
Inpatient Rehabilitation after Liver Transplantation Decreases Risk and Severity of 30-Day Readmissions



Anai N Kothari, MD, Ryan M Yau, Robert H Blackwell, MD, Colleen Schaidle-Blackburn, ANP-BC, Talar Markossian, PhD, Matthew AC Zapf, BA, Amy D Lu, MD, MPH, MBA, FACS, Paul C Kuo, MD, MS, MBA, FACS

BACKGROUND: Discharge location is associated with short-term readmission rates after hospitalization for several medical and surgical diagnoses. We hypothesized that discharge location: home, home health, skilled nursing facility (SNF), long-term acute care (LTAC), or inpatient rehabilitation, independently predicted the risk of 30-day readmission and severity of first readmission after orthotopic liver transplantation.

STUDY DESIGN: We performed a retrospective cohort review using Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases for Florida and California. Patients who underwent orthotopic liver transplantation from 2009 to 2011 were included and followed for 1 year. Mixed-effects logistic regression was used to model the effect of discharge location on 30-day readmission controlling for demographic, socioeconomic, and clinical factors. Total cost of first readmission was used as a surrogate measure for readmission severity and resource use.

RESULTS: A total of 3,072 patients met our inclusion criteria. The overall 30-day readmission rate was 29.6%. Discharge to inpatient rehabilitation (adjusted odds ratio [aOR] 0.43, $p = 0.013$) or LTAC/SNF (aOR 0.63, $p = 0.014$) were associated with decreased odds of 30-day readmission when compared with home. The severity of 30-day readmissions for patients discharged to inpatient rehabilitation were the same as those discharged home or home with home health. Severity was increased for those discharged to LTAC/SNF. The time to first readmission was longest for patients discharged to inpatient rehabilitation (17 days vs 8 days, $p < 0.001$).

CONCLUSIONS: When compared with other locations of discharge, inpatient rehabilitation reduces the risk of 30-day readmission and increases the time to first readmission. These benefits come without increasing the severity of readmission. Increased use of inpatient rehabilitation after orthotopic liver transplantation is a strategy to improve 30-day readmission rates. (*J Am Coll Surg* 2016;223:164–173. © 2016 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

Disclosure Information: Nothing to disclose.

Support: This work supported by NIH T32 GM08750-16.

Presented at the Western Surgical Association 123rd Scientific Session, Napa Valley, CA, November 2015.

Received December 21, 2015; Revised January 20, 2016; Accepted January 20, 2016.

From the Departments of Surgery (Kothari, Schaidle-Blackburn, Zapf, Lu, Kuo) and Urology (Blackwell), Loyola University Medical Center, and the One:MAP Analytics Research Group (Kothari, Yau, Blackwell, Zapf, Lu, Kuo), Loyola University Medical Center, Department of Surgery, Maywood, IL; and the Department of Public Health Sciences (Markossian), Loyola University Chicago, Chicago, IL.

Correspondence address: Paul C Kuo, MD, MS, MBA, FACS, Department of Surgery, Loyola University Medical Center, 2160 S First Ave, EMS Building, Room 3244, Maywood, IL 60153. email: paul.kuo@luhs.org

Hospital readmission rates after inpatient admissions are important quality metrics and have important financial implications.^{1,2} The Centers for Medicare and Medicaid Services (CMS) first brought readmissions into focus with public reporting of hospital rates in 2009.³ With the introduction of the Hospital Readmission Reduction Program (HRRP) in 2012, as part of the Affordable Care Act, hospitals with excess readmissions were subject to CMS financial penalties. Beginning with acute myocardial infarction, heart failure, and pneumonia, the program now also includes COPD, elective primary total hip and/or total knee arthroplasty, and soon will include coronary artery bypass graft.^{2,4} Although readmissions after liver transplantation are not currently penalized by CMS

Abbreviations and Acronyms

AIC	= Akaike information criterion
CMS	= Centers for Medicare and Medicaid Services
HCUP SID	= Healthcare Cost and Utilization Project State Inpatient Databases
HRRP	= Hospital Readmission Reduction Program
IQR	= interquartile range
LTAC	= long-term acute care
OR	= odds ratio
SHR	= subdistribution hazard ratio
SNF	= skilled nursing facility

programs, several groups anticipate this could change as the HRRP continues to grow.^{5,6}

Readmission rates after liver transplantation are high, with reported rates ranging from 37.9% to 45%.⁷⁻⁹ Although the reasons for readmission after non-transplant surgery are largely attributable to new complications from the index operation, this is not clearly defined in liver transplantation.¹⁰ Both surgical and medical reasons for readmission are described in this patient population and include infection, abnormal laboratory values, electrolyte disturbances, and postoperative pain.^{8,11} As a result, efforts to reduce readmissions must be multifactorial and include prehospital, hospital, and post-hospital targets.

Recent studies have identified preoperative and immediate postoperative predictors for readmission after liver transplantation.¹² However, there is a paucity of data examining the period of time after discharge and the role discharge destination plays on unplanned readmission in this vulnerable population. The primary objective of this study was to determine the association between discharge location (home, home health, skilled nursing facility [SNF], long-term acute care [LTAC], or inpatient rehabilitation) and risk of 30-day readmission after liver transplantation. Secondary objectives included defining the severity of first readmission after surgery and determining the causes of readmission based on location of discharge.

METHODS

Data sources

The Healthcare Cost and Utilization Project State Inpatient Databases (HCUP SID) for Florida and California were used to identify cases from 2009 to 2011. Each SID captures all inpatient stays at non-federal facilities for the respective state, regardless of primary payer. Encounters in the SID are obtained from participating state-level data organizations and based on data abstracted

from inpatient discharge records.¹³ The SID is organized using uniform formatting, allowing for use of HCUP tools and software to facilitate clinical research. A total of 17 states include variables to track sequential visits for an individual patient over time within the state. The consistency of encrypted person identifiers is measured by HCUP and varies by state. The states of California and Florida each have notably high reliability (88.3% and 96.0%).¹⁴ This study was deemed exempt from institutional review board approval based on the use of de-identified records.

Patient inclusion

Records for patients 18 years or older, who underwent orthotopic liver transplantation were identified using the *International Classification of Diseases, Version 9, Clinical Modification* (ICD-9-CM) procedure code 505.9. Patients were included only if they also had the Diagnosis Related Group (version 24) 480 as part of their discharge record. Patients with concurrent renal transplantation were excluded. Any unplanned inpatient admissions within 30 days of discharge were categorized as readmissions, and all readmissions were in reference to the original operation. The HCUP SID classifies each patient record as emergent, urgent, or elective. A readmission was considered unplanned if the patient encounter was urgent or emergent. Patients with repeat liver transplantation 30 days or more from discharge were excluded.

Outcomes and exposure variables

Our primary endpoint was unplanned readmission within 30 days of discharge after initial liver transplantation. Secondary outcomes included reason and severity of readmission. Severity of readmission was estimated using the total cost of an inpatient readmission encounter, not including the cost of post-discharge care. This was derived using charge-to-cost conversion and normalized to allow comparisons of patients at different hospitals.

Location of discharge was the principal exposure variable and was assigned using uniform fields provided by HCUP. Crosswalk between HCUP indicators and assigned category of discharge location for study are shown in [Supplementary Table 1](#) (Available online). No missing values were present for discharge location in any of the discharge records that met our inclusion criteria.

Explanatory variables

To capture the complexity of admission at the time of liver transplantation patient demographic and clinical characteristics were used based on availability within the dataset. Charlson Comorbidity Index was calculated using

Download English Version:

<https://daneshyari.com/en/article/4290539>

Download Persian Version:

<https://daneshyari.com/article/4290539>

[Daneshyari.com](https://daneshyari.com)