2016 myRESEARCH™
Science Internship Program: Laboratory Medicine

Civic Education
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Jermaine Leonard
Science Internship Program: Laboratory Medicine
Incidence of Acute Cellular Rejection in Heart Transplant Recipients in Correlation with Age and Gender

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Abstract

• Cellular rejection is the leading cause of death in heart transplant patients in the first year.
• Right ventricular biopsies (Bx) demonstrate the presence and severity of rejection in the transplanted heart.
• A diagnosis of acute rejection allows clinicians to make adjustments in the patient’s antirejection therapy, improving survival time.
Background

• Heart transplantation is an effective therapy for end-stage heart failure.

• The process includes:
  – Screened by a multidisciplinary team before listing the patient
  – Added to the waiting list until donor becomes available
  – Heart transplant surgery can last from 4 to 12 hours
  – Patients usually recover from 7 to 14 days afterwards
• The immune system recognizes foreign antigens that are not genetically identical and produces antibodies against it.

• A donor heart is recognized by the recipient’s immune system as foreign by allore cognition.

• The use of immunosuppressive agents to counteract this has improved the survival time among patients.
Background (cont.)

- Acute cellular rejection is still one of the leading causes of death in the early post-transplant period.
- Acute cellular rejection is a mononuclear inflammatory response.
  - Composed of lymphocytes attacking transplant
- An endomyocardial biopsy is the gold standard to diagnose rejection.
A standard methodology for the grading of cellular rejection was established by pathologists in 1990 and revised in 2005.

- Variability in interpretation of pathologists

Treatment is based on biopsy grading scale.
Background (cont.)

Mild Rejection

Moderate Rejection

Severe Rejection
Problem/Purpose

• To investigate the incidence of acute cellular rejection, Grade 2R or greater, (based on the 2005 revised standard methodology for the grading of cellular rejection) in heart transplant recipients from 2006-2011 within the first three months post-transplantation correlating with the age and gender of the recipient.
Hypothesis

• 20-40% of the heart transplant patients will experience at least one episode of acute cellular rejection in the first year of transplantation.

• Acute cellular rejection (ACR) is most common in the first 6 months after heart transplantation.
Methodology

- The study population consisted of all patients transplanted from 2006-2011.
- Biopsy results for the first three months after transplant searched for all patients.
- Grades of rejection, age and gender were recorded.
Data

Percentage of Bx Results

- ACR: 82.77%
- No ACR: 2.54%
- No Bx: 2.54%
- Insufficient: 12.15%

Total of 354 Patients
Total of 2,381 Biopsies

Incidence of Grade 2R ACR

Number of Grade 2 R ACR Biopsies

- Age: 0-18
- Age: >18

- Male
- Female
### Without Acute Cellular Rejection

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<th>Female</th>
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### With Acute Cellular Rejection

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<tr>
<td>Total</td>
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<td>20</td>
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Results

• 43 (12.15%) of the total of 354 patients experienced at least one episode of acute rejection within the first three months.

• 18 (5.08%) of the total 354 patients were excluded from study due to insufficient number of biopsies.

• 2 (6.67%) out of the total of 30 pediatric patients experienced acute rejection.

• 41 (13.40%) out of the total of 306 adult patients experienced acute rejection.
Results (cont.)

- 20 (22.47%) out of the total of 89 female patients experienced acute rejection
- 23 (9.31%) out of the total of 247 male patients experienced acute rejection
Conclusions

• The incidence of acute rejection in our institution is found to be lower than the stated incidence in the literature.
• There is no significant difference in the incidence of acute cellular rejection between pediatric and adult patients.
• Women are more likely to experience acute cellular rejection than men.
Recommendations

• Extend the timeframe to correlate rejection with the evolution of immunosuppressive therapies (early antirejection protocols vs more recent protocols)

• Analyze a longer period of time following transplantation to get a more accurate incidence of ACR

• Include demographic of ethnicity to see the possible correlation with rejection
References

- Kirklin, J. K. (n.d.). Is biopsy-proven cellular rejection an important clinical consideration in heart transplantation?
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