Long-term Outcomes in Consecutive 936 Patients with Acute Stanford type A Aortic Dissection Underwent Aggressive Indication of Total Arch Replacement for Primary Entry Resection

National Cerebral and Cardiovascular Center
Dept Vascular Surgery

Yosuke Inoue,
Kento Shinzato, Kazufumi Yoshida, Yojiro Koda, Takayuki Shijo,
Yoshimasa Seike, Hitoshi Matsuda

COI disclosure

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COI Disclosure Information

Name of Presenter：Yosuke Inoue

I have nothing to disclose

Background

- With the improvement of surgical techniques and perioperative management in patients with acute Stanford type A aortic dissection (AAAD) , initial surgical strategies focusing on long-term outcomes are gradually becoming the subject of discussion.

- TAR with frozen elephant trunk is one of the effective options for primary entry resection and distal false lumen thrombosis, however efficacy and long-term data are still insufficient from overview points of AAAD treatment.

Objectives

This study report the surgical results of aggressive indication of total arch replacement (TAR) aimed at primary entry resection, which we have consistently performed for last 25 years.

Patients and Methods

AAAD (1998-2023)
underwent emergency operation
(n=970)

Exclusion (n=34)
*TEVAR (N = 25)
*Insufficient preoperative data(N= 9)

Cohort of this study
(N = 936)

- Institution: Single center
- Design: Retrospective cohort study
- IRB: Approved by M30-057

Primary outcome

Surgical results and in-hospital mortality

Secondary outcome

Long-term survival

Reoperation during follow-up

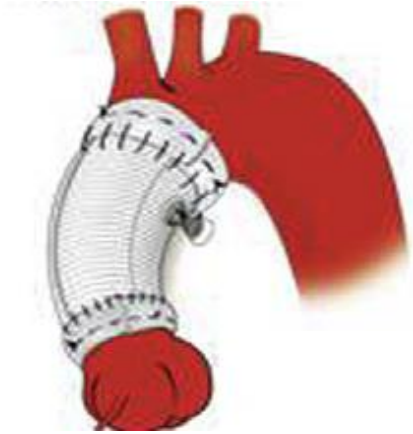
Surgical policies

Location of primary entry tear

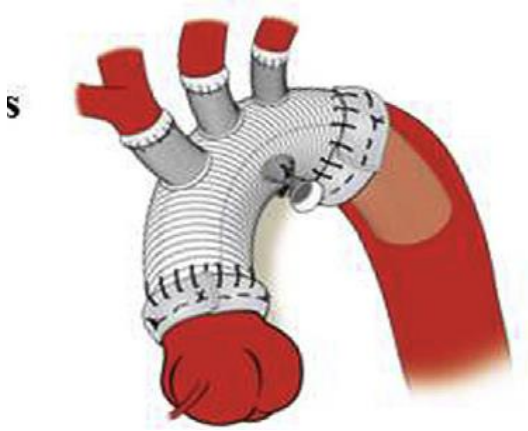
Ascending aorta

Beyond the arch

*Neck vessel dissection
*Arch dilatation
*Younger age (<50)
*Hereditary aortic disease



Non-TAR



TAR

Principle policy of TAR

- ✓Indicated regardless of patients' age
- ✓Not indicated for salvage operation
  (requiring resuscitation, deep coma)
- ✓Elephant trunk is routinely inserted
- ✓Frozen elephant trunk (FET) implantation from 2014 with Zone 3 anastomosis
- ✓Neck vessels are individually reconstructed

Statistics and Patient follow up

- ✓Nominal variables are analyzed by fisher exact T test and logistic regression model, and continuous variables are analyzed by student T test or Mann-whitney U test dependent test where it follows a normal distribution or not.
- ✓Long-term survival are presented Kaplan-Meire method and evaluated by Log-rank test.
- ✓Contrast medium CT angiography was taken within 1 month after the operation and false lumens status is evaluated by postoperative CT angiography in early phase
- ✓Follow-up CT scan was checked at outpatient clinic 3, 6, 12 months after the operation and annual follow up thereafter.
- ✓Lost follow up is defined no confirmation of survival more than 1 year

Results-1 (Patients' demographics)

Variables		N (%)
Age (Mean ± 2SD) / Age ≥ 80 years old		67.8 ± 13.5 / 196 (20.9 %)
Male gender (N/%)		466 (47.6 %)
Preoperative Status	Shock	179 (21.4 %)
	Hemodynamic collapse requiring resuscitation	34 (4.1 %)
	Chronic kidney disease (creatinine >1.5 mg/dl)	76 (8.1 %)
Malperfusion	Coronary	77 (8.2 %)
	Brain and arm	162 (17.3 %)
	Visceral	53 (5.7 %)
	Leg	79 (8.4 %)
DeBakey classification (I/II/III retrogade)		676 (72.2 %)/110 (11.8 %)/ 111 (11.9 %)
Distal extent of aortic dissection	Ascending –Arch	220 (23.5 %)
	Descending	143 (15.3 %)
	Abdominal aorta	186 (19.7 %)
	Iliac artery	358 (38.3 %)

Results-2 Surgical procedures and early results

Variables		N (%)
Primary entry resection rate		**865** (92.4 %)
Main surgical procedure		
	Hemiarch or Partial arch replacement (1 or 2 vessel reconstruction)	520 (55.6 %)
	Total arch replacement -- Classical elephant trunk	184 (19.7 %)
	-- Frozen elephant trunk	232 (24.7 %)
Concomitant procedures	CABG	64 (6.8 %)
	Root replacement	95 (10.1 %)
Operative variables	Operation time (mean ± 2SD) (min)	458 ± 174
	Cardiopulmonary bypass time	249 ± 101
	Circulatory arrest time	54 ± 20
In-hospital mortality		101 (10.8 %)
Complication	Mechanical ventilation (> 72 hours)	330 (35.3 %)/
	Stroke (including preoperative established stroke)	83 (8.8 %)
	Permanent spinal cord ischemia	1 (0.1 %)
	Tracheostomy	102 (10.9 %)

Results-3 (Risk factors for in-hospital mortality)

Variables	Univariable	Multivariable		
	P value	Odds ratio	95% CI	P value
Age > 80s	0.004	3.39	1.84- 6.26	<0.001
Male gender	0.113	1.53	0.88– 2.67	0.13
Chronic kidney disease	0.033	2.53	1.16 – 5.53	0.019
Preoperative coma	<0.001	2.98	1.60 – 5.53	<0.001
Malperfusion				
Coronary	<0.001	1.80	0.83 – 3.87	0.13
Visceral	0.041	3.33	1.46 – 7.60	0.004
Shock	<0.001	2.35	1.26 – 4.40	<0.001
Hemodynamic collapse requiring resuscitation	<0.001	6.14	3.02 – 12.5	<0.001
Operation time > 460 min	<0.001	3.54	1.98 – 6.32	<0.001
Circulatory arrest time > 65 min	0.02	1.98	1.10 – 3.58	0.024
Non-TAR replacement	0.005	2.1	1.08 – 3.93	0.029

Results-4 Long-term survival

AAAD (1998-2023)
underwent emergency operation
(n=970)

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Cohort of this study
(N = 936)

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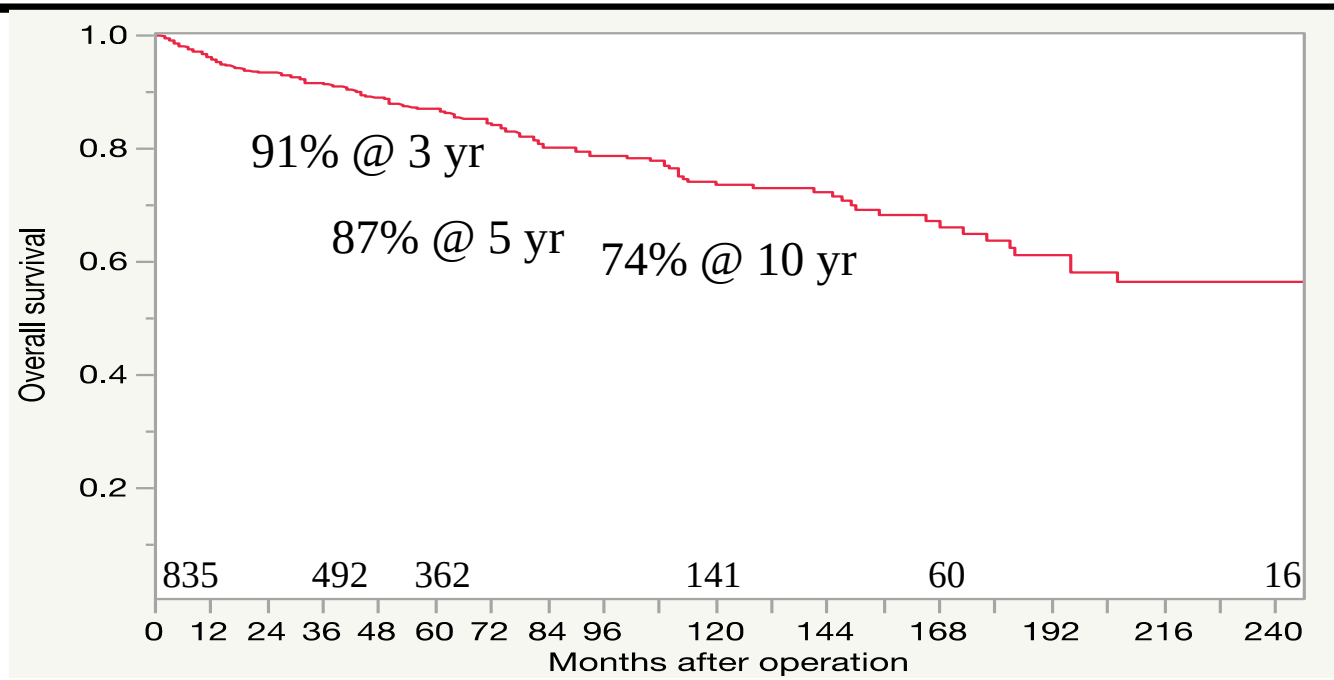
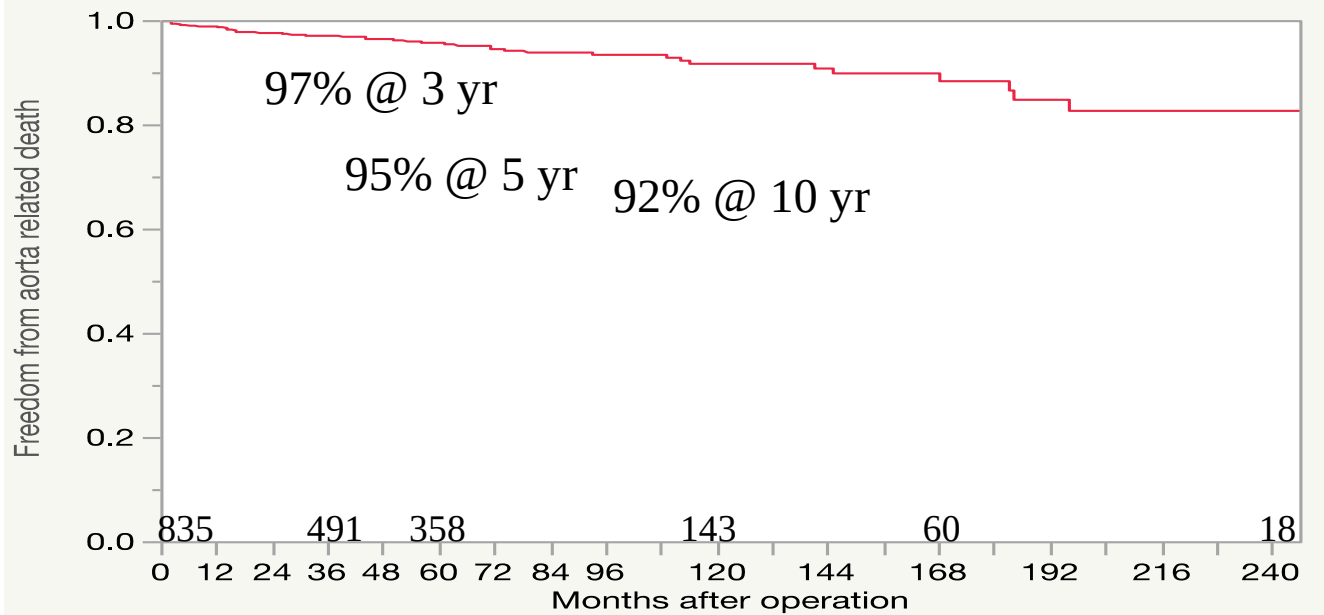
Hospital survivor
(N = 835)

Follow up rate : 90.8 % (758/835)
Mean follow up: 65 months

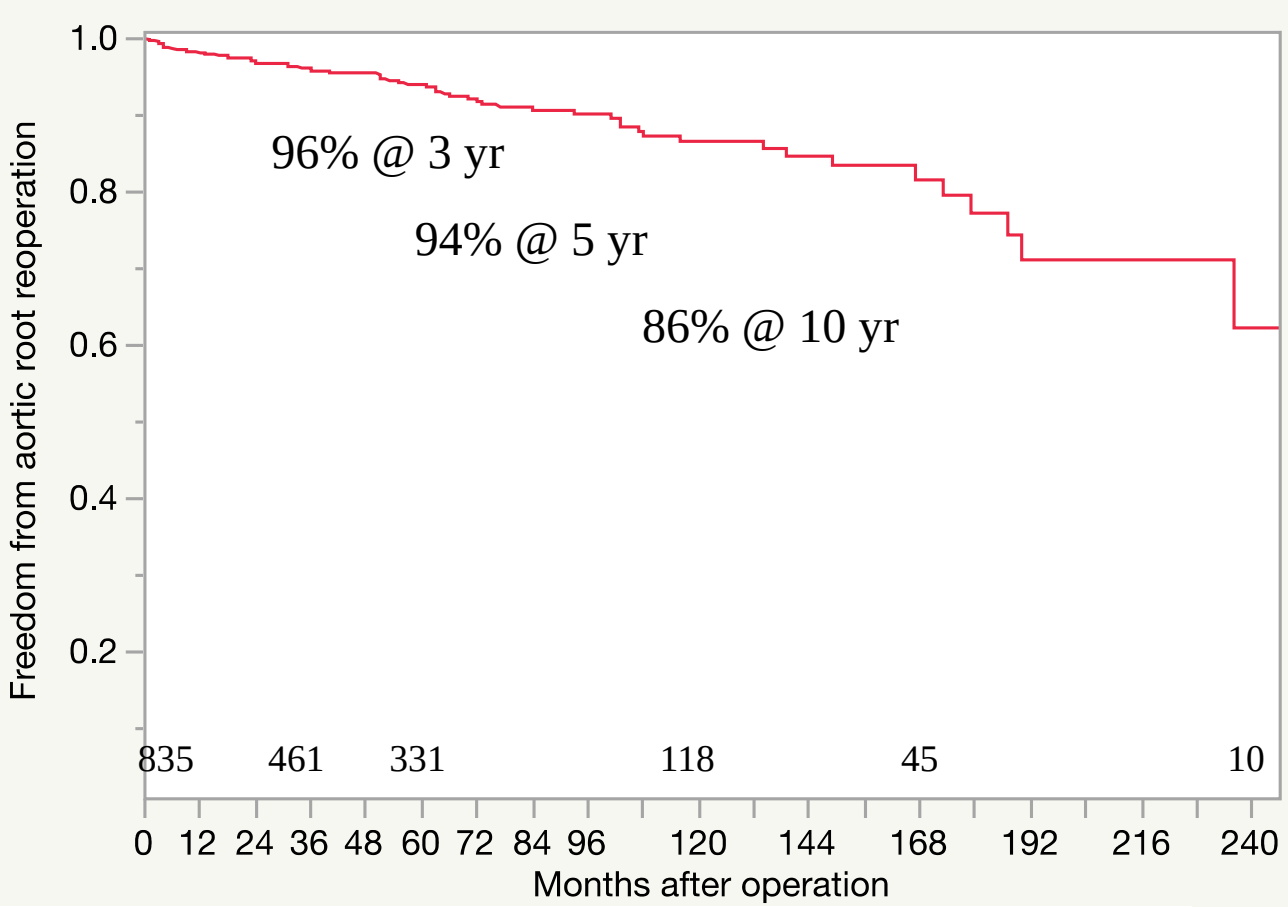




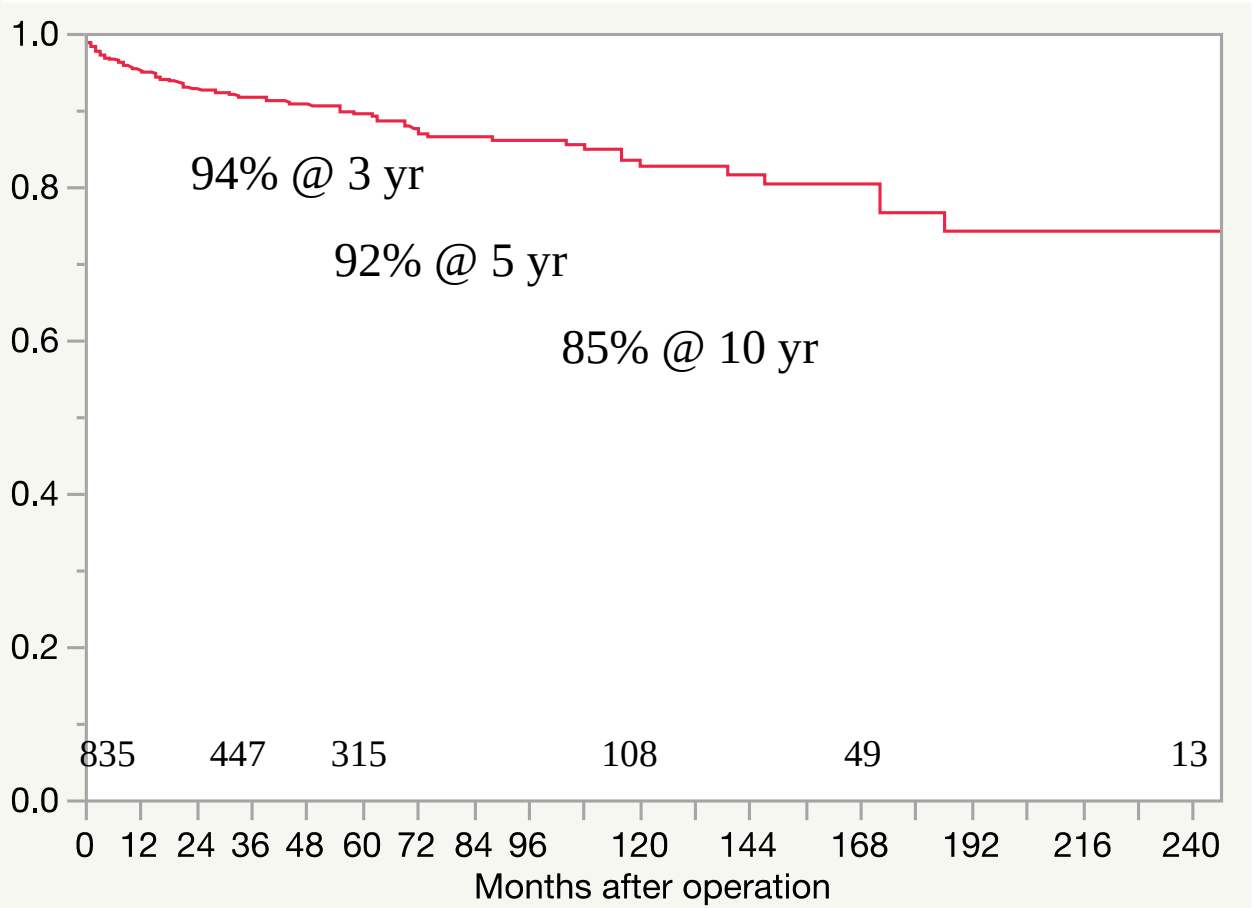
Results-5 freedom from reoperation

- ✓ Reoperation was indicated dilation (>55mm), rapid enlargement (5mm> 6months), pseudoaneurysm formation.

Freedom from aortic root reoperation



Freedom from distal aortc reoperation



Results-6 Predictors for distal aortic reoperation

Variables	Univariable	Multivariable		
	P value	Odds ratio	95% CI	P value
Male gender	<0.001	2.24	1.22– 4.09	0.008
Chronic kidney disease	0.71			
Achieving primary entry resection	0.012	0.344	0.06 – 0.54	0.01
DaBakey III retrograde dissection	0.02	1.01	0.44 – 2.33	0.97
Patent false lumen at thoracic aorta	<0.001	4.24	2.10 – 8.55	<0.001
TAR procedure	0.13	0.82	0.47 – 1.45	0.51
TAR with frozen elephant trunk procedure	0.013	0.18	0.06 – 0.54	0.002
Hereditary aortic disease	<0.001	4.25	2.10 – 8.55	<0.001
Re-entry at visceral arteries				
Celiac artery	0.10			
Superior mesenteric artery	0.25			

Conclusion

- ✓Early outcomes of aggressive indication of TAR aimed to achieve primary entry resection are acceptable.
- ✓Postoperative patent false lumen status at thoracic aorta and hereditary aortic disease were still risk even in aggressive TAR.
- ✓Present study suggested that the promotion of false lumen thrombosis of the thoracic aorta through secure and aggressive primary entry resection and the use of FET contributed to the reduction of distal aortic reoperation