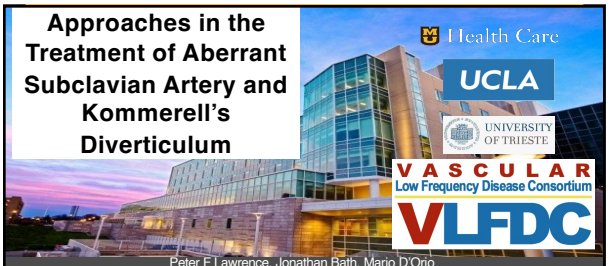
Approaches in the Treatment of Aberrant Subclavian Artery and Kommerell's Diverticulum



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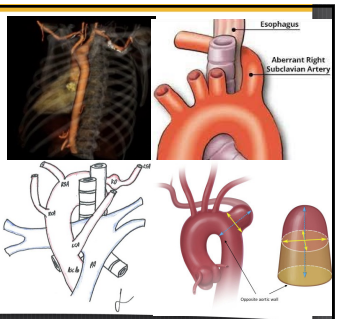
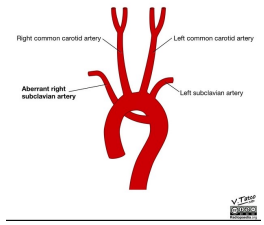
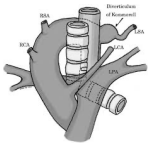
NO DISCLOSURES

Background

- Aberrant subclavian artery (ASA) can occur with or without Kommerell's Diverticulum (KD)
- Can be associated with both right and left aortic arch
- Incidence is approximately 0.2-.25% of the population







Background

- Outcomes of treatment are poorly reported
- Small case series
- Significant variation
- Optimal approaches are largely unknown

Long-term results of hybrid repair techniques for Kommerell's diverticulum

Natural history and management of Kommerell's diverticulum in a single tertiary referral center

Results of aberrant right subclavian artery aneurysm repair

Methods

- VLFDC investigator network
- Adult patients with ASA/KD
- Surgical treatment
- Jan. 2000 to Dec. 2019
- Demographics/Outcomes

VASCULAR
Low Frequency Disease Consortium
VLFDC

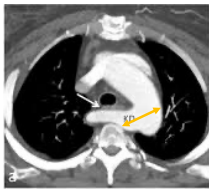
Results - demographics

- 173 patients with complete data
- 26 institutions worldwide
- Indications for surgery:
  - Symptoms 67%- dysphagia lusuria
  - Size 39%
  - Rupture 6%
  - Rapid growth 4%
  - Appearance 2%
  - Other 19%

Variables	N	%
Age, mean (sd)	59	(15.4)
Female gender	77	44.5
White race	134	78
Black race	18	10
Other race	20	12
Symptomatic	115	67
-Pain	29	17
-Dyspnea	20	11
-Dysphagia	82	47
-Dysphonia	14	8
-Neurologic	5	3
-Other	13	7.5

Results – perioperative variables

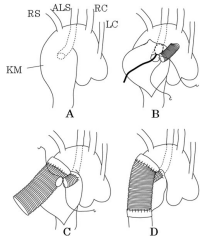
- Preop. mean diameter 36 mm
- Right-sided arch 17%
- Mean OR time 347 minutes
- Procedure type:
  - Endovascular/hybrid 77%
  - Open 23%



Idrees et al. *J Thorac Cardiovasc Surg* 2014

Type of repair

- **Open repairs n = 40 (23%):**
  - Primary aortic repair 16%
  - ASA ligation 72%
  - Aortic graft repair 30%
  - Aortic patch repair 7%
  - CSB 33%
  - SCT 61%
  - Other 33%

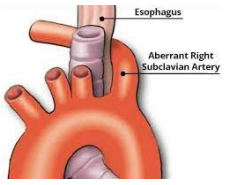


Type of repair

- **Hybrid repairs n = 123 (72%):**
  - TEVAR + CSB 23%
  - TEVAR + CSB + coil 36%
  - TEVAR + SCT 15%
  - Other 26%
- Timing:
  - Same operation 39%
  - Staged operation 61%

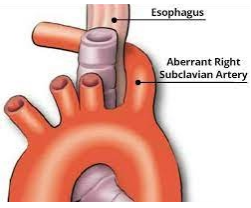
Type of repair

- **Total endovascular n = 14 (8%):**
  - TEVAR alone 71%
  - Fenestrated TEVAR 7%
  - Branched TEVAR 7%
  - Laser fen. TEVAR 14%



Results – Overall Outcomes

- 30-day Mortality 6.5%
- Overall Mortality 13%
- Return to OR 7%
- Length of stay 11 days
- Readmission 8%
- Symptom relief 1 yr. 76%

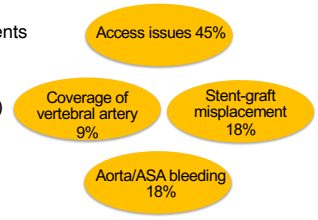


Results – Specific Outcomes

Specific Outcomes	%
Intraoperative complications	11%
Subclavian occlusion	3%
Reintervention	13%
Endoleak	17%
Postoperative complications	24%

Intraoperative Complications

- Occurred in 11% of patients
- Vascular injury (6%)
- Non-vascular injury (5%)
  - vocal cord paralysis



Reintervention

- 12% of patients
  - 13% open procedures
  - 13% endo/hybrid procedures
- Not associated with type of procedure, symptoms, urgent presentations
- Trend towards female patients (p=0.06)

Indication for reintervention n = 22	%
Endoleak	36%
Sac increase	5%
Persistent/recurrent symptoms	18%
Pseudoaneurysm	5%
Graft infection	5%
Thrombosis of subclavian	14%
Other	18%

Reintervention

Type of reintervention (n=22)	%
Upper extremity bypass and TEVAR	9%
Angioplasty/stent/coil embolization to ASA	23%
Upper extremity bypass alone	23%
Open aortic surgery	18%
TEVAR alone	14%
TEVAR/chimney	5%
Incision and drainage	5%
Unknown	5%

Results –Univariable outcomes

- Subgroups:
  - Elective vs. Urgent

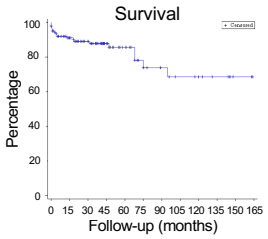
Variables	Elective n = 137 (%)	Urgent n = 36 (%)	p value
30-day mortality	2	23	<.001
Overall mortality	10	24	.03
Intraop. comp.	7	29	.0002
Length of stay (d)	8.5	18.1	.0003
Respiratory failure	9	31	.0006
Symp. relief at 1 yr	81	11	.004

Results – multivariable analysis

Risk factor	Outcome	OR	95% CI
Urgent operation	Overall mortality	5.1	1.1-23.1
Urgent operation	Intraoperative complication	9.6	2.55-36.9
Urgent operation	Length of stay ≥ 10 days	10.7	3.61-31.64
Diabetes	30-day readmission	6.5	1.3-32.4
Female gender	Reintervention	5.3	1.31-22.1
Urgent operation	Respiratory failure	15.6	3.4-71.6

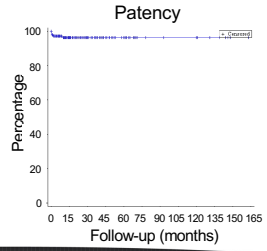
Survival Analysis

- Survival status reported on 166 patients
- At a mean follow-up of 40.7 months
- 87.3% of patients were still alive



Patency Analysis

- 142 patients subclavian intervention
- 5 occlusions, 3 reopened
- Primary patency
  - 96.5% at mean follow-up 33.7 months
- Secondary patency
  - 97.9% at mean follow-up 33.2 months



Conclusions
Aberrant Subclavian Artery

- Rare disease but thoracic and vascular surgeons need to understand it
- Some patients have just ASA and some have ASA plus Kommerell's
- Hybrid approach has become standard
- Urgent procedures are associated with a higher mortality
- Revascularization of the distal subclavian artery is commonly needed
- Reinterventions are most often for endoleak
- Long-term results, resolution of symptoms, and survival are excellent

Results – Univariable analysis

- Female:
  - Younger
  - More symptomatic
  - Fewer comorbidities
  - Shorter length of stay

Variables	Female n = 77 %	Male n = 96 %	p value
Age (yr)	57	62	.03
Symptoms	75	59	.02
Hypertension	58	84	.0001
MI	4	23	.0003
CKD	4	17	.006
Length of stay (d)	8.5	12.1	.03