

Endovascular Arch Repair

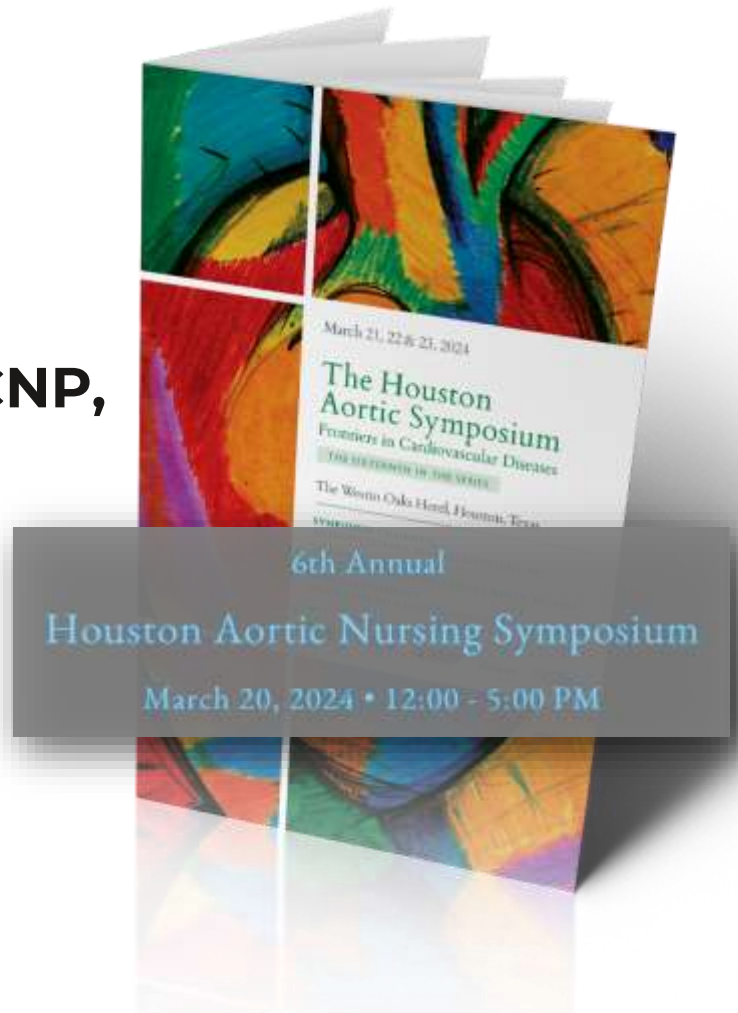
**Jody Thiele, RN, MSN, APRN, AGACNP,
RNFA**

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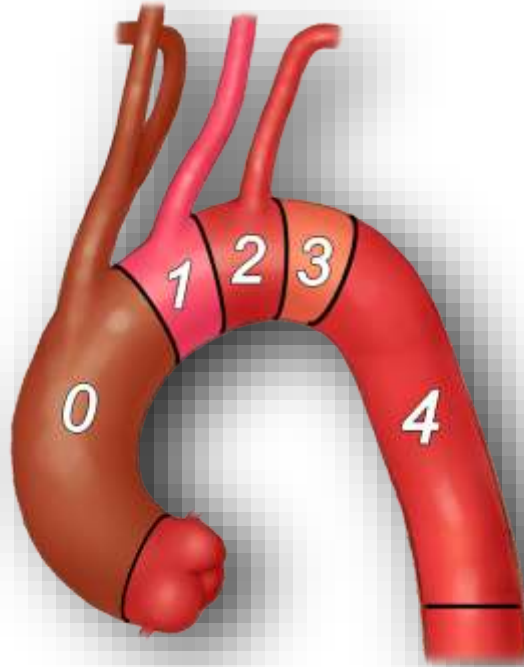
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**Cardiothoracic &
Vascular Surgery**

 **UTHealth Houston**
McGovern Medical School



Arch Landing zones



2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease

Ascending Aortic Aneurysm

Open repair is reasonable for Ascending aneurysms \geq **5.5-cm** in low risk patients (**Class 1**)

Aortic Arch Aneurysm

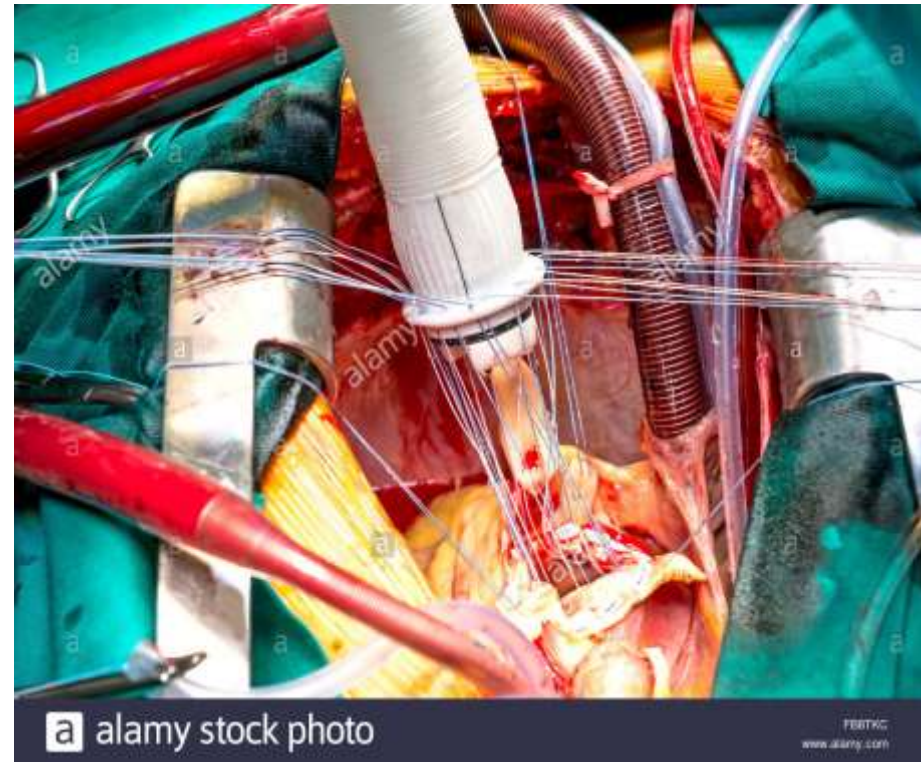
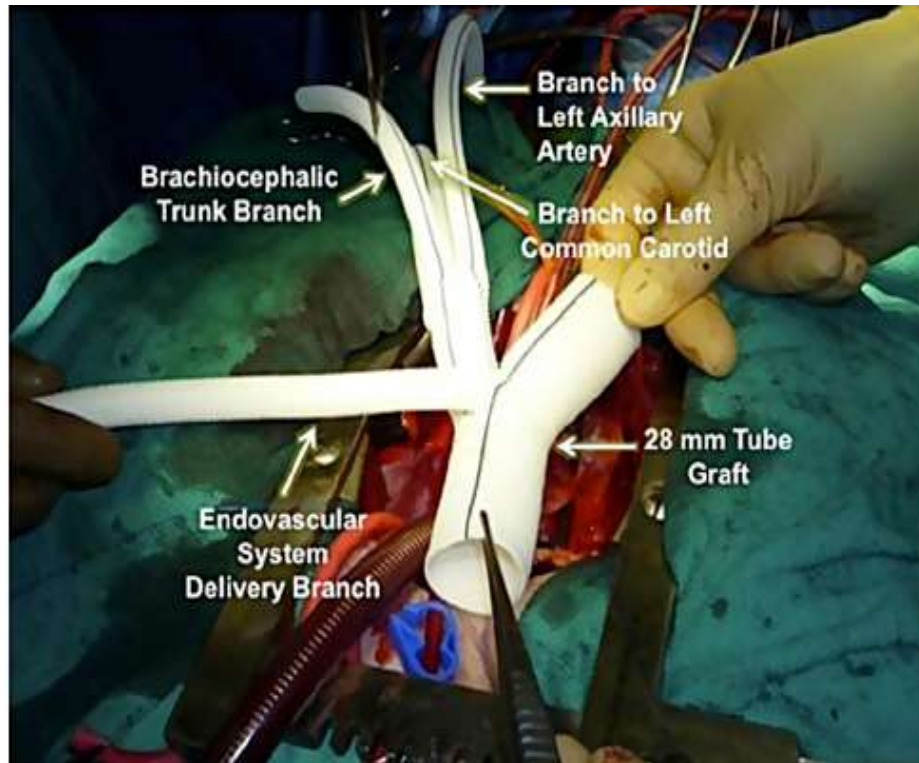
Open repair is reasonable for arch aneurysms \geq **5.5-cm** in low risk patients (**Class 2a**)

Hybrid/ endovascular repair may be reasonable for arch aneurysms in high risk patients (**Class 2b**)

Editor's Choice — Current Options and Recommendations for the Treatment of Thoracic Aortic Pathologies Involving the Aortic Arch: An Expert Consensus Document of the European Association for Cardio-Thoracic Surgery (EACTS) & the European Society for Vascular Surgery (ESVS)

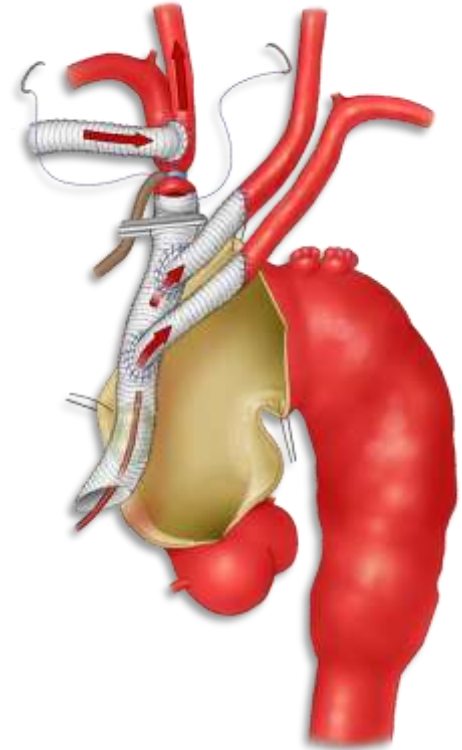
Recommendation	Class	Level
1. Decision-making for the treatment of aortic arch pathologies by an aortic team is recommended	I	C
3. Treatment of elective arch pathology is recommended to be performed in specialized centers providing open and endovascular cardiac and vascular surgery on site	I	C
31. It is recommended that endovascular aortic arch repair is performed in centers with adequate volume of and expertise in open and endovascular arch repair	I	C

Ascending/Arch open repair



Defining high risk for open arch repair

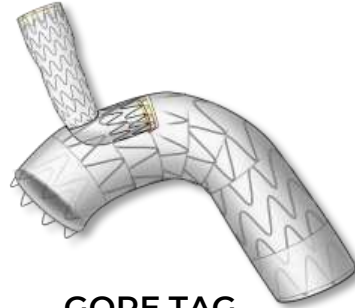
- Age > 70 years-old
- (Multiple) prior median sternotomies
- Chronic pulmonary disease GOLD 3-4
- Stage > IIIB Chronic kidney disease
- Congestive heart failure (EF<40%)
- Pulmonary hypertension/ R heart failure
- Symptomatic ischemic cardiomyopathy
- Cirrhosis
- Severe atheromatous debris
- Frailty



Zone 0 arch devices



INOUE



GORE TAG
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Endospan



NAJUTA



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Anatomical limitations for endovascular repair

- Short grafts or landing zones
- Excessively kinked ascending grafts (~30%)
- Aortic debris
- Tortuous/ angulated arch geometry
- Tortuous/ diseased access vessels
- Extensive dissection or diseased supra-aortic trunks



Multi-disciplinary team

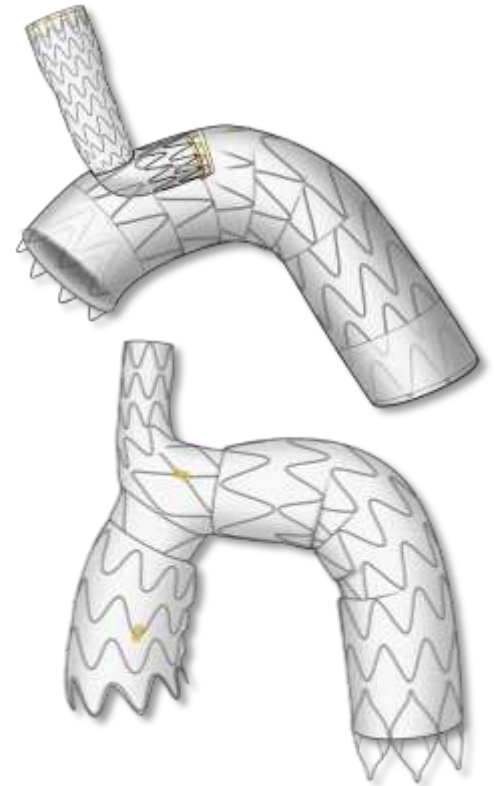
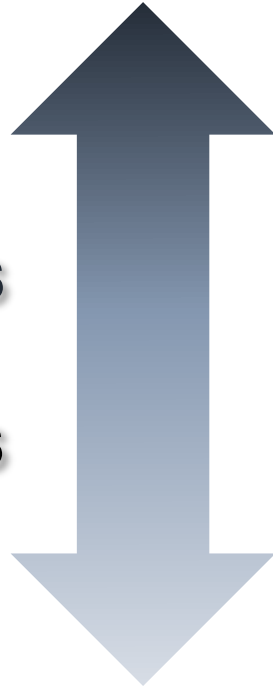
- Rapid pacing
 - Hemodynamic support
 - Retrograde type A dissection
 - Injury to aortic valve
 - L ventricular perforation
 - Inadvertent coverage of coronary arteries
 - Arrhythmias
-
- Conversion to open repair

Single branch devices

- Less arch manipulations
 - Potential for single branch cerebral protection
 - High flow
-
- Cervical debranching procedures
 - Patency based on single vessel
 - Retrograde configuration (Gore)
 - Component separation/
endoleak (Nexus)

PROS

CONS



Gore® TAG® Thoracic Branch Endoprosthesis (TBE)

FDA approval,

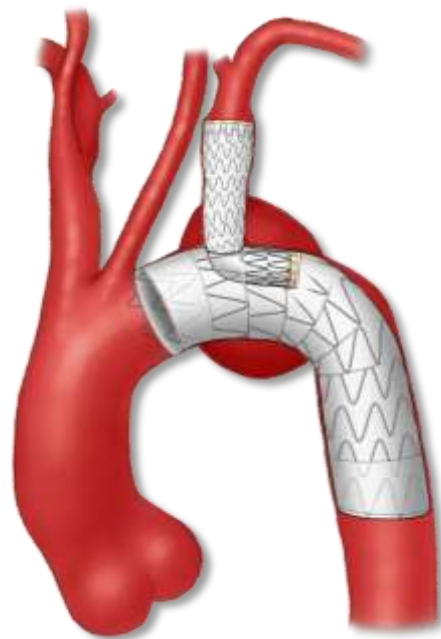
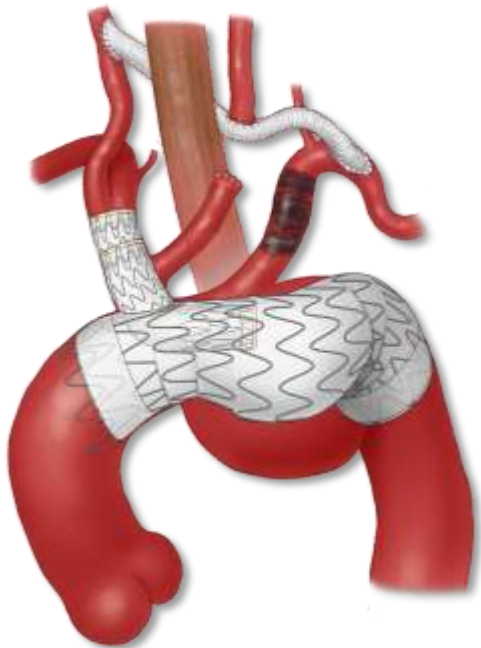
May 13, 2022

First U.S. implants,

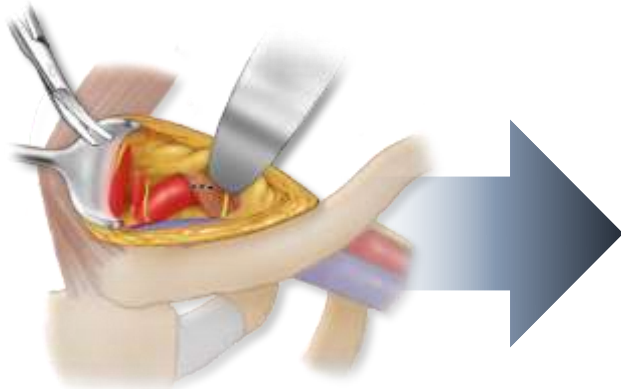
August 2022



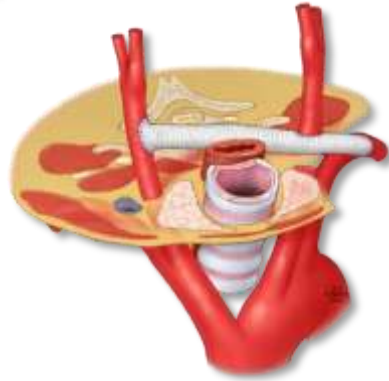
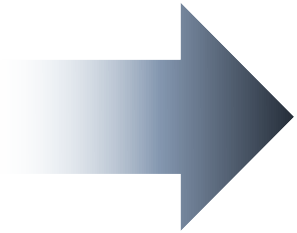
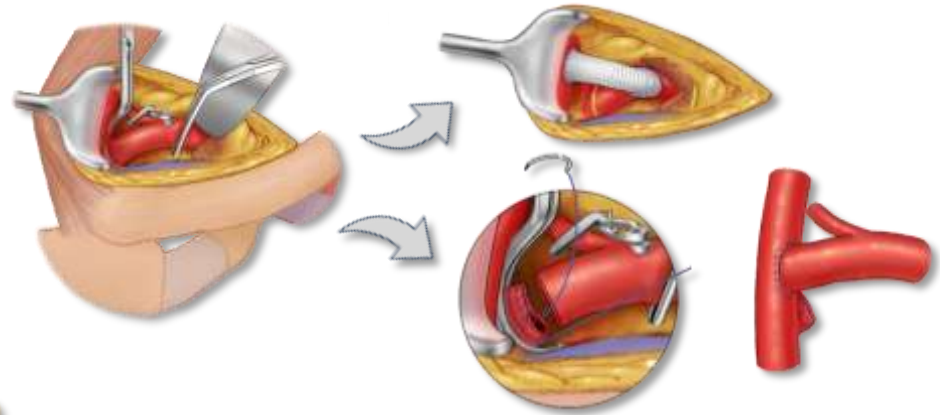
Single branch devices



Cervical debranching



Bypass or transposition

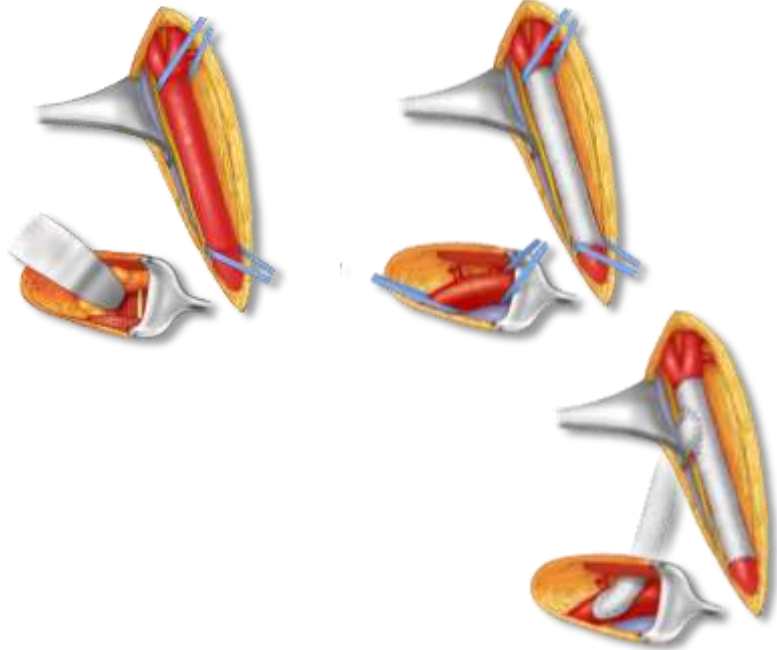


Carotid-carotid-LSA bypass

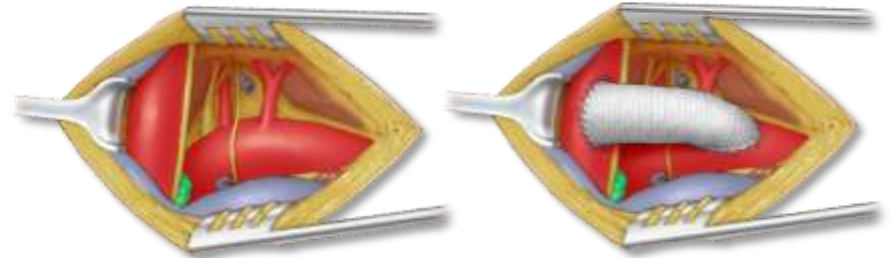
Cervical debranching



R carotid interposition graft
R carotid-subclavian bypass

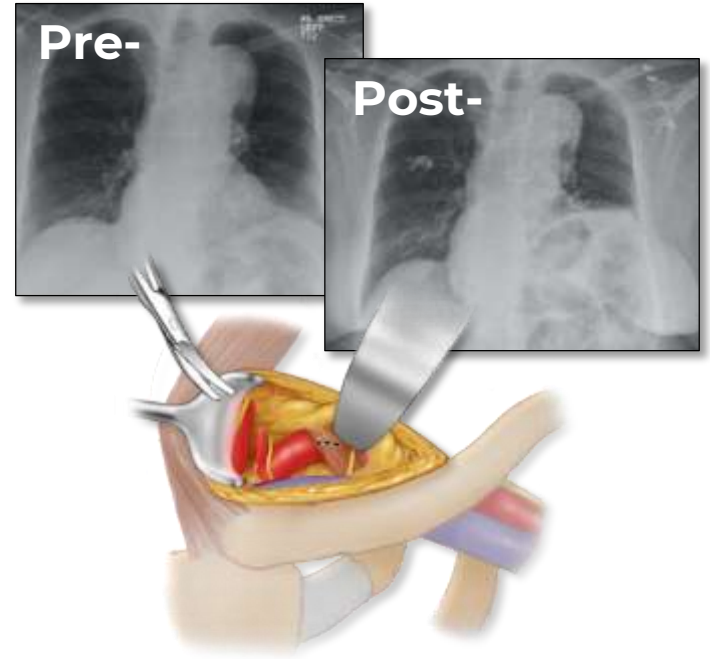


L carotid-subclavian bypass



Early complications

- Hematoma
- Wound Infection
- Nerve injury
 - *Phrenic nerve*
 - *Vagus(recurrent laryngeal) nerve*
 - *Brachial plexus*
- Thoracic duct injury (chyle or lymphatic leak)
- Horner syndrome
- Vessel injury/ dissection
- Jugular vein thrombosis
- Graft infection



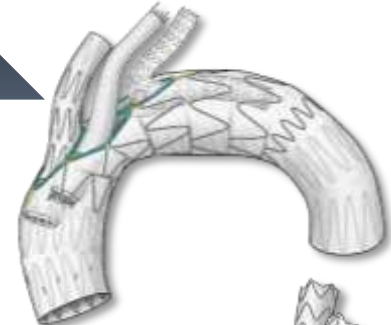
Double and triple branch devices

- No cervical debranching
- Antegrade branches for innominate/ L carotid
- Potential for total percutaneous technique

PROS

CONS

-
- Sequential arch manipulation
 - More complex cerebral protection
 - Less forgiven to ascending graft kinks
 - Wound complications with cervical incisions

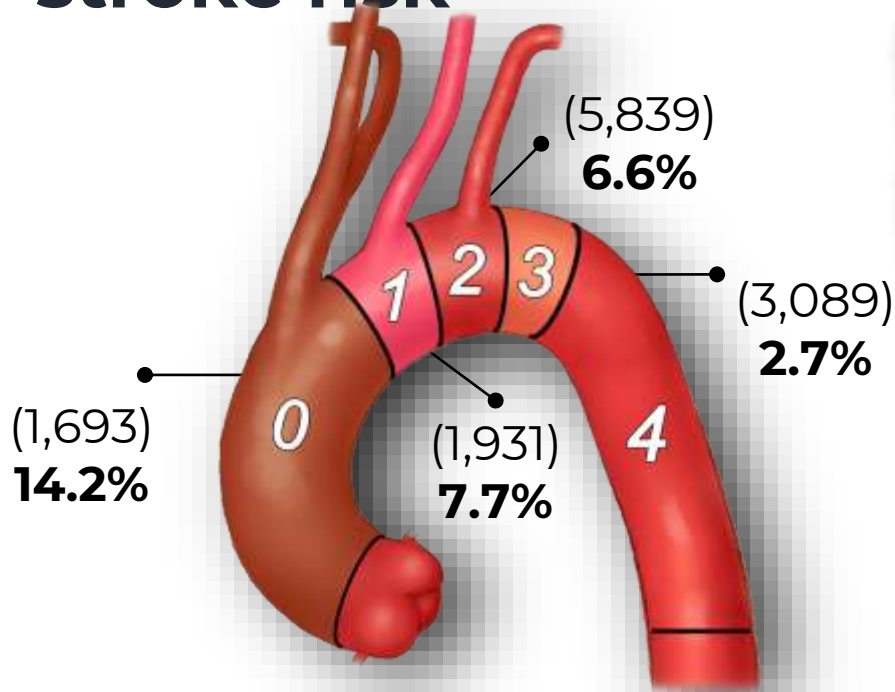


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Effect of landing zone location on stroke risk



From the Eastern Vascular Society

A meta-analysis on the effect of proximal landing zone location on stroke and mortality in thoracic endovascular aortic repair

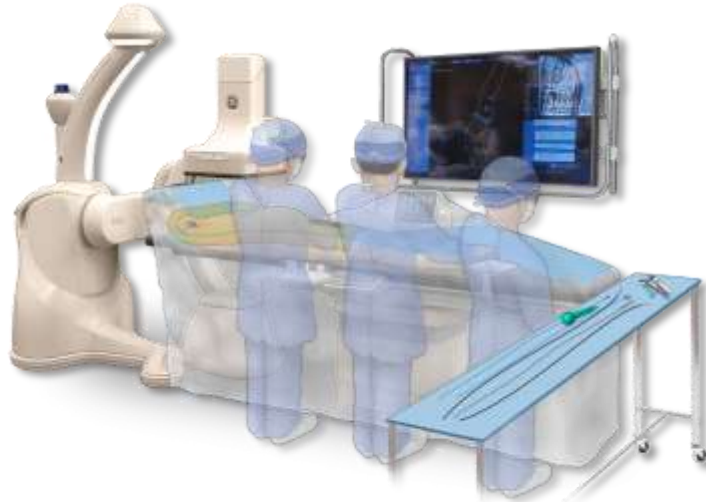
Yuchi Ma, BS,^a Mishal S. Siddiqui, MBBS,^b Syed A. Farhan, MD,^a Francisco C. Albuquerque, MD,^a Robert A. Larson, MD,^a Mark M. Levy, MD,^a Josue Chery, MD,^c and Daniel H. Newton, MD,^a Richmond, VA, and Karachi, Pakistan

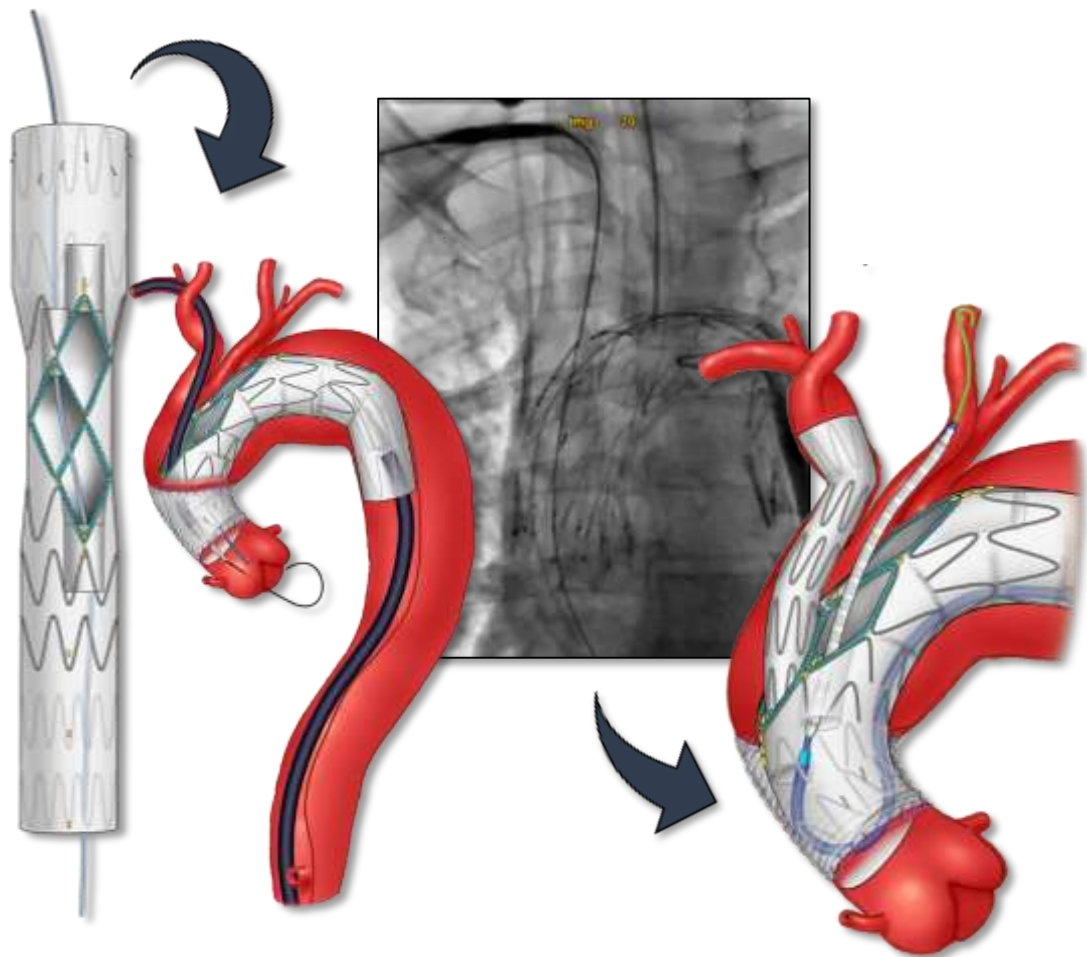
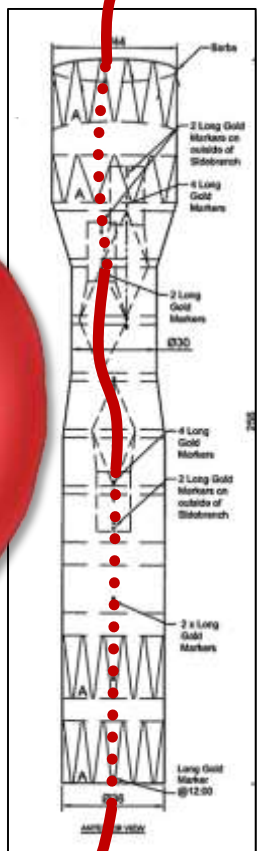
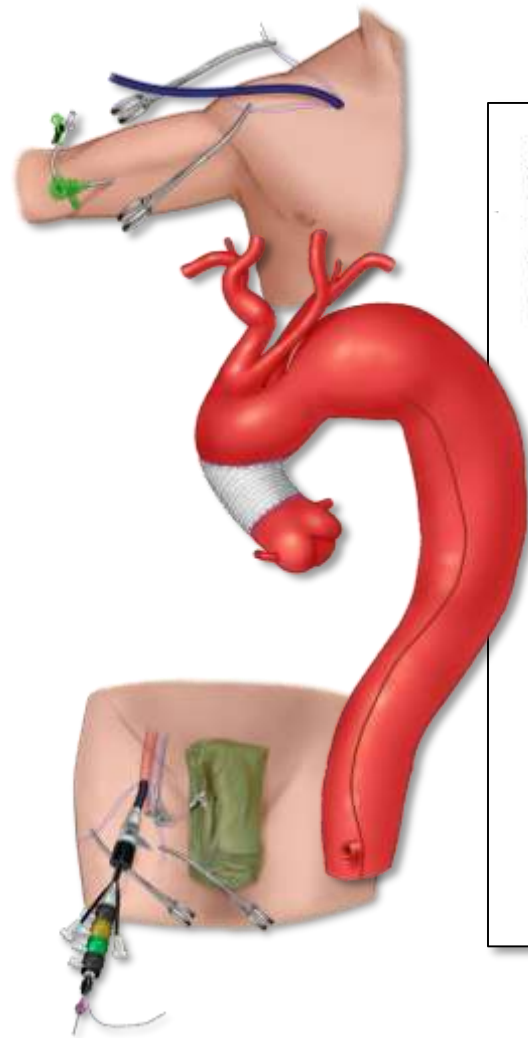
- 57 studies/ **22, 244** patients treated by TEVAR
- 30-day mortality: **2.9-3.7%** Zones 1-3
9.3% Zone 0

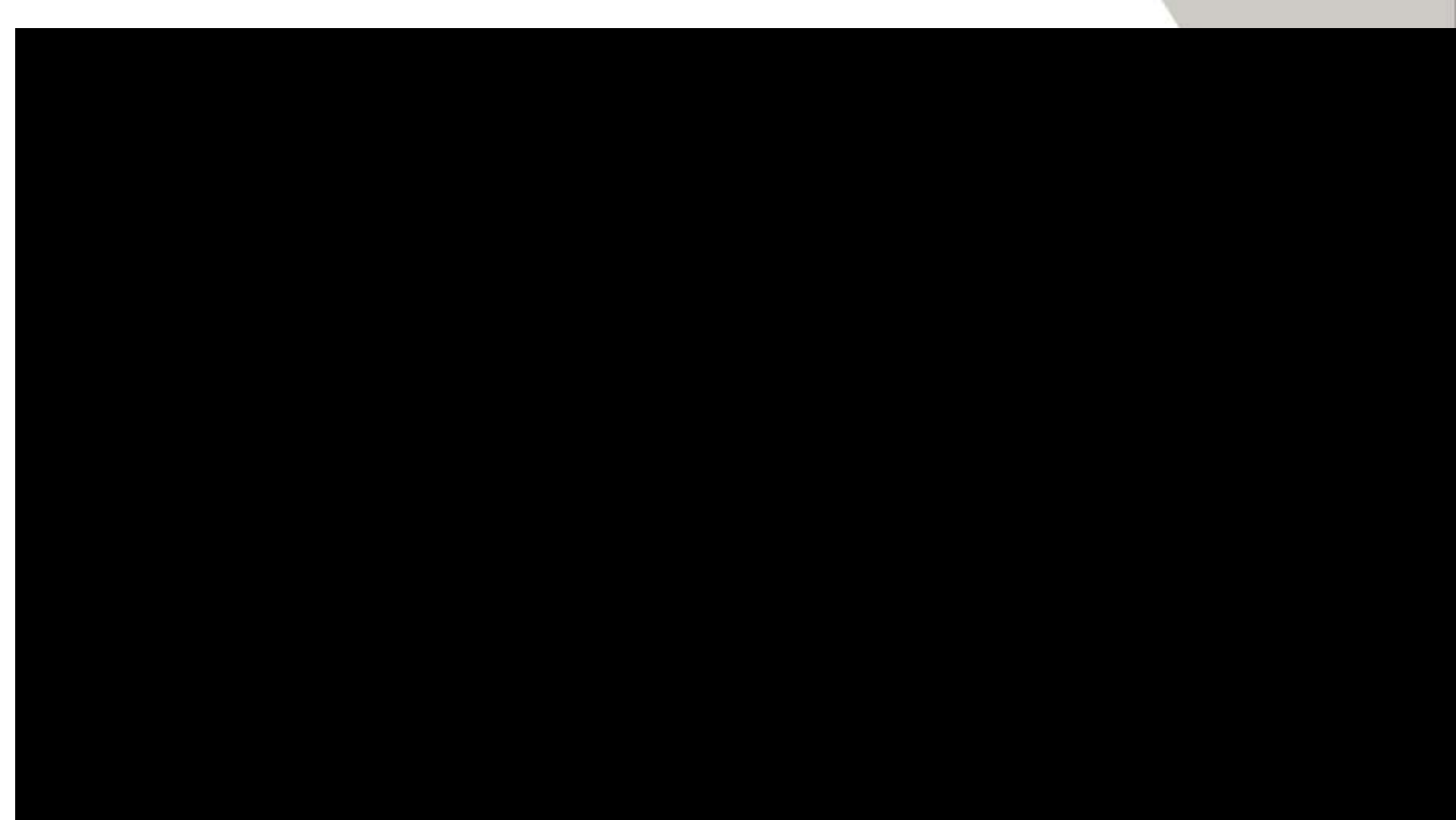
Hybrid operating room set up

- Advanced imaging applications
 - On-lay fusion
 - Cone beam computed tomography
- Open surgical repair
- Anesthesia talk
 - IJ access
 - Arterial line
 - ACT monitoring
- EEG monitoring
- Mini cell saver
- CO2 flushing

Recommendation 5		
A hybrid room with a fixed imaging system is recommended for thoracic endovascular aortic repair involving the aortic arch		
Class	Level	References
I	C	-










Thank You!



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