Prognostic Value of Dobutamine Stress Echocardiography in Heart Transplantation Recipients

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DISCLOSURES

A Singhvi: None

R Araujo-Gutierrez: None

MH Park: None

A Bhimaraj: Consulting Fee: Abbott, Abiomed

BH Trachtenberg: None

I Hussain: None

A Guha: Consulting Fee: Abiomed, Speaker: Johnson and Johnson, Bayer.

BACKGROUND

- Dobutamine stress echocardiography (DSE) carries a class IIa recommendation for screening of cardiac allograft vasculopathy (CAV).

- Positive DSEs have a modest ability to diagnose CAV, however a normal DSE has a fairly low negative predictive value for angiographic CAV.

- The ability of a positive DSE to predict outcomes is controversial.

- Outcomes following a normal DSE have not been assessed in large, modern cohorts.

OBJECTIVES

- We sought to assess the accuracy of DSE in detecting CAV in our cohort.

- We also sought to analyze the prognostic value of DSE in heart transplantation recipients.

METHODS

- All adult heart transplantations performed at our institution from 2000 to 2010 were retrospectively reviewed.

- Multi-organ transplant recipients, patients who expired within the first year after transplantation, and those who did not have a DSE were excluded.

- At our institution, DSE is the diagnostic modality of choice till 4 years post transplant. From the 5th year onwards, coronary angiography is performed.

- An abnormal DSE prior to 5 years also usually prompts an angiography.

- Patients were grouped according to their DSE result and development of angiographically significant CAV (ISHLT grade ≥2) and survival were analyzed.

- We further analyzed outcomes in patients with a normal DSE and predictors of development of CAV in this cohort.

- Unpaired t-test was used for analysis.

- Kaplan-Meier survival curves were generated.

- *P* value <0.05 was considered significant.
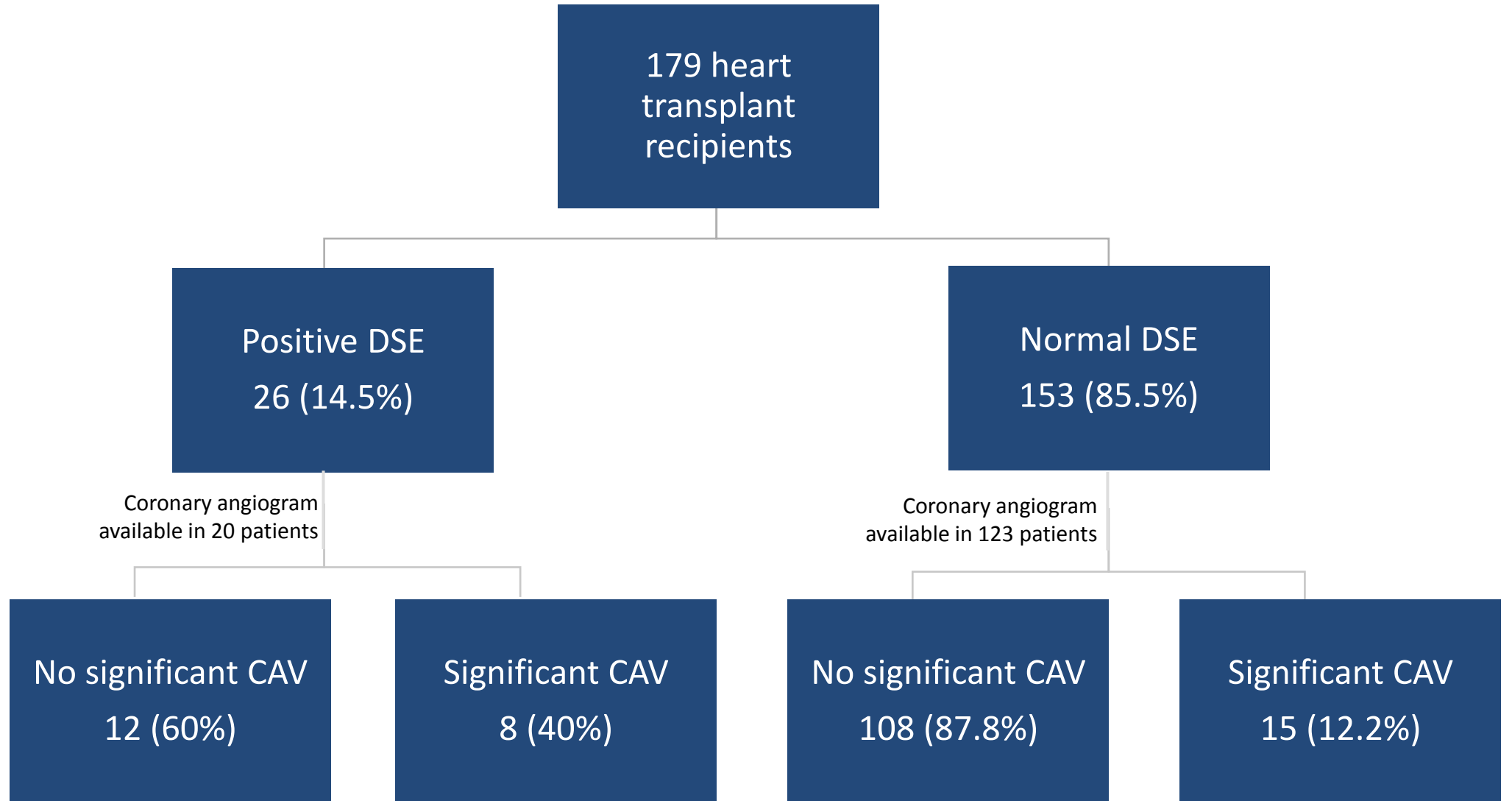
RESULTS

Patient Characteristics

179 heart transplant recipients included in the analysis

Baseline Characteristics	n=179
Age* (mean ± SD)	60.1 ± 10.4
Male gender	139 (77.6%)
Race	115 (64.2%)
BMI (mean ± SD)	27 ± 4.2
Non-ischemic CMP	81 (45.2%)
Ischemic CMP	98 (54.7%)
Comorbidities	
Diabetes Type I	4 (2.2%)
Diabetes Type II	53 (29.6%)
Hypertension	63 (35.25)
Re-transplant	3 (1.7%)
Pre-transplant support	
LVAD	15 (8.4%)
Inotropes	72 (40.2%)
IABP	32 (17.9%)
ECMO	1 (0.56%)
Donor age >40 years	39 (24%)
Gender Mismatch	43 (24%)
Ischemic Time (hours, mean ± SD)	2.6 ± 0.9
Ischemic Time >4 hours	9 (5%)
Years to cath from transplant (median, range) Ɨ	5.1 (1.1-11.6)

*Age at time of DSE
Ɨ Cath available in 142/179

179 heart transplant recipients

Positive DSE
26 (14.5%)

Normal DSE
153 (85.5%)

Coronary angiogram available in 20 patients

Coronary angiogram available in 123 patients

No significant CAV
12 (60%)

Significant CAV
8 (40%)

No significant CAV
108 (87.8%)

Significant CAV
15 (12.2%)

Characteristics by DSE Result

A positive DSE was associated with:

- Angiographically significant CAV (50% vs 29.3%, P=0.0015)
- Higher ISHLT grade CAV (mean grade 0.84±1 vs 0.34±0.6, P=0.0077)

	DSE + n=26	DSE - n=116	P value
Age*	64.1 ± 6.7	59 ± 10.3	0.0188
Male gender	21 (80.8%)	90 (77.6%)	0.7248
Caucasian	16 (61.5%)	74 (63.8%)	0.8307
Any CAV	13 (50%)	34 (29.3%)	0.0431
CAV ≥2	7/26 (26.9%)	6/116 (5.2%)	0.0004
CAV Grade (mean)	0.84 ± 1	0.34 ± 0.6	0.0010

*At time of DSE
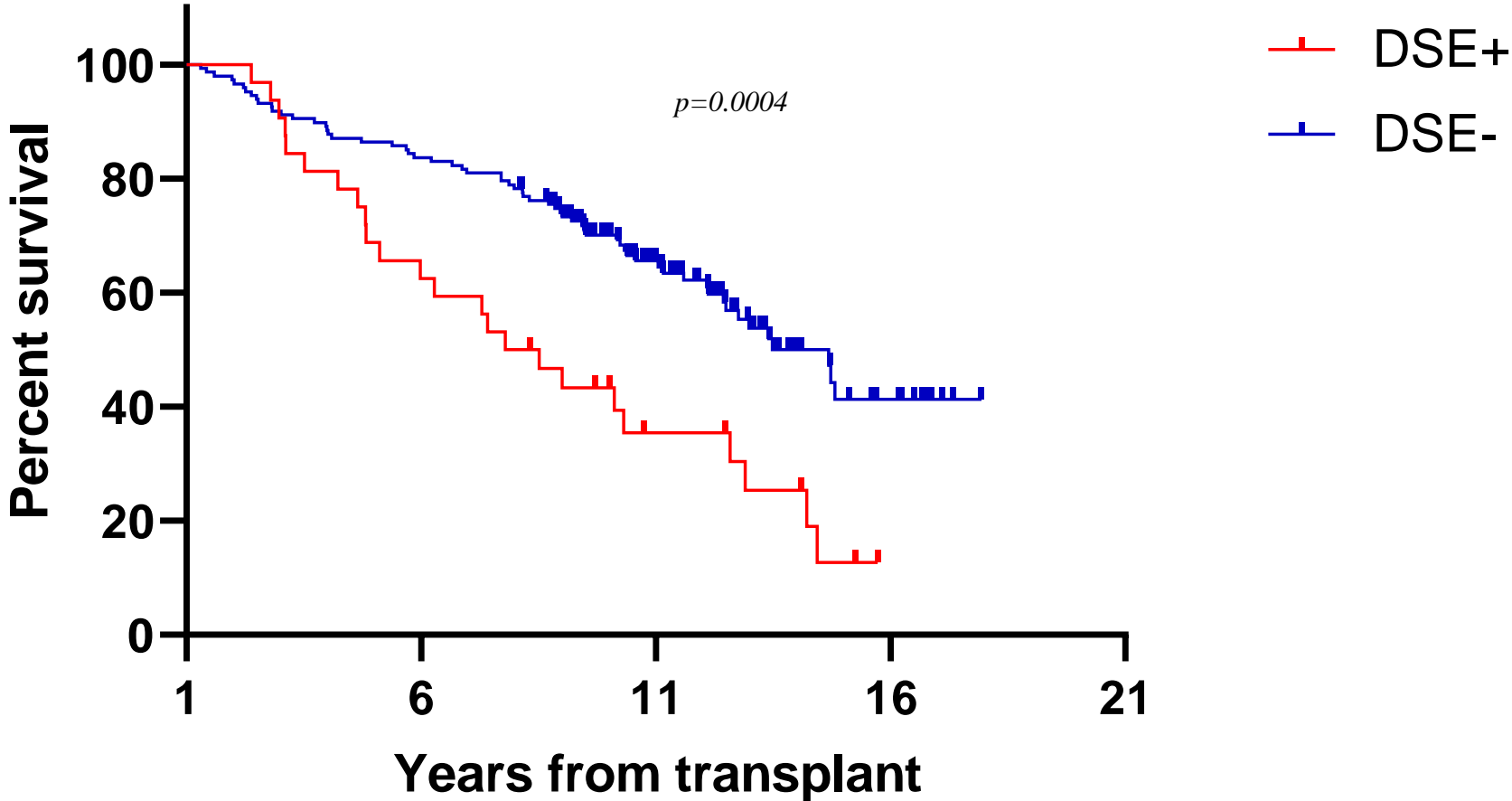Only patients with cath data available included in this analysis

Presence and Severity of CAV by DSE Result
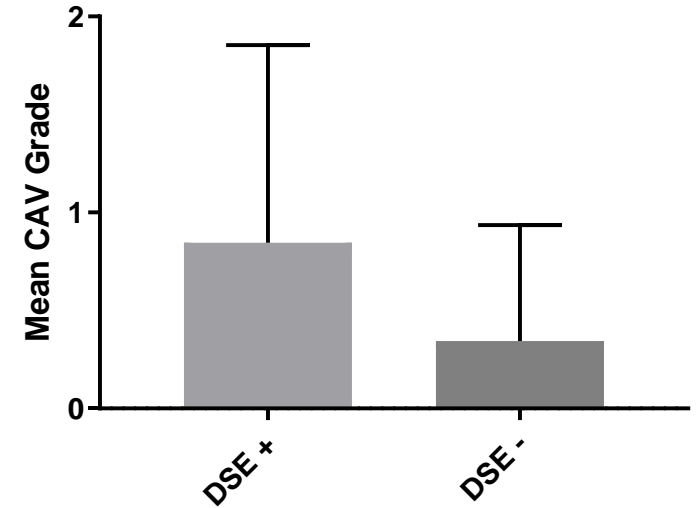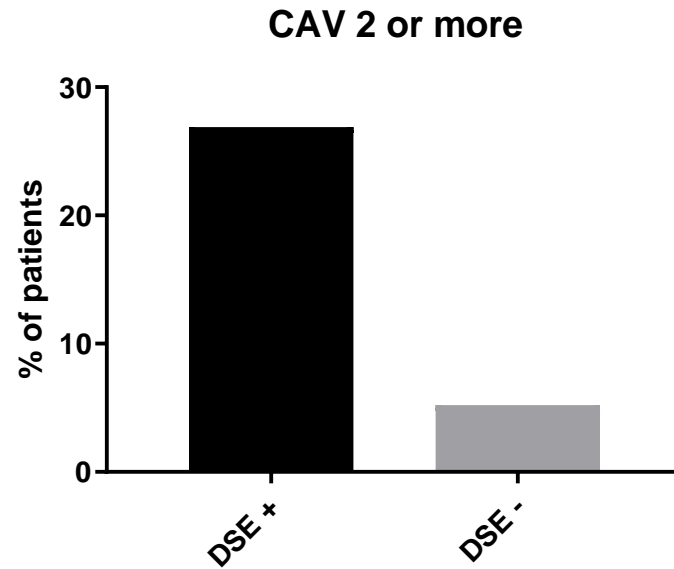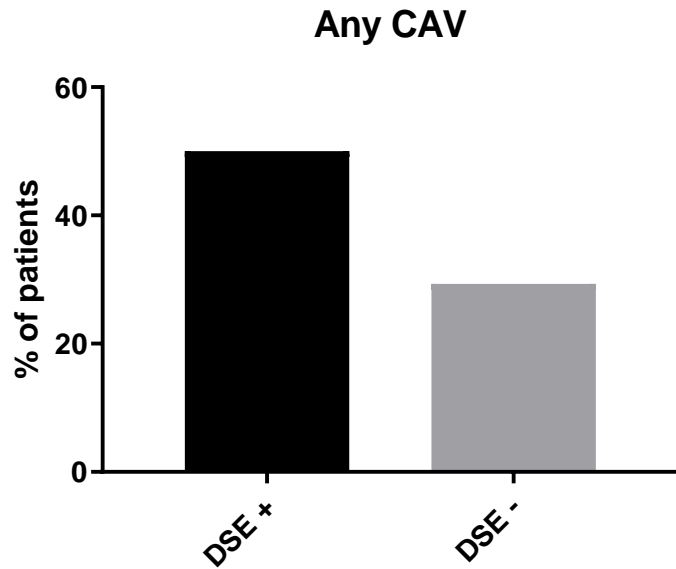
Survival by DSE Result

Worse 10-year survival in those with a positive DSE (43.3% vs 70.1%, *P*=0.0018)

Kaplan-Meier Survival Curve

Patient Characteristics by CAV Status of those with a normal DSE

In those with a normal DSE, those who developed CAV had:
- Higher prevalence of hypertension, donor age >40 years and HLA DR mismatch
- No differences in age, gender or BMI

	DSE – CAV- n=82	DSE – CAV+ n=34	P value
Age*(mean ± SD)	59.4 ± 9.1	58.1 ± 12.9	0.5451
Male gender	61 (74.4%)	29 (85.3%)	0.2032
Caucasian	55 (67.1%)	19 (55.9%)	0.2575
BMI	27.1 ± 4.5	28 ± 4.3	0.3137
Comorbidities			
Diabetes	22 (26.8%)	8 (23.5%)	0.7147
Hypertension	22 (26.8%)	17 (50%)	0.0160
CMV Mismatch	33/69 (47.8%)	11/30 (36.7%)	0.3093
DR Mismatch (mean ± SD)	1.6 ± 0.6	1.3 ± 0.7	0.0374
Donor age >40	13/82 (15.8%)	12/32 (37.5%)	0.0118
Dialysis after listing	3 (3.6%)	0	-
Stroke after listing	3 (3.6%)	1 (2.9%)	0.8821

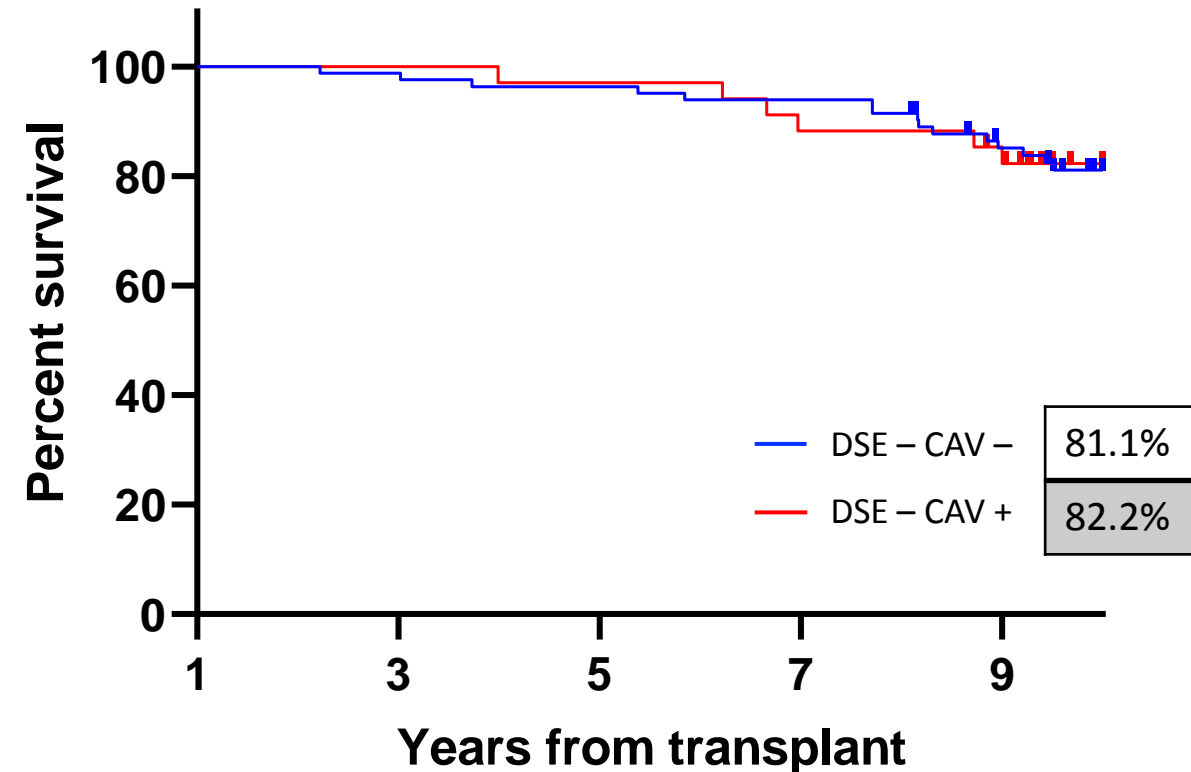DR mismatch data in 75/82 and 29/34 patients, respectively.

Survival in those with Normal DSE

Following a normal DSE, no difference in overall survival or 10-year survival between those who developed and did not develop CAV
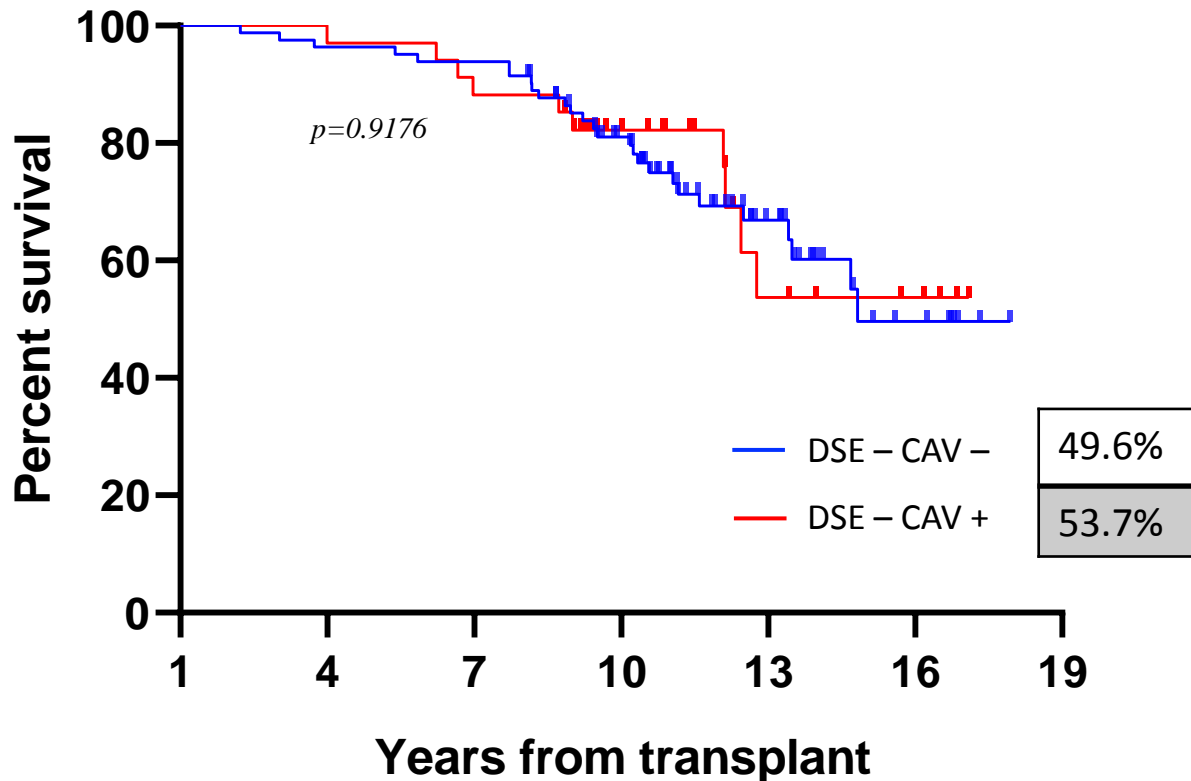
CONCLUSION

- A positive DSE is associated with development of angiographically significant CAV and worse survival.

- A normal DSE is associated with better survival, regardless of development of CAV.

THANK YOU

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