Body Mass Index Impacts Short, Intermediate, and Long-Term Survival in Lung Transplantation

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Purpose: The effects of extremes of weight are poorly understood in the setting of lung transplant (LTX) with challenges in nutrition, rehabilitation, as well as preexisting co-morbidities. We sought to assess the impact of donor and recipient body mass index (BMI) on short (0-90 days), intermediate (91-365 days) and long-term (>365 days) LTX survival.

Methods: The United Network for Organ Sharing data registry was queried for first-time recipients of single or double LTX from a cadaveric donor transplanted between 1987-2013 for recipients age 18-80 years at the time of the transplant and had data on recipient and donor BMI categorized as underweight (15-18.4 kg/m2), normal weight (18.5-29.9 kg/m2), or morbidly obese (35-40 kg/m2). Short- and intermediate survival was assessed using logistic regression of survival 0-90 days, as compared to >90 days post-transplant; and survival to 365 days, as compared to surviving 91-365 days. Multivariate Cox proportional hazards models adjusted for characteristics of the recipient, donor, and transplant.

Results: 22090 LTX recipients met inclusion criteria. Compared to recipients in the normal weight category, underweight recipients had improved short-term survival (OR=1.23, 95% CI=1.07,1.4; p=0.004) and obese recipients worse (OR=0.88, 95% CI=0.78,0.99; p=0.03). Obese recipients were less likely than normal weight recipients to survive 1-yr (OR=0.84; 95% CI=0.75,0.94; p=0.002). Recipients from obese donors were less likely to survive to 1-yr than recipients of lungs from normal weight donors (OR=0.81; 95% CI=0.71,0.91; p<0.001). Long-term conditional survival analyzed found differences in survival by recipient BMI (p<0.001) & donor BMI categories (p=0.048). Proportional hazards models found that obese recipients had increased mortality hazard compared to normal weight recipients (HR=1.15; 95% CI=1.07,1.23; p<0.001). Multivariate Cox model demonstrated elevated mortality in underweight (HR=1.13; 95% CI=1.01,1.26; p=0.03) and obese recipients (HR=1.14; 95% CI=1.04,1.26; p=0.007).

Conclusion: In a population based analysis, BMI heavily influences LTX survival for short, intermediate, & long-term. Underweight recipients may not have the physiologic reserve necessary to obtain optimum results while those with elevated BMI have challenges that may be attributed to their obesity.