Mail the Get Well Cards Home!!
Effectively Managing Shorter Length of Stays
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and
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Factors Influencing Length of Stay: 1980s-1990s
- Higher rejection rates
- Longer duration of induction therapy
- Late bladder catheter removal
- Patient participation and education
- Focus on inpatient monitoring versus outpatient care

Changes in the Care of Kidney Recipients Over 2 Decades

Kidney Transplant: Pre- and Post-Cyclosporine
- Deceased donor 1 year graft survival:
  - 1977: 53%
  - 1984: 68%
- Cyclosporine introduced in late 1983
  - Early studies showed a 1 year deceased donor graft survival of 80%
  - Significant reduction in rejection rates (Decreased from 60-80% to 40%)

Kidney Transplant: Pre- and Post-Cyclosporine


Kidney Transplant Length of Stay: Pre- and Post-Cyclosporine

Table 2 — Percent of Patients Rehospitalized and Total Adjusted* Mean Days Hospitalized According to Immunosuppressive Drug Regimen

<table>
<thead>
<tr>
<th>Medication Regimen</th>
<th>No Cyclosporine</th>
<th>Cyclosporine</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehospitalized</td>
<td>64.5%</td>
<td>61.3%</td>
<td>NS12</td>
</tr>
<tr>
<td>Adjusted mean days hospitalized (transplant &amp; follow-up)</td>
<td>40.5</td>
<td>26.4</td>
<td>.00015</td>
</tr>
<tr>
<td>Follow-up hospitalizations</td>
<td>15.0</td>
<td>15.9</td>
<td>.805</td>
</tr>
<tr>
<td>1 year total</td>
<td>56.3</td>
<td>42.4</td>
<td>.015</td>
</tr>
</tbody>
</table>

*Length of stay was adjusted through multiple regression analysis for HLA match, age, sex, ethnicity, coexisting conditions, multi-system disease, diabetes, preexisting urologic complications, transplant status, remnant surgery, time interval between pre and post-transplant, days of stay before transplant, and secular changes in length of stay at the study hospital. NS indicates not significant. Hy was corrected for continuity. Multiple linear regression analysis. Columns may not add to totals because separate estimates were derived for each comparison.


Antibody Induction


Table 1 — Characteristics of Renal Transplant Donors and Recipients, 1988 to 1996.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>No. of transplants</td>
<td>223</td>
<td>229</td>
<td>240</td>
<td>236</td>
<td>241</td>
<td>247</td>
<td>252</td>
<td>259</td>
<td>272</td>
<td>2395</td>
</tr>
<tr>
<td>Black race (%)</td>
<td>20.4</td>
<td>20.0</td>
<td>19.7</td>
<td>19.8</td>
<td>20.3</td>
<td>20.3</td>
<td>21.1</td>
<td>21.1</td>
<td>21.5</td>
<td>20.6</td>
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<tr>
<td>White (%)</td>
<td>79.6</td>
<td>79.9</td>
<td>80.3</td>
<td>79.7</td>
<td>78.7</td>
<td>78.9</td>
<td>78.7</td>
<td>78.8</td>
<td>77.5</td>
<td>79.4</td>
</tr>
<tr>
<td>Sex ratio (M:F)</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.6</td>
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<tr>
<td>Age (years)</td>
<td>45.6</td>
<td>45.5</td>
<td>45.6</td>
<td>45.7</td>
<td>45.6</td>
<td>45.5</td>
<td>45.6</td>
<td>45.5</td>
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<td>45.5</td>
</tr>
<tr>
<td>Mean creatinine (mg/dl)</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.3</td>
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<tr>
<td>Mean serum creatinine (mg/dl)</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
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<td>2.5</td>
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<tr>
<td>Mean serum albumin (g/dl)</td>
<td>3.7</td>
<td>3.6</td>
<td>3.6</td>
<td>3.6</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
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<tr>
<td>Mean serum creatinine (mg/dl)</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
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<tr>
<td>Mean serum creatinine (mg/dl)</td>
<td>35.8</td>
<td>35.8</td>
<td>35.8</td>
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<td>35.8</td>
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<td>35.8</td>
</tr>
<tr>
<td>Mean serum creatinine (mg/dl)</td>
<td>43.3</td>
<td>43.3</td>
<td>43.3</td>
<td>43.3</td>
<td>43.3</td>
<td>43.3</td>
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</tr>
</tbody>
</table>

*With the exception of the number of transplants, all other values are means. Hy is the degrees of freedom to random donor cells.
Antibody Induction

- ATGAM (Horse Antithymocyte Globulin)
  - 1980s: Given over 14-28 days
- Thymoglobulin (Rabbit Antithymocyte Globulin)
  - 1990s: Given over 7-14 days
  - Current day: Total dose of 6 mg/Kg given over 3-5 days
- Alemtuzumab
  - Often given as a single dose
- IL-2 receptor blockers
  - Given day 0 and day 3

**Acute Rejections Within the First Year Post-Transplant**

- Acute rejection: deceased donor
- Acute rejection: living donor

First-time, kidney-only transplant recipients age 18 & older, with kidney function at discharge.

**USRDS 2009 ADR**

**Effect of Improving IS Protocols on Length of Stay**

<table>
<thead>
<tr>
<th>Group</th>
<th>Protocol</th>
<th>Length of Hospital Stay</th>
<th>Rejection Rate</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ALG, azathioprine, prednisone</td>
<td>0.8</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>2</td>
<td>Cyclosporine, prednisone</td>
<td>1.2</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>ALG, azathioprine, low dose</td>
<td>1.6</td>
<td>5%</td>
<td>8%</td>
</tr>
</tbody>
</table>


**Surgical Technique**

- **Bladder Catheter Removal**
  - **Leadbetter-Politano**
    - Catheter removed day 14
  - **Lich-Gregoir**
    - Catheter removed day 5 (now day 2-3)
    - PVR X 3 as inpatient with **patient monitored** voiding at home
    - Elevated PVR- home with catheter, removed in clinic with PVR check

**Notes**

- Group 1: ALG, azathioprine, prednisone (1983)
- Group 2: Cyclosporine, prednisone (1984)
- Group 3: ALG, azathioprine, low dose cyclosporine, low dose prednisone (1985)
Development of Clinical Pathways

- Delineate optimal and efficient patient care post-kidney transplant
- Following the pathway should result in the best patient care and shortest LOS
- Ultimate goal: Increase overall efficiency and quality

Utility of Clinical Pathways: LOS

- University of Minnesota Hospital developed two clinical pathways during 1993
  - Adult cadaveric and living donor transplants
- Detailed critical orders, patient teaching and expected patient outcomes


Utility of Clinical Pathways: LOS

- University Medical Centre Mannheim developed a clinical pathway implemented on July 1, 2006
  - Control group- January 1, 2005 until implementation
  - CP group- implementation until August 31, 2007
- Mean LOS Control (21.4) vs CP (18.3) group (P=0.25)

**Utility of Clinical Pathways: Outcome Quality**


**Patient Participation and Education**

- 1980s:
  - Patients allowed the luxury of time for education
  - Patients were required to pass a “final exam”

**Utility of Clinical Pathways: Outcome Quality**

<table>
<thead>
<tr>
<th>Outcome quality indicator</th>
<th>CP group (n=32)</th>
<th>Control group (n=44)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day mortality</td>
<td>1 (3.1)</td>
<td>1 (2.3)</td>
<td>1.00</td>
</tr>
<tr>
<td>Transplant rejection</td>
<td>10 (30.3)</td>
<td>12 (27.3)</td>
<td>0.74</td>
</tr>
<tr>
<td>Re-operation</td>
<td>1 (3.1)</td>
<td>2 (4.5)</td>
<td>0.60</td>
</tr>
<tr>
<td>Acute graft rejection</td>
<td>0</td>
<td>5 (11.4)</td>
<td>0.02</td>
</tr>
<tr>
<td>Delayed graft function</td>
<td>2 (6.3)</td>
<td>10 (22.7)</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Patient Participation and Education

- Teaching by inpatient nursing and nurse coordinator
  - “What to expect” and “What to do if…”
- Primary medication teaching by a transplant pharmacist and nursing staff
- Outpatient NP’s for the first 8 weeks post-transplant
  - Continuation of teaching
  - Confirmation of patient participation

Current Length of Stay

- Average United States LOS: 9.7 days
- Average UCSF LOS: 4.7 days
  - Living Donor: 4 days
  - Deceased Donor: 5.3 days
- Safe and efficient discharge is a multidisciplinary process
- Requires a shift in focus from inpatient to outpatient care

Managing SRTR Data

- UCSF created forms to facilitate data input
  - “TCR forms” completed by Pre-Transplant Nurse Coordinator
  - “TRR forms” completed by Inpatient Nurse Coordinator
- Centralized input process through the transplant Data Center
- TRF forms completed by Data Center

Summary

- Shorter length of stay achieved by:
  - Lower rejection rates
  - Early bladder catheter removal
  - Shorter induction cycle
  - Shifting of inpatient care and teaching to the outpatient setting
- Team approach is paramount!!