Donor-Recipient Ethnic Matching Impacts Short and Long-Term Results of Heart Transplantation

Peled Yael, Loewenthal Ron, Raichlin Eugenia,
Gueta Itai, Younis Arwa, Anan Arwa, Kassif Yigal,
Har-Zahav Yedael, Nachum Eyal, Freimark Dov,
Goldenberg Ilan, Lavee Jacob

Heart Transplantation Unit & Heart Failure Institute
Sheba Medical Center and Tel Aviv University, Israel

Background:

The impact of donor-recipient ethnic matching on results of heart transplantation (HT) has been poorly studied with inconclusive results.

Israeli Arabs and Jews are both diverse and heterogeneous groups that together comprise the vast majority of Israel's population (Jews 74.8% and Arabs 20.7%).

We aimed to investigate the impact of ethnic matching on early and late outcomes following HT among patients enrolled in the Sheba Medical Center (SMC) HT Registry

Methods:

The study population comprised all 168 patients who underwent HT Between 1991-2017. Patients and their donors were ethnically categorized to Jews and Arabs. Primary end point was all-cause early and late mortality; secondary outcomes included primary graft dysfunction (PGD), rejections and vasculopathy. Total rejection score (TRS) based on the revised 2004 ISHLT grading system (0R=0, 1R=1, 2R=2, 3R=3) and any rejection score (ARS; 0R=0, 1R=1, 2R=1, 3R=1) were normalized for the total number of biopsy specimens.

Results:

Donor-recipient ethnic matching was found in 111 patients, whereas 57 were ethnic mismatched. Baseline characteristics were similar in both groups (Figure 1, Table 1).

In-hospital mortality was lower among the ethnic matched group (5.5% vs. 26%; $p<0.05$). Kaplan–Meier survival analysis showed that overall survival at 10 years was significantly higher among matched patients (78.3% vs. 43.2%, log-rank $p<0.001$, Figure 2).

Multivariate analysis showed that ethnic matched group experienced a significant 73% reduction in the risk for death (HR=0.27, 95% CI [0.086, 0.750], p=0.010). These findings were validated by propensity score analysis.

PGD was significantly lower among the matched group (Table 2).

The ethnic mismatched group experienced also significantly higher rejections rates (TRS 0.56±0.58 vs. 0.4±0.28; p=0.02, ARS 0.41±0.24 vs.0.34±0.2; p=0.03, Table 3). No differences in rate of vasculopathy were found.

Figure 1: Grouping of recipients and donors according to ethnic origin

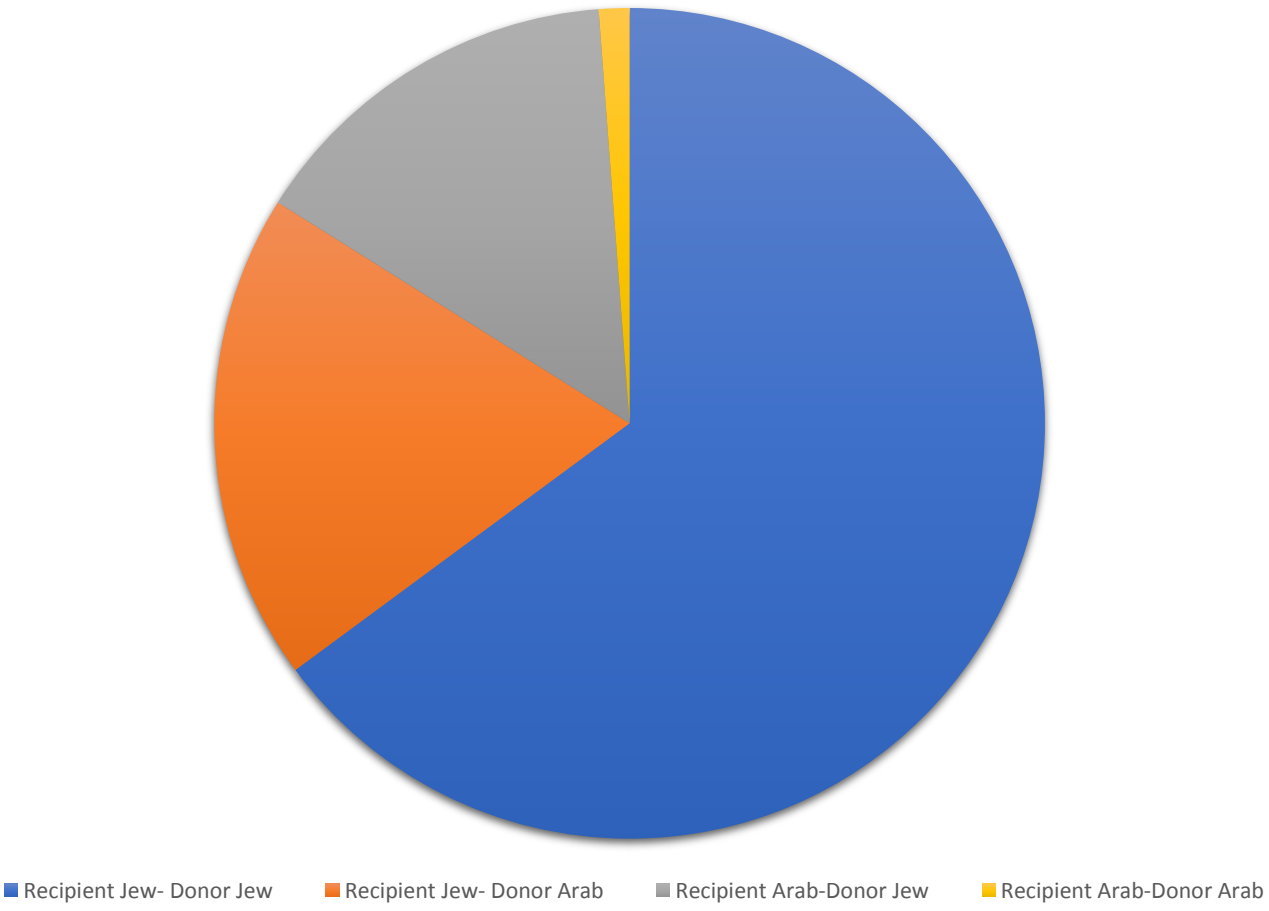

Table 1: Baseline Characteristics by ethnic matching

	Ethnic matching		P-value
	Mismatch (N=57)	Match (N=111)	
Gender-recipient [male,%]	75.4	82.9	.250
Gender-donor [male,%]	75.0	72.2	.710
Ethnic-recipient [Arab %]	44.0	2.0	<.001
Ethnic-donor [Arab %]	56.0	2.0	<.001
Age-recipient (y)	46.5±15.5	50.3±13.8	.104
Age-donor (y)	31.8±12.9	32.5±13.2	.766
BMI-recipient	24.2±4.5	24.8±4.5	.422
BMI-donor	24.3±4.3	24.5±3.7	.825
Etiology of HT [Ischemic heart disease,%]	52.6	60.6	.361
Hypertension (%)	67.4	72.4	.548
Diabetes (%)	21.2	18.9	.742
CMV mismatch	37.8	39.7	.855
Creatinine (mg/dL)	1.2±0.5	1.3 ±0.9	.530
Mean pulmonary artery pressure (mmHg)	34.9 ±12.7	34.6 ±14.1	.897
Pulmonary capillary wedge pressure (mmHg)	24.3 ±10.6	24.6 ±11.3	.892
Pulmonary vascular resistance (Wood)	2.3 ±1.1	3.2 ±1.1	.040
LVAD bridge to HT (%)	14.3	15.5	.842
PRA>30%	0.0	1.0	.722

Continuous variables and categorical variables are presented as mean±standard deviation and percentage, respectively.

Figure 2: Survival by ethnic matching using Kaplan-Meier analysis

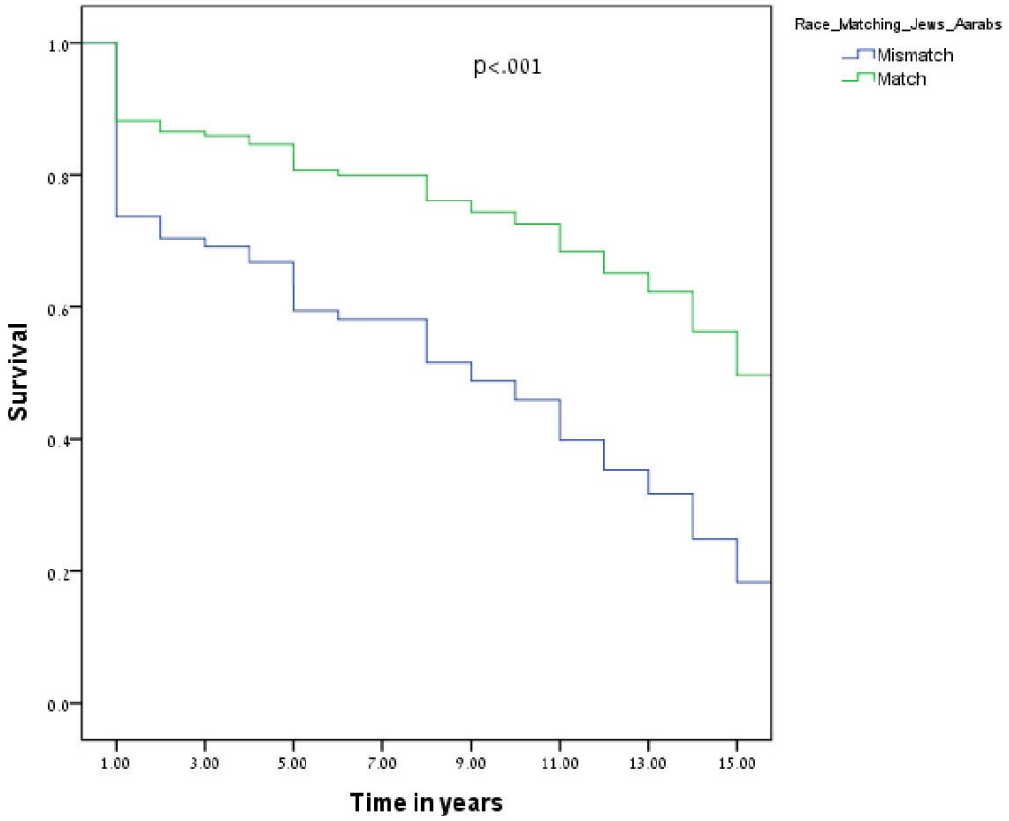

Table 2: Operative data

	Ethnic matching		P-value
	Mismatch (N=57)	Match (N=111)	
Ischemic time (minutes)	167.9±45.3	148.0±40.2	.007
Primary graft dysfunction (%)	50.9	21.2	<.001
Days from admission to discharge	57.6±12.8	56.7±7.8	.957
Days from transplant to discharge	18.1±23.2	16.9±14.2	.861
In-hospital death (%)	26	5.5	p<0.001

Table 3: rejection score

	Ethnic mismatched	Ethnic matched	p
Total rejection score	0.565±0.581	0.403±0.284	0.023
Any rejection score	0.418±0.249	0.339±0.206	0.03

Conclusions

Donor–recipient ethnic matching is a powerful independent predictor of early and long-term outcomes following HT.

The unique and blessed “bridge between hearts”, that crosses boundaries of religion and ethnicity may be further strengthened by our findings. The data presented in this paper will help to design treatment protocol unique to our patients emphasizing on frequency of biopsies, immunosuppressive