**Title: Donor Sizing in Heart Transplantation of Patients with Adult Congenital Heart Disease: An Analysis of United Network for Organ Sharing Registry**

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**Specific Aims:**

1. Evaluate the association between donor weight to recipient weight and all-cause mortality or right heart failure for patients undergoing heart transplantation.
2. Evaluate the association between donor height to recipient height and all-cause mortality or right heart among patients undergoing heart transplantation.
3. Evaluate the association between sex mismatch and all-cause mortality or right heart failure for patients undergoing heart transplantation.

**Background:**

The relationship between elevated pulmonary vascular resistance (PVR) in the recipient and acute right ventricular failure in the donor heart in the non-ACHD population is well established. The accuracy of PVR assessment in the ACHD population remains uncertain.

However, a recent paper by Krishnamurthy, et.al published in JHLT describes an evaluation of the UNOS database that showed that transplant outcomes were no worse in congenital patients with pulmonary hypertension than those patients without[1](#_ENREF_1). This study included 983 ACHD patients who underwent transplantation between 1984-2014. A common explanation for this success, is based on the belief that donors are typically oversized. However, this fact has never been thoroughly analyzed or proven. What has been shown is that undersizing the donor organ demonstrates increased mortality[2](#_ENREF_2).

Hypothesis: We hypothesize that the reason for these equivalent outcomes is not due to oversized donors – donor weight and/or donor height being >20% larger than recipient by height and weight. In addition, we hypothesize that adult congenitals undergoing transplantation are no more likely than non ACHD patinets to have male:female transplants and male:male than it is to have female:male or female:male.

The area of pulmonary hypertension within ACHD/Transplant has been a point of contention and remains a major concern and area of uncertainty. However, we have no large-scale studies to drive management decisions in ACHD patients with elevated PVR being evaluated for cardiac transplantation. An evaluation of the UNOS database regarding sizing and sex of donors may help further reduce the risk of right heart failure.

**Methods:**

*Study Design:* Retrospective cohort study

*Data source:* United Network for Organ Sharing (UNOS) registry

*Patient population:*

Patients with adult congenital heart disease undergoing heart transplantation from January 1st, 2000 to June 30th, 2017.

*Inclusion criteria:*

All adults (age ≥18 years) with congenital heart disease undergoing heart transplantation

*Exclusion criteria:*

1. Age <18 years
2. Prior history of solid organ transplantation

*Primary outcome:*

1. All-cause post-transplant mortality

*Secondary outcome:*

1. Post-transplant short-term outcomes
   1. Stroke (pre-discharge)
   2. Prolonged length of index hospital stay
   3. Post-transplant dialysis (pre-discharge)
2. Post-transplant long-term outcomes
   1. Cardiac allograft vasculopathy
   2. Acute rejections within 1st year
   3. Hospitalizations related to rejection or infection
   4. Renal failure require dialysis or re-transplantation

*Additional data points to include:*

1. *Recipient*
   1. Age, gender, weight, height, body mass index, and history of prior cardiac surgery
   2. Medical history to include - diabetes, drug treated systemic hypertension, drug treated COPD, and cigarette use
   3. Lab values – bun, creatinine, and bilirubin (total)
   4. Hemodynamics – systolic/diastolic and mean pulmonary artery pressure, pulmonary capillary wedge pressure, trans pulmonary gradient, diastolic pressure gradient, and pulmonary vascular resistance.
2. *Donor-* age, gender, weight, height, body mass index

**References:**

1. Krishnamurthy Y, Cooper LB, Lu D, Schroder JN, Daneshmand MA, Rogers JG, Milano CA, Hernandez AF and Patel CB. Trends and outcomes of patients with adult congenital heart disease and pulmonary hypertension listed for orthotopic heart transplantation in the United States. *J Heart Lung Transplant*. 2016;35:619-24.

2. Bergenfeldt H, Stehlik J, Hoglund P, Andersson B and Nilsson J. Donor-recipient size matching and mortality in heart transplantation: Influence of body mass index and gender. *J Heart Lung Transplant*. 2017;36:940-947.