Outcomes of Total Arch Replacement and Frozen Elephant Trunk in Acute Aortic Syndrome

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Disclosures:

None

Background

Despite increasing reports of successful replacement of the aortic arch for acute aortic syndrome [1], arch surgery is nonetheless perceived with reverence.

Extension of the aortic pathology, preoperative status and GERAADA [2] score for 30-day mortality prediction are factors to be considered.

Single centre experience with the frozen elephant trunk in patients with acute aortic syndrome

[1] Di Bartolomeo R et al., Frozen elephant trunk surgery in acute aortic dissection. J Thorac Cardiovasc Surg. 2015 Feb;149(2 Suppl):S105-9. doi: 10.1016/j.jtcvs.2014.07.098. Epub 2014 Aug 10. PMID: 25212056.

[2] Czerny M et al., Prediction of mortality rate in acute type A dissection: the German Registry for Acute Type A Aortic Dissection score. Eur J Cardiothorac Surg. 2020 Oct 1;58(4):700-706. doi: 10.1093/ejcts/ezaa156. PMID: 32492120.

Methods

Single centre retrospective study

Includes all patients (n = 90) that underwent total arch replacement and frozen elephant trunk implantation for acute aortic syndrome between March 2008 and March 2023

No disclosures

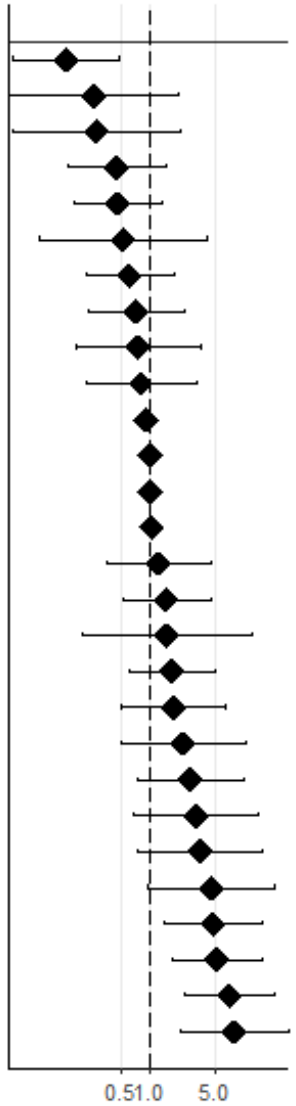
Results

Overall, 90 patients underwent FET implantation due to acute aortic syndrome, 81 of which were aortic dissections type A (AADA).

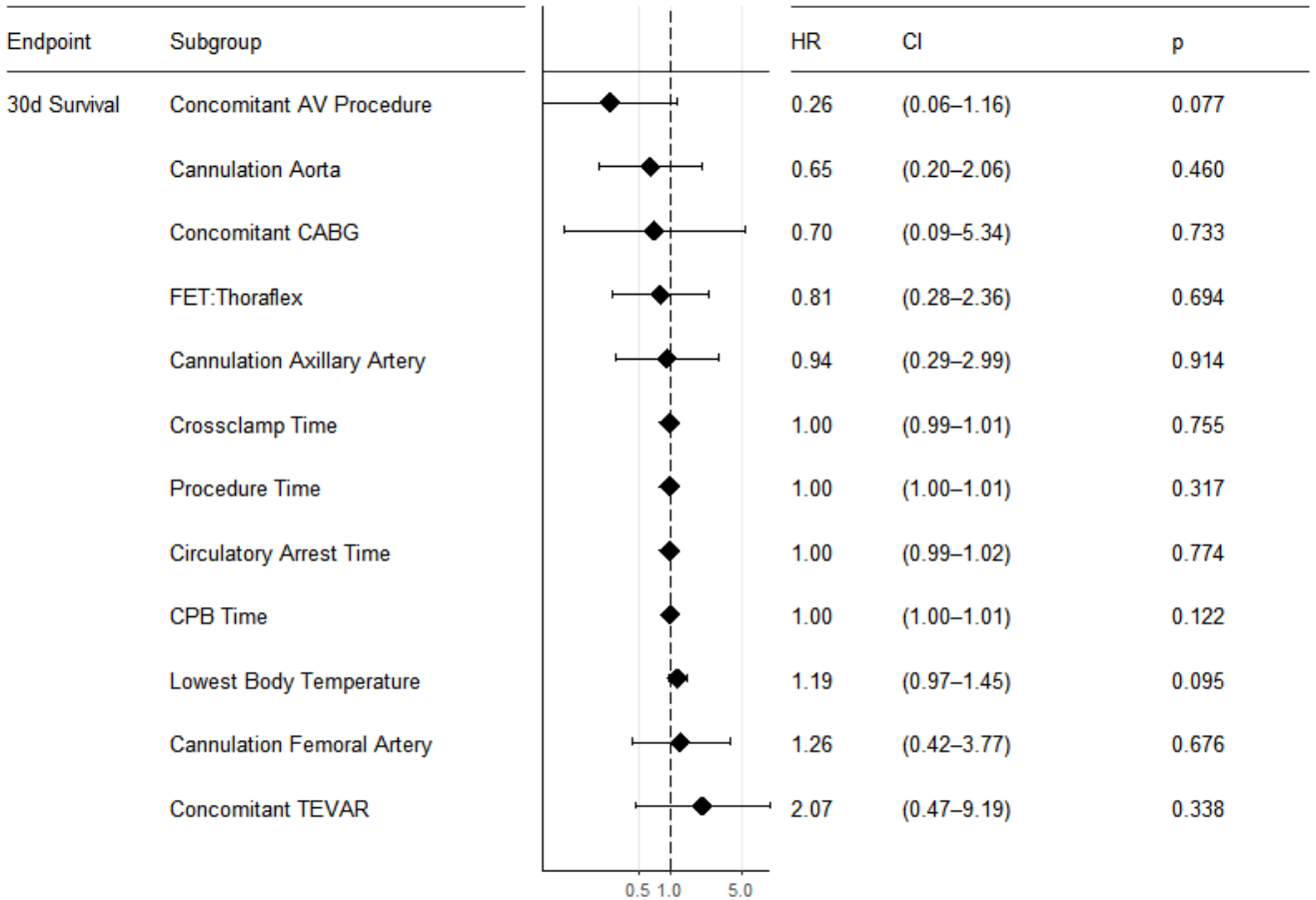
Mean age was 60.0 (±11.6 sd) years, 74 patients (82%) were male. All had extensive aortic pathologies with involvement of the aortic arch, supraaortic vessels or descending aorta.

All patients were operated in mild to moderate hypothermia with antegrade cerebral perfusion.

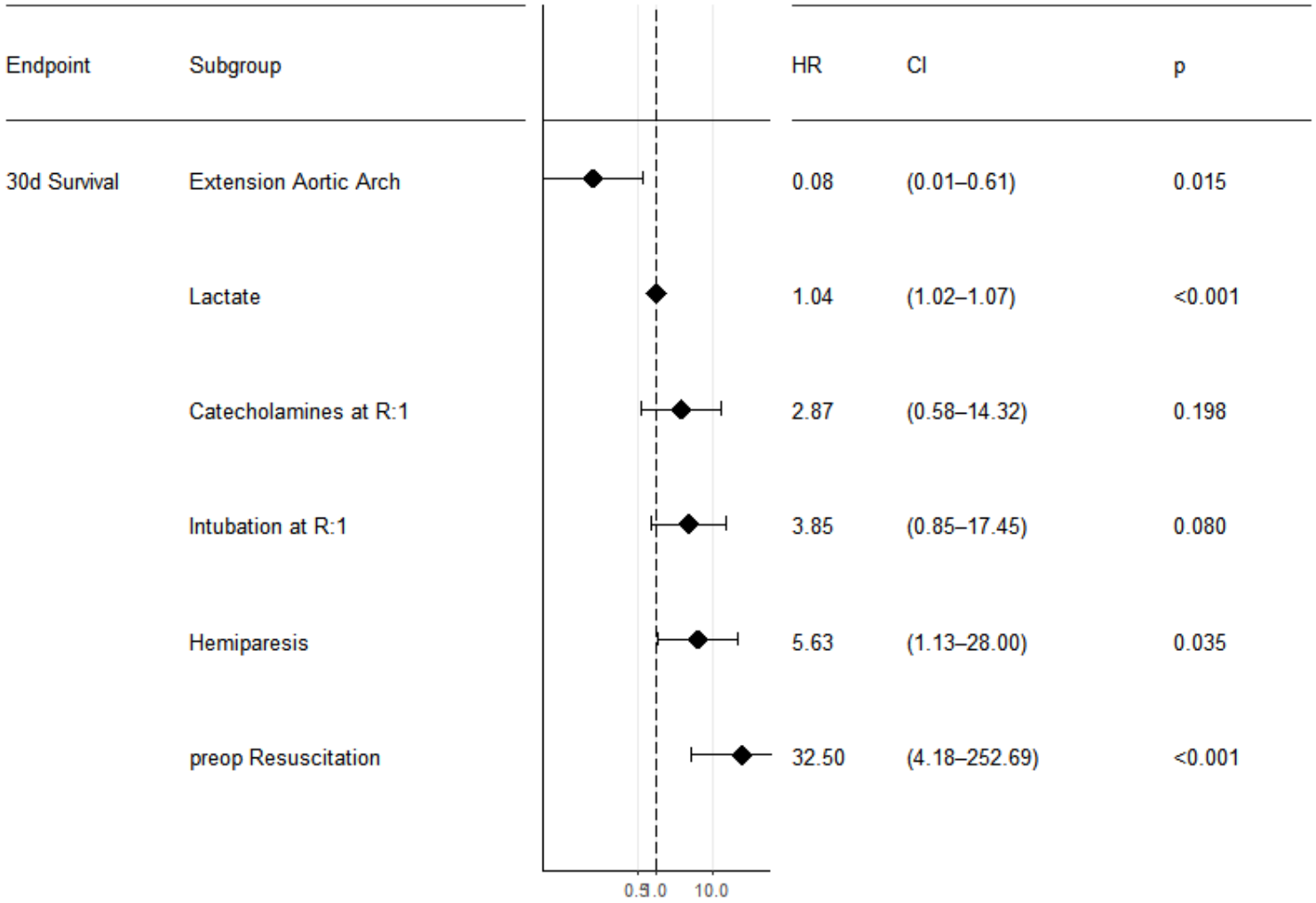
Endpoint	Subgroup	HR	CI	p
30d Survival	Extension Aortic Arch	0.14	(0.04–0.49)	0.002
	Malperfusion peripheral	0.27	(0.03–2.05)	0.205
	Extension Descending Aorta	0.28	(0.04–2.16)	0.224
	Malperfusion none	0.46	(0.14–1.48)	0.193
	Neurol. Asymptomatic	0.47	(0.16–1.34)	0.157
	Malperfusion renal	0.54	(0.07–4.14)	0.552
	Hypertension	0.62	(0.22–1.80)	0.380
	AI 0	0.73	(0.23–2.34)	0.602
	AI III-IV	0.77	(0.17–3.43)	0.729
	Smoking	0.83	(0.23–3.08)	0.786
	BMI	0.94	(0.82–1.07)	0.353
	Age	1.03	(0.98–1.07)	0.255
	Lactate	1.03	(1.02–1.05)	<0.001
	GERAADA Score	1.07	(1.04–1.09)	<0.001
	Sex	1.27	(0.36–4.49)	0.715
	AI I-II	1.51	(0.52–4.35)	0.445
	Diabetes	1.53	(0.20–11.70)	0.682
	Pericardial Effusion	1.73	(0.61–4.85)	0.300
	Extension Supraaortic Vessels	1.80	(0.51–6.39)	0.361
	Paraparesis	2.27	(0.51–10.12)	0.284
	Malperfusion cerebral	2.70	(0.74–9.87)	0.133
	Previous Cardiac Surgery	3.10	(0.70–13.74)	0.137
	Malperfusion coronary	3.42	(0.76–15.46)	0.111
	Malperfusion visceral	4.49	(0.99–20.29)	0.051
	Catecholamines at R:1	4.67	(1.43–15.21)	0.010
	Hemiparesis	5.13	(1.71–15.36)	0.003
	Intubation at R:1	6.94	(2.36–20.38)	<0.001
	preop Resuscitation	7.81	(2.15–28.36)	0.002



Forest plot showing results of univariate cox regression for preoperative parameters



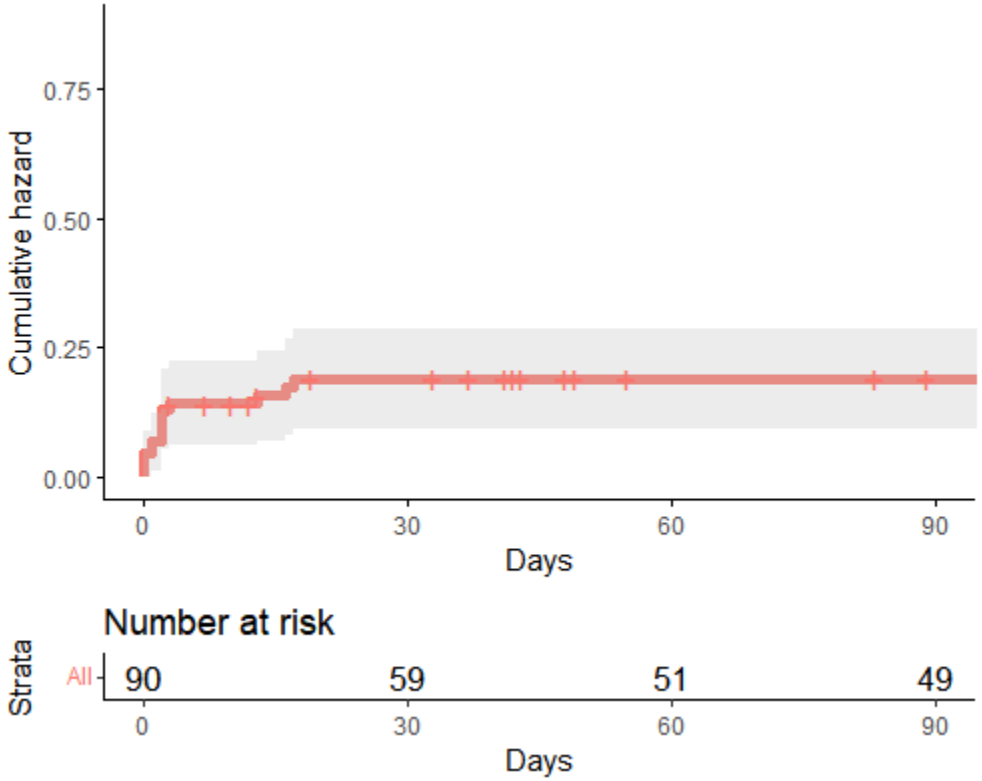
Forest plot showing results of univariate cox regression for intraoperative parameters



Forest plot showing results of multivariate cox regression for preoperative parameters

Preoperative lactate levels ($p<0.001$), preoperative hemiparesis ($p=0.035$) and preoperative resuscitation ($p<0.001$) served as significant predictors in a multivariate cox regression.

Variables such as procedure time or concomitant procedures had no significant influence on survival.

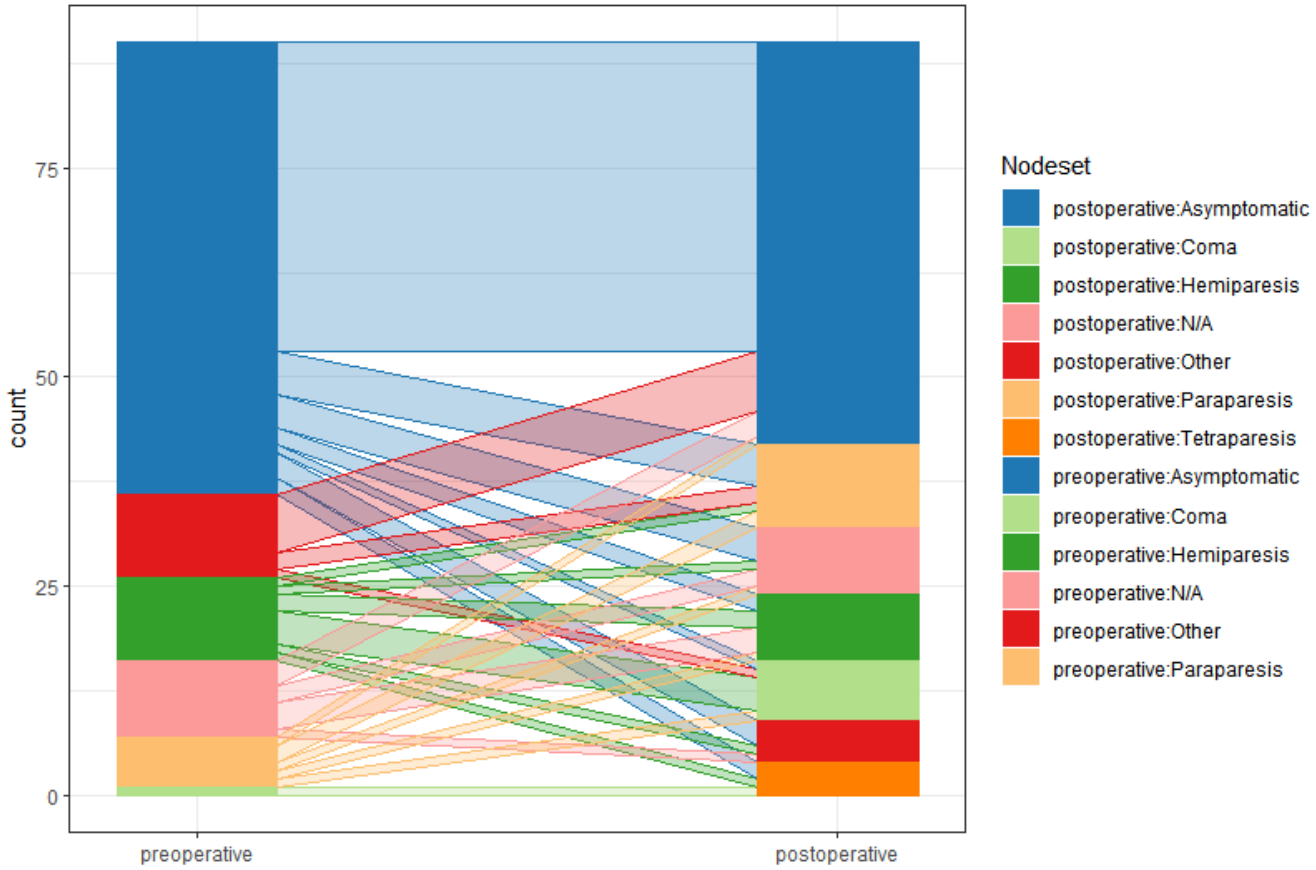


Cumulative hazard plot showing results of 90-day survival analysis

Predicted 30-day mortality by the GERAADA score was 23.9 % (SEM 0.148).

Actual 30-day mortality was 17.4% (SEM 4.1).

Trend towards overprediction but no statistically significant difference. Unpaired t-test p = 0.115.



Parallel coordinate plot showing individual development of neurological symptoms (preoperative and postoperative)

27 patients (30%) presented with neurological disorders, including aphasia, hemiparesis, paraparesis and coma.

Following surgery, neurological disorders were observed in 34 patients (38%).

Results

Several patients underwent concomitant procedures i.e., 32 patients (35%) underwent aortic valve procedure, 8 patients (9%) underwent CABG, 7 patients (8%) underwent TEVAR.

Reexploration for bleeding was required in 13 patients (14%). Postoperative haemodialysis was required in 21 patients (23%). Considering long term outcomes, aortic redo surgery was required in 8 patients (9%) and 5-year survival rate was 78.5%.

Since 2017 increased utilization of the approach. 26 patients (29%) received a FET before 2017 and 64 patients (71%) after that time point.

Conclusions

The recent adaptation of a comprehensive treatment approach i.e., total arch replacement and frozen elephant trunk implantation in acute aortic syndrome led to an improved outcome.

Overprediction trend of early mortality by the GERAADA score and a low rate of aortic redo surgery in the long-term course support this idea.