ARCH ENDO REPAIR: THE BOLTON PERSPECTIVE

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Disclosure

Speaker name:

Piergiorgio Cao

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

Background

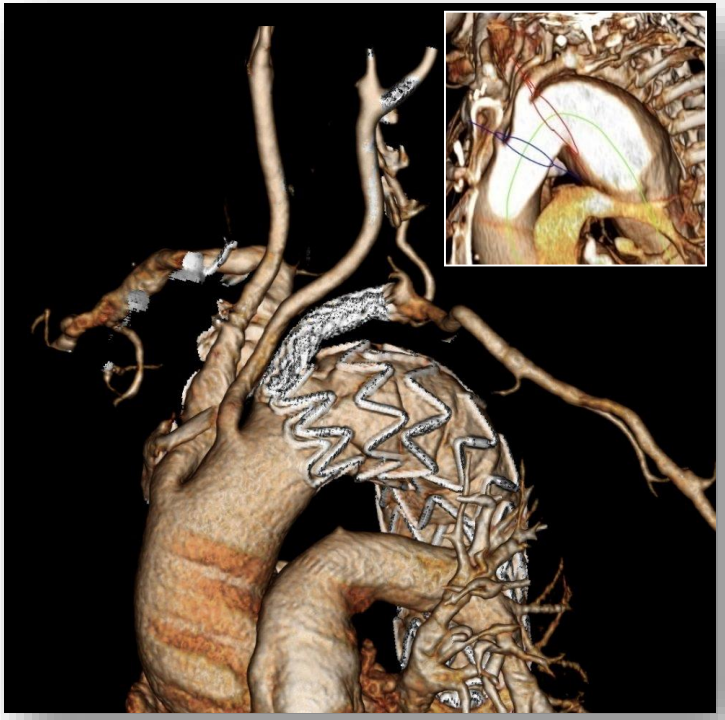
- **Any repair of aortic arch remains demanding and exposes to not negligible mortality and stroke risks**

- **Open repair: gold standard**

- **Hybrid and endovascular repair: valid alternative mostly in high risk patients**

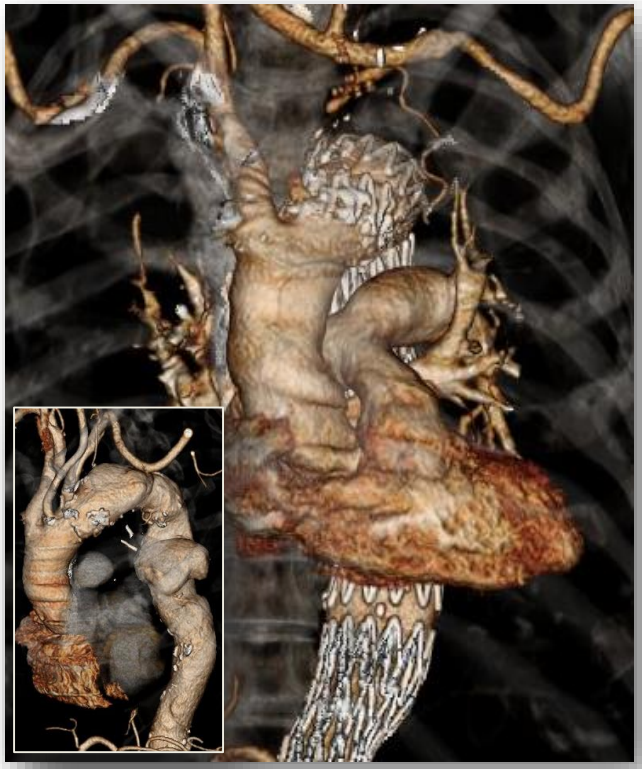
Debranching technique (Zone 2)

Car – Subcl BP



Chimney on LSA

Debranching technique (Zone 1)



Car – Car – Subcl BP

Car – Subcl BP (Bovine Arch)

Bilateral Car – Subcl BP (aberrant RSA aneurysm)

Debranching technique (Zone 0)

Total Debranching

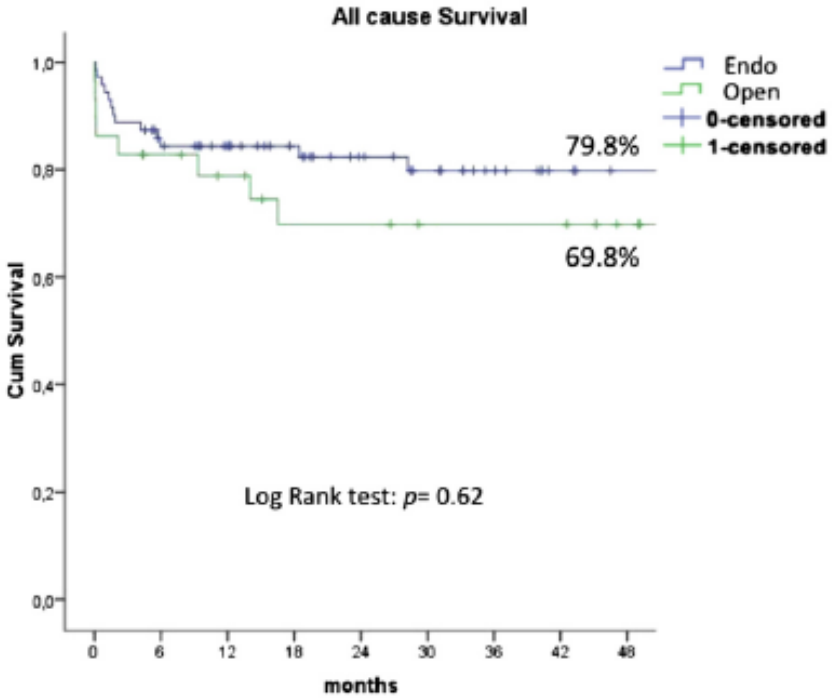
Single Branched +
Car – car – subcl BP

Double Branched +
Car – subcl BP

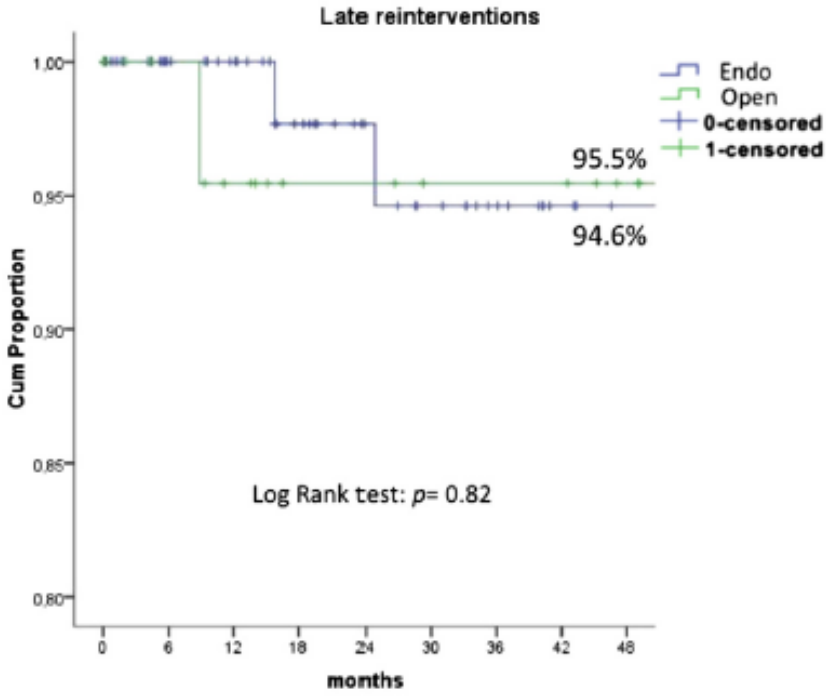
Perioperative results

	Endo	Open	P
Death	8.5%	13.8%	0.47
Stroke	5.6%	3.4%	1
Spinal cord ischemia	2.8%	0%	0.50

5-year results



	months	0	12	24	36	48
ENDO	n° at risk	71	49	34	22	14
	st. error	0	0.04	0.05	0.05	0.05
OPEN	n° at risk	29	19	14	13	10
	st. error	0	0.08	0.09	0.09	0.09

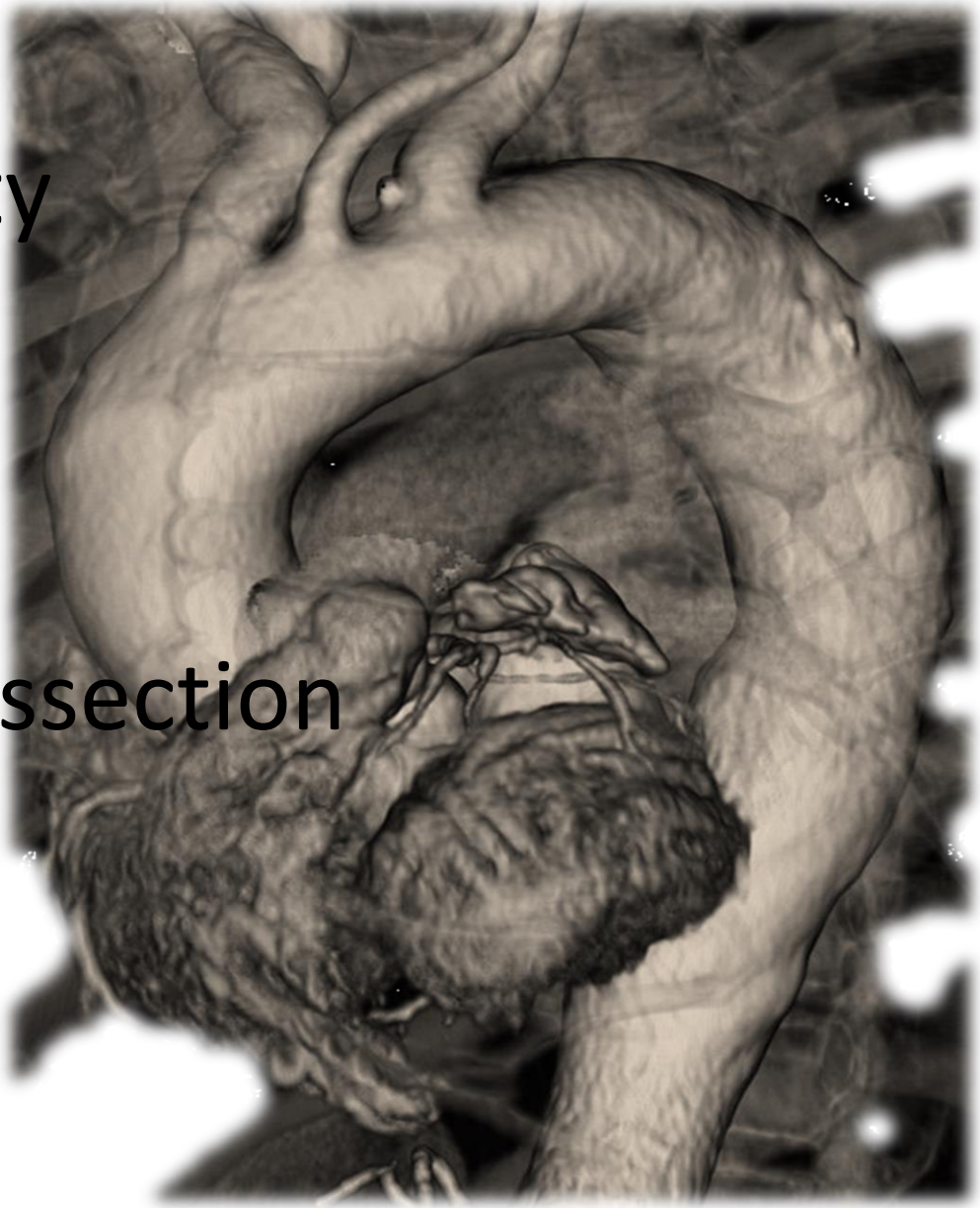


	months	0	12	24	36	48
ENDO	n° at risk	71	47	32	22	14
	st. error	0	0	0.02	0.04	0.04
OPEN	n° at risk	29	19	14	12	10
	st. error	0	0.04	0.04	0.04	0.04

JVS 2015

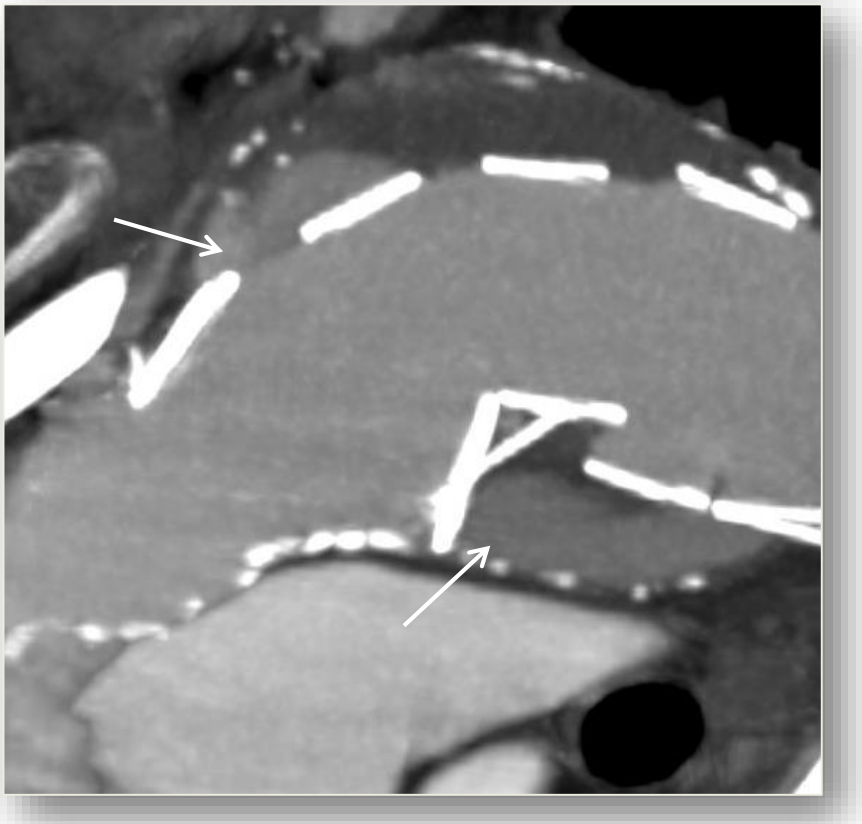
Arch TEVAR issues

- ✓ Conformability
- ✓ Endoleak
- ✓ Retrograde dissection
- ✓ Stroke



Conformability

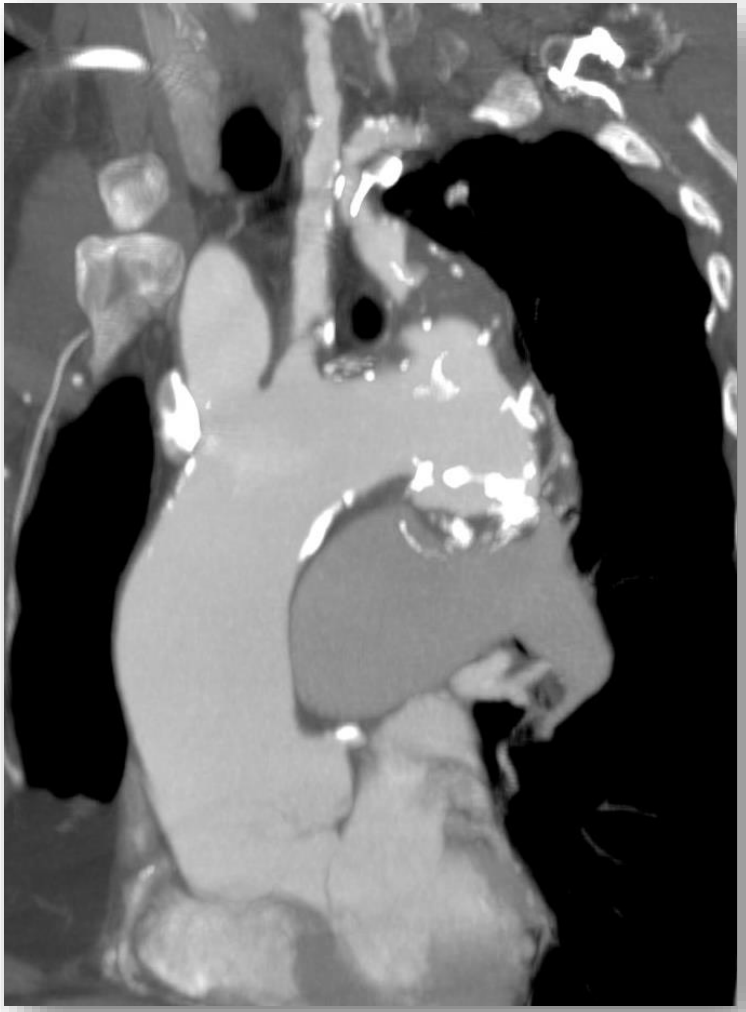
Deployment related issues



Conformability

Migration and type I endoleak

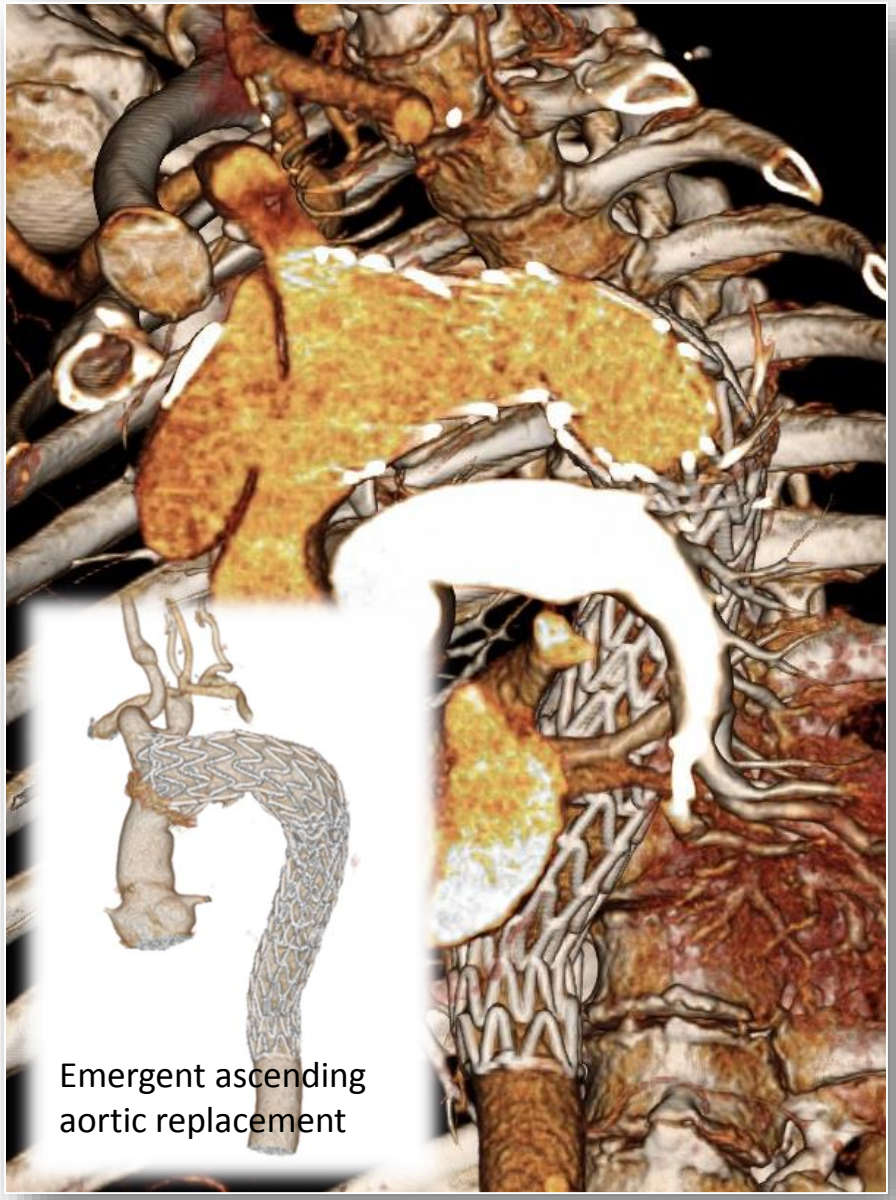
Patients’ selection

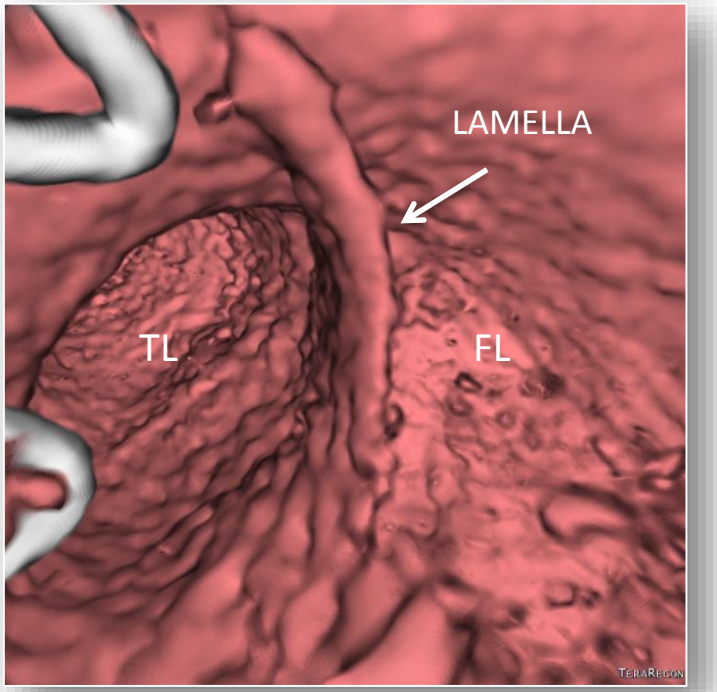


Shaggy” aorta

Retrograde dissection

Zone 1 repair





San Camillo Experience
2009 - 2015

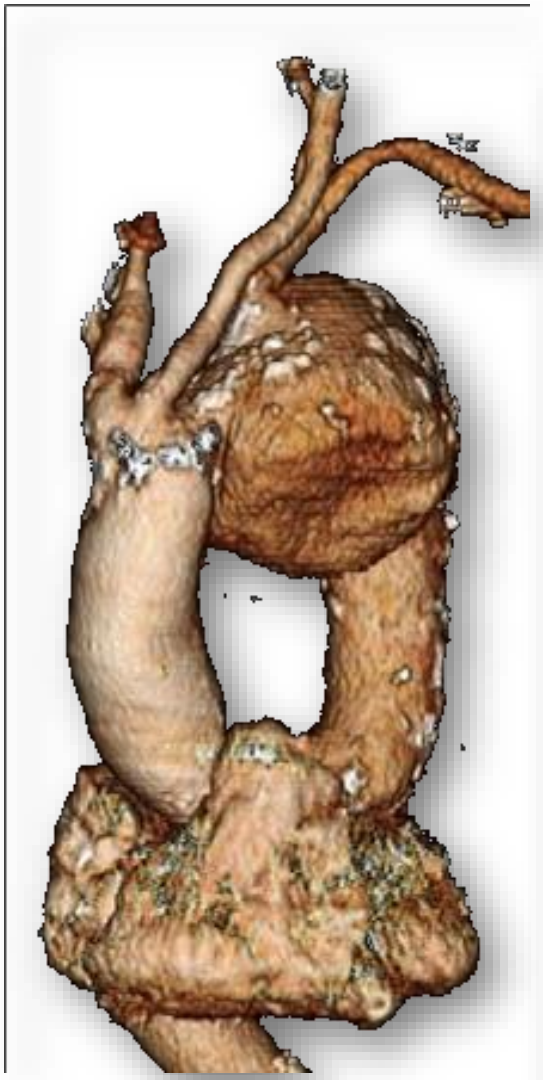
TEVAR: 483

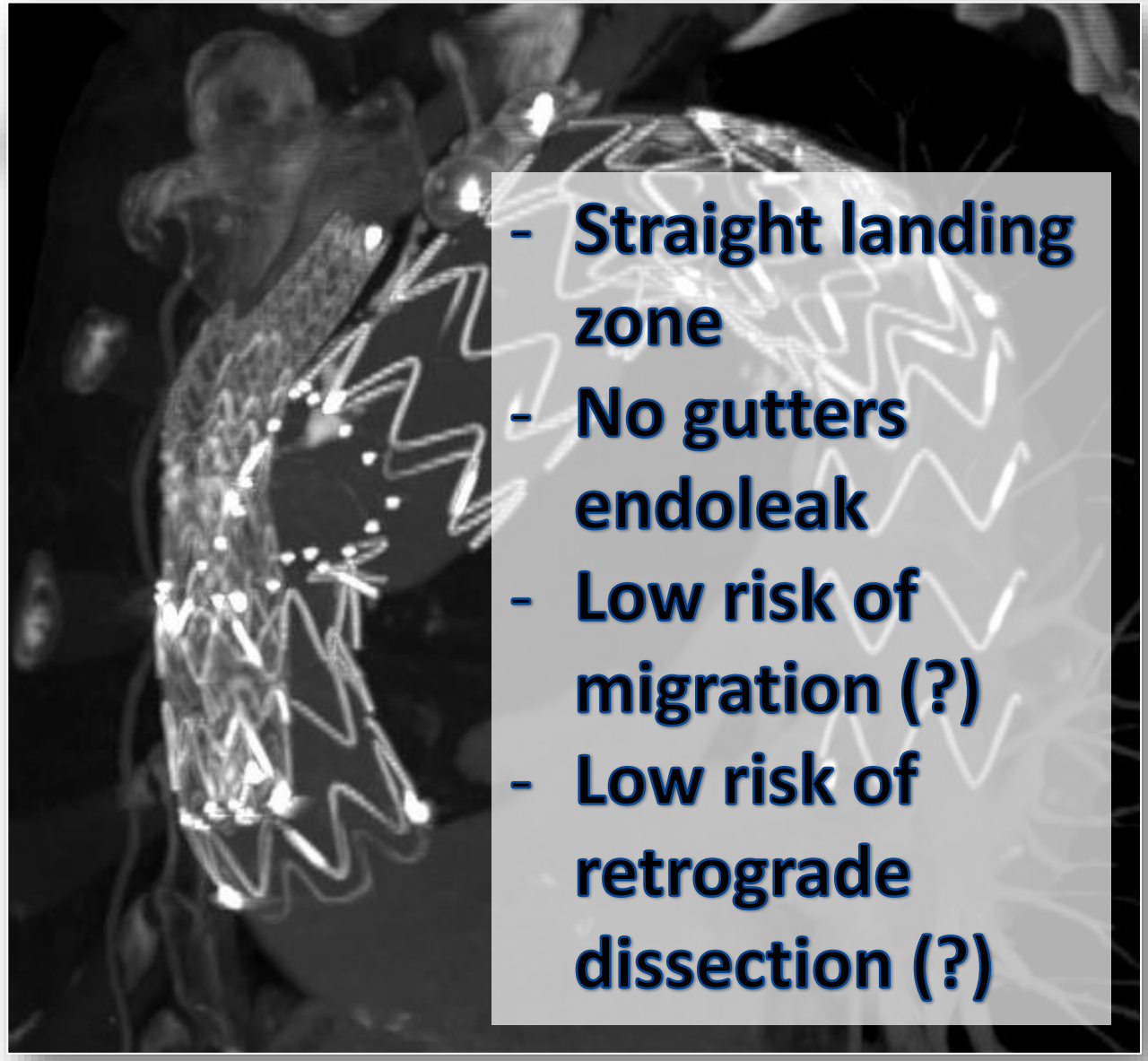
RAD: 7 (1.4%)

Zone 0-1: 109

RAD in Zone 1 :5.9%)

Potential advantages of Arch Branched stentgrafts

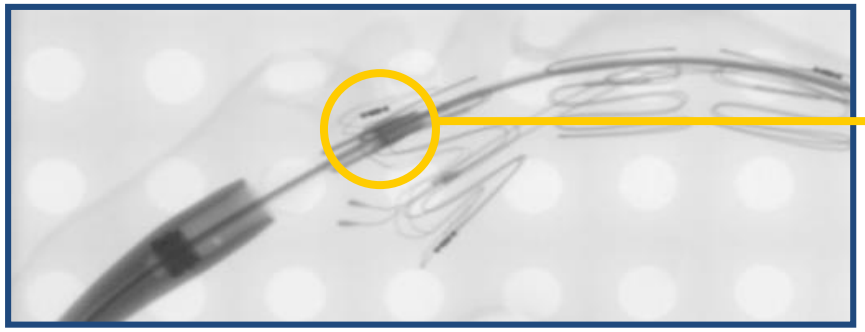




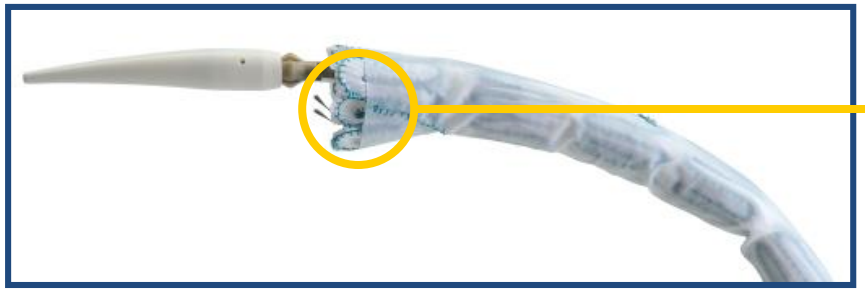
- Straight landing zone
- No gutters endoleak
- Low risk of migration (?)
- Low risk of retrograde dissection (?)

BOLTON ARCH BRANCHED STENTGRAFT

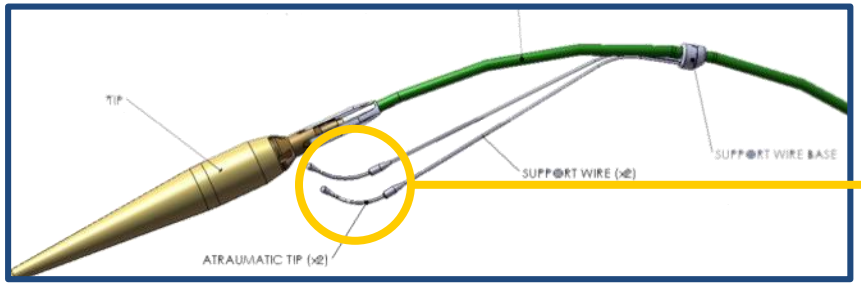
Delivery System based on Relay NBS PLUS Thoracic Stent-Graft



Proximal Clasping mechanism to allow stent-graft **repositioning** and **pre-curved guidewire lumen** to allow **self-orientation**

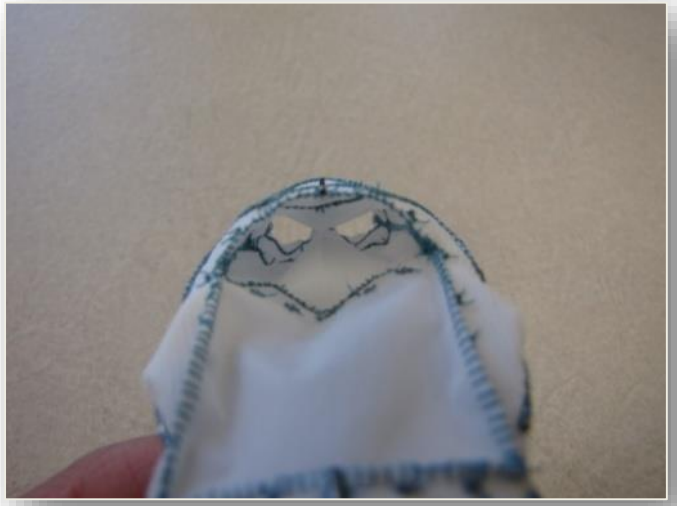


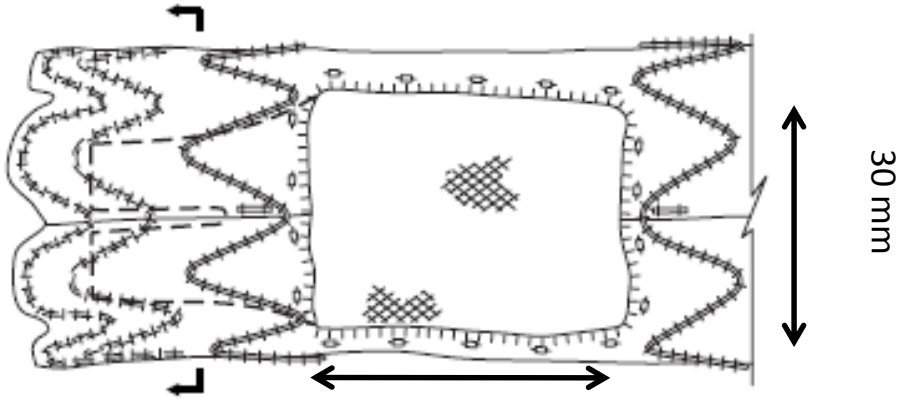
Secondary sheath allows easy tracking to zone 0

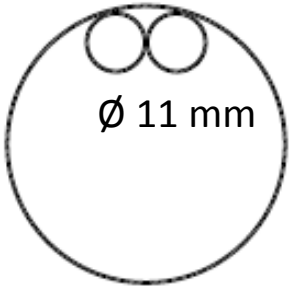


Atraumatic **Support Wires** to **control the expansion** of the inferior portion of the graft

Bolton Arch Branched Device

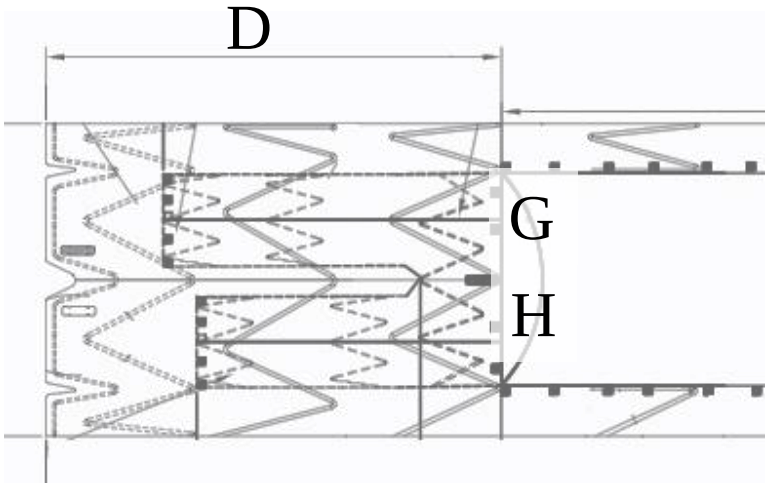






BOLTON ARCH BRANCHED STENTGRAFT

Main Body – Tunnel length and diameter

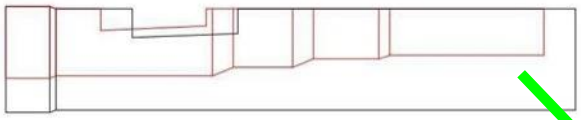


G: Posterior tunnel for *BCT*
H: Anterior tunnel for *LCCA*

Tunnel Length		
Length D	**Length G**	**Length H**
60 mm	44 mm	40 mm
45 mm	34 mm	30 mm

Tunnel Diameter	
Diameter G	**Diameter H**
12 mm	12 mm

BOLTON ARCH BRANCHED STENTGRAFT

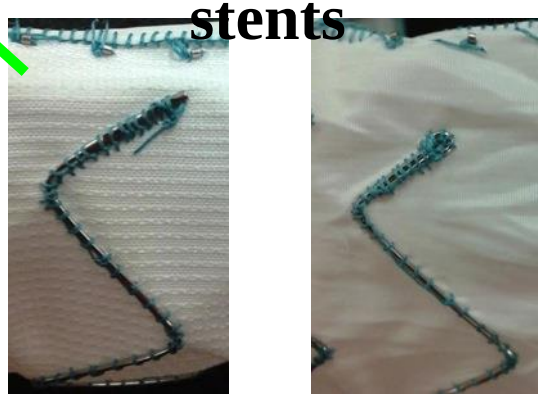


Specific tapering pattern

Low profile graft

“PRO” delivery system (24-25F)

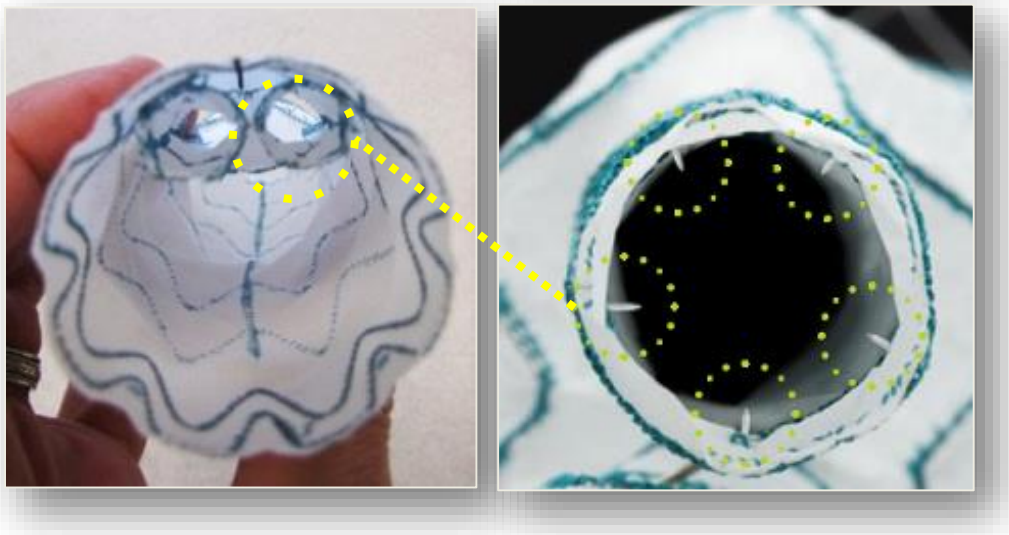
Redesigned size Dedicated stents

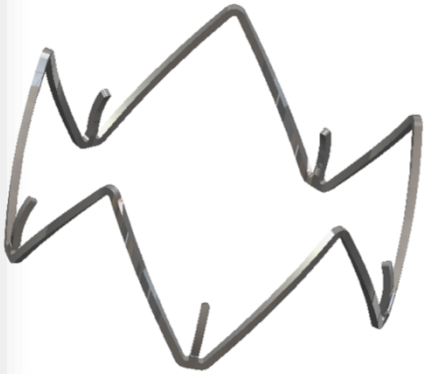


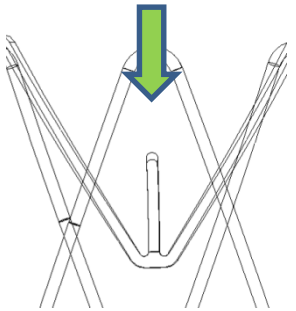
New Hemi Stents

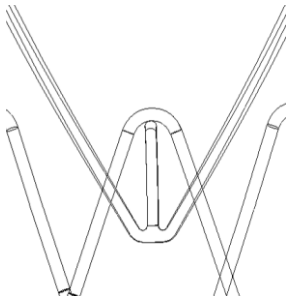
BOLTON ARCH BRANCHED STENTGRAFT

Lock stent prevents modular disjunction







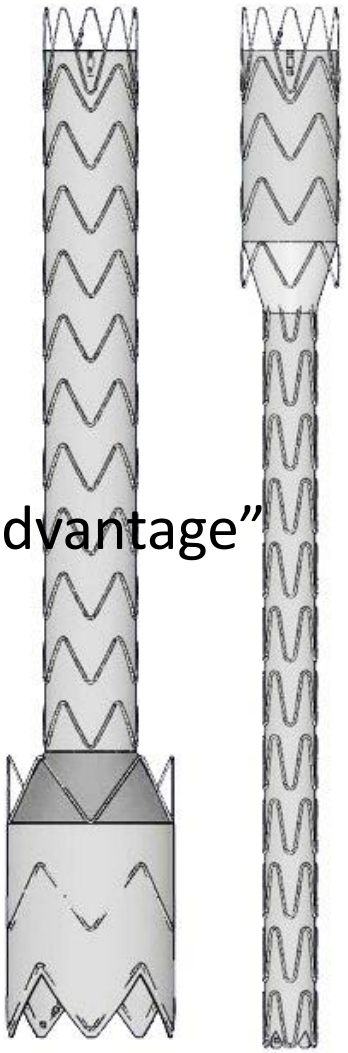


Dull barbs facing towards lumen of the tunnel **preventing potential disconnection** of the branches

BOLTON ARCH BRANCHED STENTGRAFT

Branches

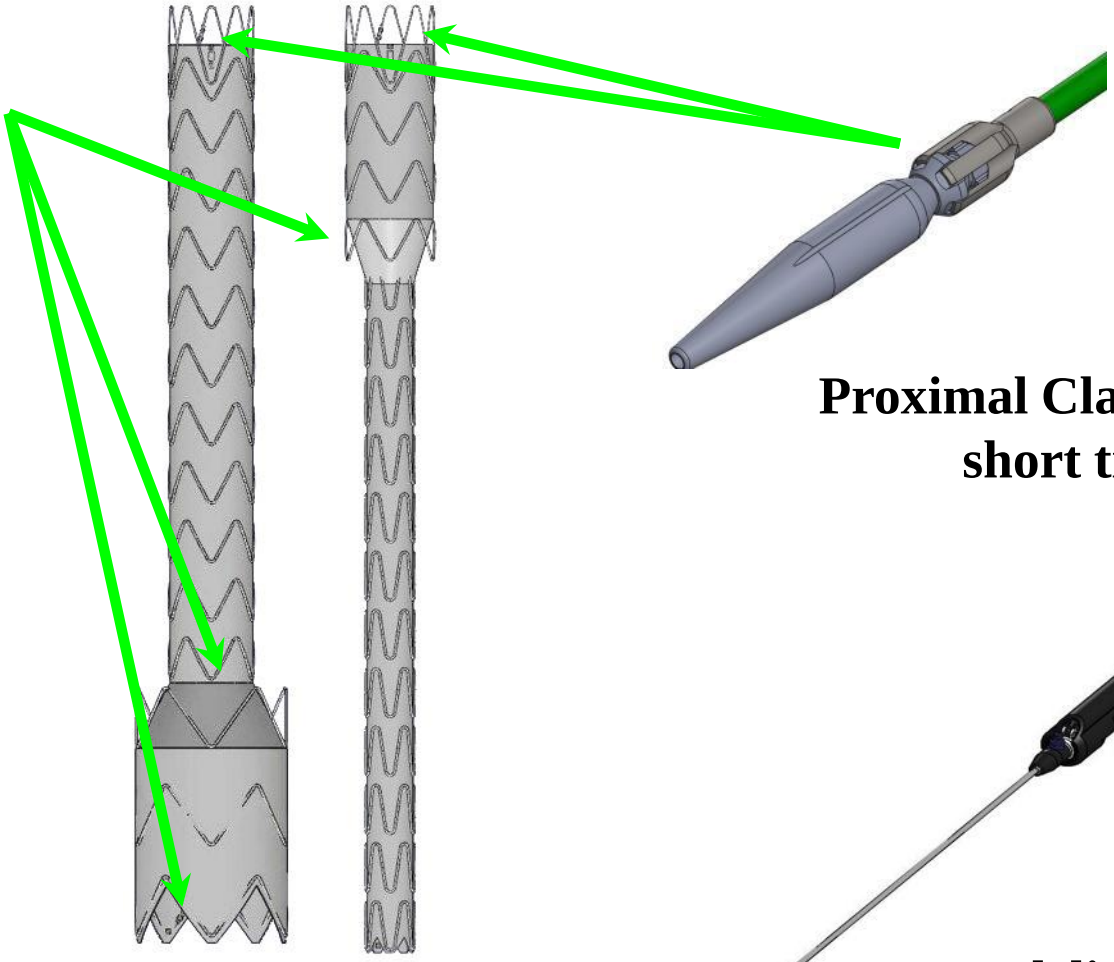
- **Introduction of dedicated bridging stents**
  - 14F O.D. with 45cm long detachable sheath
  - 8-24mm of diameter; 70-140mm of length
  - Controlled deployment through “mechanical advantage”
  - Proximal capture



BOLTON ARCH BRANCHED STENTGRAFT

Branches optimization

Dedicated design

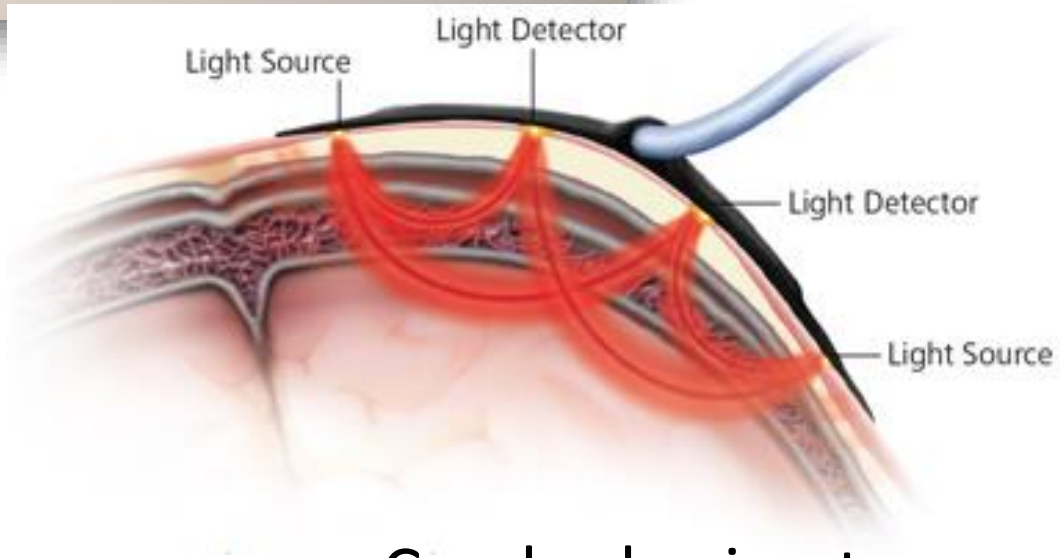


Proximal Clasping & short tip

14F delivery system

Intraoperative monitoring

rSO_2



Cerebral oximetry sensor

Prevention of air embolism

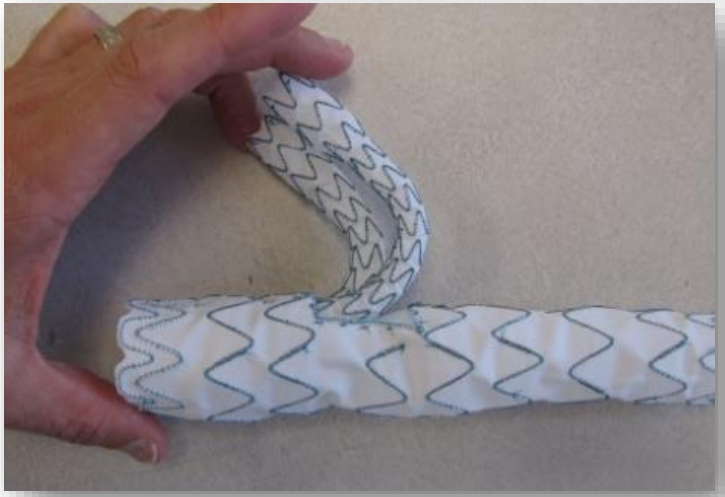
Stentgraft flushing with CO_2

(before flushing with saline)

- More effective de-airing (higher diffusion of CO_2)
- Lower risk of air embolism (higher solubility of CO_2 in the blood)

AAA + Aortic Arch

Limits of Arch Branched stentgrafts



- **Time for customization**

- **Morphological criteria:**
  - Asc Ao diameter
  - Asc Ao length
  - Prosthetic

Bolton Arch Branched Device

Center	Investigator	City	Country
Ospedale San Camillo Forlanini	Prof. Cao	Roma	Italy
Ospedale G. Brotzu	Dr. Camparini	Cagliari	Italy
Hopital Rangueil	Prof. H. Rousseau	Toulouse	France
Osaka University Hospital	Dr. Kuratani	Osaka	Japan
UMC Utrecht	Prof. F. Moll – dr. Van Herwaarden	Utrecht	Netherlands
Hopital George Pompidou	Dr. J. M. Alsac	Paris	France
Hospital UCA de Oviedo	Dr. M. Alonso	Oviedo	Spain
St. Mary's Hospital - London	Dr. M. Hamady	London	United Kingdom
Linköping University Hospital	dr. C. Forssell	Linköping	Sweden

	Total
N	**26**
Male	69,2%
Mean Age	72y
TAA	80,8%
PAU	3,8%
Type B Dissection	15,4%
Procedure completed	100%
Freedom from endoleak	92,3%
Perioperative overall death	11,5%
Perioperative procedure related death	3.8%

Conclusion

Endovascular approach is a valid alternative to open surgery for all patients **when morphologically feasible**

Identification of a suitable proximal landing zone remains a major concern in TEVAR for arch disease

The choice of a straight proximal landing zone, like **ascending aorta**, may prevent deployment related issues, type I endoleak and retrograde dissection

Branched stentgrafts might be useful in avoiding arch manipulations and decreasing the risk of major adverse events and should be extended to the most “unstable” areas of the aortic arch (zone 1)