

Limited Sutures or Sutureless Total Arch Replacement Improves Outcomes in Acute Type A Aortic Dissection

Yi-Tso Cheng, Shih-Ming Huang, Ing-Heng Hii, Chi-Fu Cheng, Pei-Chei Lu
John Chien-Hwa Chang
Division of Cardiovascular Surgery, Dalin Tzu Chi Hospital
Department of Medicine, Tzu Chi University

佛教慈濟醫療財團法人大林慈濟醫院

Dalin Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation



VasoRing Connector in Surgery for Acute Type A Aortic Dissection (ATAAD)

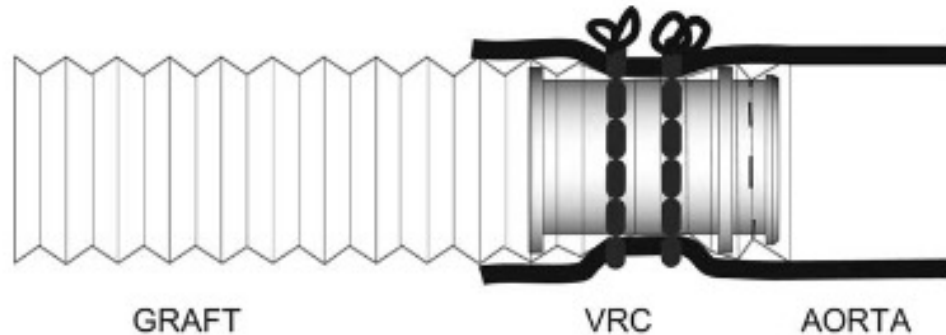


FIGURE 3. The ringed graft is inserted into the aorta, and the braided nylon tapes are tied against the wider groove of the VRC to achieve a sutureless anastomosis.

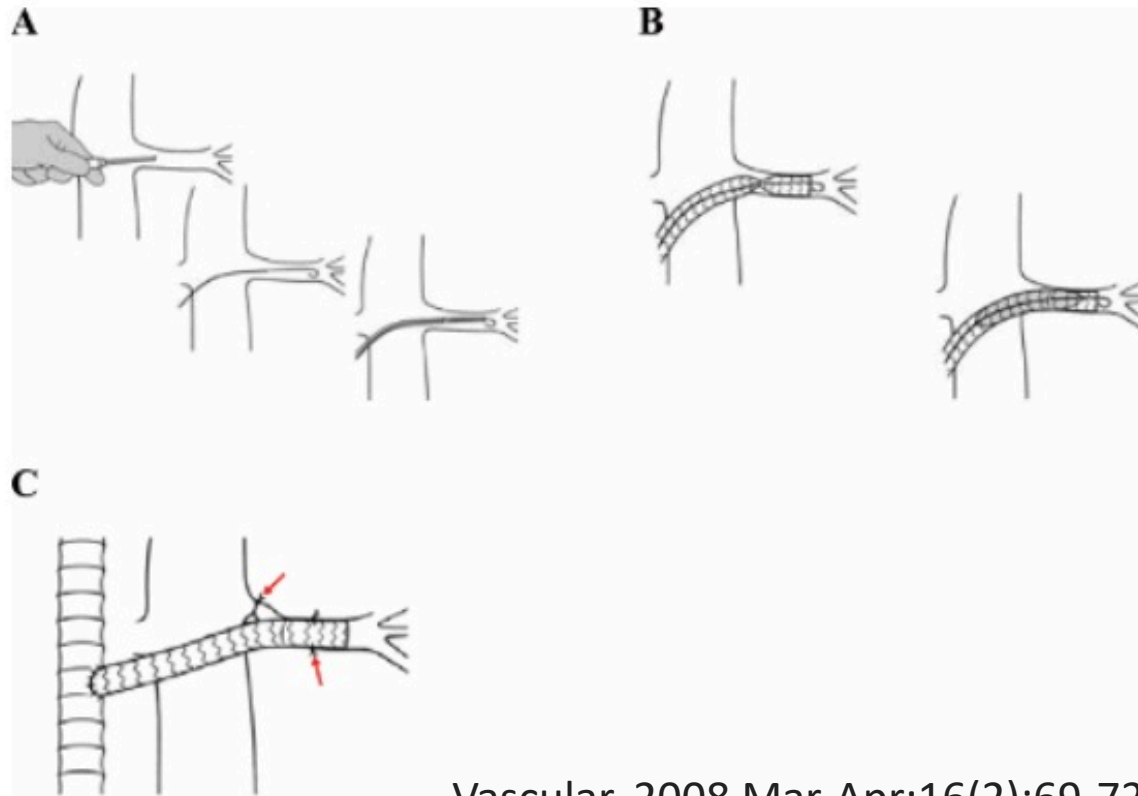
- Described by Jeng Wei on 2009
 - J Thorac Cardiovasc Surg. 2009 Sep;138(3):674-7
- Midterm results has been reported
 - J Thorac Cardiovasc Surg. 2012 Jan;143(1):72-7,
 - Ann Thorac Surg. 2018 Sep;106(3):764-770
 - Eur J Cardiothorac Surg. 2019 Jul 1;56(1):189-196



Viabahn Open Revascularization TEChnique (VORTEC)

New Technique to Facilitate Renal Revascularization with Use of Telescoping Self-Expanding Stent Grafts: VORTEC

Mario Lachat*, Dieter Mayer*, Frank J. Criado†, Thomas Pfammatter‡, Zoran Rancic*, Michele Genoni*, and Frank J. Veith*§

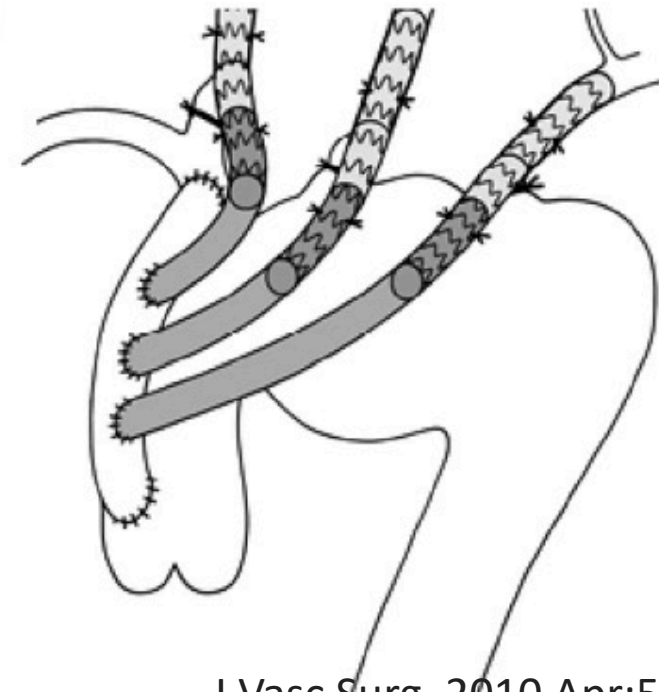


Vascular. 2008 Mar-Apr;16(2):69-72

Novel sutureless telescoping anastomosis revascularization technique of supra-aortic vessels to simplify combined open endovascular procedures in the treatment of aortic arch pathologies

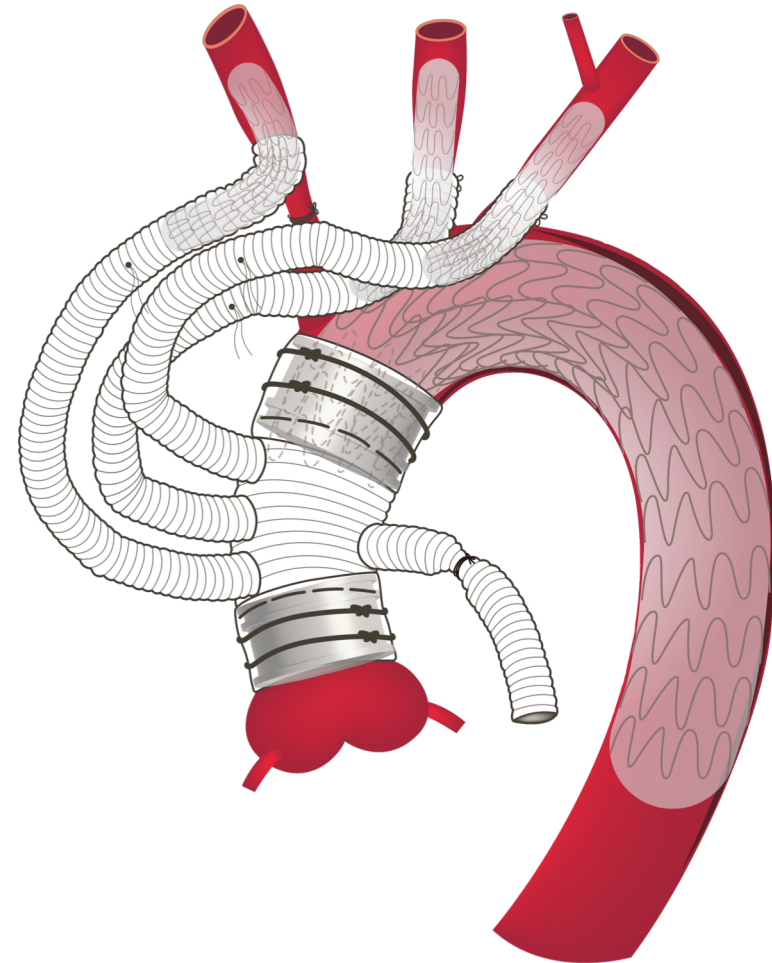
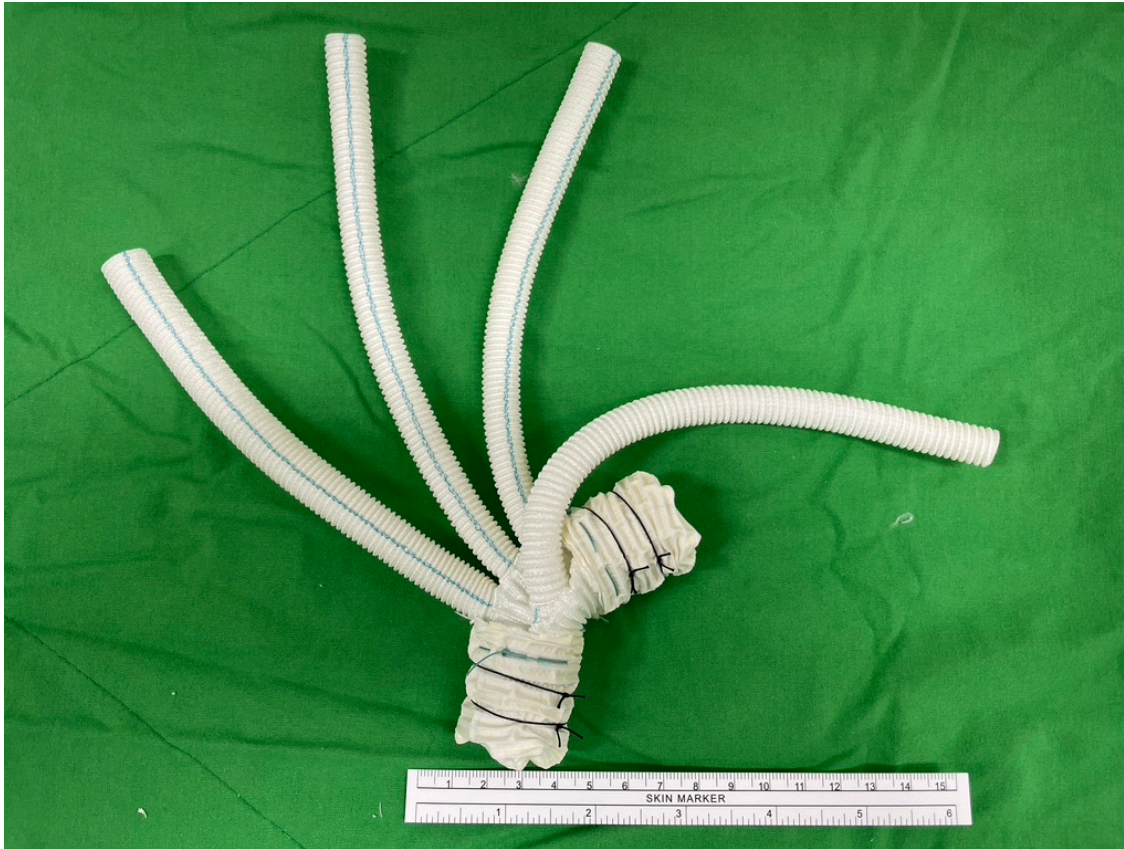
Konstantinos P. Do
Thomas Frauenfeldt
Ohio; and New York,

mmatter, MD,^b
vitzerland; Cleveland,

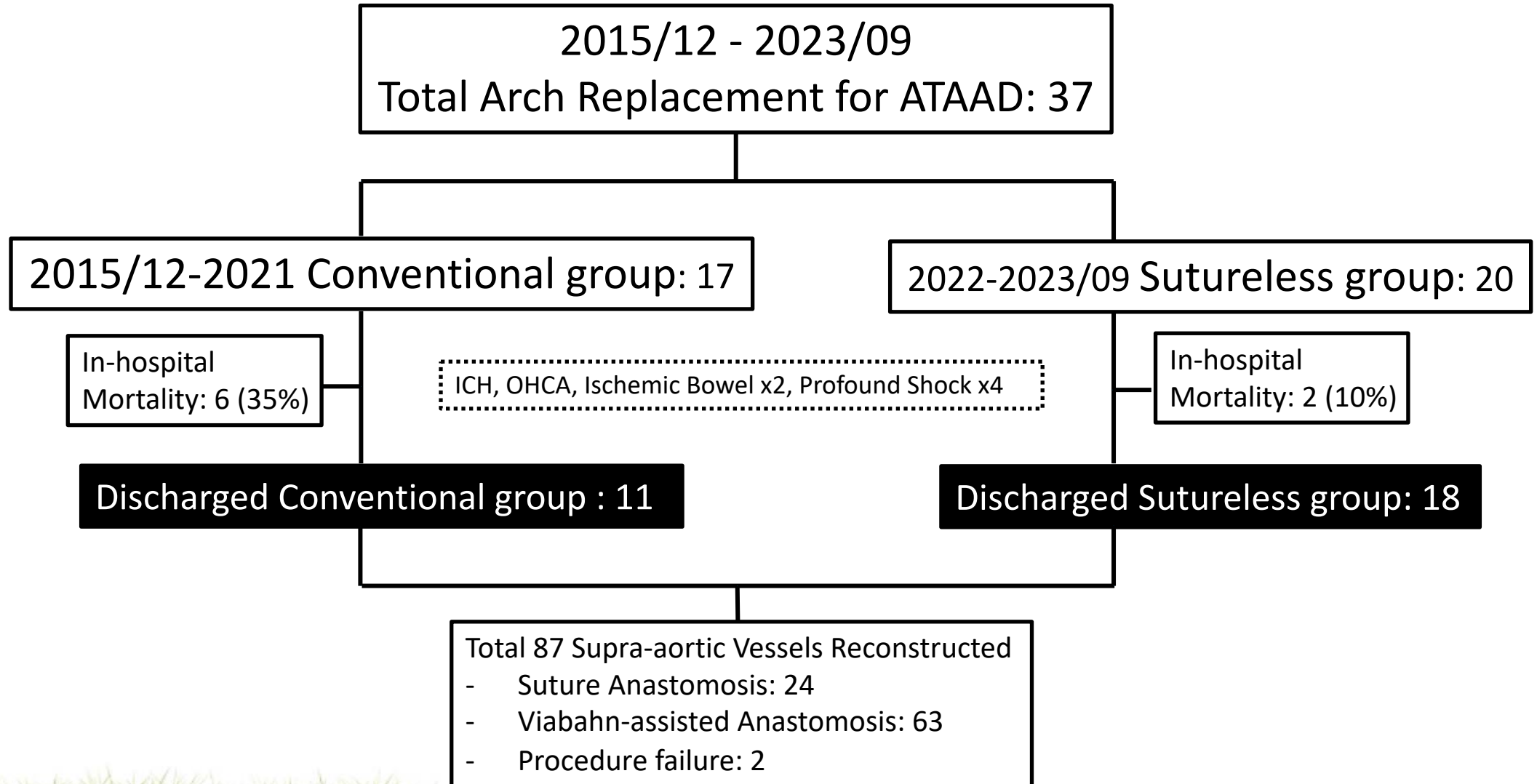


J Vasc Surg. 2010 Apr;51(4):836-41.

4-branched Graft + VasoRing Connector + VORTEC + TEVAR = Sutureless Total Arch Replacement



Material and Method



Patient Demographics

Characteristics	All	Conventional group	Sutureless group	<i>p</i> -value
Number of Patients	37	17	20	
Age, y	62 (54.5-68.25)	63 (44.25-69.25)	61.75 (56.5-68)	0.58
Male sex	29 (78.4%)	14 (82.4%)	15 (75%)	0.7
Hypertension	27 (73%)	12 (70.6%)	15 (75%)	1
Diabetes	3 (8.1%)	1	2 (10%)	1
Dyslipidemia	5 (13.5%)	4 (23.5%)	1 (5%)	0.16
Hemopericardium	17 (45.9)	7 (41.2%)	10 (50%)	0.74
Preoperative Stroke	8 (21.6%)	4 (23.5%)	4 (20%)	1

No Statistical differences in Preoperative Patient Demographics between the Conventional and Sutureless group



Operative Outcome-1

Characteristics	All	Conventional group	Sutureless group	p-value
Number of Patients	37	17	20	
Operative Variables				
Operative Time, m	423 (357.5-490.5)	492 (470-683.25)	401 (328.5-434)	0.0002
CPB Time, m	227 (182-317.25)	325 (297.75-345.5)	191 (174.5-234.5)	0.0004
Cross-clamp Time, m	68 (44.25-110.75)	144 (98.25-201)	49.5 (40.5-81)	0.0007
SACP		17	1	16
SACP Time, m	11 (3.9-20.5)	50	<u>10.5 (3.77-17.5)</u>	
Circulatory Arrest		7	5	2
Arrest Time, m	50 (28-59.25)	54 (47.5-64.25)	14.5 (5-24)	0.0952

CPB: Cardiopulmonary bypass; SACP: Selective antegrade cerebral perfusion

Significantly shorter Operative Time and CPB Time in the Sutureless group



Operative Outcome-2

Characteristics	All	Conventional group	Sutureless group	p-value
Number of Patients	37	17	20	
Blood Components Transfused				
LP-RBC	4 (2-6.5)	6 (3.5-8)	2 (2-4)	0.0019
Fresh Frozen Plasma	0 (0-3)	0 (0-3)	0 (0-3)	0.986
Platelet	2 (1-2)	2 (1-2)	2 (1-2)	0.6181
Cryoprecipitate	0 (0-12)	0	11 (0-24)	0.0016

LP-RBC: Leukocyte-poor red blood cell

Less LP-RBC and more Cryoprecipitates used in the Sutureless group



Post-operative Outcomes in Discharged Patients

Characteristics	All	Discharged Conventional group	Discharged Sutureless group	<i>p</i> -value
Number of Discharged Patients	29 (37)	11 (17)	18 (20)	0.3
Postoperative Variables				
Time to Extubation, h	28.4 (8.7-146.8)	71.4 (7.5-130.3)	24.3 (9.8-181.5)	0.98
ICU Stay, d	7 (4-15.25)	6 (4-9.75)	7.5 (4-22)	0.74
Hospital Stay, d	27 (20.5-46.75)	33 (22.5-48.25)	25 (17-46)	0.38

No Statistical differences in Discharged patient between the Conventional and Sutureless group



Post-operative Outcomes in Discharged Patients

Characteristics	All	No preoperative stroke	Preoperative stroke	p-value
Number of Patients	29	23	6	
Postoperative Variables				
Time to Extubation, h	28.4 (8.7-146.8)	18.7 (6.5-58)	412.6 (267-1512)	0.0001
ICU Stay, d	7 (4-15.25)	6 (3.25-9.75)	29 (22-36)	0.0075
Hospital Stay, d	27 (20.5-46.75)	24 (19-36)	46 (35-113)	0.0122

Post-operative Outcomes depends on the Preoperative status



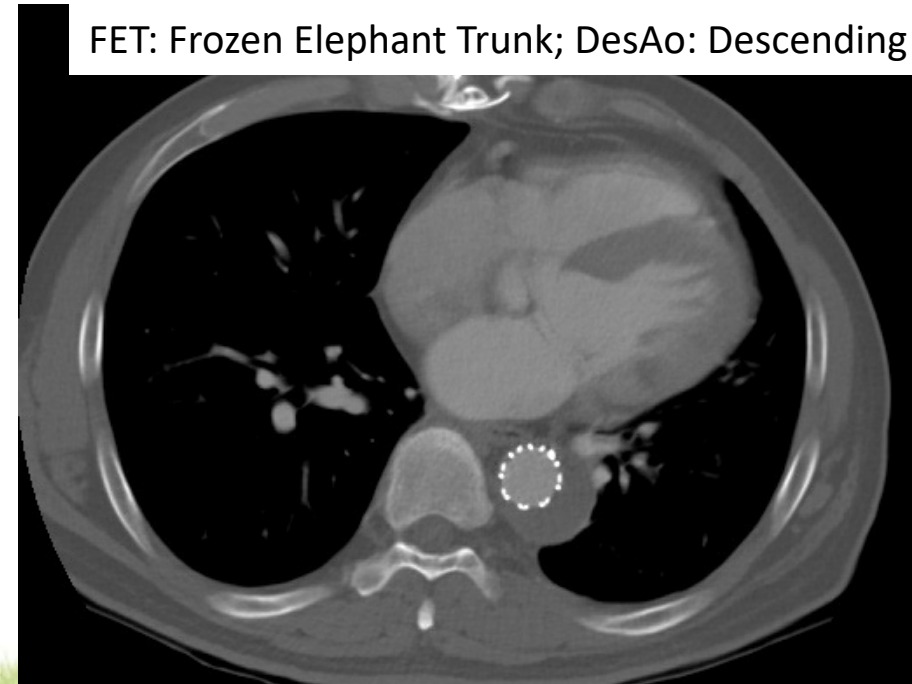
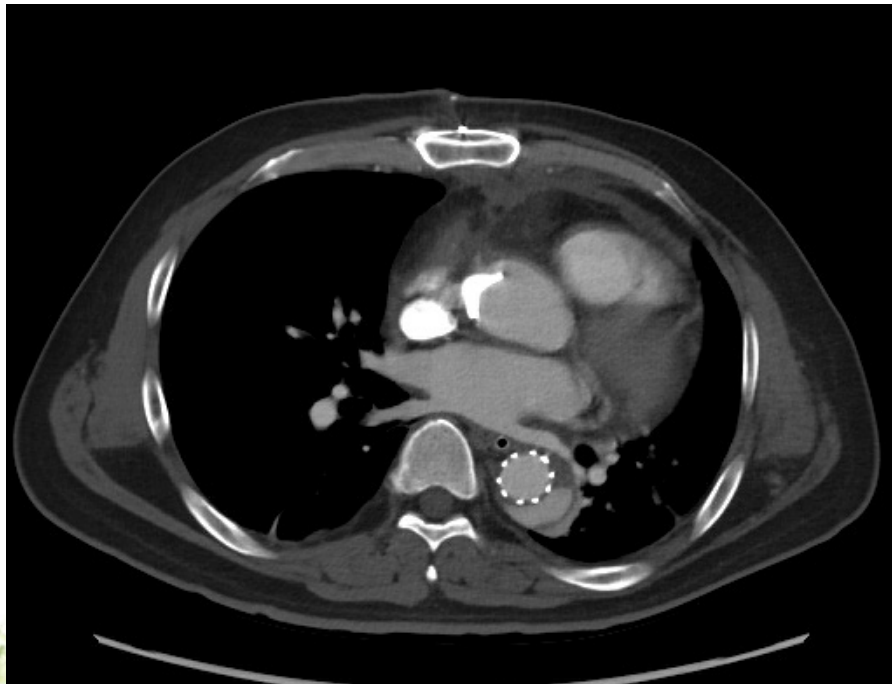
Outcome of Viabahn-assisted Supra-aortic vessel reconstruction

- 29 patients survived to discharge
 - 63 vessels reconstructed with Viabahn
 - Total VORTEC experience: 92.8 yrs
 - Innominate artery
 - Re-intervention in one for endoleak
 - LCCA: Technically feasible
 - LSA
 - Initial procedure failure in 2 cases
 - » Case No. 2, No. 6
 - Vertebral artery over-stenting in 3
 - » 2 in conventional Group
 - » 1 in the sutureless group due to aberrant origin from the Aortic Arch

Patients (29)	Innominate A	LCCA	LSA	RCCA
Number of Vessel	28	29	29	1
Number of VORTEC	9	26	27	1
Stent patent	9	26	25	1
Stent thrombosis	0	0	2	0
In-stent stenosis	0	0	0	0
Stenosis distal to the stent	0	0	0	0
Kinking of stented vessel	0	0	0	0
Vessel perforation	0	0	0	0
Minor bleeding	0	0	0	0
Major bleeding	0	0	0	0
Retained dissection	1	0	1	0
New onset of vessel dissection	0	0	0	0
Endoleak	1	0	0	0
Reintervention at stent site	1	0	0	0
Vertebral artery over-stenting			3	

Aortic Remodeling of Distal Thoracic Aorta

Characteristics	All	Discharged Conventional group	Discharged Sutureless group
Number of Patients	28	10	18
Residual dissection at Arch	0	0	0
Residual dissection at FET	3	2	1
Residual dissection at DesAo	21	9	12



FET: Frozen Elephant Trunk; DesAo: Descending Aorta

Take Home Message

- Sutureless Total Arch Replacement
 - Shortening operation time to 4-8 hours
 - Fewer blood components in transfusion
 - Durable results in follow-up
 - Patent supra-aortic vessel with less residual dissection
 - Stable aortic remodeling from arch to Frozen Elephant Trunk
 - Improved Overall Outcome
 - Mortality in 10%
 - Morbidity related to preoperative condition

