RESULTS OF HYBRID SURGERY TO TREAT AORTIC ARCH ANEURYSM

Ths.Bs Đoàn Văn Nghĩa

Cardiovascular center- E hospital

OVERVIEW

I. Introduction[1-2]

- Aortic arch aneurysm is a rare disease
- Association with adjacent aorta
- Occurs silently or is discovered with severe complications
- High morbidity and mortality

1. Sethi, S., & Parekh, U. (2020). Aortic Arch Aneurysm.
2. Writing Committee Members, Isselbacher, E. M., Preventza,. (2022). 2022 ACC/AHA Guideline for the diagnosis and management of aortic disease: a report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *Journal of the American College of Cardiology*, *80*(24), e223-e393.

OVERVIEW

II. Etiology[1][3]

- Isolated or associated with descending: Atherosclerosis, Degenerative
- With ascending: cystic medial degeneration
- Infectious or non-infectious inflammatory
- Injuries

1. Sethi, S., & Parekh, U. (2020). Aortic Arch Aneurysm
3. Salameh MJ, Black JH, Ratchford EV. Thoracic aortic aneurysm. Vasc Med. 2018 Dec;23(6):573-578

HTAD (see Table 7): syndromic

- Marfan syndrome
- Loeys-Dietz syndrome
- Vascular Ehlers-Danlos syndrome
- Smooth muscle dysfunction syndrome
- Others: attributable to pathogenic variants in *FLNA*, *BGN*, *LOX*

HTAD (see Table 7): nonsyndromic

- *ACTA2*, *MYH11*, *PRKG1*, *MYLK*, and others
- Familial thoracic aortic aneurysm without identified pathogenic variants in a known gene for HTAD

Congenital conditions

- Bicuspid aortic valve
- Turner syndrome
- Coarctation of the aorta
- Complex congenital heart defects (tetralogy of Fallot, transposition of the great vessels, truncus arteriosus)

Hypertension

Atherosclerosis

Degenerative

Previous aortic dissection

Inflammatory aortitis

- Giant cell arteritis
- Takayasu arteritis
- Behçet disease
- Immunoglobulin G4-related disease, antineutrophil cytoplasmic antibody-related, sarcoidosis

Infectious aortitis

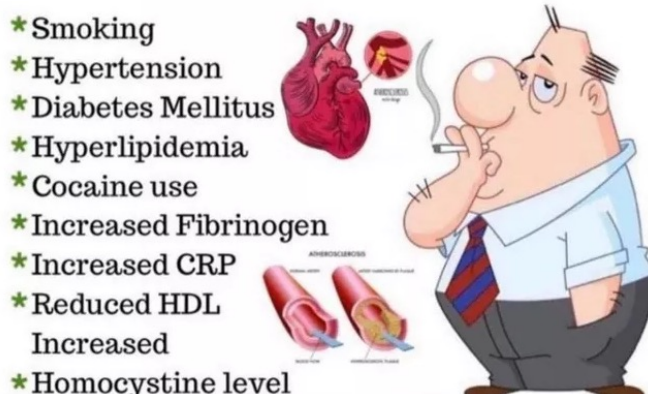
- Bacterial, fungal, syphilitic

Previous traumatic aortic injury

OVERVIEW

III. Risk factor[2][4]

- for atherosclerosis
- increase aortic wall stress

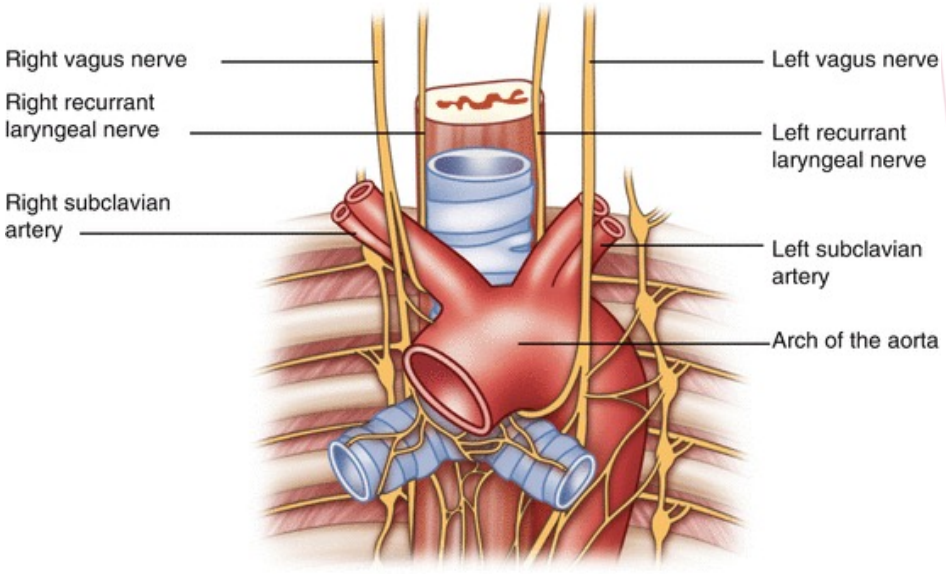


IV. Epidemiology

- TAAs occur in 5 to 10 per 100,000 person years: Arch- 10%
- Male/female: 2-4
- Age: 60-70

2. Writing Committee Members, Isselbacher, E. M., Preventza, O.. (2022). 2022 ACC/AHA Guideline for the diagnosis and management of aortic disease: a report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *Journal of the American College of Cardiology*, *80*(24), e223-e393
4. Patel HJ, Deeb GM. Ascending and arch aorta: pathology, natural history, and treatment. Circulation. 2008 Jul

OVERVIEW



V. Clinical[2]

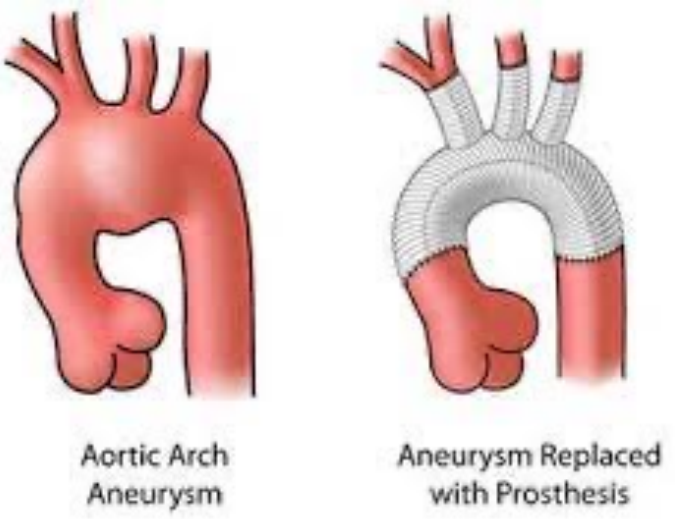
- Asymptomatic
- Chest, neck, jaw pain
- Compression of adjacent anatomical
- Life-threatening complications: dissection or aortic rupture
- systemic embolization, gastrointestinal hemorrhage

VI. Evaluation

Gold standard: CTA

2. Writing Committee Members, Isselbacher, E. M., Preventza,. (2022). 2022 ACC/AHA Guideline for the diagnosis and management of aortic disease: a report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *Journal of the American College of Cardiology*, *80*(24), e223-e393.

OVERVIEW



VII. **Treatment**

- Medical management
- Surgical management: increased 25% 2011-2014[5]
- Hybrid arch repair (HAR) first reported by Czerny et al in 2003[6]
- Total TEVAR

5.Englum BR, He X, Gulack BC, et al. Hypothermia and cerebral protection strategies in aortic arch surgery: a comparative effectiveness analysis from the STS Adult Cardiac Surgery Database. Eur J Cardiothorac Surg 2017;52:492-8

6. Czerny M, Fleck T, Zimpfer D, et al. Combined repair of an aortic arch aneurysm by sequential transposition of the supra-aortic branches and endovascular stent-graft placement. J Thorac Cardiovasc Surg 2003;126:916-

OVERVIEW

VII. **Treatment**:

Recommendations for Aortic Arch Aneurysms
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

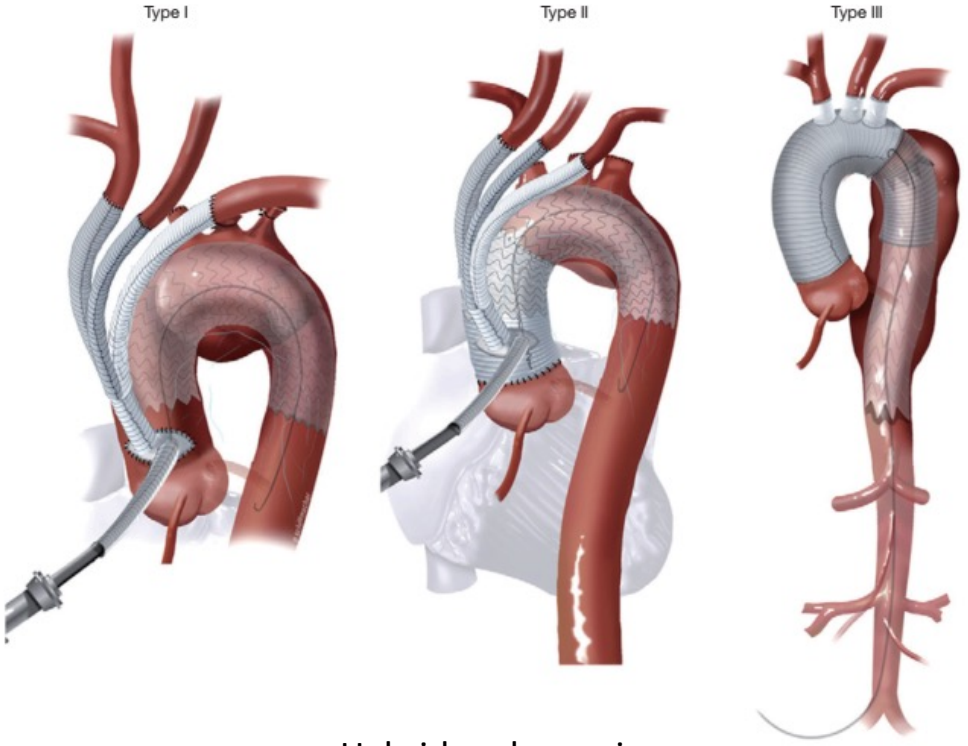
COR	LOE	RECOMMENDATIONS
1	C-EO	1. In patients with an aortic arch aneurysm who have symptoms attributable to the aneurysm and are at low or intermediate operative risk, open surgical replacement is recommended.
2a	B-NR	2. In patients with an isolated aortic arch aneurysm who are asymptomatic and have a low operative risk, open surgical replacement at an arch diameter of ≥5.5 cm is reasonable.[1-3]
2a	C-LD	3. In patients undergoing open surgical repair of an ascending aortic aneurysm, if the aneurysmal disease extends into the proximal aortic arch, it is reasonable to extend the repair with a hemiarch replacement.[4,5]
2b	C-LD	4. In patients undergoing open surgical repair of an aortic arch aneurysm, if the aneurysmal disease extends into the proximal descending thoracic aorta, an elephant trunk procedure may be considered.[6,7]
2b	C-EO	5. In patients with an aortic arch aneurysm who are asymptomatic but meet criteria for intervention, but have a high risk from open surgical repair, a hybrid or endovascular approach may be reasonable.

2. Writing Committee Members, Isselbacher, E. M., Preventza,. (2022). 2022 ACC/AHA Guideline for the diagnosis and management of aortic disease: a report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *Journal of the American College of Cardiology*, *80*(24), e223-e393.

OVERVIEW

VII. **Treatment**

Original HAR classification syster
Bavaria et al 2013[7]



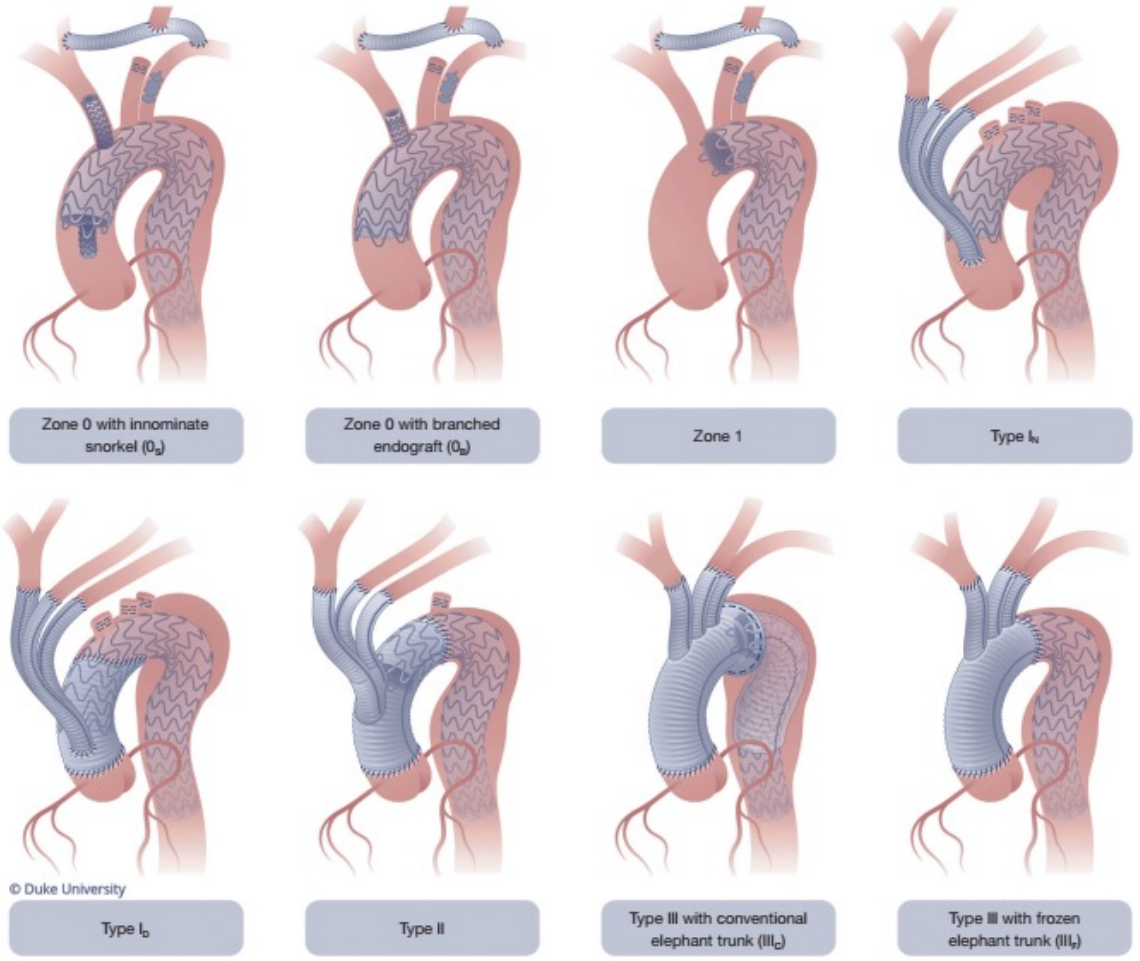
Hybrid arch repair

7. Bavaria, J., Vallabhajosyula, P., Moeller, P., Szeto, W., Desai, N., & Pochettino, A. (2013). Hybrid approaches in the treatment of aortic arch aneurysms: postoperative and midterm outcomes. *The Journal of Thoracic and Cardiovascular Surgery*, *145*(3), S85-S90.

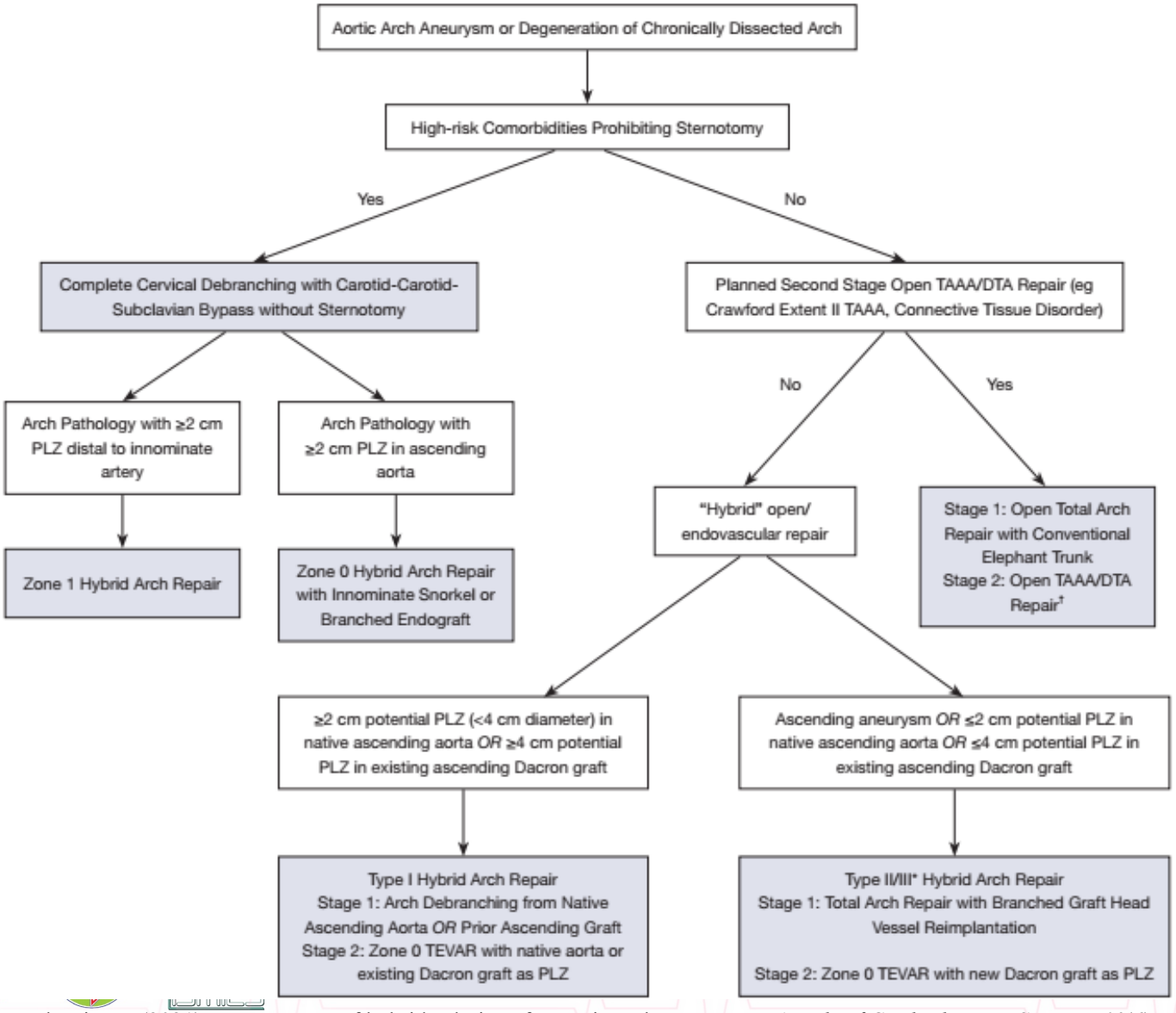
OVERVIEW

VII. **Treatment**

New classification system
Hughes- Vekstein 2021[8]



8. Hughes, G. C., & Vekstein, A. (2021). Current state of hybrid solutions for aortic arch aneurysms. *Annals of Cardiothoracic Surgery*, *10*(6), 731.



8. Hughes, G. C., & Vekstein, A. (2021). Current state of hybrid solutions for aortic arch aneurysms. *Annals of Cardiothoracic Surgery*, *10*(6), 731.

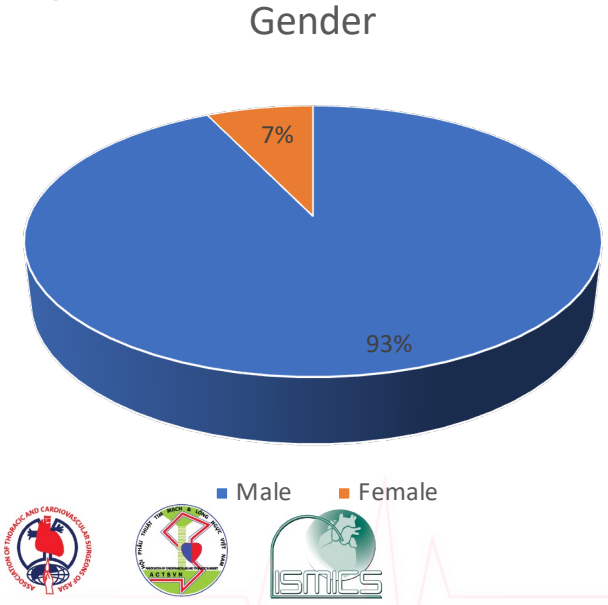
METHODS

- All patients who underwent HAR
- Time: 2020-2022
- Research location: Cardiovascular center- E hospital
- retrospective, descriptive study

RESULTS

I. Patient demographics

- 14 patients
- Age: 66.2± 8.4 (49-79)



Medical history	Ratio
Hypertension	100%
Diabetes	21.4%
Hyperlipidemia	28.6%
Stroke	7.1%
Coronary artery disease	14.3%
Chronic lung disease	2,7%
Smoke	57.2%

RESULTS

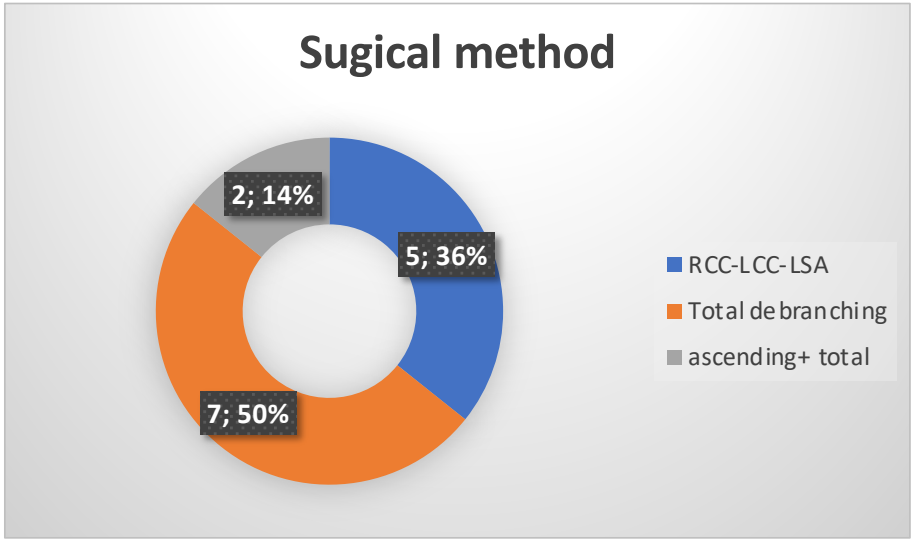
II. Clinical and imaging

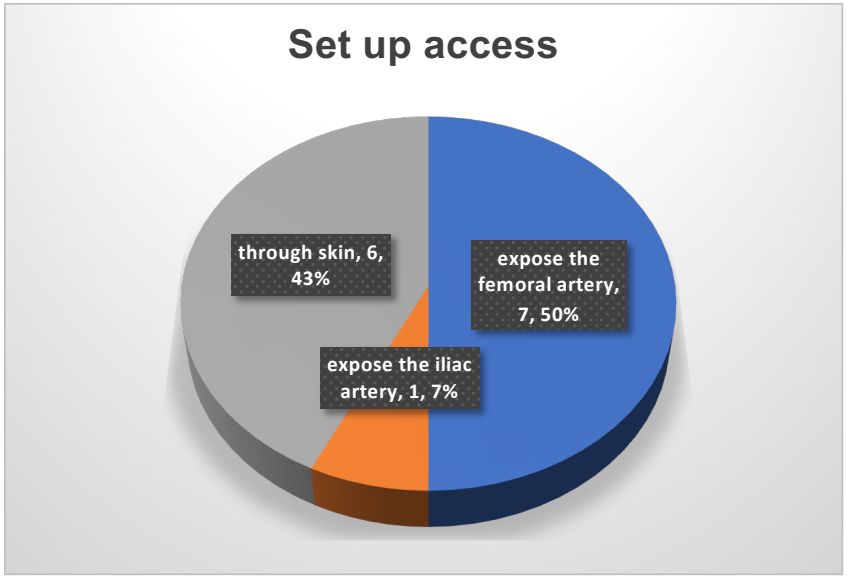
Clinical	Tỉ lệ
Chest pain	92.9%
Syncope	7.1%
Hemoptysis	7.1%
Hoarseness	7.1%
Dyspnea	28.6%

	Diameter(mm) mean	Min	Max
Aneurysm	61.2± 16.2	40	80
Pseudoaneurysm	43.3± 21.2	12	80

RESULTS

III. Intraoperative variables

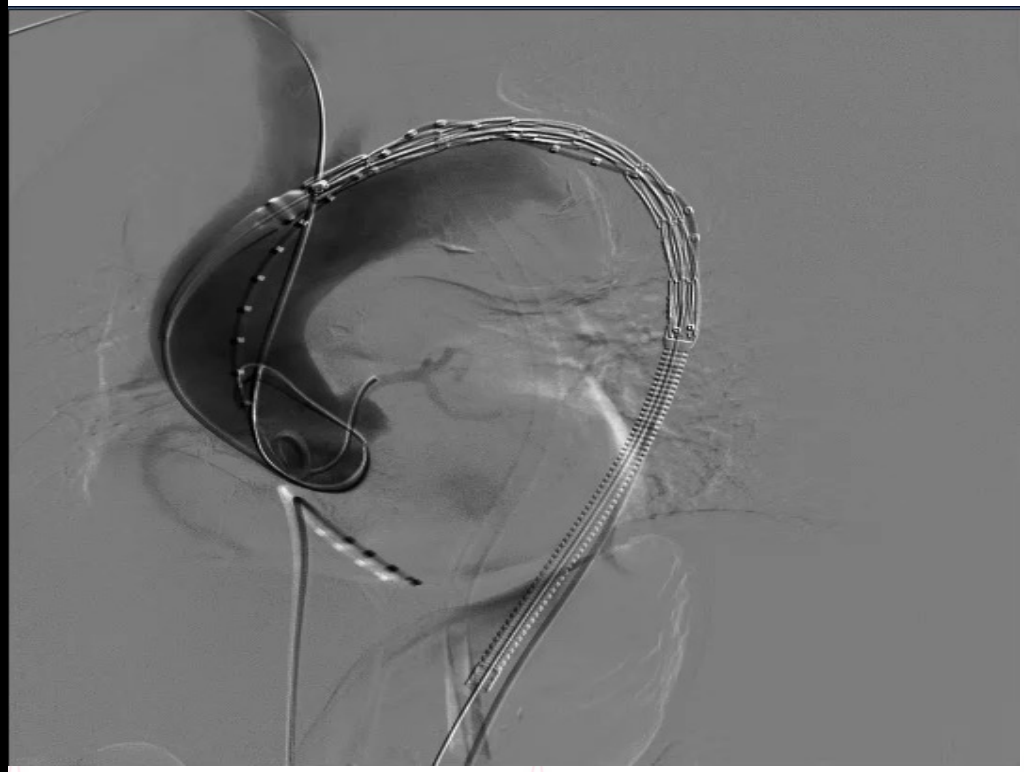




	common carotid clamp time (min)	Min	Max
Right	15.1± 2.4	11	20
Left	13.6± 2.6	8	17

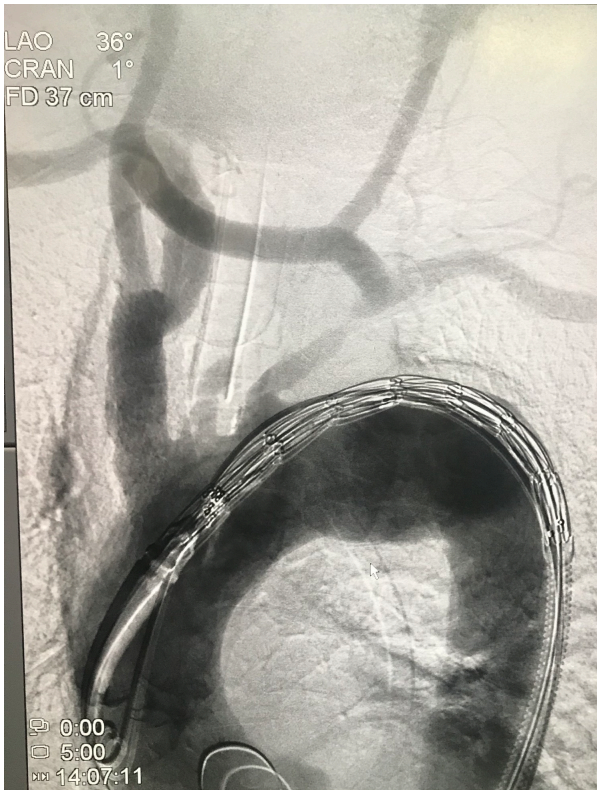
accompanying technique	N
Chimney TABC	1 (7.1%)
coil LSA	1 (7.1%)

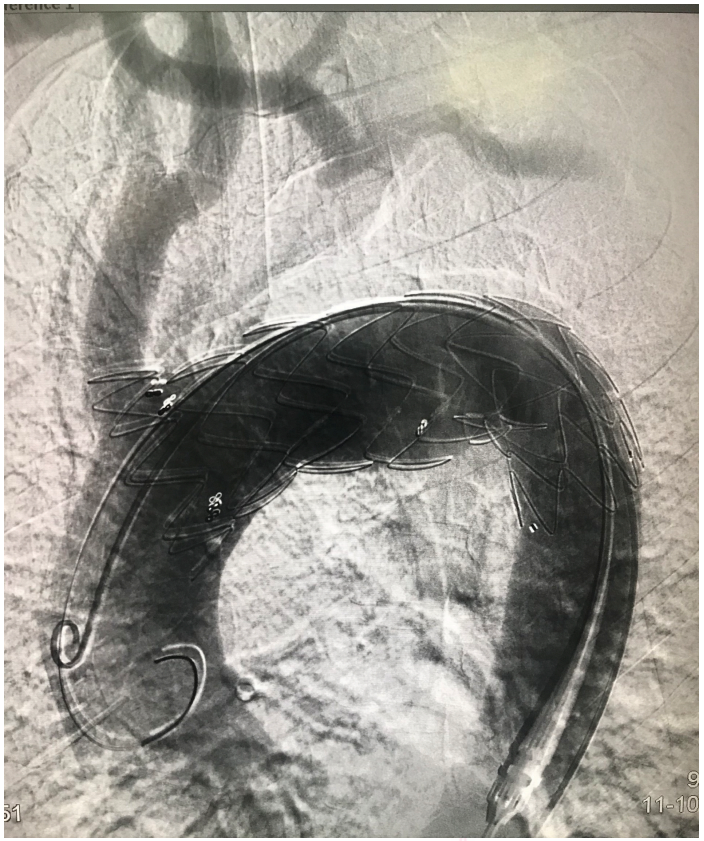
1. Female, 77 y/o – Zone 0s

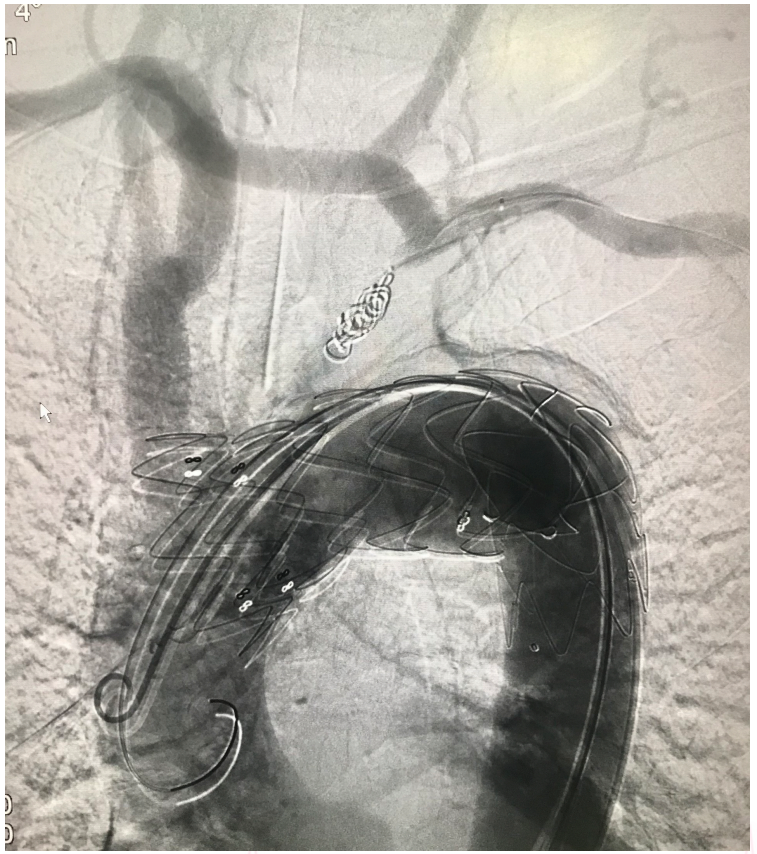


1. Female, 77 y/o – Zone 0s

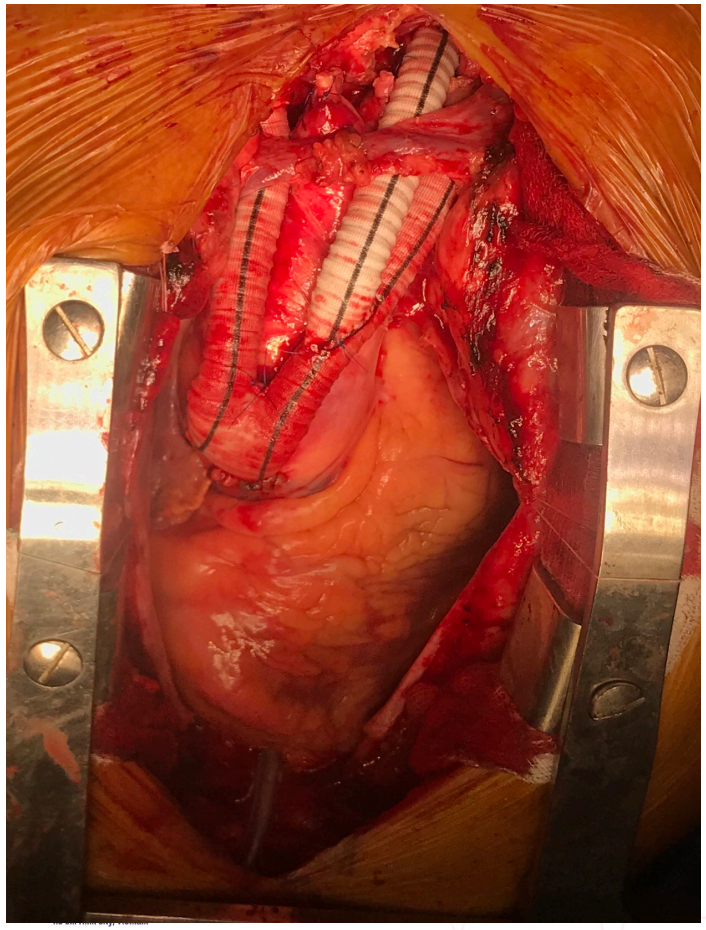
2.Male, 79 y/o- Zone 1

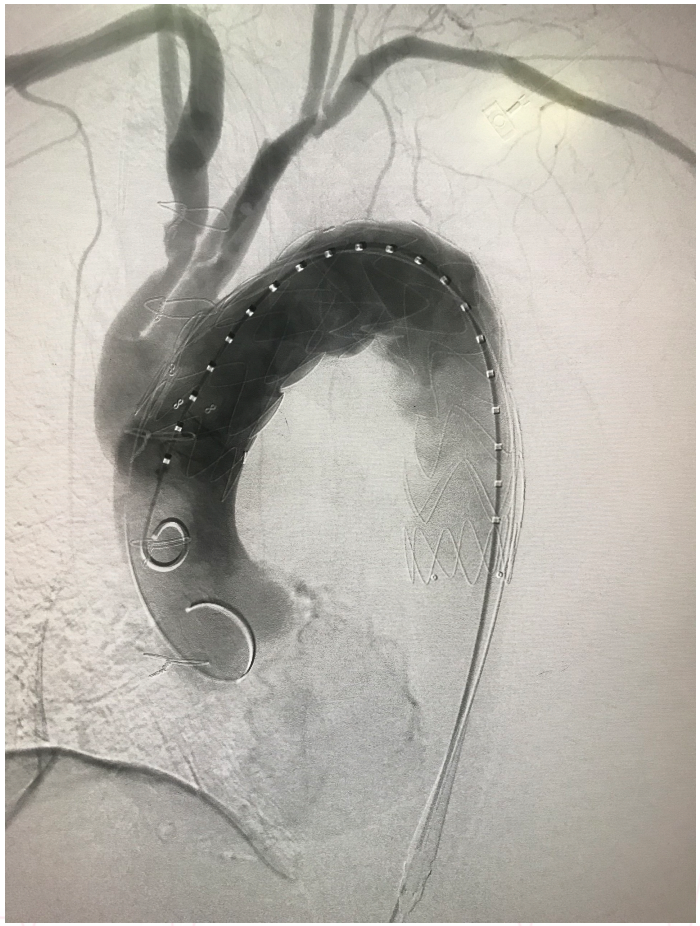






3.Male, 63 y/o- Type 1 N





4.Male, 63 y/o- Type II

4.Male, 63 y/o- Type II

RESULTS

III. Postoperative outcomes

Time	N± Std	Min	Max
Operation time (h)	4.1± 1.3	2.5	7
ventilation time (h)	46.3± 76.7	2	287
Length of ICU stay (days)	4± 4.7	0.5	18.8
Postoperative hospital stay (days)	15.1± 7.1	8	35

Complication	Tỉ lệ
Reoperation for pleural cavity blood clot	(1)7.1%
Pneumonia	(2) 14.2%
Hoarseness	(1)7.1%
Paraplegia	0%
Sepsis	(2) 14.2%
Stroke	(1)7.1%
Renal failure	(1)7.1%
Access complications	(1)7.1%
Endoleak	(1)7.1%
In-hospital mortality	(2) 14.2%

RESULTS

Annals of Cardiothoracic Surgery

SYSTEMATIC REVIEW | KEYNOTE LECTURE | FEATURED ARTICLES | OPERATIVE TECHNIQU

> Vol 2, No 3 (May 30, 2013) > A systematic review and meta-analysis of hybrid aortic arch replacement

Systematic Review

A systematic review and meta-analysis of hybrid aortic arch replacement

Konstantinos G. Moulakakis[1,2], Spyridon N. Mylonas[3], Fotis Markatis[1], Thomas Kotsis[3], John Kakisis[1], Christos D. Liapis[1]

[1]Department of Vascular Surgery, Athens University Medical School, Attikon University Hospital, Athens, Greece;[2]The

Results: Forty-six studies were eligible for the present meta-analysis: 26 studies with a total of 956 patients reported aortic arch debranching procedures, and 20 studies with 1,316 patients performed either 'frozen' or stented elephant trunk technique. The pooled estimate for 30-day/in-hospital mortality was 11.9% for the arch debranching group and 9.5% for the elephant trunk group. Cerebrovascular events of any severity were found to have occurred postoperatively at a pooled rate of 7.6% and 6.2%, while irreversible spinal cord injury symptoms were present in a pooled estimate of 3.6% and 5.0% in the arch debranching and elephant trunk group, respectively. Renal failure requiring dialysis occurred at 5.7% and 3.8% in both groups, while cardiac complications rate was 6.0% in the arch debranching cohort and pulmonary complication was 19.7% in the elephant trunk cohort.

Annals of Vascular Surgery

Articles Publish About Contact

GENERAL REVIEW | VOLUME 72, P601-609, APRIL 2021 Download Full Issue

Zone 1 Aortic Arch Hybrid Endovascular Repair with Extra-anatomical Bypass: A Meta-analysis

Nicholas GR. Bayfield • Miny Samuel • Anna-Louise E. Bayfield • Andrew MTL Choong

Published: November 20, 2020 • DOI: https://doi.org/10.1016/j.avsg.2020.10.010 • Check for updates

Results

Twenty studies incorporating 348 patients were included. In-hospital or 30-day mortality was 10.1% (95% confidence interval, 6.7–14.9%). Overall operative technical success was 89.8% (83.7–93.8%). Early type 1 endoleak rate was 14.0% (7.4–24.7%). Stroke prevalence was 9.5% (6.1–14.3%). Spinal cord paraplegia prevalence was 3.8% (1.9–7.6%). Retrograde aortic dissection prevalence was 4.1% (1.5–10.6%).

CONCLUSION

- Management of aortic arch aneurysm is always a challenge
- HAR continues to evolve, with an increasingly important role
- HAR surgery at E hospital initially achieved good results
- Relatively safe: Low mortality and complication rates
- Limitations of study: small number, short follow-up time

- THANK YOU!