Subclavian Artery Aneurysms Repair

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Disclosures

None

Subclavian Artery Aneurysms

- 1 - 3.5% of all peripheral arterial aneurysms
- Pain, Horner's syndrome, hoarseness, or distal embolization
- Etiology: atherosclerotic, trauma, post stenotic dilation in TOS, and genetic

Table 1 Aetiology of SAA.

Etiology	Before 1980 Number of cases (%)	After 1981 Number of cases (%)	Overall Number of cases (%)
Trauma	5 (10%)	123 (37%)	128 (33%)
Atherosclerosis	12 (24%)	60 (18%)	72 (19%)
T.O.S.	12 (24%)	59 (18%)	71 (18%)
Iatrogenic	0 (0%)	32 (10%)	32 (8%)
Collagen disorders	5 (10%)	24 (7%)	29 (7%)
Mycotic	8 (16%)	13 (4%)	21 (5%)
Unknown	3 (6%)	4 (1%)	7 (2%)
Coarctation aortae	2 (4%)	5 (1%)	7 (2%)
Congenital	1 (2%)	4 (1%)	5 (1%)
Post-radiotherapy	0 (0%)	5 (1%)	5 (1%)
H.I.V.	0 (0%)	3 (1%)	3 (1%)
Not defined	3 (6%)	4 (1%)	7 (2%)
Total	51	336	387

B.P. Vierhout et al, Eur J Vasc Endovasc Surg (2010)

Extrathoracic subclavian artery aneurysm in a patient with suspected genetic arteriopathy JVS CIT 2021;7:46-50

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JVS-CIT Cases, Innovations and Techniques

Operative repair of right intrathoracic subclavian artery aneurysms in patients with genetic arteriopathy JVS CIT 2023;9:1081.

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Subclavian Artery Aneurysms

Surgical Decision-Making

Determine etiology

- **Location: right vs. left**
- **Location: Intrathoracic vs. extrathoracic**
- **Proximal exposure**
  - RSCA: Median sternotomy vs supraclavicular
  - LSCA: left lateral thoracotomy vs supraclvicular
- **Vertebral artery management**
  - Jump bypass vs reimplantation into the CCA
- **Open repair**
  - Aneurysmorrhaphy
  - Interposition graft
  - Ligation
- **Endovascular approaches**
  - Stents
  - Embolizaiton

Genotype-Surgical Phenotype Correlation: Genetic variant and type of variant is associated with tissue integrity = Precision Vascular Surgery

Tensile strength

Conceptual model

- *FBN1*
- *FBN1* null

Marfan Syndrome

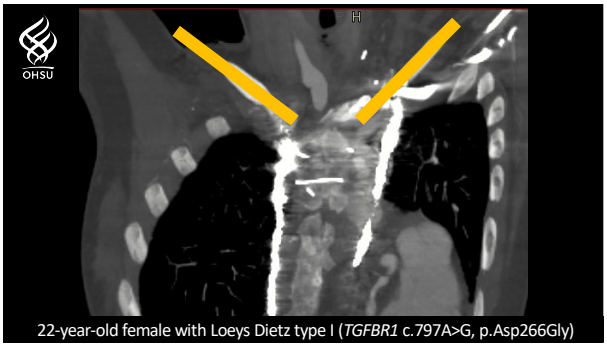
- *TGFBR2*
- *TGFBR1*
- *SMAD3*

Loeys Dietz Syndrome

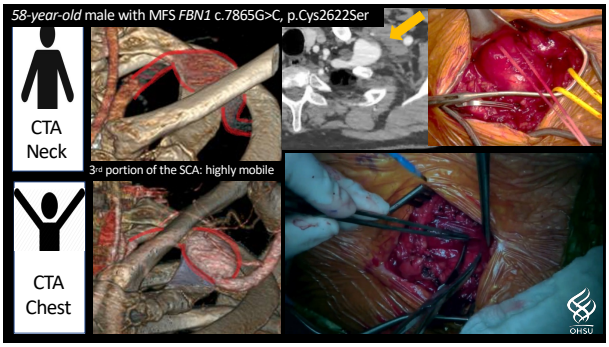
TGFb2/TGFb3 (?)

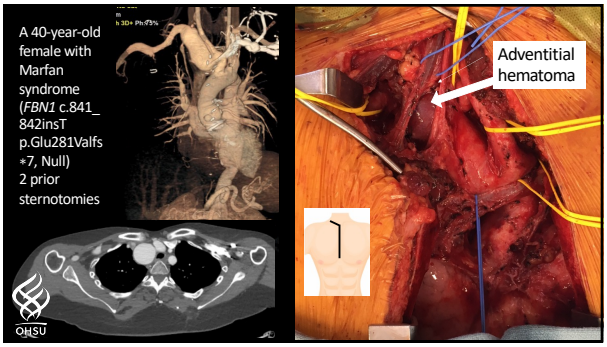
- *COL3A1* null
- *COL3A1* small amino acid substitution (?)
- *COL3A1* large amino acid substitution

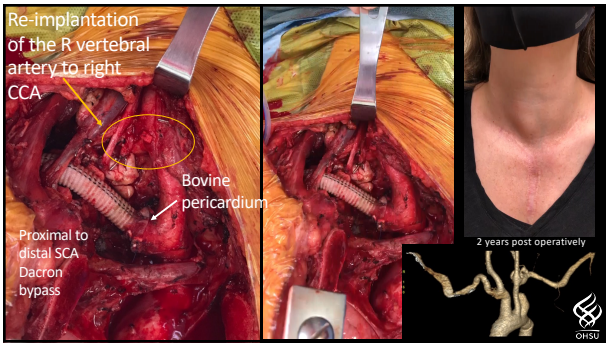
Vascular Ehlers-Danlos Syndrome

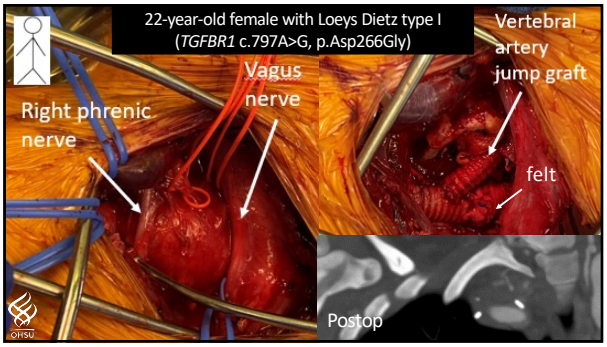


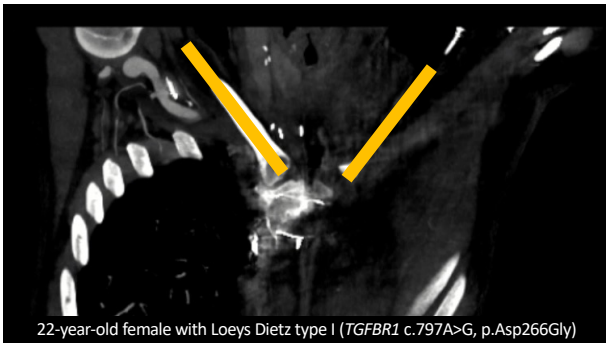
22-year-old female with Loeys Dietz type I (*TGFBR1* c.797A>G, p.Asp266Gly)


58-year-old male with MFS FBN1 c.7865G>C, p.Cys2622Ser
CTA Neck
3rd portion of the SCA: highly mobile
CTA Chest
OHSU


A 40-year-old female with Marfan syndrome (FBN1 c.841_842insT p.Glu281Valfs*7, Null) 2 prior sternotomies
Adventitial hematoma
OHSU


Re-implantation of the R vertebral artery to right CCA
Bovine pericardium
Proximal to distal SCA Dacron bypass
2 years post operatively
OHSU


22-year-old female with Loeys Dietz type I (TGFBR1 c.797A>G, p.Asp266Gly)
Right phrenic nerve
Vagus nerve
Vertebral artery jump graft
felt
Postop
OHSU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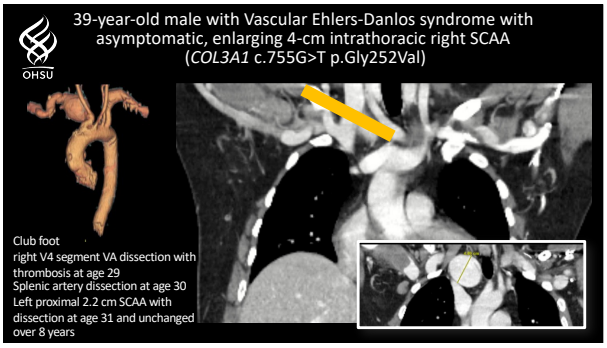
39-year-old male with Vascular Ehlers-Danlos syndrome with asymptomatic, enlarging 4-cm intrathoracic right SCAA (COL3A1 c.755G>T p.Gly252Val)
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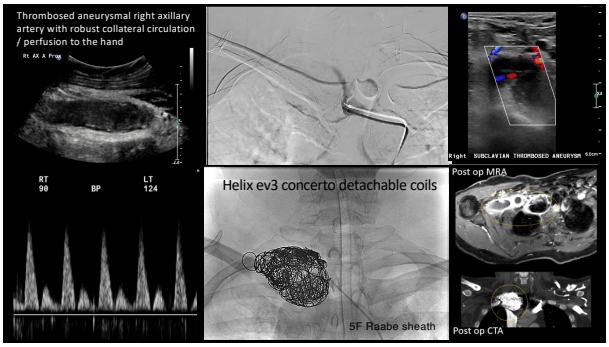
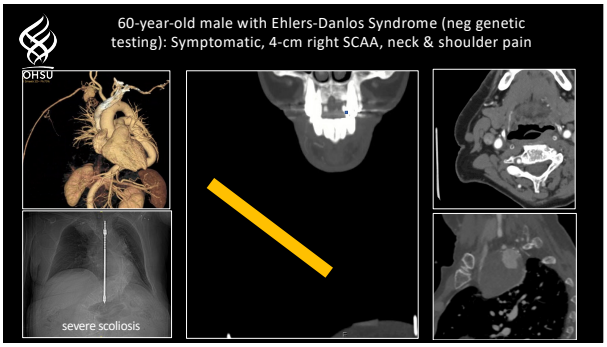
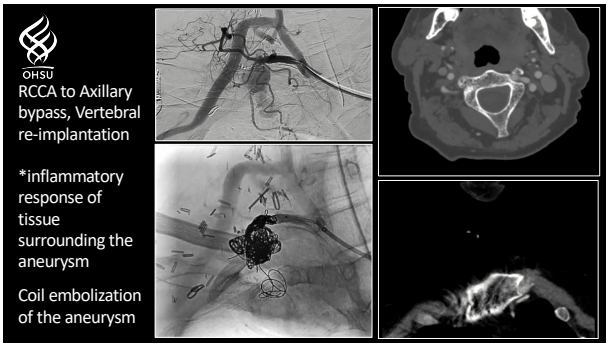
Club foot
right V4 segment VA dissection with thrombosis at age 29
Splenic artery dissection at age 30
Left proximal 2.2 cm SCAA with dissection at age 31 and unchanged over 8 years


Thrombosed aneurysmal right axillary artery with robust collateral circulation / perfusion to the hand
RT 90
BP
LT 124
Helix ev3 concerto detachable coils
5F Raabe sheath
Post op MRA
Post op CTA


60-year-old male with Ehlers-Danlos Syndrome (neg genetic testing): Symptomatic, 4-cm right SCAA, neck & shoulder pain
OHSU
severe scoliosis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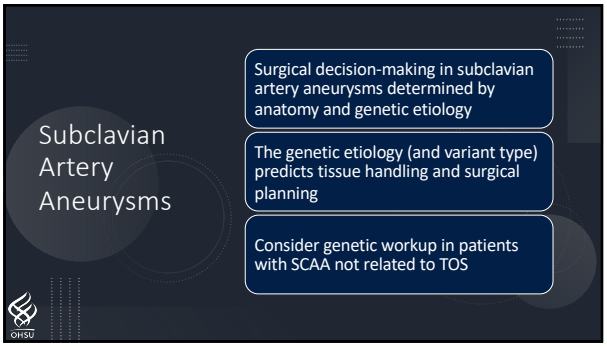
RCCA to Axillary bypass, Vertebral re-implantation
*inflammatory response of tissue surrounding the aneurysm
Coil embolization of the aneurysm


Subclavian Artery Aneurysms
Surgical decision-making in subclavian artery aneurysms determined by anatomy and genetic etiology
The genetic etiology (and variant type) predicts tissue handling and surgical planning
Consider genetic workup in patients with SCAA not related to TOS
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