Hemi-Arch versus Total Arch Replacement in DeBakey Type I Acute Aortic Dissection

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Objectives

Although recent reports indicate a trend towards a more extensive arch operation, the recommended extent of graft replacement in acute type A aortic dissection (AAAD) is an ongoing controversy.

The aim of this study was to compare early and late outcomes of hemi-arch versus total arch replacement in DeBakey type I communicating AAD patients.

Patients and Methods

Graft replacement for AAAD from 2004 to 2022

221patients

39 patients were excluded.

- DeBakey type II dissection
- non-communicating dissection
- Chronic type B dissection
- Previous Thoracic Aortic repair
- Surgery after 14days from onset

Total 182 patients with DeBakey type I communicating AAAD

- Hemi-Arch Replacement (HAR)* : 80
- Total Arch Replacement (TAR) : 102

*: includes partial arch replacement

We retrospectively reviewed the preoperative patients' characteristics and the early and late surgical outcomes.

Characteristics of patients

	HAR n=80	TAR n=102	p
Male Gender	34 (42.5%)	64 (62.7%)	0.072
Age (y.o)	70.3 (38-90)	65.4 (31-94)	0.005
80 y.o. ≤	23 (28.8%)	15 (14.7%)	0.017
Previous MI	1 (1.3%)	2 (2.0%)	0.591
Previous stroke	6 (7.5%)	2 (2.0%)	0.074
Renal failure : w/ HD	1 (1.3%)	0 (0.0%)	0.440
Connective tissue disorders	3 (3.8%)	9 (8.8%)	0.142
Organ mal-perfusion	16 (20.0%)	37 (36.3%)	0.350
Shock	15 (18.8%)	11 (10.8%)	0.095
Distal arch diameter (mm)	38.6±5.7	40.3±7.1	0.137

Categorical data: n (%), Continuous data: mean (range)

Operative Data

	HAR n=80	TAR n=102	p
CPB time (min)	153±73	243±68	0.245
Operation time (min)	344±198	519±152	0.100
Concomitant surgery	18 (22.5%)	15 (14.7%)	0.509
Aortic valve (± Bentall)	13	7	
Mitral valve	1	0	
CABG	5	8	

CABG: Coronary artery bypass grafting, CPB: Cardio-pulmonary bypass,

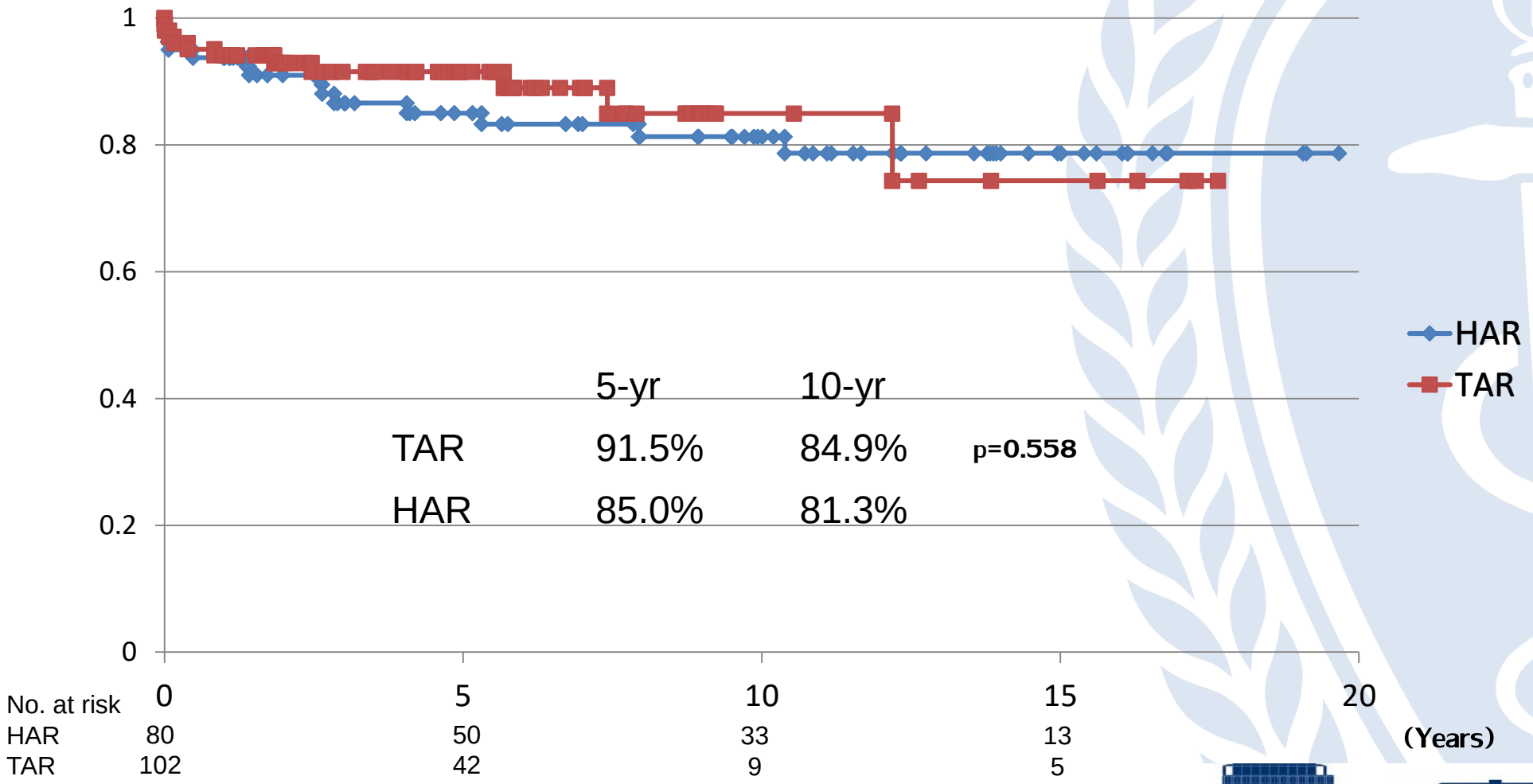
Operative Morbidity and Mortality

	HAR n=80	TAR n=102	P
Cerebral infarction	4 (5.0%)	5 (4.9%)	0.618
Acute myocardial infarction	2 (2.5%)	1 (1.0%)	0.409
Pneumonia	6 (7.5%)	5 (4.9%)	0.336
Acute renal failure (CHDF)	4 (5.0%)	2 (2.0%)	0.235
Gastro-intestinal ischemia	2 (2.5%)	1 (1.0%)	0.409
Hospital mortality	4 (5.0%)	3 (2.9%)	0.368

Late Outcomes: Mortality

	HAR n=80	TAR n=102
Ave. Follow up period (years)	8.2	4.7
Late Deaths	10	8
Cerebrovascular	2	2
Cardiovascular	1	1
Pulmonary	2	4
Malignancy	5	1

Freedom from All-Cause Mortality



Risk Factor Analysis of Hospital mortality

	Univariate	Multivariate	OR(95%CI)
Age>80yo	0.001	0.016	8.491 (1.496-48.201)
Connective tissue Dis.	0.473		
Previous MI	0.727		
Previous stroke	0.563		
Chronic Renal failure (HD)	0.841		
Shock	0.271		
Malperfusion	0.174		
TAR	0.473		

Stepwise logistic regression analysis

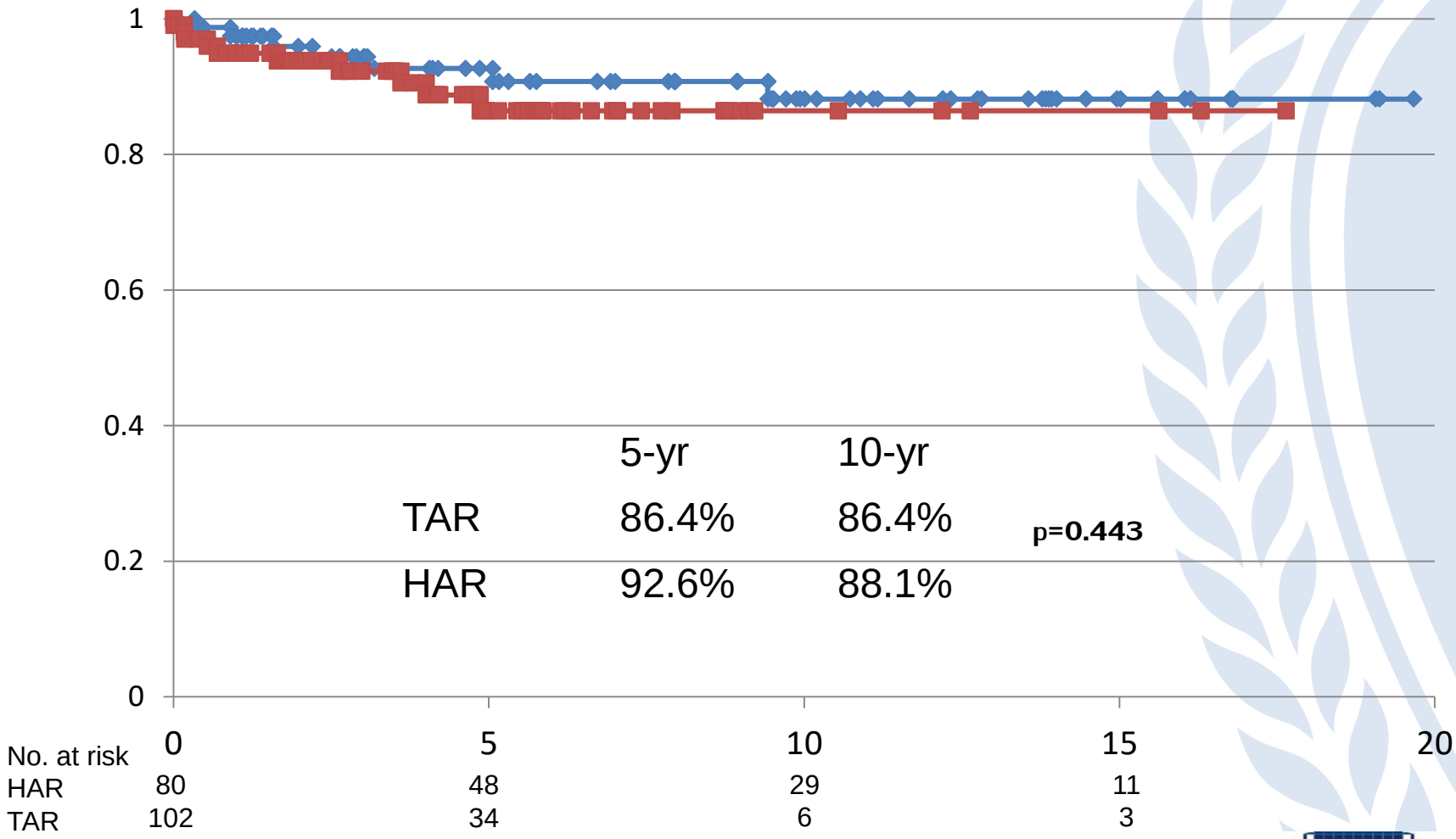
OR: Odds ratio, HD: Hemodialysis, MI: Myocardial infarction

TAR: Total arch replacement

Late Outcomes: Aortic Re-intervention

	HAR n=80	TAR n=102
Re-intervention (patients)	7 (8.8%)	10 (9.8%)
Ave. time to second op. (years)	3.2 (0.3-9.4)	1.5 (0.2-4.9)
Aortic Root	1	0
Arch	2	N/A
Descending	6	4
Thoracoabdominal	2	4
Abdominal	0	3
Multiple re-intervention	3	1

Freedom from Aortic Re-intervention



Risk Factor Analysis of Aortic Re-intervention

	Univariate	Multivariate	OR(95%CI)
Age<60yo	0.040	0.049	2.847(1.007-8.048)
Connective tissue disorders	0.088		
w/o Primary entry resection	0.020	0.021	3.398 (1.200-9.624)
HAR	0.509		

Stepwise logistic regression analysis

DTA: Descending thoracic aorta

HAR: Hemi-arch replacement

Discussions

- According to our results, simple hemi-arch replacement can be pursued to achieve the primary goal to save the patients with AAAD.
- Total arch replacement and hemi-arch replacement for AAAD achieved comparable operative outcomes.
- Total arch replacement might be useful for the patients with younger age.
- The main limitation of this study was its retrospective approach to the analysis, thus selection bias of patients could not be eliminated.