Post-Liver Transplant Metabolic Changes After One Year

Adnan Khan, DO; John Bruckbauer, Peter Zhang; Brian A. Yan, BA; Richard S. Kirby, Heather M. Ross, BS; Sarah L. Chen, BA; Natalia Salinas Parra, BS; Michelle Schafer, Lyena Birkenstock, BA
Thomas Jefferson University Hospital at Sidney Kimmel Medical College

Introduction

Elevations in HbA1c and BMI preoperatively and postoperatively are associated with post-transplant complications that impact long-term morbidity and mortality.

The aim of this study is to:

- Evaluate the impact of transplant indications and demographic background on postoperative changes in HbA1c and BMI.
- Understand factors associated with elevations in HbA1c and BMI can help determine at-risk patient groups.

Methods and Materials

We performed an IRB-approved retrospective study. We obtained records of patients who underwent liver transplantation at Thomas Jefferson University Hospital from January 2002 to December 2020. We analyzed changes in BMI/HbA1c at transplant and one year post-transplant by age, race, gender, and indication for transplant using STATA statistical software 14.2.

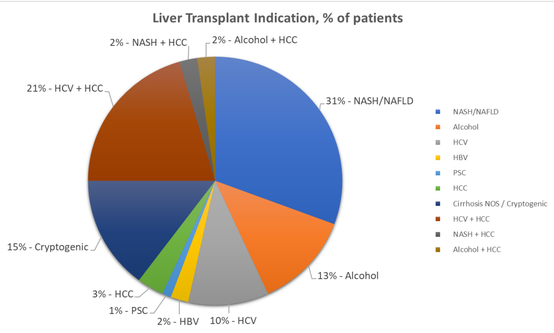

Table 1. Indication for Liver Transplantation (n = 90)

	Total Patients (%)	Mean BMI (95% CI)		p-value
		At Transplant	At 1 year after Transplant	
Overall	90 (100)	31.01 (29.90-32.13)	30.88 (29.59-32.17)	0.16
Indication for Transplant				
NASH/ NAFLD	27 (30.7)	33.08 (31.12-35.03)	32.30 (31.55-33.06)	0.21
Alcohol	11 (12.5)	26.19 (23.22-29.16)	25.96 (24.12-27.80)	0.45
HCV	9 (10.2)	30.81 (27.35-34.27)	31.23 (28.83-33.62)	0.36
HBV	2 (2.3)	37.2 (49.12-25.28)	34.40 (57.76-11.04)	0.13
PSC	1 (1.1)	25.8 (n/a)	26.3 (n/a)	n/a
HCC	3 (3.4)	29.00 (25.88-32.12)	28.53 (24.20-32.86)	0.30
Cirrhosis NOS/ Cryptogenic	13 (14.8)	28.57 (25.65-31.49)	29.54 (27.89-31.19)	0.21
HCV + HCC	18 (20.5)	32.09 (29.65-34.53)	31.63 (30.47-32.79)	0.19
NASH + HCC	2 (2.3)	31.40 (19.48-43.32)	33.72 (10.36-57.08)	0.13
Alcohol + HCC	2 (2.3)	30.00 (20.45-39.55)	28.51 (9.80-47.23)	0.37

Table 2. BMI at Transplant and 1-Year Follow-Up, Listed by Transplant Indication

Results

Of the 90 liver transplant patients included in our study:

- 57 (63.3%) were male, and 33 (36.7%) were female.
- The average age was 63.26 years (61.13- 65.38, 95% CI)

At the time of transplant:

- Mean BMI were 31.01 kg/m^2(29.90-32.13, 95% CI)
- Mean HbA1c was 6.26 (5.89-6.62, 95% CI)

- There was no statistically significant (P >0.05) change in preoperative and one year postoperative BMI in transplant patients who had the following indications: NASH, Alcohol Cirrhosis, HCV, HBV, PSC, HCC, and cryptogenic cirrhosis.
- There was also no significant change in preoperative and one year postoperative BMI when stratifying patients by gender, race, and age.
- There was no significant change in preoperative and one year postoperative HbA1c when stratifying by indication for liver transplant, gender, and race.
- There was no significant difference in preoperative and one year postoperative HbA1c in patients ≥50 years.
- Patients < 50 years had a significantly greater one year postoperative HbA1c compared to their preoperative HbA1c (5.10 vs 6.09, p =0.048).

Discussion

Significant elevations in HbA1c post-transplant may predispose patients to post-transplant diabetes:

- Diabetes is associated with transplant dysfunction and mortality, and may cause post-transplant metabolic syndrome
- Diabetes mellitus increases the risk of and complications from cardiovascular events.
- Our data showed that patients under the age of 50 need careful monitoring to minimize modifiable metabolic abnormalities.
- Calcineurin inhibitors and glucocorticoids are standard immunosuppressants
  - Both affect glucose metabolism and contribute to metabolic side effects
- Determining high-risk populations for post-transplant complications is crucial to reduce long-term post-transplant morbidity and mortality.

Conclusions

- Further research is needed to elucidate additional risk factors for post-transplant complications.
- Post-liver transplantation diabetes is one of the most frequent complications
  - Associated with increased risk of transplant loss and reduced patient survival
- Longer follow-up periods may better highlight incidence of post-transplant diabetes mellitus compared to general population

Contact

John Bruckbauer
Email: jxb573@students.Jefferson.edu