Causation and Confounding Factors for 30-Day Readmission of Kidney Transplant Patients: A Descriptive Study

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Objectives

- Compare differences in risk factors and causes of 30-day adult kidney transplant recipient readmissions between a transplant center in a Southern U.S. Region and the U.S.

- Discuss the implications of these population differences for interventions to reduce readmissions.
Hospital Readmissions

Subsequent admission (to any acute care hospital) for any reason after discharge from the index hospitalization

• Indicator of healthcare quality
  
• Increases healthcare costs

• 2013 all-cause Medicare 30-day readmission rate 17.3/100

• Centers for Medicare and Medicaid Services tracks and reduces hospital Inpatient Prospective Payment System payments for excess readmissions in select diagnoses
Kidney Transplantation Hospital Readmissions

- Percentage early (within 30 days) kidney transplant readmissions ranges from 11% to 32%\textsuperscript{3,4}
- Average cost of readmission: $10,500\textsuperscript{5}
- Readmissions complicated by vulnerabilities attributed to multiple co-morbidities\textsuperscript{4}
- Readmissions correlate with worse outcomes\textsuperscript{1}
- Tax already overburdened healthcare system

Understanding risk factors and causes contributing to readmissions within 30-days post kidney transplant is essential to reducing these hospitalizations.
Setting

- 250+ licensed bed tertiary care hospital in South Texas
- Growing transplant program

<table>
<thead>
<tr>
<th>Single Organ Kidney Transplants</th>
<th>2006</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadaveric kidney transplants</td>
<td>62</td>
<td>139</td>
</tr>
<tr>
<td>Live kidney transplants</td>
<td>90</td>
<td>176</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>152</strong></td>
<td><strong>315</strong></td>
</tr>
</tbody>
</table>
Sex of Kidney Transplant Patients by Donor Type: Hospital vs U.S. Admissions

<table>
<thead>
<tr>
<th>Transplant Type</th>
<th>Hospital Admissions 7/2015-6/30/2016*</th>
<th>U.S. 7/2015-6/30/2016*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male CD Transplants</td>
<td>53.3%</td>
<td>59.6%</td>
</tr>
<tr>
<td>Female CD Transplants</td>
<td>46.7%</td>
<td>40.4%</td>
</tr>
<tr>
<td>Male LD Transplants</td>
<td>61.9%</td>
<td>63.3%</td>
</tr>
<tr>
<td>Female LD Transplants</td>
<td>38.1%</td>
<td>36.7%</td>
</tr>
</tbody>
</table>

Race/Ethnicity of Cadaveric Kidney Transplant Patients: Hospital vs U.S. Admissions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>13.2%</td>
<td>38.7%</td>
</tr>
<tr>
<td>Black</td>
<td>13.8%</td>
<td>34.7%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>69.1%</td>
<td>17.9%</td>
</tr>
<tr>
<td>Asian</td>
<td>2.6%</td>
<td>7.4%</td>
</tr>
</tbody>
</table>

Race/Ethnicity of Live Kidney Transplant Patients: Hospital vs U.S. Admissions

- **White:**
  - Hospital Admissions: 66.2%
  - U.S.: 7/2015-6/30/2016: 67.6%

- **Black:**
  - Hospital Admissions: 25.6%
  - U.S.: 7/2015-6/30/2016: 11.8%

- **Hispanic:**
  - Hospital Admissions: 4.0%
  - U.S.: 7/2015-6/30/2016: 15.2%

- **Asian:**
  - Hospital Admissions: 2.3%
  - U.S.: 7/2015-6/30/2016: 5.8%

Body Mass Index of Cadaveric Kidney Transplant Patients: Hospital vs U.S. Admissions

*Hospital Admissions 7/2015-6/30/2016*
*U.S. Admissions 7/2015-6/30/2016*

Body Mass Index of Live Kidney Transplant Patients: Hospital vs U.S. Admissions

- 0-20: Hospital Admissions 7/2015-6/30/2016* (6.8%) vs U.S. Admissions 7/2015-6/30/2016* (13.1%)
- 21-25: Hospital Admissions 7/2015-6/30/2016* (24.4%) vs U.S. Admissions 7/2015-6/30/2016* (30.4%)
- 26-30: Hospital Admissions 7/2015-6/30/2016* (37.5%) vs U.S. Admissions 7/2015-6/30/2016* (30.1%)
- 31+: Hospital Admissions 7/2015-6/30/2016* (31.2%) vs U.S. Admissions 7/2015-6/30/2016* (25.9%)

Methods

- Single center, descriptive, retrospective study
- Kidney transplant recipients readmitted within 30 days of discharge from index hospitalization
  - Inclusion
    - Adults 18 and older
    - Transplant surgery occurred between July 1, 2015 and June 30, 2016
  - Exclusion
    - Simultaneous multi-organ transplant recipients
# Data Collection Sheet

- Developed from an extensive literature review and clinical expertise
- Guided accurate and efficient collection of metrics

<table>
<thead>
<tr>
<th>Categories</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>Primary Language, Sex, Marital Status, Age, Race/Ethnicity, Primary Payer, Distance to Hospital, Education Level</td>
</tr>
<tr>
<td>Previous Medical History</td>
<td>Prior Diseases, Cause of ESRD, Smoking History, Prior Transplant, BMI</td>
</tr>
<tr>
<td>Transplant-related Information</td>
<td>Donor Type, Medications, Documentation of Understanding of Medications, Type/Time on Dialysis, Time on Waiting List, EPTS score</td>
</tr>
<tr>
<td>Admission-related Information</td>
<td>Length of Transplant Hospital Stay, Transplant Discharge Day of Week, Cause for Readmission</td>
</tr>
</tbody>
</table>
Data Collection

• Study Year July 1, 2015 to June 30, 2016:
  • 315 kidney transplants
    • 44% cadaveric kidneys / 56% live kidneys
• 70 patients met the eligibility criteria
• RN researchers collected data from medical and clinic records using the data collection sheet
Subjects

- 315 total kidney transplant recipients July 1, 2015 to June 30, 2016
  - Seventy (22.2%) readmitted in 30 days
    - 33 (18.8%) of 176 living donor transplant recipients readmitted within 30 days
    - 37 (26.6%) of 139 cadaveric donor transplant recipients readmitted within 30 days
Characteristics of Readmitted Patients

- Primarily male (51.4%)
  - Females higher % readmissions based on percentage transplanted
    - Males: 31% readmission/admission,
    - Females: 40% readmission/admission
- Married (60%)
- Did not indicate a Race (61.4%)
- Hispanic (57.1%)
- English documented as the Language Spoken (65.7%)
- Primary payer Medicare (68.6%)
- Education Level
  - Predominately High School (37.5%)
  - 14.3% Grade School
### Significant Comorbidities

**Readmissions-South Texas**

- **Obesity (BMI)**
  - CD Range 19.1-38.7
  - CD Mean 31.3
  - LD Range 20.5-42
  - LD Mean 30.3

- **Diabetes**
  - 54.8% CD recipients
  - 54.5% LD recipients

- **Hypertension**
  - 94.6% CD recipients
  - 90.9% LD recipients

**Readmissions-Published Literature**

- **Obesity (BMI)**
  - Range 21.9 – 29
  - Mean 26.95

- **Diabetes**
  - Range 28% - 50%
  - Mean 36.2%

- **Hypertension**
  - 83% - 92%
  - Mean 88.3%
Recipients: Miles From Home to Hospital

- Cadaveric Donor Recipient
- Living Donor Recipient

- 0-20 Miles: 40.5% (Cadaveric), 24.2% (Living)
- 21-50 Miles: 2.7% (Cadaveric), 12.1% (Living)
- 51-100 Miles: 10.8% (Cadaveric), 15.2% (Living)
- 101+ Miles: 48.5% (Cadaveric), 45.9% (Living)
Readmissions Length of Index Hospitalization (days)

- Cadaveric Kidney Recipient
- Live Donor Recipient
Days Index Hospitalization to Readmission

- Cadaveric Kidney Recipient
- Live Donor Recipient

0-6 days: 24%
7-14 days: 39%
15-30 days: 43%

0-6 days: 32%
7-14 days: 36%
15-30 days: 24%
Summation of Findings

Kidney Transplant Patient Readmissions vary by the population

South Texas Transplant Readmissions more likely:

• Hispanic ethnicity
• Body Mass Index > 26
• Within 14 days of index hospitalization
• > 20 miles from the hospital
• Education less than College
• Recipients with Diabetes Mellitus
• Recipients with Hypertension
• Female
Conclusions

• Interventions must be focus on unique population characteristics, South Texas requires:
  • Cultural considerations for Hispanic females
  • Multi-modal education
    • Linguistically appropriate
    • Consideration of non-readers and lower grade level readers

• Emphasis on co-morbidities
  • Diseases: Diabetes Mellitus/Hypertension
  • Medication knowledge/Adherence strategies
  • Proper Diet Instruction

• Support for individuals from a distance
References


References


