*0.9 cm)	sPAP - 70 mmHg

Abstract No: CR-009

Successful ECMO application after CABG and AVR in a young case with familial hypercholesterolemia

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Background: Intervention options to complications increase in parallel to increasing experience and satisfactory results after increasing open heart surgical operations. One of the most common complications is postoperative low output syndrome and cardiogenic shock. In this situation, ventricular assist devices became significant alternatives as hemodynamic supporters and in terms of reversal of myocardial damage. One of these ventricular assist systems is ECMO.

Case: We aimed to present our successful ECMO application. A 20-year-old male patient with familial hypercholesterolemia was operated on due to coronary artery disease and aortic insufficiency. Three-vessel coronary bypass and aortic valve replacement with root enlargement were performed. But, he developed combined left and right cardiac failure in 4th postoperative hour. He again was operated with cardiopulmonary bypass by checking graft patency and aortic valve functions with transesophageal echocardiography. Intra-aortic balloon pump catheter was inserted. After being unable to wean from CPB we have decided to establish ECMO. A total of 14 days of AV ECMO was applied. At the end of 14th day all inotropic drugs were stopped and he was weaned from ECMO and IABP support.

Abstract No: CR-010

Leukocytoclastic vasculitis during continuous and pulsatile mechanical circulatory support

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Background: Unexpected rare dermatological pathologies remain a major challenge for transplant surgeons. We describe two Turkish women with MCS-induced leukocytoclastic vasculitis with similar cutaneous manifestations during left ventricular assist device (LVAD) and total artificial heart (TAH) support.

Case 1– 43-year-old woman presented to hospital with progressive shortness of breath with a long-standing history of postpartum cardiomyopathy. She had undergone ICD implantation in 2010 and had developed temporary blindness and TIA in 2011. Her height was 168 cm and weight 63 kg with BSA of 1.71. Her blood group was 0 Rh (+). Echocardiography showed LVEF of 20%, systolic pulmonary artery pressure of 45 mmHg associated with 3rd degree mitral and tricuspid regurgitation, and minimal aortic regurgitation. Right heart catheterization demonstrated PA 30/15/20 mmHg; RV 30/0/7 mmHg, PCWP 13 mmHg, RA 7 mmHg, mixed venous oxygen saturation 54%, and cardiac output of 2.69 L/min, trans-pulmonary gradient 7 mmHg, and PVR 2.5 Wood U. She was treated with angiotensin converting enzyme inhibitors (ACEi), beta-blockers and diuretics. At planned surgery, she underwent HeartMate II LVAD (Thoratec, Inc, Pleasanton, CA) placement as a bridge to heart transplantation. Following surgery she had prescriptions of warfarin, aspirin, carvedilol, and furosemide. On postoperative 18th day, she developed cutaneous lesions, which were reddish to violet and 4-6 mm in size were localized in both distal upper and lower extremities. The skin lesions spread to the rest of body apart from the face and neck within few days. Furthermore, the serum creatinine rose to a maximum of 2.86 mg/dL. However no dialysis was needed. Skin biopsy disclosed leukocytoclastic vasculitis and steroid therapy was commenced. The renal function recovered to the preoperative value (1.23 mg/dL) 2 weeks after steroid treatment.

Case 2– A 36-year-old woman was admitted to our institution on September 10, 2012, with decompensated valvular cardiomyopathy presented as increasing shortness of breath and abdominal distension. She had undergone AVR with St. Jude mechanical valve (size, 21 mm) for severe aortic insufficiency 18 months previously. On admission, transthoracic echocardiography showed left ventricular ejection fraction (LVEF) of 17%, mean pulmonary artery pressure of 35 mmHg associated with 3rd degree mitral and tricuspid regurgitation. A chest roentgenogram revealed significant cardiomegaly. Right heart catheterization demonstrated CVP: 24; PA 32/13/20 mmHg; RV 32/0/4 mmHg, PCWP 12 mmHg, RA 4 mmHg, mixed venous oxygen saturation 55%, and cardiac output of 2.15 L/min, trans-pulmonary gradient of 8 mmHg, and PVR 3.72 Wood U. Venoarterial (VA) extracorporeal membrane oxygenation (ECMO) was instituted. Two days later she underwent total artificial heart implantation. On postoperative 32th day, she also developed cutaneous lesions, similar to the first presented case localized in both distal upper and lower extremities that responded to 20 days course of steroid therapy.

Conclusion: Mechanical assist devices may cause systemic adverse events including immunological and inflammatory responses after implantation, which may manifest as leukocytoclastic vasculitis.

Abstract No: CR-011

Multiple peripheral pulmonary artery stenoses: as a rare cause of pulmonary hypertension

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Background: Peripheral pulmonary artery stenosis is defined as an obstruction of the pulmonary artery from the pulmonary trunk to the peripheral artery and it was firstly reported by Oppenheimer in 1938. This disorder is usually detected in early childhood and is often associated with other congenital heart disease or congenital syndromes. We present a 22-year-old male patient who had a history of the supravalvular aortic stenosis operation with pulmonary hypertension due to multiple peripheral pulmonary artery stenoses.

Case: A 22-year-old male patient who had a history of the supravalvular aortic stenosis operation in childhood referred to our department with the diagnosis of pulmonary hypertension for further evaluation. Transthoracic echocardiography showed right ventricular dilatation, moderate tricuspid regurgitation and systolic arterial pressure of 70 mmHg. Right heart catheterization revealed a mean pulmonary artery pressure of 50 mmHg. Magnetic resonance angiography imaging showed bilateral multiple severe stenoses of the peripheral pulmonary artery (Figure 1a and b). We diagnosed pulmonary hypertension due to multiple peripheral pulmonary artery branch stenosis. This case was thought to be congenital, considering his history of previous supravalvular aortic stenosis operation. Medical management with bosentan, spironolactone and heart-lung transplantation was planned.

Discussion: Peripheral pulmonary artery stenosis has been a disease with limited treatment options. In contrast to our case, most congenital pulmonary artery stenoses are located in the main or proximal segmental pulmonary artery branches, and therefore surgery or balloon angioplasty treatment can be chosen. In patients with advanced pulmonary hypertension, lung transplantation has been reported. Peripheral pulmonary artery

stenosis should be included as differential diagnosis in cases with unexplained pulmonary hypertension. Peripheral pulmonary artery stenosis is poorly understood and it requires further investigations for better therapeutic management options to be developed.

Figure 1. (a, b) Bilateral multiple severe stenoses of the peripheral pulmonary artery (arrows).

Key words: Peripheral pulmonary artery stenosis; pulmonary hypertension; supravalvular aortic stenosis.

Abstract No: CR-012

Superior vena cava reconstruction with using donor renal vein in a case of combined heart-kidney transplantation

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Background: Heart transplantation (HTX) is a widely accepted therapy for most patients under 65 years of age with advanced heart failure who remain symptomatic with the expectation of high intermediate term mortality, despite optimal heart failure medications. After the first successful simultaneous heart-kidney transplantation (HKTx) was reported in 1978, it became clear that renal dysfunction is not an absolute contraindication to HTX. We present herein the case of a 25-year-old man who underwent combined HKTx grafted from the same donor. In addition he had benign, asymptomatic superior vena cava thrombosis that was treated with open surgical bypass using donor renal vein during HKTx.

Case: Twenty-five-year-old male had dilated cardiomyopathy with chronic renal failure for four years. He was admitted for concomitant renal and heart transplantation. Then the recipient was heparinized while venous cannulation it was found that superior vena cava (SVC) was thrombosed. Venous cannulation performed by using vena cava inferior for lower and innominate vein. Orthotopic HTx was carried out first, according to the standard technique described by Lower and Shumway. Before decannulation the patient underwent a bypass from the bifurcation of brachiocephalic veins to the right atrium with use of a 10 cm part of donor renal vein. Kidney transplantation (KTx) was then performed in a standard manner in the same operation session. Computerized tomography that performed at the firth month of transplantation showed that the reconstructed superior vena cava was patent.

Discussion: Norman et al. described the first combined simultaneous heart and kidney transplant. There are no standardized guidelines to establish the indications, contraindications and surgical sequence for HKTx. It is known as the use of a single donor provides several theoretical advantages over sequential transplantation of two organs from different donors: a single exposure, to alloantigens, a single surgical procedure and a single induction immunosuppressive treatment. These advantages should be balanced against a potential increased mortality and morbidity of combined procedure. Malignancy is the most common cause of the SVC syndrome in accounts for more than 78% of the cases, and bronchogenic carcinoma is the most malignancy Nonmalignant causes of SVC include granulomatous infections secondary to tuberculosis, actinomycosis, aspergillosis, blastomycosis, nocardiasis, goiter, aortic aneurysms and sarcoidosis. The incidence of SVC obstruction arising from benign etiologies is increasing. It is now more commonly associated with central venous devices that create a nidus for SVC thrombosis. Surgical intervention of SVC syndrome includes stent placement of a bypass graft between the left innominate or jugular vein and the right atrial appendage using a autologous or Dacron graft. Extraanatomic subcutaneous bypass between the jugular vein and the femoral vein with a composite saphenous vein graft or polytetrafluoranethylene graft is an alternative if symptoms are severe and the endovascular techniques fail or not possible. The great saphenous vein is not usually suitable for direct reconstruction because of poor size match. The femoral vein or the femoropopliteal vein is a good conduit to reconstruct the SVC. It has been used with success because of its excellent suitability in terms of size and length. An spiral saphenous vein graft is autologous tissue with low thrombogenics. Although its length is limited by the available saphenous vein segment, its diameter can easily be matched to the internal jugular vein or innominate vein. Externally supported extended polytetrafluorethylene graft is used for large vein reconstruction; short large diameter (10 to 14 mm) grafts have excellent long-term patency. A fresh iliocaval allograft can be considered in rare cases when immunosuppressive treatment is otherwise indicated for prediction of a transplanted organ. Homograft, cryopreserved femoral vein and aortic arch grafts are other alternatives that have been used with success, as are grafts prepared from autogenous or bovine pericardium.

Conclusion: In our patient we used a 10 cm part of donor renal vein cause of its excellent size match and immunosuppressive treatment will require due to transplantation. He is asymptomatic at one-year follow-up. Computerized tomography which performed at second month of transplantation showed the patency of the bypass vein graft. It is the only one case in English literature; concomitant heart and kidney transplantation with a SVC syndrome that treated surgically by using a donor renal vein.

Abstract No: CR-013

Tolvaptan use in a patient with advanced heart failure and hypervolemic hyponatremia

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Background: Tolvaptan (an aquaretic, vasopressin 2 receptor antagonist) is recently approved for use in Turkey. It was approved for hypervolemic hyponatremia of heart failure (HF).

Case: In September 2013 we hospitalized an advanced, class 4, 46-year-old male with advanced heart failure. He was diagnosed as IDCMP in 2006. He had an LVEF of 28%. A CRT implanted two years ago didn't improve his functional capacity. This was his fourth HF hospitalization in the last year. He was overtly hypervolemic and had clinical signs and symptoms of biventricular HF. His initial weight on admission was 118 kg, he had normal renal function, elevated transaminases (deemed to be related with HF), serum sodium of 126 mEq/L. Increasing doses of IV loop diuretic infusions, combined diuretics, inotropes were not clinically effective. He could not loose any weight and symptomatic status did not improve and his sodium level decreased to 118 mEq/L. Then we introduced Tolvaptan 15 mg once daily (Samsca, OSAKA-Abdi İbrahim, Turkey) to his medications. He dramatically improved. Over days to weeks his urine output increased, he lost 14 kg, his serum sodium increased to 135 mEq/L. His transaminases were normalized. He was evaluated as NYHA IIII. His stabilization process took 45 days. We discussed progressively worsening course of his disease with the patient and began evaluating him as a heart transplant/LVAD candidate. A peak VO_2 test performed after his stabilization revealed 14 ml/kg/min (46% of predicted age normal). RHC numbers are in the gray zone so we are planning to proceed with an LVAD as a bridge to transplant.

Conclusion: Vasopressin-2 receptor antagonist, Tolvaptan may be efficient in patients with refractory heart failure and hypervolemic hyponatremia.

Abstract No: CR-014

An innovative technique for post-LVAD right ventricular failure from the multidisciplinary team of Houston Methodist Hospital

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Background: In the patients with heart failure, for whom interventional surgery and medical treatment is not sufficient, heart transplantation provides the greatest survival benefit. Approximately 3-4 million people have heart failure and amount of 1-1.5 million of these patients have advanced heart failure in TURKEY (Happy Study). However, only a small group of patients can have chance for heart transplantation due to limited number of donors as in USA. About 3.000 people in USA are on the waiting list for heart transplantation on any given day but about 2.000 donor hearts are available each year (USA National Heart Lung and Blood Institute).

Consequently, implantable mechanical circulatory devices are a relevant option to improve survival in this population. The device can serve for these four strategies based on the expected outcome; a) Bridge to Transplant: Patient is on the transplant list, b) Bridge to Candidacy: The decision is unclear whether the patient has contraindication to transplant c) Destination Therapy: Patient has contraindication to transplant and would not survive without MSC. d) Bridge to Recovery: Patient needs temporary support.

Houston Methodist Hospital is one of the leader centers for MCSs implantation. In 2011, 60 VADs have been implanted. The center has a successful multidisciplinary team, working together including Division of Pulmonary, Cardiology and Cardiovascular Surgery. The center spearheaded many innovations. As it is known, right ventricular dysfunction after left ventricular assist device is a common complication associated with increased morbidity and mortality. During 2 months observer period at this center I was influenced by an easy and safe method during LVAD implantation for RV failure.

Technique: In brief, to decrease incidence of right ventricular failure the left ventricle is supported by the LVAD and the right ventricle is supported by the cardiopulmonary bypass. The purpose of this setting is to eliminate the risk of unexpected cessation of CPB support between the time of removal of the aortic cannula until CBP thorough pulmonary artery has been resumed, by using a Y connector between arterial line and suction line.

Conclusion: Transplant and ventricular assist device exposure should be available for all students who wish to become a transplant surgeon in Turkey.

Abstract No: CR-015

Double ECMO: case report

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Background: Extracorporeal Membrane Oxygenation (ECMO) allows patient some time for cardiopulmonary recovery by supporting the respiratory and/or circulatory functions in the case of cardiopulmonary failure. In adults, while the post-cardiotomy syndrome at open heart surgery is the most common indication, the application at resistant cardiopulmonary failure after cardiopulmonary resuscitation becomes increasingly common. In this report, we aim to share our experience in ECMO applications of a patient who had cardiopulmonary arrest twice at different period of times during postoperative follow-up in our clinic.

Case: Coronary artery bypass grafting (CABG x 4) was performed to a 57-year-old male coronary artery patient with a history of chronic obstructive pulmonary disease and type-2 diabetes. He was extubated at the postoperative fourth hour. From the first postoperative day respiratory physiotherapy was applied frequently to this patient who was followed in the intensive care unit (ICU) without any neurological or hemodynamic problems. On the postoperative third day the patient was intubated and resuscitated after the first development of respiratory arrest. Because of the insufficient oxygen saturation under the mechanical ventilation, the first veno-arterial ECMO support was performed in an emergency situation from femoral artery and vein. The mechanical ventilation ended at the second day of ECMO support (postoperative day 5) of the patient whose hemodynamic and blood gas values improved. The ECMO support of this patient whose left ventricular ejection fraction was measured 50-55% with echocardiography was terminated on the forth day (postoperative day 7). This patient whose hospitalization was prolonged due to the sternal wound infection nearby the need of respiratory physiotherapy was discharged from ICU on the postoperative 17th day. The patient who was followed at the service with stable

hemodynamic and laboratory parameters was intubated by being taken back to ICU with the reasons of acute dyspnea, tachypnea and generally worsening on the postoperative 27th day. The second cardiopulmonary arrest developed on the postoperative 28th day while the mechanical ventilation support was on. Cardiopulmonary resuscitation was performed but the respond of this patient was not enough. The second venoarterial ECMO application was performed in an emergency situation via femoral artery and vein because of the cardiopulmonary insufficiency, which was resistant to inotrope and mechanical ventilation. The inotrope treatment was terminated on the second day and the mechanical ventilation was terminated on the third day of the ECMO support. This ECMO support was completed on the 10th day (postoperative day 38). The patient whose main cause of staying at hospital was sternal and femoral incision wound care was taken out of ICU on the postoperative forty-eighth day. The postoperative follow-up of this patient is over seventy day. The wound care of this patient whose general situation is fine and respiratory and cardiac functions are normal is done.

Conclusion: Veno-arterial ECMO could be life saving after postoperative cardiorespiratory arrest.

Abstract No: CR-016

ECMO use in the treatment of peripartum cardiomyopathy associated with acute heart failure

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Background: Peripartum cardiomyopathy (CMP) is seen in the last month of pregnancy or the first 5 months after pregnancy. This clinic condition is giving rise to later cardiovascular insufficiency and serious complications, Peripartum CMP may heal spontaneously or clinical condition deteriorates very quickly and progress to heart failure. We aim to present our ECMO application in a patient who diagnosed peripartum CMP.

Case: A 28-year-old pregnant patient followed with the diagnosis of hypertension, preeclampsia and epilepsy was received emergency caesarean section at 40th week of pregnancy. She had been admitted to ICU because of dyspnea, tachypnea, tachycardia. On postoperative day-2, she was intubated and connected to mechanical ventilation support because of further increase in respiratory distress. Postoperative echocardiography showed left ventricular ejection fraction of 20%, moderate mitral insufficiency which was compatible with peripartum CMP. She was transferred to our cardiology department on postoperative 3th day. Despite 24 hours in the cardiology clinic with medical treatment and empiric antibiotics for pneumonia, clinical condition deteriorated. Under mechanical ventilation, lung function and oxygenation were poor (FiO_2 100% saturation 80-85%; pCO_2 40-45 mmHg, pO_2 40-55 mmHg) and hemodynamic was unstable so that she was referred to our cardiovascular clinic for ECMO support. Patient was evaluated and the right femoral veno-arterial (VA-ECMO) Maquet PLS extracorporeal life support system (MAQUET AG, Rastatt, Germany) was implanted surgically in the operating theatre. Femoral arterial cannulation was performed with an 8 mm Dacron graft. She was transferred to ICU with dobutamin (20 mcg/kg/min) and norepinephrine (0.2 mcg/kg/min). After about 3 hours of ECMO implantation, hemodynamic stability acquired and blood gas parameters were improved, she was extubated. Heparin was administered with an interval of 6 hours to keep ACT about 180-200 sec. Two days after ECMO implantation, bleeding was started from cannula entrance, the right femoral artery and vein was explored in ICU. In same day, ECMO system was replaced with a new one because of thrombus formation in oxygenator and inadequate oxygenation. Heparin infusion (1000 Unite/hour) was started. ECHO and chest X-ray were performed daily. The ECMO support was terminated at 6th day. She was transferred from ICU at 8th postoperative day. Service course was uneventful. She was discharged at 13th postoperative day.

Conclusion: ECMO use has been expanded in the recent years. Early mortality rate of peripartum CMP is 25-50%. With sufficient clinical experience ECMO can be life saving when applied at the right time in patients with peripartum CMP and has a positive effect on long-term survival.

Abstract No: CR-017

Possible complication of ECMO intervention: iliac vein injury

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Background: We present our experience of the approach to iliac vein injury that is one of the possible complications during percutaneous intervention of extracorporeal membrane oxygenation (ECMO) due to postcardiotomy cardiogenic shock.

Case: A 73-year-old female patient who was performed percutaneous closure of ASD four years ago was operated upon mitral insufficiency in our clinic. Mitral valve replacement (MVR), surgical repair of ASD, tricuspid valve repair with an annuloplasty ring and radio frequency ablation (RFA) were performed by transseptal approach. We are unable to come off cardiopulmonary bypass (CPB) despite maximum inotropic support and established veno-arterial ECMO treatment intra-operatively. Arterial cannulation was performed from right femoral artery by using 8 mm Dacron graft; whereas, venous cannulation from left femoral vein was positioned percutaneously. However, an urgent paramedian laparatomy was performed on non-palpable venous cannula with sudden hypotension and hemodynamic instability. Venous cannula was seen adjacent to IVC in the abdomen by rupturing the left iliac vein. Venous cannula was removed and placed in right atrium. Iliac vein was repaired primarily. The patient was transferred to ICU under the support of ECMO; afterwards, it removed at postoperative day 7. The hospitalization was prolonged due to lung and wound infections and the patient discharged on the day 64.

Conclusion: ECMO after cardiac surgery can be a life-saving treatment. Peripheral approach should be considered in patients with suitable anatomy that is easier to process cannulation and de-cannulation. Vascular complications can be seen during the peripheral cannulation. We believe that mortality and morbidity will significantly decrease with enough experience and timely intervention in ECMO-related complications.

Abstract No: CR-018

Management of heparin induced thrombocytopenia during ECMO applications

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Background: Choosing biological valve prosthesis in the young patient population causes early degeneration and needs early redo surgery. Perioperative mortality rate is high if patient has NYHA class III-IV and urgent redo surgery is performed. Sometimes these patients also need intravascular devices (such as; Extracorporeal Membrane Oxygenation (ECMO), Intra-aortic balloon pump (IABP), Ventricular assist device (VAD) before or after the surgery. In the current study, we report the successful treatment of biological mitral valve dysfunction complicated with severe right side failure, severe pulmonary hypertension, bilateral bronchopneumonia and heparin induced thrombocytopenia due to heparin usage under ECMO support.

Case: A 22-year-old female patient was admitted to our center with severe mitral valve dysfunction and a history of Freestyle biological aortic valve (Sorin Freedom Solo Aortic valve, size: 21), stented biological mitral valve (SorinPericarbon More mitral valve, size: 27) implantation and ring annuloplasty for tricuspid valve operation six years ago at secondary care center. Mitral valve dysfunction was diagnosed by following cardiologist. She refused the reoperation. On admission, she was hemodynamicaly unstable because advanced right heart failure with ascites, pleural effusion, and bilateral leg edema and severe pulmonary artery hypertension secondary to biological mitral valve dysfunction and bilateral severe broncho-pneumonia were present. Preoperative echocardiography showed left ventricular ejection fraction of 50%, severe mitral stenosis (mitral valve area: 0.8 cm^2), severe mitral and tricuspid insufficiency, sPAP of 100 mmHg, and enlargement of right side chambers Emergent operation was performed. Mitral valve replacement (25 mm St. Jude) performed via right anterolateral thoracotomy. The first postoperative day in the ICU was uneventful and she was extubated. But after 18 hours, pulmonary artery pressure was elevated, lung function and oxygenation were poor (pCO_2 50-60 mmHg, pO_2 60-65 mmHg), so that she was re-intubated. Mechanical ventilation was not sufficient, left ventricle function deteriorated in spite of inotropic support, the femoral veno-arterial (VA-ECMO) Maquet PLS extracorporeal life support system (MAQUET AG, Rastatt, Germany) was implanted surgically in the ICU at 3rd postoperative day. Thrombocytopenia was observed at the 5th postoperative day. The partial thrombus formation was occurred venous and arterial sides of ECMO oxygenator. We evaluated the situation as a Heparin induced thrombocytopenia, but we did not confirmed with lab test. Heparin stopped and fondaparinux (Arixtra®) was administered 2.5 mg by subcutaneous injection once daily. ECMO system was replaced with a new one at 8th postoperative day because of inadequate oxygenation. Under the treatment of fondaparinux, thrombus formation was not observed at renewed ECMO system. Following discontinuation of heparin therapy, platelet counts increased gradually. The ECMO support was terminated at 10th postoperative day. She was discharged at 28th postoperative day.

Conclusion: The benefits of ECMO cannot be underestimated in this patient. But besides these advantages HIT, which is a rare condition, arises as an extra disease for this patient. As a result of whole approaches, the patient was discharged with success. Despite many reports of successful treatment of HIT with fondaparinux further research and large scale prospective studies are necessary to guide the use of fondaparinux in the management of HIT.

Abstract No: CR-019

Total artificial heart implantation in a female patient with biventricular heart failure and borderline chest size

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Backgroud: SynCardia Total artificial heart (TAH) implantation could be difficult or impossible in patients with relatively small chest. TAH displaces a space of about 400 ml within the thoracic cavity and the weight of both ventricles is about 160 grams.

Case: A 36-year-old woman was admitted to our institution on September 10, 2012, with decompensated valvular cardiomyopathy presented as increasing shortness of breath and abdominal distension. She had undergone AVR with St. Jude mechanical valve (size, 21 mm) for severe aortic insufficiency On March 2011. On admission, transthoracic echocardiography showed left ventricular ejection fraction (LVEF) of 17%, mean pulmonary artery pressure of 35 mmHg associated with 3rd degree mitral and tricuspid regurgitation. A chest roentgenogram revealed significant cardiomegaly. Right heart catheterization demonstrated CVP: 24; PA 32/13/20 mmHg; RV 32/0/4 mmHg, PCWP 18 mmHg, mixed venous oxygen saturation 55%, and cardiac output of 2.15 L/min, trans-pulmonary gradient of 8 mmHg, and PVR 3.72 Wood U, RV stroke volume: 22 mL, RVFAC: 20%, RVSWI: 254 mmHg * mL/m^2, TAPSE 1.4 cm. Blood biochemistry showed; ALT 3893 u/L, AST 5195 u/L, Total bilirubin 4.53 mg/dL, Direct bilirubin 1.49 mg/dL, INR: 10.72, D-dimer 2685 ng/ml. Along with hemodynamic monitorization, we commenced 5 microgram/kg/min Dopamine and Dobutamine, 5 mg/hr furosemide infusion. Further deterioration of her clinical status required venoarterial extracorporeal membrane oxygenation (VA-ECMO). Upon these results patient was announced as urgent heart transplant candidate. Two days later, she underwent TAH implantation with the diagnosis of biventricular failure and existence of a mechanical valve in the aortic position.

On thorax CT the distance between mid corpus T_{10} vertebrae and the tip of sternum was measured as 123 mm, also the distance between T_{10} vertebrae to the closest point of xiphoid process was measured as 119 mm. Chest was kept opened for five days following the procedure to allow the dissolution of edema. During the closure of the sternum, we experienced an unacceptable level of blockage on the inflow provided by the TAH, due to inadequate space inside the thoracic cavity.

Technique: We have performed an ad hoc remodeling of the sternum by incising xiphoid process and sternal body from the level of 5th facet of the costal cartilage. Resorbable fleece composed equine collagen containing Gentamicin (septocoll) was applied for local prophylaxis against any bacterial infections. Her recovery was uneventful without any wound problems. Currently the patient is awaiting a donor heart at home and managing routine all daily activities.

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Tacrolimus related posterior reversible encephalopathy syndrome after heart transplantation

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Background: The clinical picture of posterior reversible encephalopathy syndrome (PRES) is characterized by acute or subacute encephalopathy with headache, vomiting, focal neurological deficits, altered mental status, visual impairment and seizures. Seizures may begin focally, but usually become generalized. PRES is a clinicoradiological entity and has characteristic magnetic resonance imaging (MRI) findings.

Methods: Seventeen-year-old boy was on cyclosporine (CsA) therapy after heart transplantation. Since renal function tests elevated, treatment was switched from CsA to tacrolimus (TAC). On fourth day of TAC treatment, he had generalized tonic-clonic seizures. TAC trough level was above 30 ng/mL, other blood test results were normal. Cranial CT findings were normal, however MRI was compatible with PRES.

Results: It was thought to be due to TAC therapy; the dosage reduced, which improved the clinical situation of the patient.

Conclusion: Because prompt recognition of PRES can have major prognostic implications for patients, it is very important for intensivists and for all physicians working in critical care areas to be aware of this entity and to suspect it even before any radiological imaging is available. Herein, we have reported successful treatment of a heart transplant recipient with PRES by reducing tacrolimus dosage.

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