Characterization of Vasoplegia Immediately After Heart Transplantation

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Abstract

Background: Vasoplegia (Vp) after heart transplantation (HTx) has not been well described. Vp has been seen and observed in patients with PGD which may suggest that there is an inflammatory source for this occurrence. Previous studies have suggested an inflammatory milieu in the recipient contributes to Vp in the immediate post-transplant period. Patients with liver disease may also develop Vp due to circulating vasodilating substances. We evaluated the incidence of Vp with and without the diagnosis of PGD.

Methods: Between 2010 and 2014 we assessed 347 heart transplant patients in the immediate post-Tx period. Patients were divided into vasoplegia (n=107, defined as mean arterial pressure < 70 mmHg with need for intravenous pressor support within 48 hours of transplantation) and no vasoplegia (n=240) groups. Pressor support includes IV epinephrine, norepinephrine, and vasopressin. Overall outcomes included 30-day and 1-year survival, 1-year freedom from any-treated rejection (ATR), acute cellular rejection (ACR), antibody-mediated rejection (AMR). The incidence of Vp was then recorded for patients with severe PGD and those patients with biopsy-proven liver fibrosis as these states are associated with hypotension.

Results: Vp was seen in 107 (30.8%) of patients in the immediate post-transplant window. The average IV pressor support included the following: epinephrine 6 mcg/min, norepinephrine 1.2 mcg/min, vasopressin 0.02 units/min. There was no significant difference in 30-day survival, 1-year survival, and 1-year freedom from ATR, ACR between the vasoplegia and no vasoplegia groups (see table). Vp was seen in 18.8% (3/16) of severe PGD patients and in 33.3% (4/12) of patients with biopsy-proven fibrosis which was not excessive.

Conclusion: Vp is not uncommon in HTx in the immediate post-operative period. Transplantation with IV inotropes led to acceptable outcome in these patients. The implication of Vp in post-Tx patients appears to be transient and does not affect long-term outcome.

Background

- Vasoplegia (Vp) after heart transplantation (HTx) has not been well described.
- Vp has been seen and observed in patients with PGD which may suggest that there is an inflammatory source for this occurrence.
- Previous studies have suggested an inflammatory milieu in the recipient contributes to Vp in the immediate post-transplant period.
- Patients with liver disease may also develop Vp due to circulating vasodilating substances.

Purpose

- To assess the incidence of Vp with and without the diagnosis of PGD

Methods

- Between 2010 and 2014 we assessed 347 heart transplant patients in the immediate post-Tx period.
- Patients were divided into vasoplegia (n=107, defined as mean arterial pressure < 70 mmHg with need for intravenous pressor support within 48 hours of transplantation) and no vasoplegia (n=240) groups.
- Pressor support includes IV epinephrine, norepinephrine, and vasopressin.
- Endpoints included:
  - 30-day survival
  - 1-year survival
  - 1-year freedom from any-treated rejection (ATR)
  - 1-year freedom from acute cellular rejection (ACR)
  - 1-year freedom from antibody-mediated rejection (AMR).
- The incidence of Vp was then recorded for patients with severe PGD and those patients with biopsy-proven liver fibrosis as these states are associated with hypotension.

Demographics

Demographics	Vasoplegia (n=107)	No Vasoplegia (n=240)	P-Value
Mean Recipient Age, Years ± SD	56.7 ± 13.7	56.7 ± 12.6	0.993
Mean Donor Age, Years ± SD	35.1 ± 13.1	35.6 ± 13.3	0.765
Body Mass Index, Mean ± SD	25.3 ± 4.4	25.2 ± 4.6	0.977
Female (%)	24.3%	28.3%	0.434
Previous Pregnancy in Females (%)	7.7%	22.1%	0.105
Ischemic Time, Mean Mins ± SD	160.7 ± 64.5	145.1 ± 57.2	0.026
Primary Reason for Transplant, Underlying Diagnosis of Coronary Artery Disease (%)	36.4%	35.4%	0.853
Status 1 at Transplant (%)	77.6%	77.9%	0.942
Cytomegalovirus Mismatch (%)	21.4%	23.2%	0.713
Diabetes Mellitus (%)	24.3%	24.2%	0.978
Treated Hypertension (%)	39.4%	45.7%	0.296
Insertion of Mechanical Circulatory Support Device (%)	30.8%	20.0%	0.027
Prior Blood Transfusion (%)	56.2%	42.0%	0.026
Pre-Transplant PRA ≥ 10% (%)	29.9%	26.7%	0.533
Pre-Transplant Creatinine, Mean ± SD	1.7 ± 1.4	1.4 ± 1.1	0.077
ATG Induction Therapy (%)	53.3%	34.6%	0.001

Outcomes

Endpoints	Vasoplegia (n=107)	No Vasoplegia (n=240)	P-Value
30-Day Survival	97.2%	97.9%	0.672
1-Year Survival	90.7%	92.9%	0.338
1-Year Freedom from Any-Treated Rejection	84.3%	82.7%	0.569
1-Year Freedom from Acute Cellular Rejection	96.8%	95.7%	0.839
1-Year Freedom from Antibody-Mediated Rejection	91.5%	90.7%	0.576

Results Summary

- Vp was seen in 107 (30.8%) of patients in the immediate post-transplant window
- The average IV pressor support included the following:
  - Epinephrine 6 mcg/min
  - Norepinephrine 1.2 mcg/min
  - Vasopressin 0.02 units/min
- There was no significant difference in 30-day survival, 1-year survival, and 1-year freedom from ATR, ACR between the vasoplegia and no vasoplegia groups (see table).
- Vp was seen in 18.8% (3/16) of severe PGD patients and in 33.3% (4/12) of patients with biopsy-proven fibrosis which was not excessive.

Conclusion

- Vp is not uncommon in HTx in the immediate post-operative period.
- Transplantation with IV inotropes led to acceptable outcome in these patients.
- The implication of Vp in post-Tx patients appears to be transient and does not affect long-term outcome.

Author Disclosures

F. Esmailian: G; C; TransMedics Inc. **J. Patel:** G; C; Alexion, Pfizer, Alnylam. O; C; Therakos. **M. Kittleson:** None. **L. Czer:** G; C; St. Jude Medical. **S. Dimbil:** None. **R. Levine:** None. **F. DeLeon:** None. **A. Hage:** C; C; Bayer. G; C; United Therapeutics, Actelion, Bellerophon Therapeutics, Lung Biotechnology, Reata Pharmaceuticals. **J. Chung:** None. **D. Chang:** G; C; Mesoblast, Amgen. S; C; Abbott Laboratories, AbbVie, Repligen. **J. Kobashigawa:** G; C; CareDx, Sanofi, CSL Behring.