Recipient: donor height ratio matching can predict early mortality better than weight ratio matching in the U.S. pediatric DCM cohort.

Donor to Recipient Age Difference in Weight-Matched Pediatric Heart Transplants Predicts Mortality

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Purpose: Donors are matched on weight for pediatric heart transplant (PHT), however, age differences are not considered in this decision. This study attempts to identify age differences in weight matched PHT and its effect on post-transplant survival.

Methods: United Network of Organ Sharing (UNOS) database from October 1987 - March 2014 was queried for all PHT. Transplants with donor-to-recipient weight ratio of 0.8-1.5 were identified (weight matched). Donor to recipient age differences were categorized into, donors 5 yr younger, donors 5 yr older than recipients.

Results: A total of 4408 PHT were identified as weight matched transplants. Donor to recipient age difference was present in 70% (3067) of the cohort, with median age difference of 1 yr [-13 - 45]. Transplants with donors 5 yr older than recipients are associated with decreased post-transplant survival compared to donors within 5yr of recipient age (p=0.002). [Figure] Increasing age difference by each year was associated with decreasing median post-transplant survival time [p<0.001; 1.018 (1.008-1.025)]. In a multivariate cox-regression model increasing donor to recipient age difference was associated with mortality [p<0.001; 1.015 (1.008-1.023)], regardless of all known predictors of PHT mortality.

Conclusion: In PHT, an increasing donor to recipient age difference decreases survival. Careful consideration must be given when selecting a donor older than the recipient, especially when the difference exceeds 5 years.

The Impact of Ischemic Time on Early Rejection After Pediatric Heart Transplant

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Purpose: Prolonged graft ischemia is thought to be a risk factor for early rejection post-heart transplant (HTx), but this phenomenon has not been well studied in a pediatric population. Furthermore, factors that may moderate the association between ischemic time (IT) and early rejection have not been investigated.

Methods: From 2004-2012, pediatric HTx recipients (n=2381) were identified from the United Network for Organ Sharing database. A receiver operating characteristic curve determined the optimal IT discriminating patients by the presence of early rejection. Separate univariate analyses were performed to determine characteristics associated with 1) early rejection and 2) IT. A multivariable logistic regression assessed independent risk factors for early rejection. We specifically included interaction terms that evaluated whether IT’s independent effect on the risk of early rejection is moderated (either enhanced or diminished) via interaction with its associated factors found on univariate analysis.

Results: An IT of 3.1 hours optimally discriminated patients with and without early rejection. Factors associated with early rejection in univariate analysis were age > 1 year (p<.0001), Caucasian race (p=.1), congenital heart disease (p=.04), status 2 at HTx (p=.003), ventricular assist device (VAD) support at HTx (p=.01), PRA level >10% (p<.0001) and IT >3.1 hours (p=.001). Factors associated with prolonged IT were recipient age <2 years (p=.02), congenital heart disease (p<.0001), VAD (p=.08), dialysis (p=.001), PRA >10% (p=.004), donor age <1 year (p=.01). In the multivariable analysis, IT >3.1 hours was an independent risk factor for early rejection (adjusted odds ratio 1.44, 95% confidence interval 1.10-1.88; p=.01). No interaction term between IT and any of its associated factors was significant i.e. IT’s risk was not moderated by any interaction with other factors. The analysis was replicated using the cohort’s median IT of 3.5 hours and found no notable differences in results.

Conclusion: Duration of IT is an independent risk factor for early rejection in pediatric HTx recipients. No other risk factors for rejection moderate the risk conferred by IT. Further characterization of the mechanism by which increasing IT causes early rejection may identify interventions to mitigate this risk.

High BMI Predicts Poor Outcomes in DCM But Not CHD Patients: The Differential Impact of Obesity on Outcomes in Pediatric Heart Transplantation

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**Purpose:** Body mass index (BMI) is thought to have an important impact on waitlist and post-transplant mortality in children. Our aim was to investigate whether the impact of BMI varies by the etiology of the heart failure.

**Methods:** UNOS has 3,254 listings for primary, isolated heart transplant in patients 3-18 yrs old (1995-2012) with either congenital heart disease (CHD) or dilated cardiomyopathy (DCM). Patients were stratified into 4 groups based on BMI%ile-for-age (BMI%): underweight (BMI% < 5), normal weight (5-84), overweight (85-94), or obese (≥ 95). Waitlist and post-transplant outcomes were assessed.

**Results:** Obesity was more common among DCM patients (18.7% vs. 9.91%) while underweight was more common in CHD patients (20.0% vs. 15.7%, p<0.0001). Waitlist survival was unaffected by BMI% category among CHD patients; underweight (HR 1.3, 1.0-1.6) and obese (1.2, 1.0-1.5) DCM patients HR 1.8 had worse survival and lower transplantation rates (OR0.6, 0.5-0.8). Overweight DCM (1.8, 0.8-4.2) patients and obese CHD (1.9, 0.9-4.0) patients had higher risk-adjusted mortality prior to discharge. Overweight (HR 1.6, 1.2-2.2) and obese (1.2, 0.9-1.7) patients had higher 1-yr conditional mortality, whereas obese CHD patients had lower mortality (0.5, 0.3-1.0). Higher BMI% was a significant predictor of coronary allograft vasculopathy (p=0.02), and diabetes (p=0.0006) in DCM (but not CHD) patients (Figure).

**Conclusion:** The impact of BMI% on waitlist and post-transplant mortality varies by diagnosis. Analyses of weight and nutritional status in heart failure and transplantation need to examine CHD and DCM patients separately. BMI alone is insufficient, and better measures of nutrition, causes of increased BMI (obesity vs fluid retention), and physical conditioning are required to better estimate risk.