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AMERICAN ASSOCIATION FOR THORACIC SURGERY
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Impact of ABO Compatibility on Heart Transplantation Outcomes in a Nationwide Cohort Study Over the Last Decade

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- [5]Yale Center for Advanced Heart Failure, Mechanical Circulatory Support, and Heart Transplantation

- AATS Annual Meeting - May 7, 2013

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Yale SCHOOL OF MEDICINE

Disclosures:

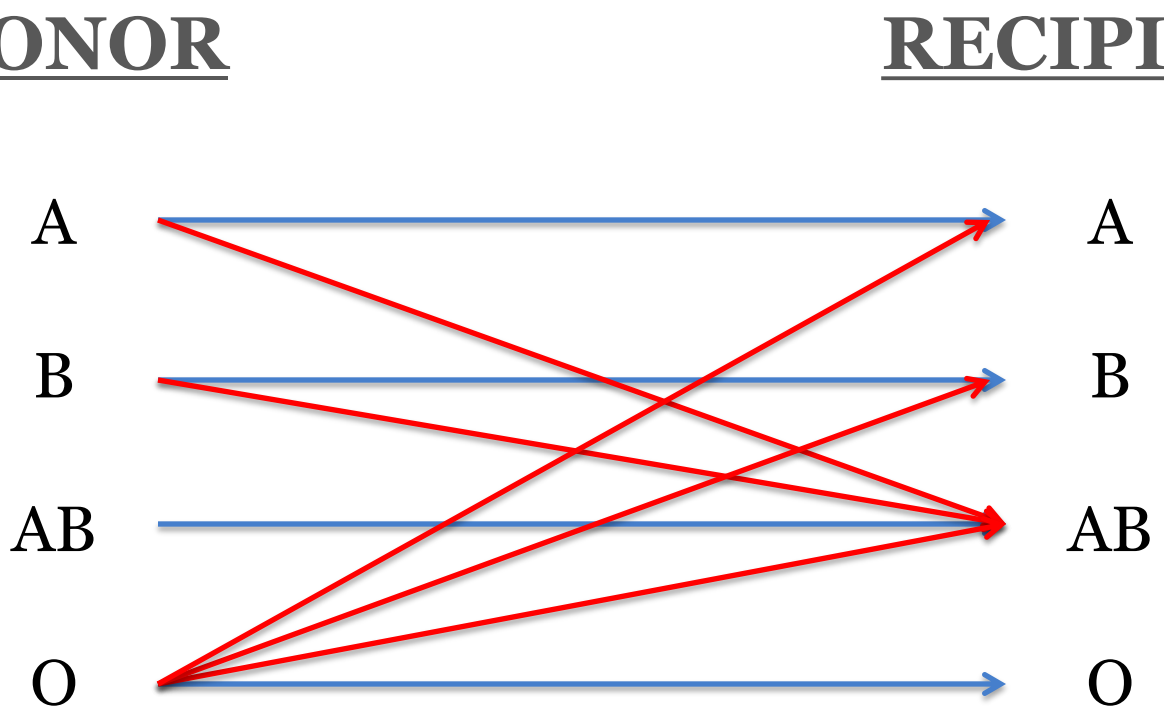
None

Background

- Approx 2,000 heart tx annually (USA)
  - ~10% of recipients do not survive the first year
- Demand vs. supply: donor hearts
  - As of March 2013, 3,481 patients waiting for a heart transplant*
- Optimum and efficient allocation
- Are ABO compatible donor/recipient matches associated with worse outcomes compared with ABO identical matches?
  - Previous studies have shown conflicting results

**Organ Procurement and Transplantation Network (OPTN)*

ABO Blood Type System



Identical Matches
Compatible Matches

Methods

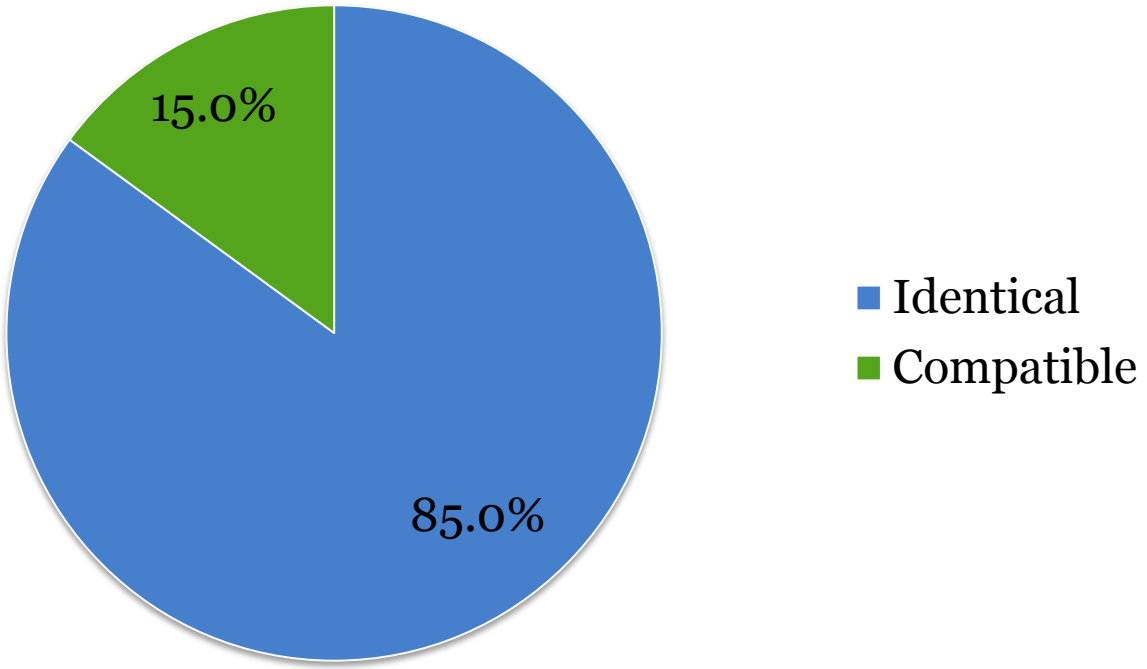
- Retrospective cohort analysis
- Data source: The United Network for Organ Sharing (UNOS), Organ Procurement and Transplantation Network (OPTN)
- All adult (>18) single-organ heart transplants were included
  - 10 year period: January 2000 – December 2009
- Primary stratification based on donor-recipient ABO matching
  - ABO blood type identical vs. compatible
- Outcome measures
  - Primary: all cause graft failure
  - Secondary: 30-day mortality, length of hospital stay, graft rejection, recipient cause of death

Methods (cont.)

- Univariate Analysis: Recipients
- Univariate Analysis: Donors
- Univariate Analysis: Kaplan-Meier Survival Curves
- Multivariate Analysis: Cox Proportional Hazards

Results

- January 2000 – December 2009:
  - 15,267 ABO identical transplants
  - 2,684 ABO compatible transplants



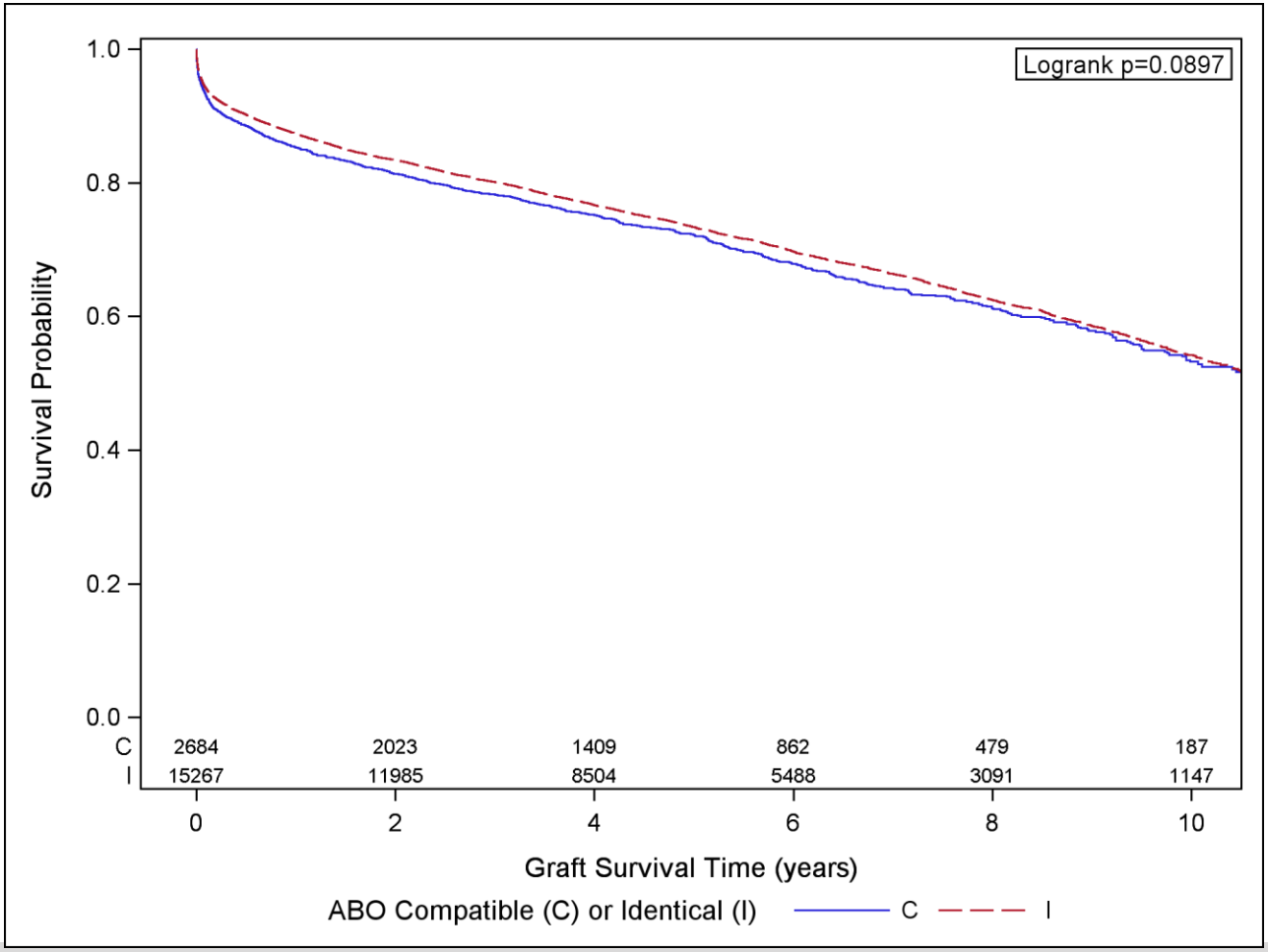
Results – Univariate Analysis

Baseline demographic characteristics that were significantly different between the two cohorts ($p < 0.05$):

- Donor & recipient ethnicity
- Donor history of cancer
- Recipient gender
- Recipient age
- Recipient waitlist status at transplant
- Recipient location before transplant
- Recipient life support
- Recipient total bilirubin
- Graft ischemic time

Results – Kaplan Meier

ABO compatible transplants do not result in decreased survival compared to ABO identical transplants



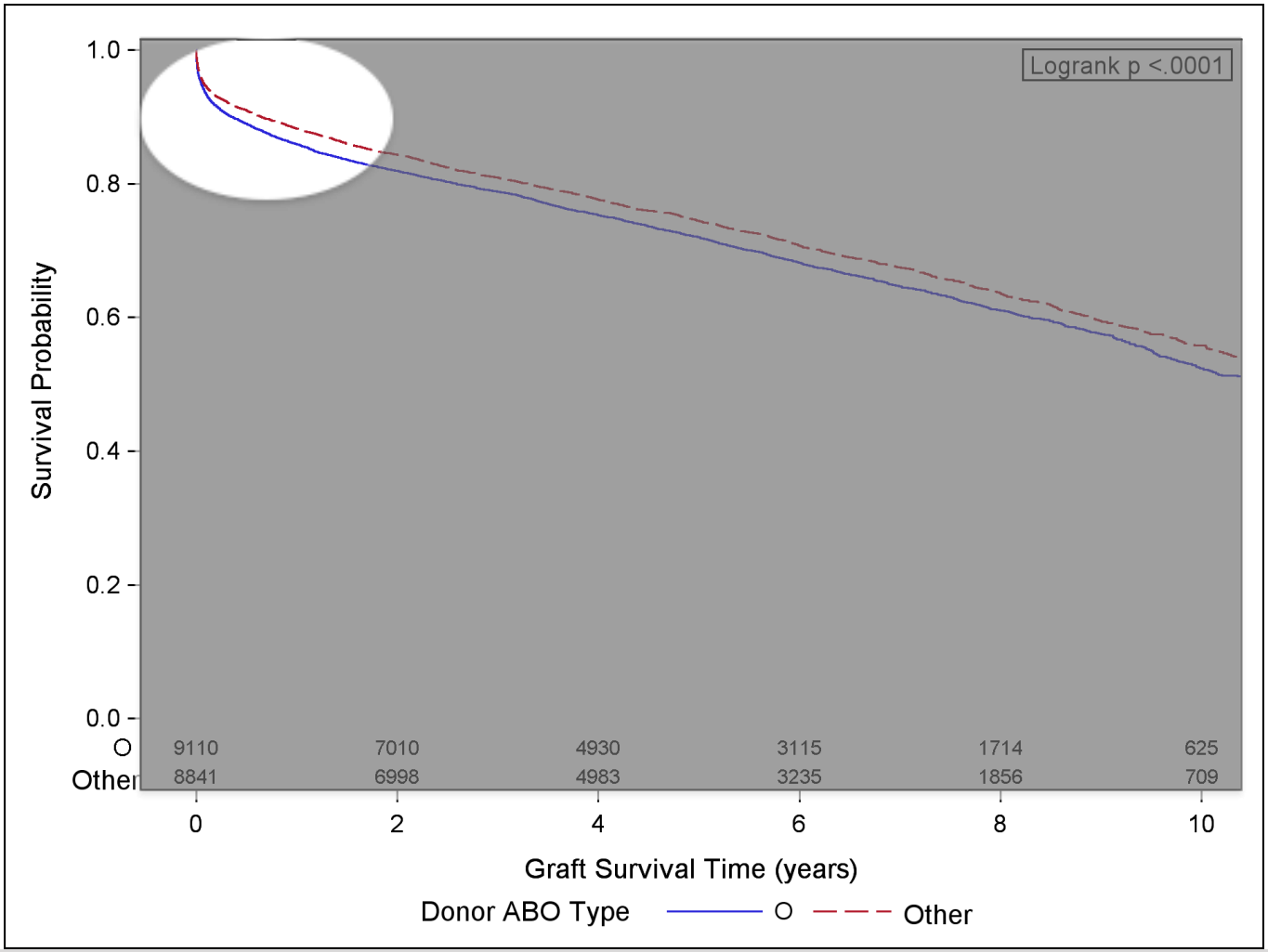
Results – Multivariate Analysis

Multivariate Cox Proportional Hazards Regression Model

Variable	Hazard Ratio (95% Confidence Limits)	p-Value*
ABO compatible[a]	0.99 (0.89-1.10)	0.87
Gender (male vs. female)	0.95 (0.88-1.03)	0.24
Donor ethnicity[b]		
Black	1.08 (0.98-1.20)	0.14
Hispanic	1.00 (0.90-1.10)	0.95
Asian	1.13 (0.87-1.47)	0.37
Recipient ethnicity[b]		
African American	1.42 (1.30-1.56)	< 0.001
Hispanic	1.09 (0.94-1.25)	0.25
Asian	0.92 (0.70-1.19)	0.52
Life support at transplant[c]		
All	1.07 (0.94-1.21)	0.32
IABP	0.98 (0.81-1.20)	0.85
Ventilatory support	1.88 (1.50-2.37)	< 0.001
ECMO	2.60 (1.72-3.83)	< 0.001
Ischemic time	1.09 (1.06-1.13)	< 0.001
Waitlist status at transplant[d]		
Status 1B	1.00 (0.90-1.11)	0.95
Status 2	1.08 (0.94-1.23)	0.29
Status before transplant[e]		
In ICU	1.24 (1.10-1.39)	< 0.001
In hospital (not ICU)	1.13 (0.99-1.28)	0.07
Total bilirubin	1.03 (1.02-1.04)	< 0.001

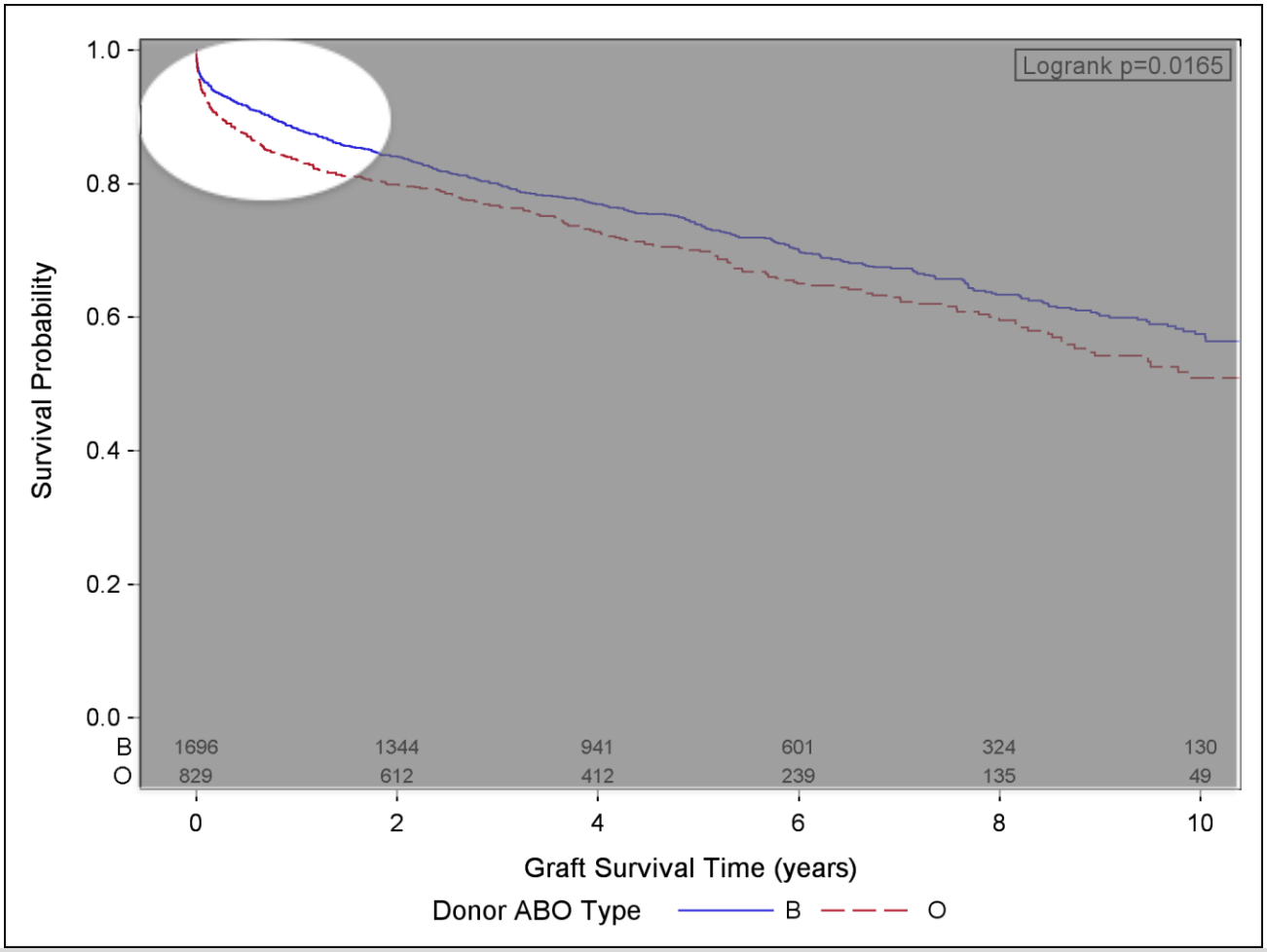
Results – Kaplan Meier

Grafts from blood type O donors are associated with poorer outcomes



Results – Kaplan Meier

In ABO blood type B recipients, grafts from type O donors are associated with worse outcomes compared with type B donors



Limitations

- Strength of the primary database
  - Completeness
  - Quality of predictor variables
- Accuracy of patient information
- We are confident, however, that any errors in patient data will not bias our results

Conclusions

- ABO compatible heart transplantation does not result in adverse outcomes with respect to graft survival and incidence of acute rejection compared with ABO identical grafts
  - Therefore, ABO compatible and identical hearts should be viewed equally in clinical decision making

- Possible exception: ABO blood type O donors are associated with poorer outcomes, especially when given to type B recipients

- The impact of above findings on donor allocation for type B recipients may need to be investigated further

THANK YOU