Heart Transplantation with Older Donors: Should there be an Age Cutoff

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Disclosures

- **I will not discuss off label use and/or investigational use of drugs/devices in my presentation.**
- **I have no financial relationships to disclose.**

Background

- **Heart transplantation (HTx) remains limited by donor availability.**
- **Although the traditional cutoff age for heart transplant donors is 55 years, only a few programs accept older donors (≥55 yrs) in an effort to broaden the donor pool.[1]**
- **The ISHLT registry has reported that older donor age is a risk factor for recipient mortality following HTx and recommends caution in transplanting donors ≥55 yrs.[2]**
- **The use of these older donor hearts remains contentious.**

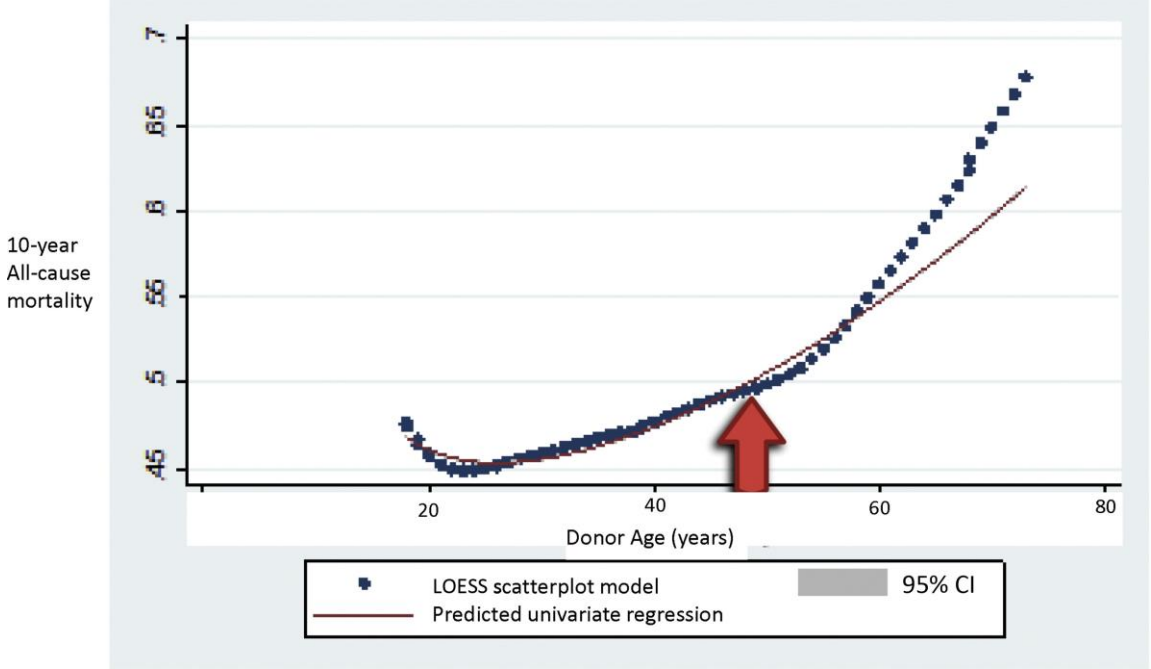
1. Kilic et al. *J Thorac Dis.* 2014 Aug;6(8):1097-1104
2. Costanzo et al. *J Heart Lung Transplant.* 2010 Aug:29(8):914-56

Background

- **Daniel et al. used the UNOS database to assess the outcome of recipients age >60 who received donor hearts > 50.**

- **They found that recipients of allografts with donor age more than 50 years were 30% more likely to die by 5 years compared with those receiving a donor heart younger than age 50. ”**

Background



Daniel et al. *Ann Thorac Surg.* 2019 Jan 1;107(1):62-66

Background

- **Gupta et al. compared Donors less than 50 to donors greater than or equal to 50 years.**
- **Conclusions: “Although we observed a substantial reduction in survival among patients who were allocated donor hearts at least 50 years of age, this difference was not solely attributable to the categorical variable of donor age 50 in this group. Donor age as a continuous variable, however, was determined to be a notable predictor of survival and use of the donor age cut-point of 40 years (categorical variable) allowed risk stratification with similar accuracy. The use of a donor age cut-point of 40 years may be a useful clinical criterion for graft-related risk assessment.”**

Background

- **Prieto et al.: Conclusion: “Parameters of exclusion of donor hearts can and must be adjusted, since the use of selected marginal donors associated with short ischaemic times appears to have no negative impact on morbidity and mortality, more importantly when compared with mortality on the waiting list.”**

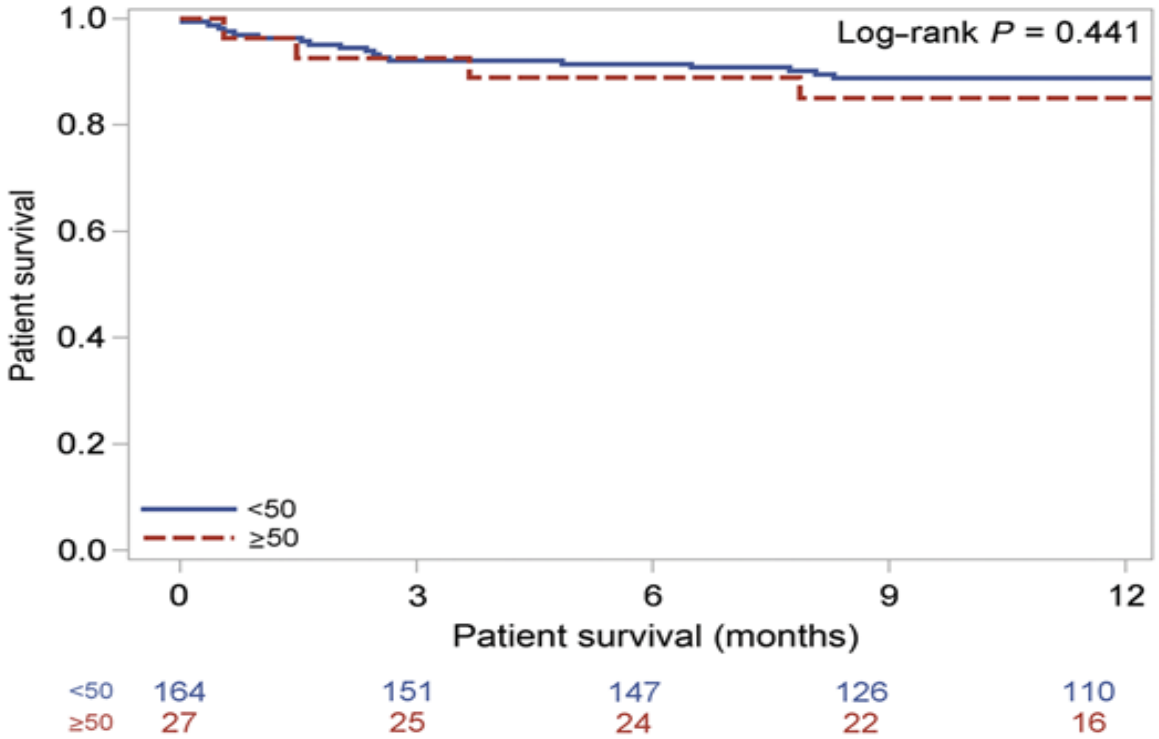
Background

- **Ram et al. sought to assess donor- recipient age differences to determine if there was an impact on long term survival**
- **Patients were divided into three groups: donors older than recipients, donors younger than recipients, and donors much younger than recipients**
- **There was no statistical difference in survival between the groups. However, gender matching in the young group led to a lower incidence of PGD**

Background

- **Chamogeorgakis et al. assessed their heart transplant cohort and divided patients into those who received donors>50 and those who had donors <50**
- **There was no significant difference in survival**

Background



Chamogeorgakis et al. *Interact Cardiovasc Thorac Surg.* 2016 Oct;23(4):580-3

Purpose

- **We sought to assess our HTx recipients who received donors ≥55 years and compared them to those who received donors <55 years old.**

Methods

- **Between 2010 and 2018, we assessed 815 HTx recipients and divided them into those who received donors ≥ 55 years (n=65) and those who received donors <55 years (n=750).**

- **We further subdivided the Older donor group into 55-59 years and 60-64 years.**

Methods

- **Endpoints included:**
  - 1,3 and 5 year survival
  - 1-year freedom from cardiac allograft vasculopathy (CAV) as defined by stenosis ≥ 30% by angiography
  - 1-year freedom from non-fatal major adverse cardiac events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke)
  - 1-year freedom from any-treated rejection, acute cellular rejection and antibody-mediated rejection

Demographics

Demographics	Donors ≥ 55 Years (n=65)	Donors < 55 Years (n=750)	p-value
Mean Recipient Age, mean ± SD	62.8 ± 10.0	54.9 ± 13.0	<.001
Mean Donor Age, mean ± SD	57.6 ± 2.3	33.7 ± 13.6	<.001
Body Mass Index, mean ± SD	25.3 ± 4.4	25.4 ± 4.7	0.857
Female, %	32.3	29.5	0.63
Previous Pregnancy in Females, %	90.0	72.1	0.112
Ischemic Cardiomyopathy, %	43.1	30.8	0.041
Status 1 at Transplant, %	60.7	82.9	<.0001
Cytomegalovirus Mismatch, %	28.3	24.1	0.463

Demographics

Demographics	Donors ≥ 55 Years (n=65)	Donors < 55 Years (n=750)	p-value
Diabetes Mellitus, %	45.9	28.4	0.004
Treated Hypertension, %	62.5	48.8	0.049
Insertion of Mechanical Circulatory Support, %	12.3	28.4	0.005
Prior Blood Transfusion, %	37.5	50.0	0.073
Pre Transplant PRA >=10, %	20.0	32.7	0.035
Pre Transplant Creatinine, mean ± SD	1.3 ± 0.6	1.5 ± 1.1	0.012
ATG Induction Therapy, %	47.7	51.5	0.558
Gender Mismatch (%)	24.6	24.4	1.000
Female into Male Mismatch (%)	15.4	13.0	0.568

Demographics

Demographics	Donors ≥ 55 Years (n=65)	Donors < 55 Years (n=750)	p-value
INR, Mean ± SD	1.6 ± 0.6	1.5 ± 0.5	0.144
Total Bilirubin, Mean ± SD	1.3 ± 0.8	1.2 ± 0.6	0.885
Sodium, Mean ± SD	135.5 ± 2.8	135.3 ± 2.8	0.558
MELD Score, Mean ± SD	14.2 ± 5.6	14.4 ± 5.9	0.746
Ischemic Time Minutes, mean ± SD	157.5 ± 55.6	157.7 ± 58.2	0.985
Total CPB Time, Mean ± SD	151.5 ± 61.8	157.0 ± 57.5	0.458
Temporary MCS (ECMO)	1.5	0.6	0.381
Temporary MCS (ECMO + any non-durable)	4.6	6.9	0.613

Results

Endpoints	Donors ≥ 55 Years (n=65)	Donors < 55 Years (n=750)	P-Value
1-Year Survival	87.2	91.2	0.205
3-Year Survival	85.2	84.6	0.536
5-Year Survival	62.9	79.0	0.192
1-Year Freedom from NF-MACE	74.8	86.5	0.012
1-Year Freedom from CAV	87.9	94.8	0.022
1-Year Freedom from Any-Treated Rejection	89.6	82.6	0.211

Results Summary

- **There was no significant difference between the donor ≥55 group and donor <55 groups in terms of 1 ,3 and 5 year survival.**
- **The donor ≥55 group had a significantly lower freedom from CAV and NF-MACE at 1 year.**
- **There was no difference in any type of rejection between the two groups.**
- **The causes of mortality in the older donor group was predominately Primary Graft Dysfunction and infectious complications.**

Conclusion

- **Heart transplant recipients receiving donor hearts ≥ 55 years appear to have acceptable early and mid-term survival.**
- **Despite the lower freedom from CAV and NF-MACE, the older donors can be considered for a selected group of recipients with acceptable outcome.**
- **Larger numbers are warranted to confirm these findings.**