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Outcomes of hybrid TEVAR for proximal aortic arch diseases



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Disclosure

Speaker name: Young-Guk Ko

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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest



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Open Total Arch Repair

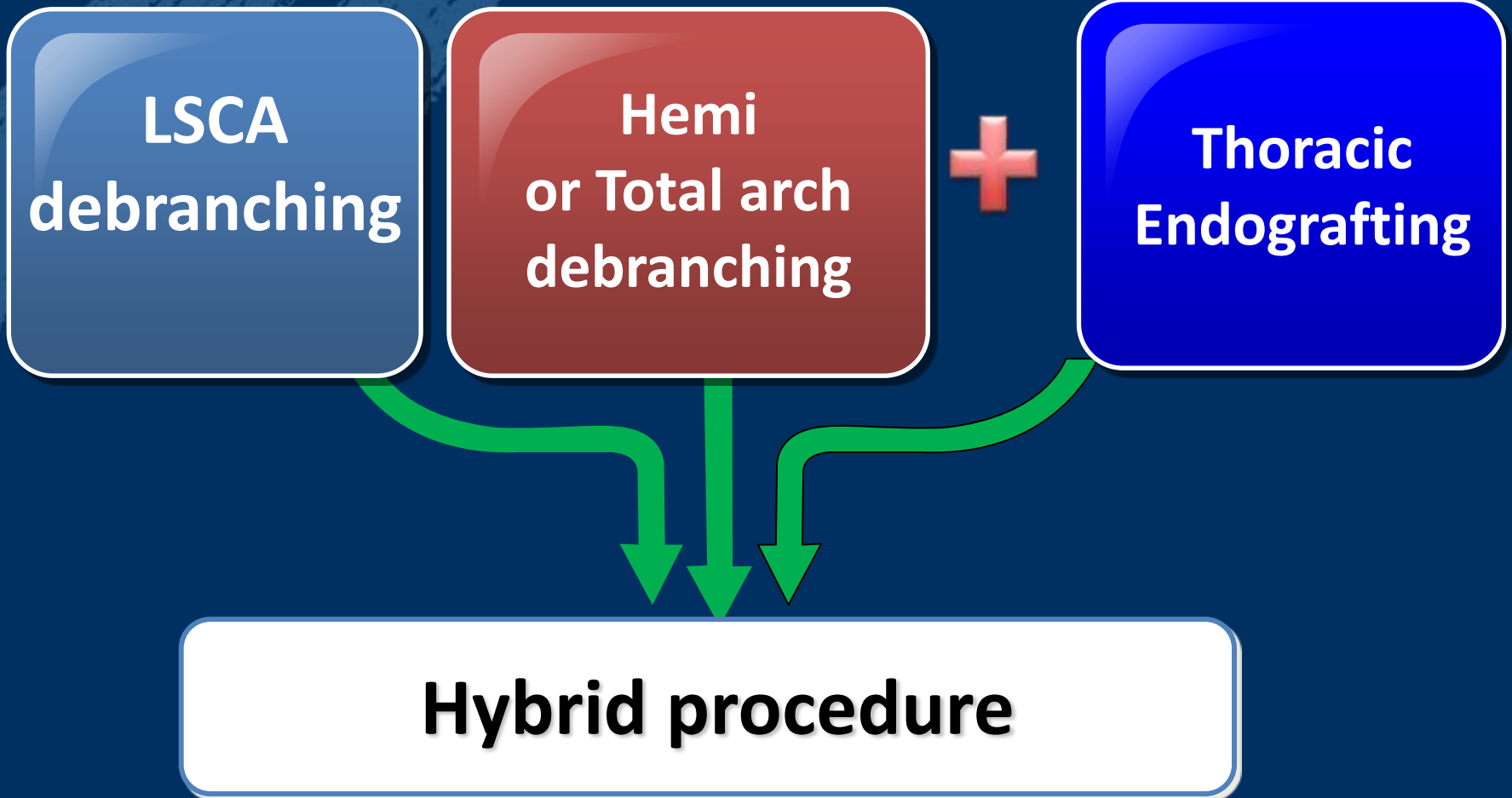
- Technically demanding
- Complex circulatory management
- CPB & Deep hypothermic circulatory arrest(DHCA)
- Operative mortality 5~20%
- Neurologic deficit 3~15%
- Morbid and mortality significant in high risk patients





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Hybrid Thoracic Endovascular Aortic Arch Repair (Hybrid TEVAR)





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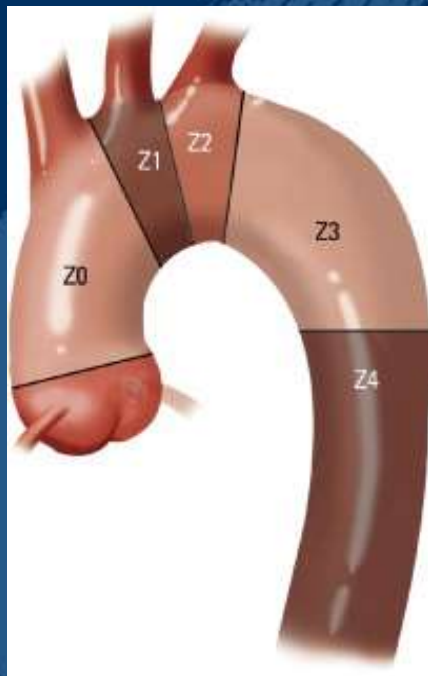
Goal of Hybrid TEVAR

- To minimize morbidity and mortality in the treatment of thoracic aortic diseases with less invasive procedures



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Study population

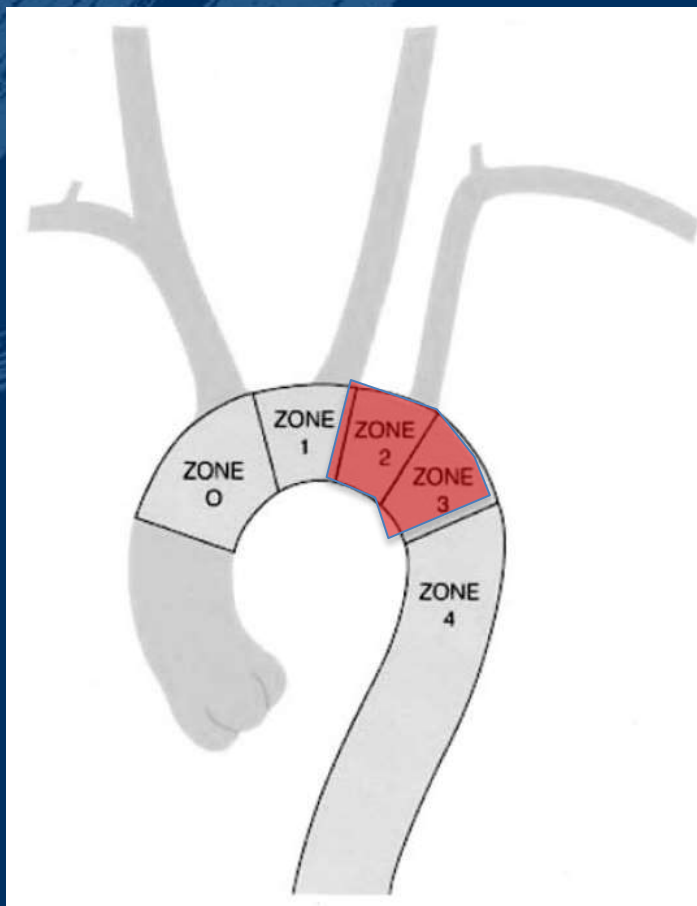


- Retrospective study with data from two institutions (Severance Cardiovascular Hospital and Gil Medical Center) between Feb 2006 and Oct 2014
- **Inclusion criteria:**
 - 1) maximum aortic diameter ≥ 55 mm
 - 2) rapid aortic enlargement (≥ 10 mm/year).
- **Exclusion criteria:**
 - 1) aortic arch diseases requiring landing in zone 2 or 3
 - 2) acute type A dissection
 - 3) Marfan syndrome



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Aortic Pathologies Involving the Origin of the Left CCA



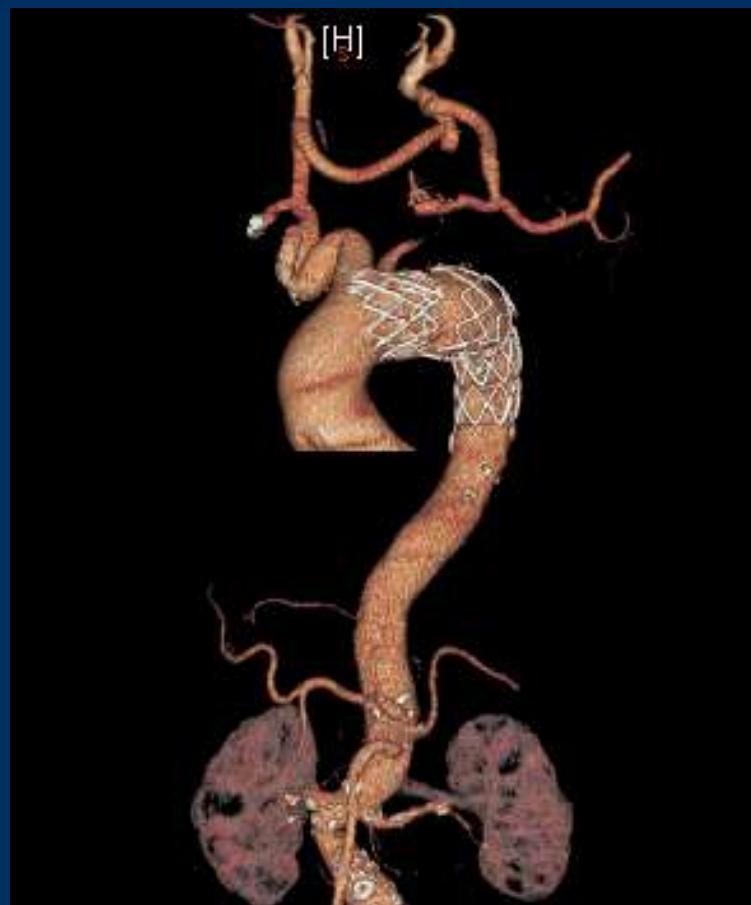
With or without revascularization of the LSCA



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Landing Zone 1

F/70, (CSJ, 5272281)

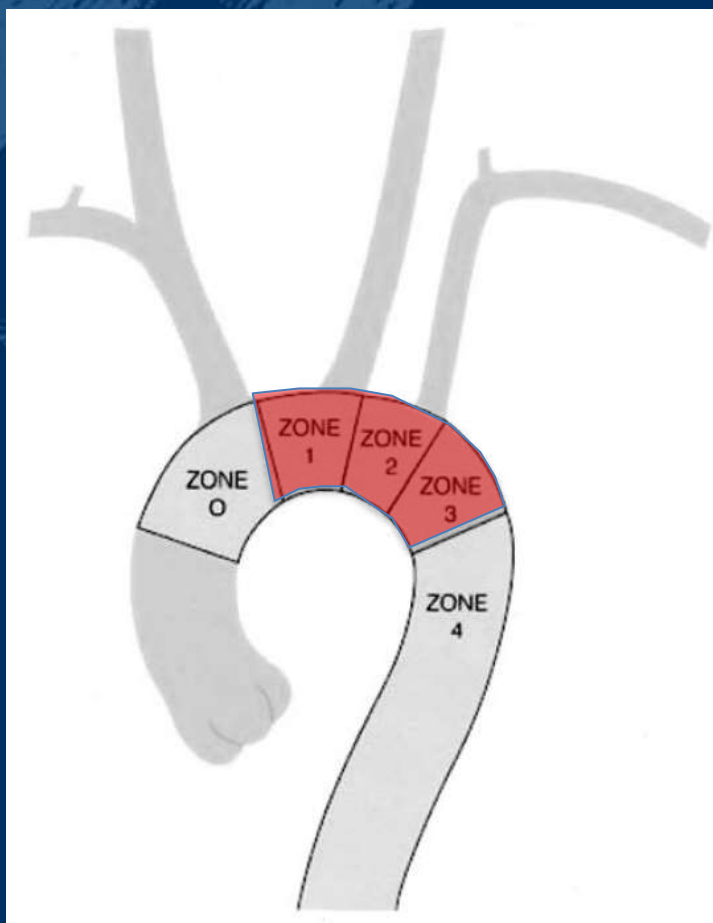




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Aortic Pathologies Involving the Origin of the Innominate Artery

With antegrade or retrograde stent graft implantation

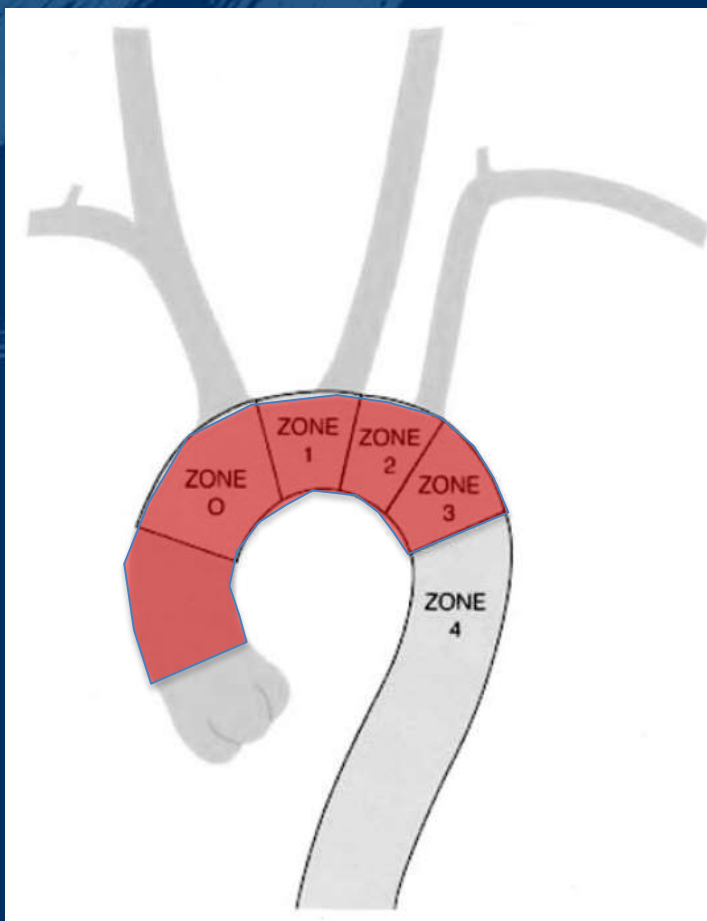




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Pathologies Involving Ascending Aorta and Aortic Arch

With antegrade or retrograde stent graft implantation





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Landing Zone 0

M/80, (LSS, 5261404)





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Baseline Clinical Characteristics

	Hybrid repair (n = 35)	Open repair (n = 20)	p-Value
<u>Age, years</u>	66.9 ± 14.1	59.2 ± 11.2	0.042
Male, n (%)	26 (74.3)	13 (65.0)	0.543
Hypertension, n (%)	21 (60.0)	14 (70.0)	0.565
Diabetes mellitus, n (%)	4 (11.4)	6 (30.0)	0.144
Dyslipidemia, n (%)	14 (40.0)	5 (25.0)	0.378
<u>Smoker, n (%)</u>	19 (54.3)	4 (20.0)	0.022
Coronary artery disease, n (%)	20 (57.1)	9 (45.0)	0.415
Peripheral arterial disease, n (%)	8 (22.9)	2 (10.0)	0.297
<u>Chronic obstructive pulmonary disease, n (%)</u>	9 (25.7)	1 (5.0)	0.075
<u>Chronic renal failure, n (%)</u>	6 (17.1)	1 (5.0)	0.402
Prior aortic surgery, n (%)	2 (5.7)	1 (5.0)	1.000
<u>EuroSCORE II (%)</u>	5.8 ± 5.8	2.6 ± 3.6	0.031
Type of aortic arch, n (%)			0.841
I	6 (17.1)	3 (15.0)	
II	8 (22.9)	6 (30.0)	
III	21 (60.0)	11 (55.0)	
Proximal extent of disease, n (%)			1.000
Zone 0	20 (57.1)	11 (55.0)	
Zone 1	15 (42.9)	9 (45.0)	
Indication for intervention, n (%)			0.081
Aneurysm	29 (82.9)	12 (60.0)	
Aortic dissection	5 (14.3)	8 (40.0)	
Pseudoaneurysm	1 (2.9)	0	



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Procedural Data: Hybrid TEVAR

Success rate of supra-aortic vessel transposition, n (%)	35 (100)
Type of supra-aortic vessel transposition	
Aorta to BA, ICCA, LSCA, n (%)	20 (57.1)
RCCA to LCCA to LSCA, n (%)	15 (42.9)
Median time from supra-aortic transposition to endovascular repair (days)	8 (0-133)
Staged procedure, n (%)	26 (74.3)
Stent-graft, n (%)	
Seal thoracic	16 (45.7)
Valiant	13 (37.1)
TX2 Pro-Form	6 (17.1)
Number of stent-graft, n (%)	
1	20 (57.1)
≥2	15 (43.9)
Maximal diameter of stent-graft (mm)	38.6 ± 4.7
LSCA embolization, n (%)	16 (45.7)
Percutaneous approach, n (%)	34 (97.1)
Primary success, n (%)	27 (77.1)
Type I endoleak, n (%)	6 (17.1)



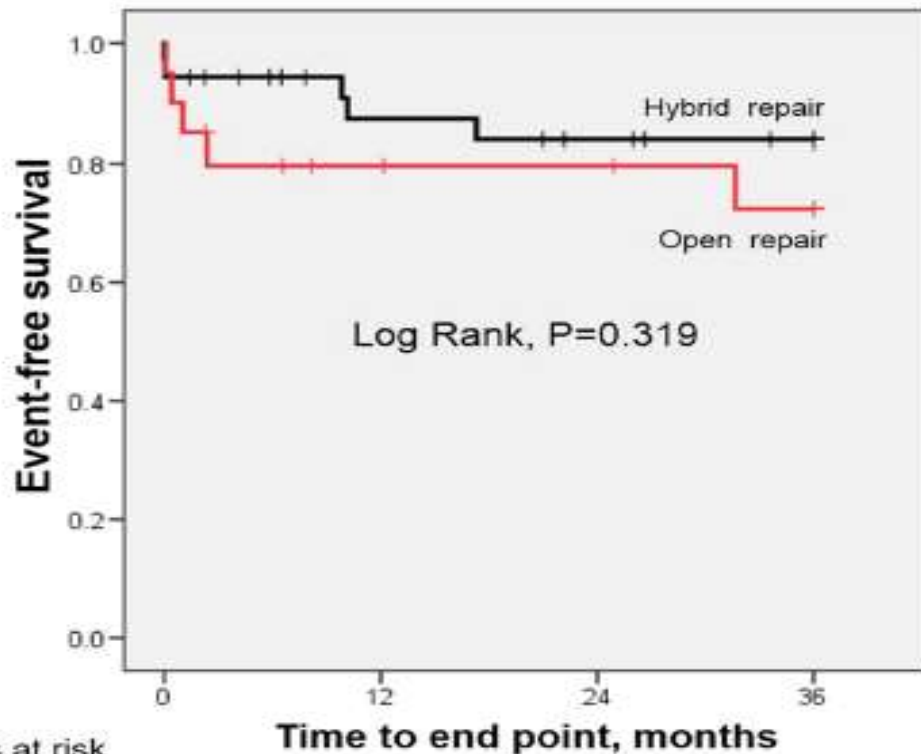
Perioperative (30-day) and follow-up clinical outcomes

	Hybrid repair (n = 35)	Open repair (n = 20)	p-Value
Perioperative outcomes			
<u>Death or stroke, n (%)</u>	4 (11.4)	6 (30.0)	0.144
Death, n (%)	2 (5.7)	3 (15.0)	0.342
Stroke, n (%)	2 (5.7)	3 (15.0)	0.342
Spinal cord ischemia, n (%)	0	0	
<u>Retrograde dissection, n (%)</u>	3 (8.6)	0	0.293
Renal failure, n (%)	2 (5.7)	2 (10.0)	0.616
Bleeding, n (%)	1 (2.9)	2 (10.0)	0.546
<u>Vascular injury, n (%)</u>	3 (8.6)	0	0.293
<u>Pneumonia, n (%)</u>	1 (2.9)	1 (5.0)	1.000
Wound infection, n (%)	0	1 (5.0)	0.364
Follow-up outcomes			
Death, n (%)	5 (14.3)	5 (25.0)	0.469
Stroke, n (%)	3 (8.6)	3 (15.0)	0.396
<u>Reintervention, n (%)</u>	9 (25.7)	0	0.020
Chronic renal failure, n (%)	2 (5.7)	2 (10.0)	0.597



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Overall Survival



Numbers at risk

Hybrid repair	35	25	22	19
Open repair	20	13	12	11

Hybrid group:

- 2 patients died from an aortic rupture at 9 and 10 months
- One patient from sepsis and multiorgan failure at 17 months.

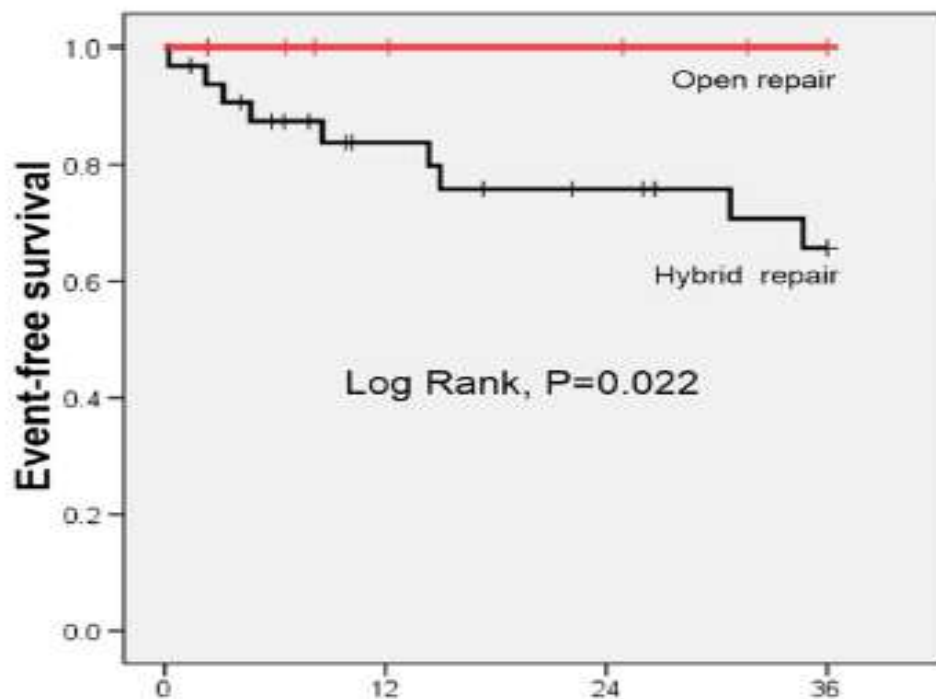
Open group:

- One patient died of disease progression at 2 months after a CVA event that occurred during the operation.
- One patient died at 31 months due to intracranial hemorrhage



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Reintervention-free Survival



Numbers at risk

Hybrid repair	35	21	17	13
Open repair	20	13	12	11

Hybrid group: 9 patients required a reintervention.

- Additional stent graft for Type I endoleak (n=4), endotension (n=2), and type B dissection (n=1)
- Open repair for type I endoleak (n=1) and retrograde dissection (n=2)

Open group:

- No reintervention



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Conclusions

- Comparable perioperative and late mortality and morbidity rates were observed for hybrid repair of proximal aortic disease and open surgical repair.
- However, there was a trend towards less perioperative death and stroke in hybrid TEVAR group.
- The reintervention rate was significantly higher with hybrid TEVAR.
- Therefore, hybrid repair may be considered as an acceptable treatment alternative to surgery, particularly in anatomically suitable and high-risk surgical candidates.

ENdovascular & COronary REvascularization in Seoul

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Thank you for your attention!

See you in Seoul!



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