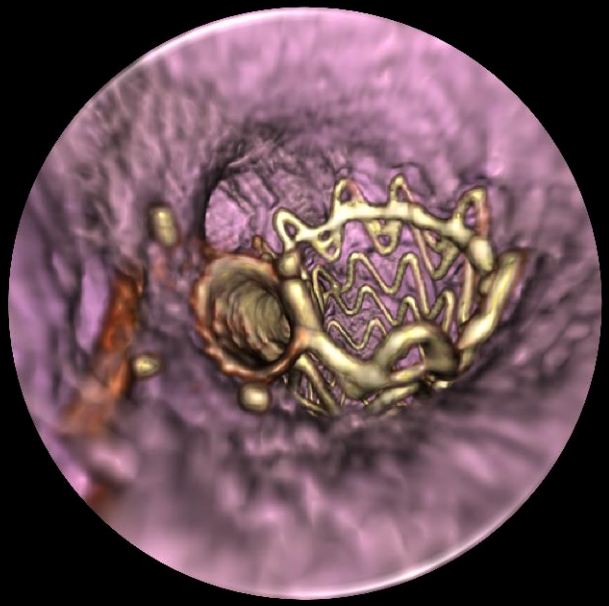
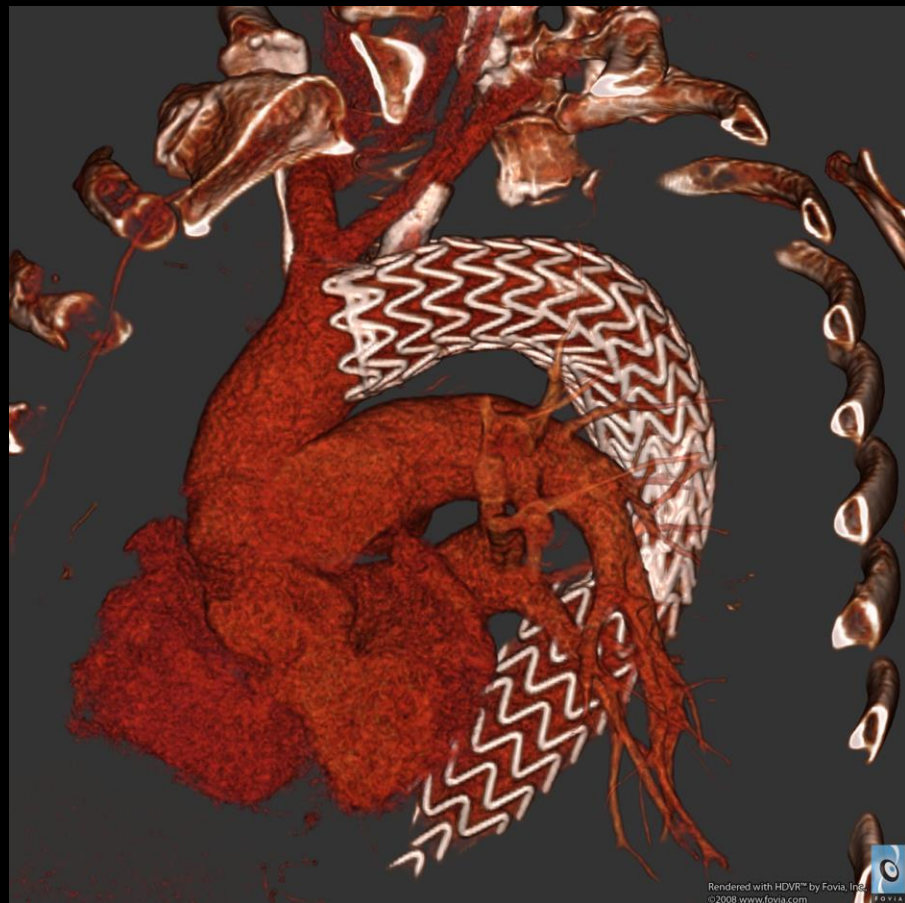
CHIMNEY FOR ARCH LESIONS:

TECHNIQUE & RESULTS





Nicola Mangialardi

Unit of Vascular Surgery,

San Filippo Neri Hospital – Rome - Italy

The Chimney Graft, a Systematic Review

Jip L. Tolenaar,[1,2] Jasper W. van Keulen,[1,3,†] Santi Trimarchi,[2] Bart E. Muhs,[3] Frans L. Moll,[1] and Joost A. van Herwaarden,[1] Utrecht, The Netherlands; Milan, Italy; and New Haven, Connecticut

Ann Vasc Surg - oct 2012

Endovascular Chimney Technique of Ao
Arch Pathologies: A Systematic R

Jian Yang,[1,2] Jiang Xiong,[1] Xiaoping Liu,[1]
Beijing, People's Republic of China

Triple-h

ascular and Endovascular Surgery
Volume 45 Issue 1 January/2013

Mean Morbidity 15, 84%
Mean Mortality 4,2%
Mean Follow up 10,28 months

ascular aortic repair with the graft technique

Wouter Hogendoorn, MD,[a,b] Felix J. V. Schlösser, MD, PhD,[a] Frans L. Moll, MD, PhD,[b] Bauer E. Sumpio, MD, PhD,[a,c] and Bart E. Muhs, MD, PhD,[a,c] *New Haven, Conn; and Utrecht, The Netherlands*

(J Vasc Surg 2013;58:502-11.)

The chimney-graft technique for preserving supra-aortic branches: a review

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

Ann Cardiothorac Surg 2013;2(3):339-346

OPEN QUESTIONS

- ✓MATERIAL CHOICE
- ✓INTERACTION GRAFTS/AORTIC WALL
- ✓OVERSIZING (GUTTERS!!)

&….

COMPARISON WITH NEW TECHNIQUES

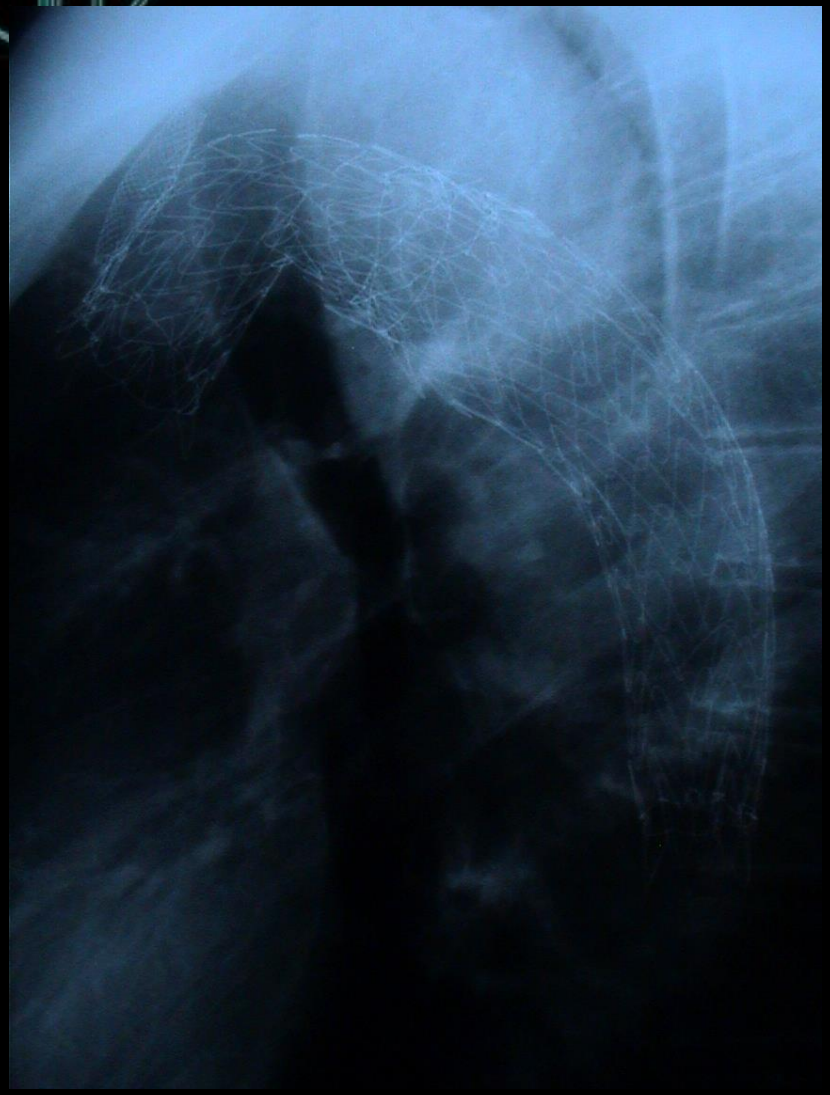
LONG TERM RESULTS

CHIMNEY GRAFT PERMEABILITY
&
MATERIAL FATIGUE

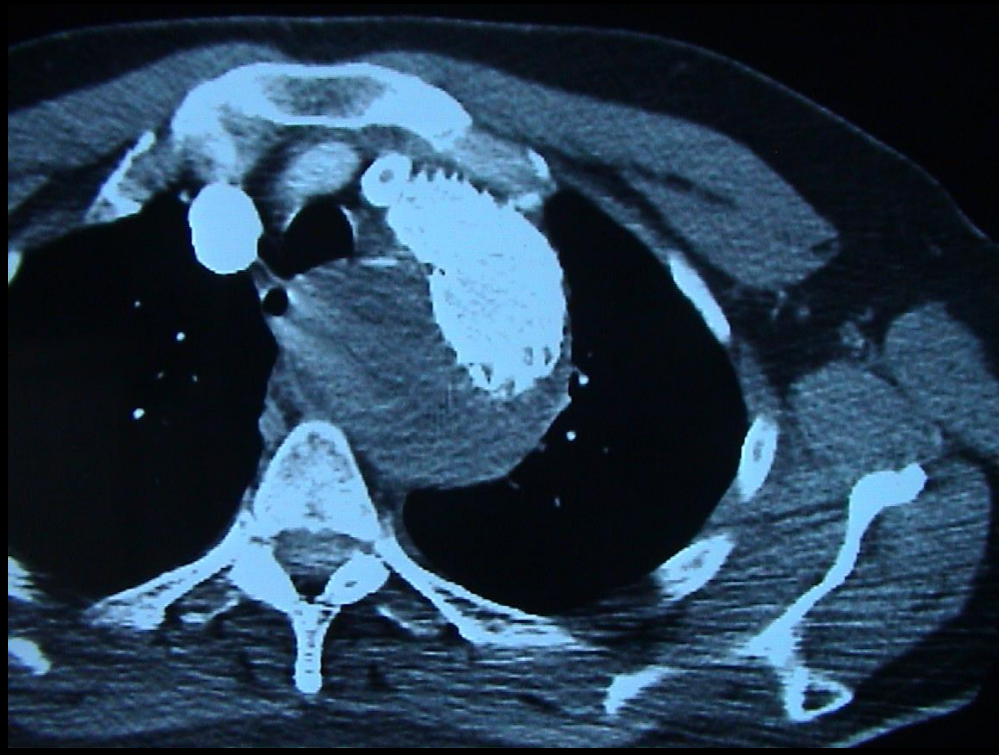
WE HAVE SOME LONG TERM RESULTS

1. 06/2002 overstenting of the LCCA
2. 12/2002 overstenting of the IA

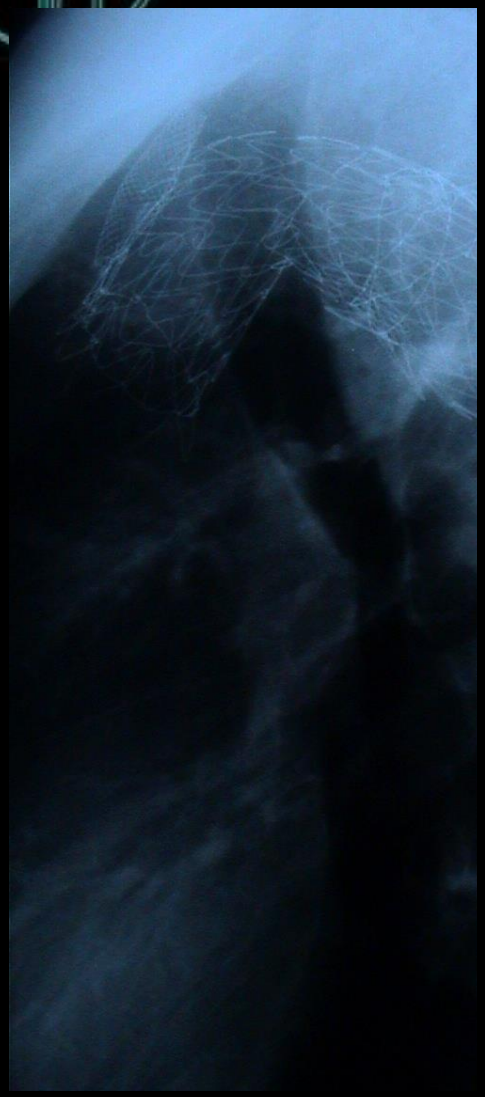
LCA COVERAGE

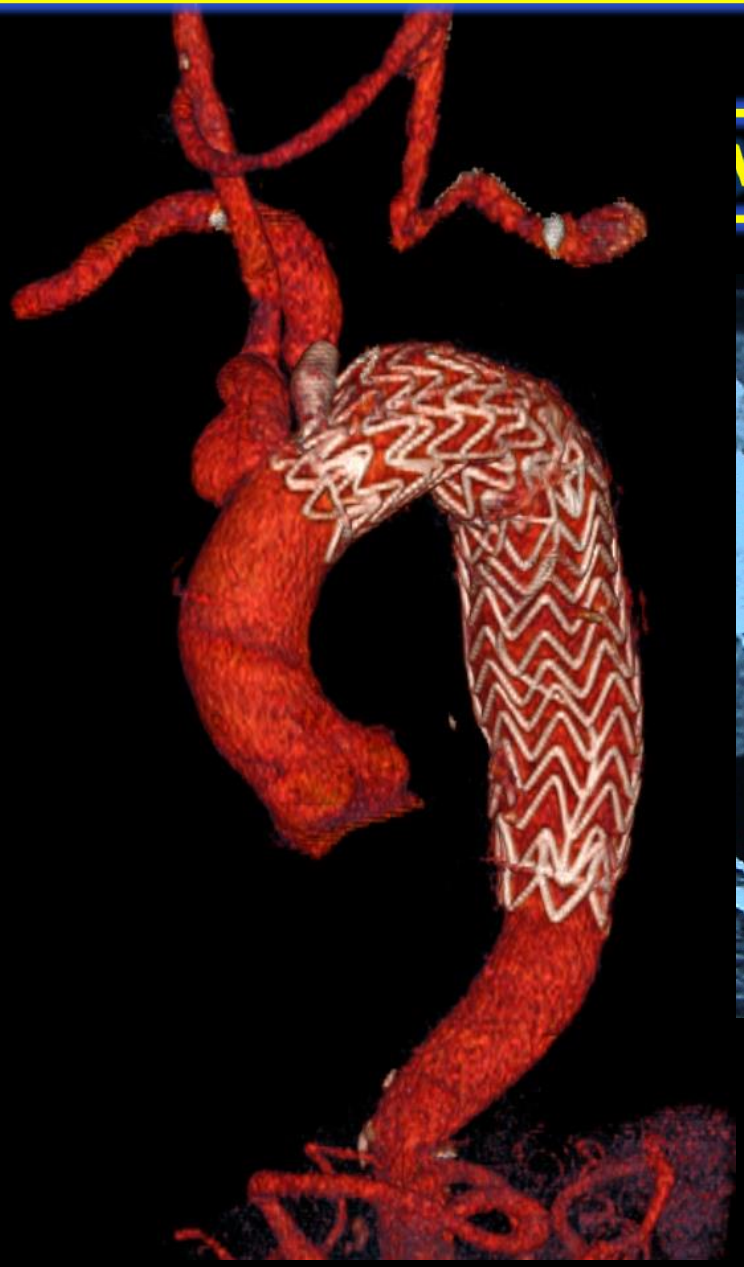


22 MTHS

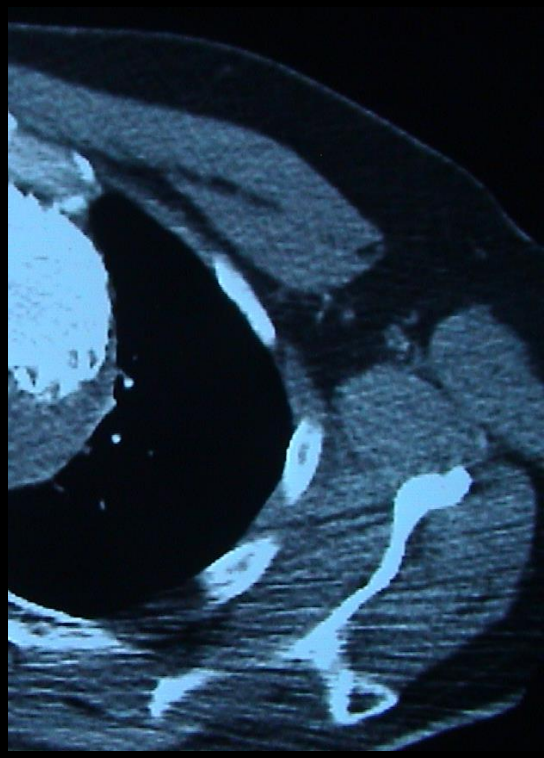


> 11 YEARS





MTHS

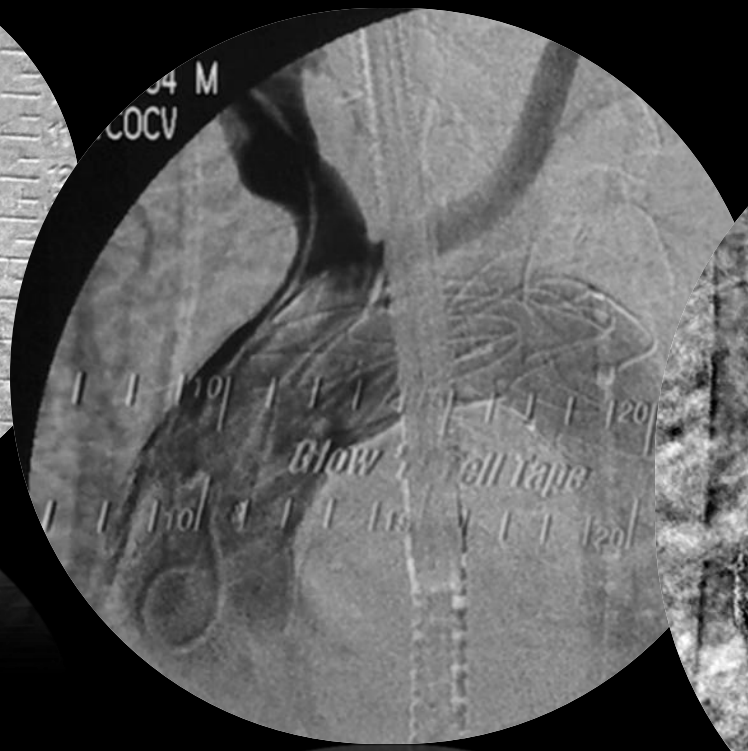


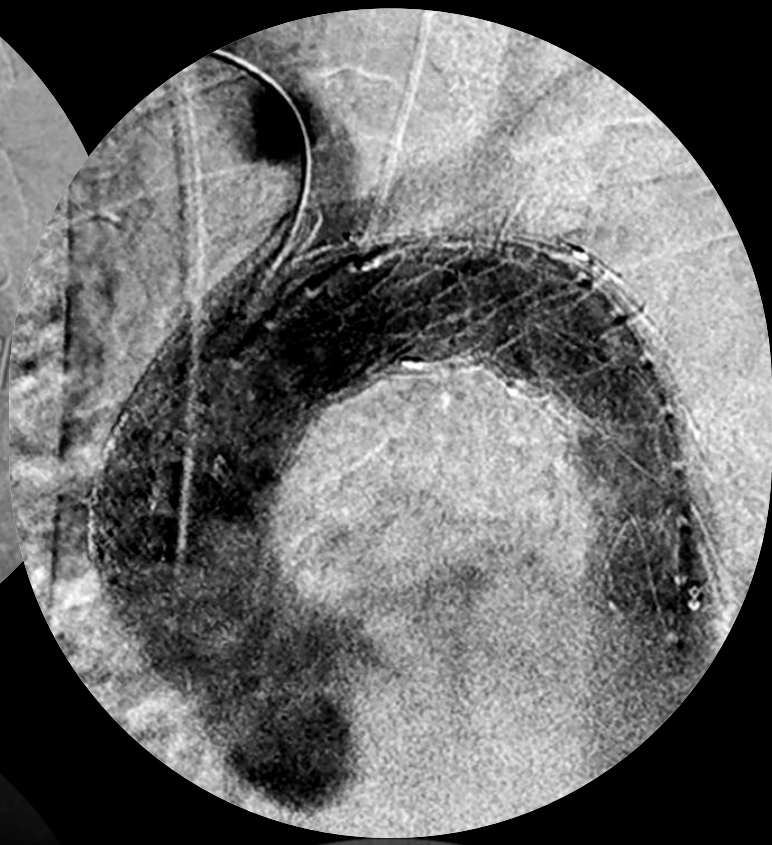
11 YRS – OVERTSENTING INNOMINATE ARTERY

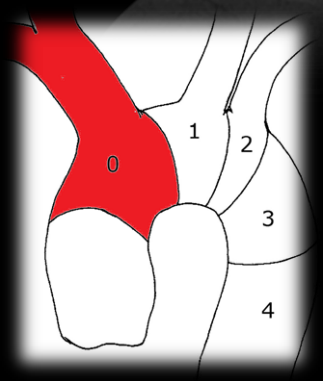
IA coverage

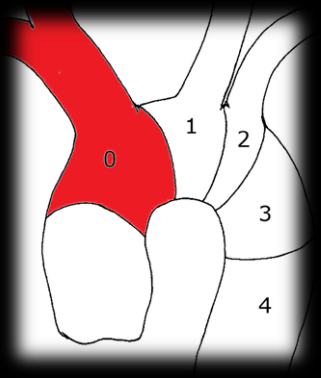
TRANS-BRACHIAL

WALLSTENT 11-70



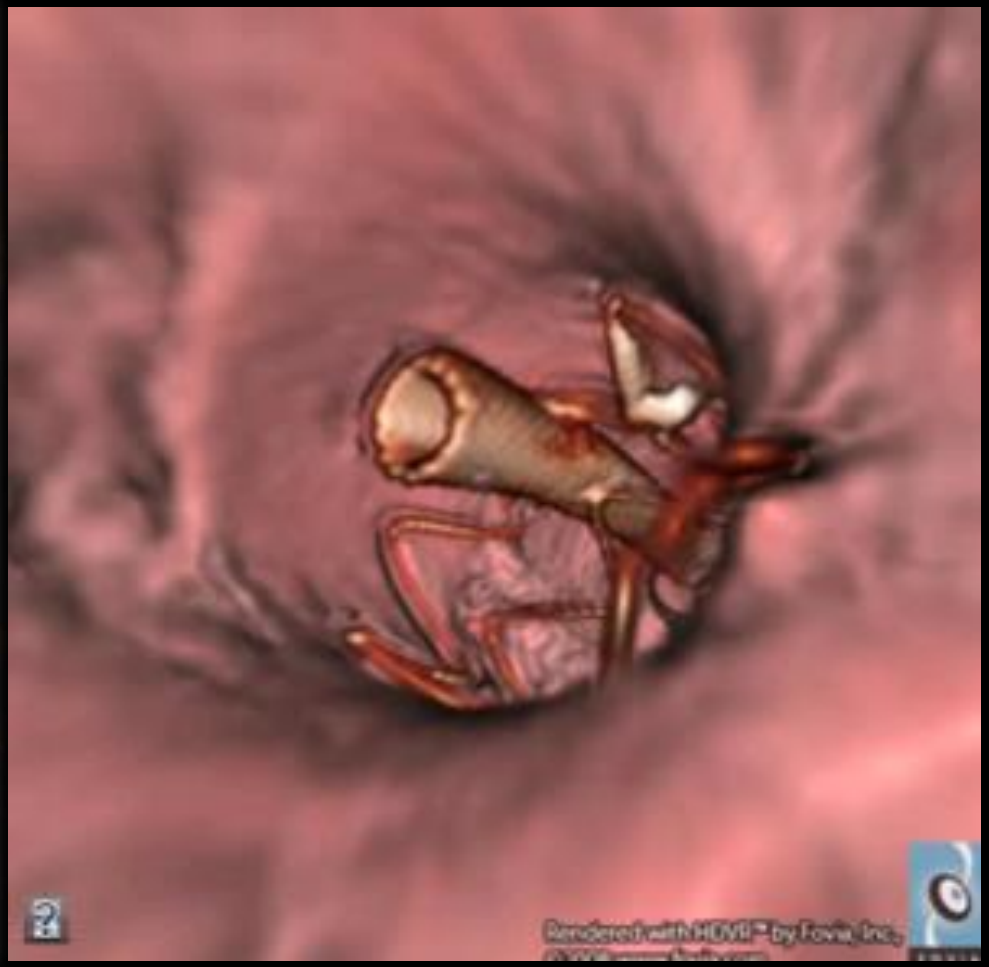






> 11 YEARS

AORTIC ARCH CHIMNEY: IA

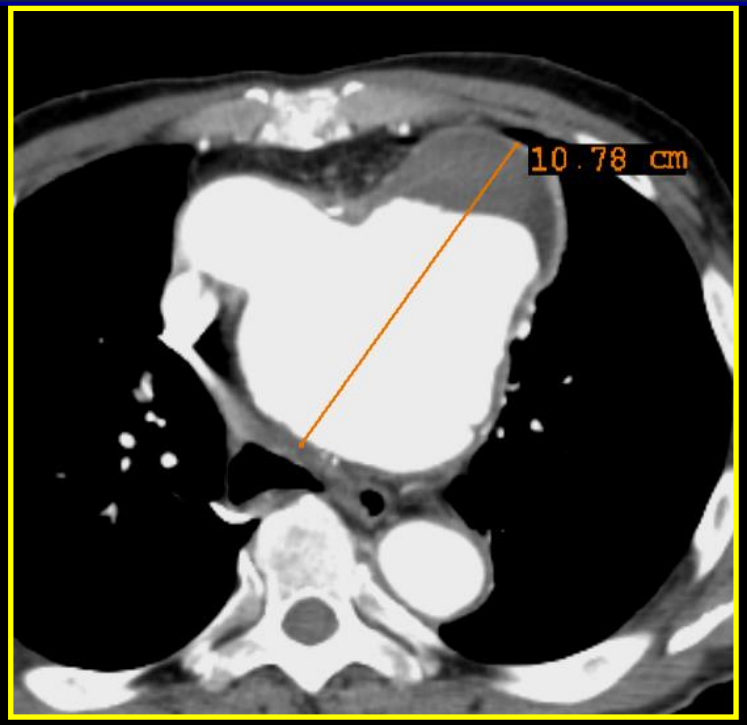


BETWEEN 2002 & 2008

LSA	1
LSA+LCCA	1
LCCA	1

PLANNED INNOMINATE ARTERY CHIMNEY

- 81 YRS – 108 mm ATA
- COPD (O2 Dep) - CAD - HTA
- UNFIT FOR DEBRANCHING



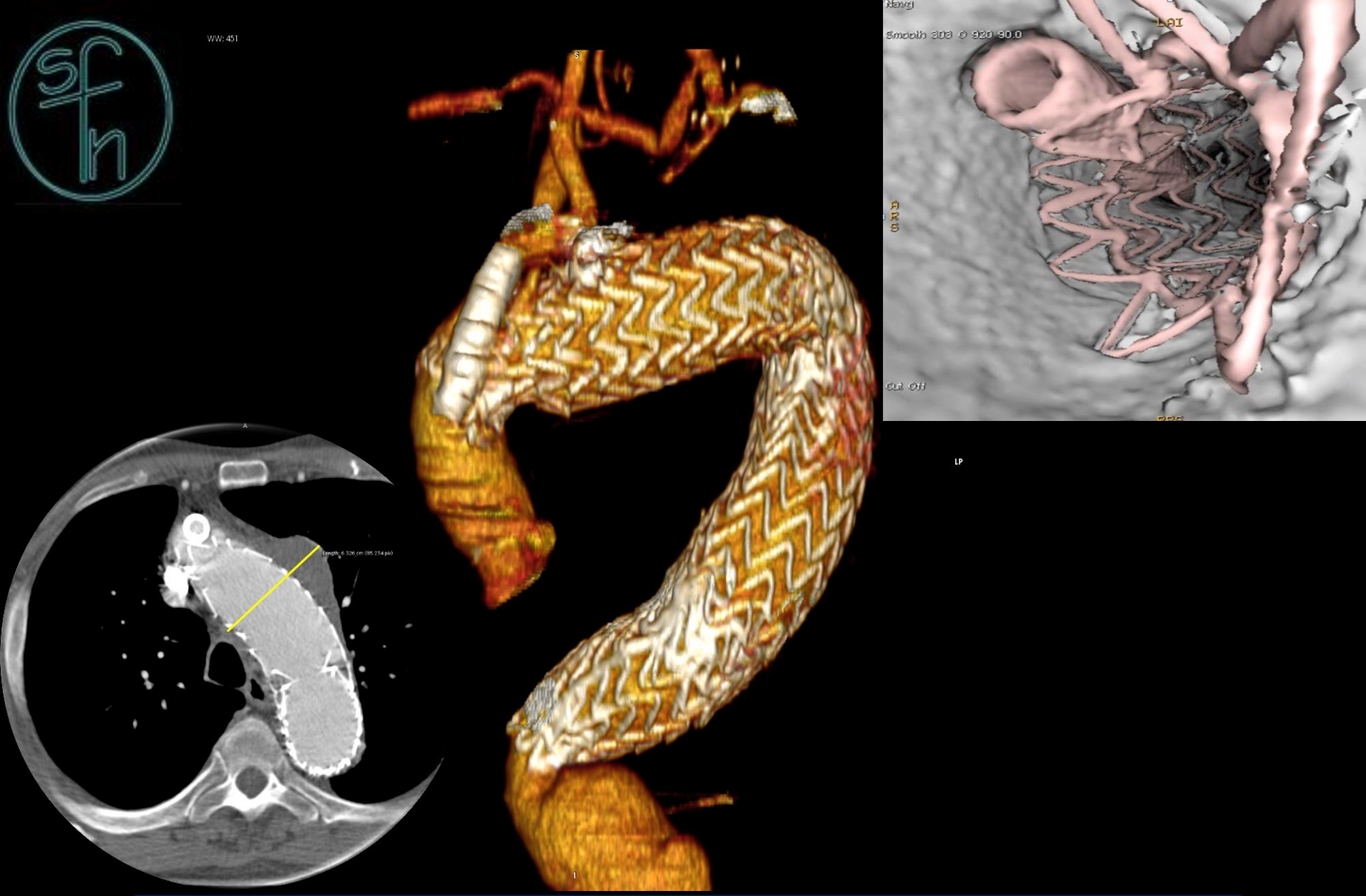
TECHNIQUE

- RETROPHARINGEAL HEMIARCH DEBRANCHNG
- R/t FEMORAL > CUT-DOWN
- R/t BRACHIAL

MATERIALS

- GORE TAG 40 (20+15)
- GORE HEMOBAHN 11 - 50
- WALLSTENT 12 - 40

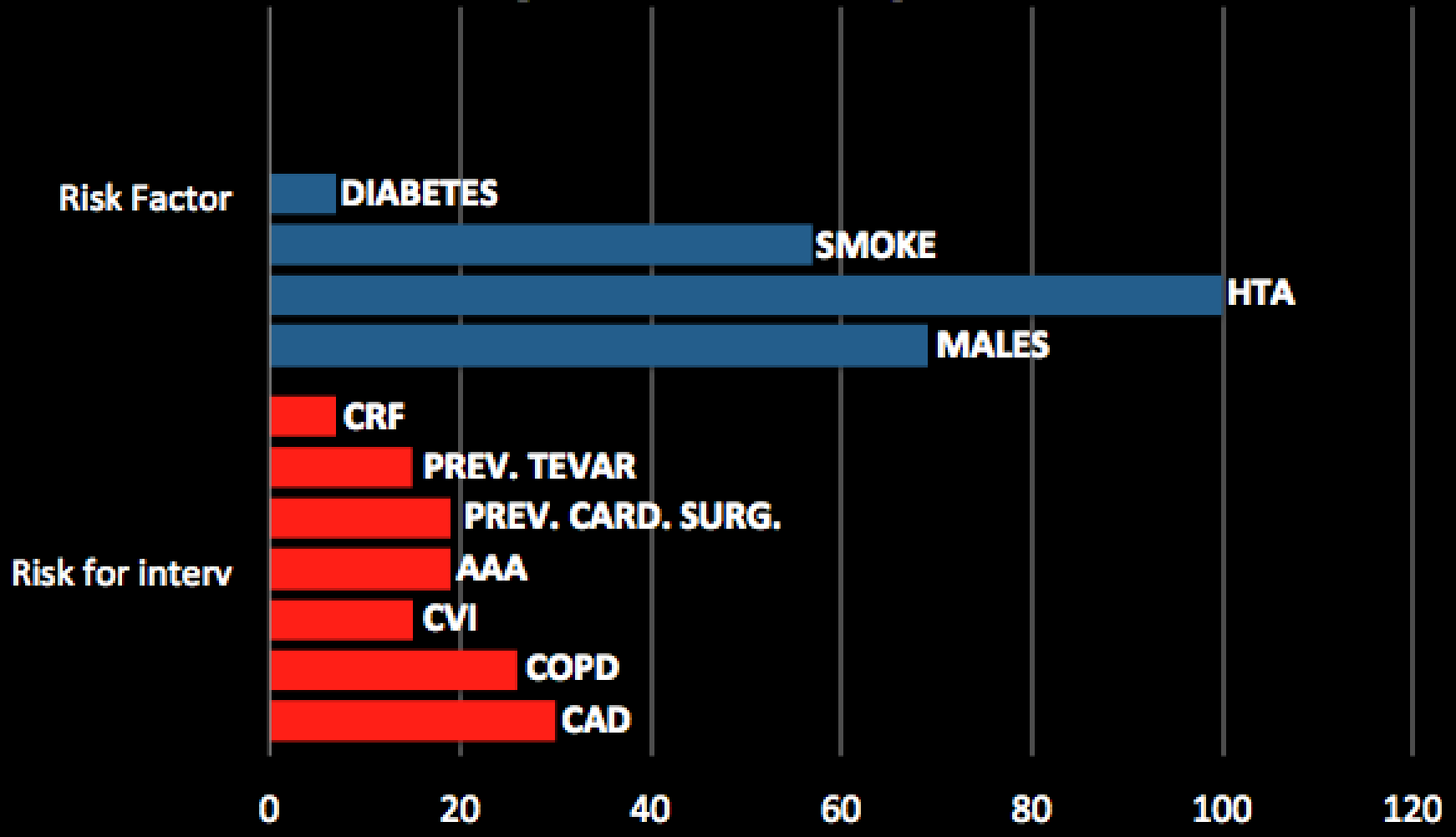
3D
Ex: 12016
Se: 3
Volume Rendering No cut
DFOV 52.0 cm
STND/+
No VOI
kv 120
mA Mod.
Rot 0.60s/HE+ 55.0mm/rot
0.6mm 1.375:1/0.6sp
Tilt: 0.0
12:11:50 PM
W = 1534 L = -256
350/1



>5 YRS: SAC SHRINKAGE = Ø 41 mm

OUR EXPERIENCE: 26 CHIMNEY PTS JUN 2002-OCT 2013

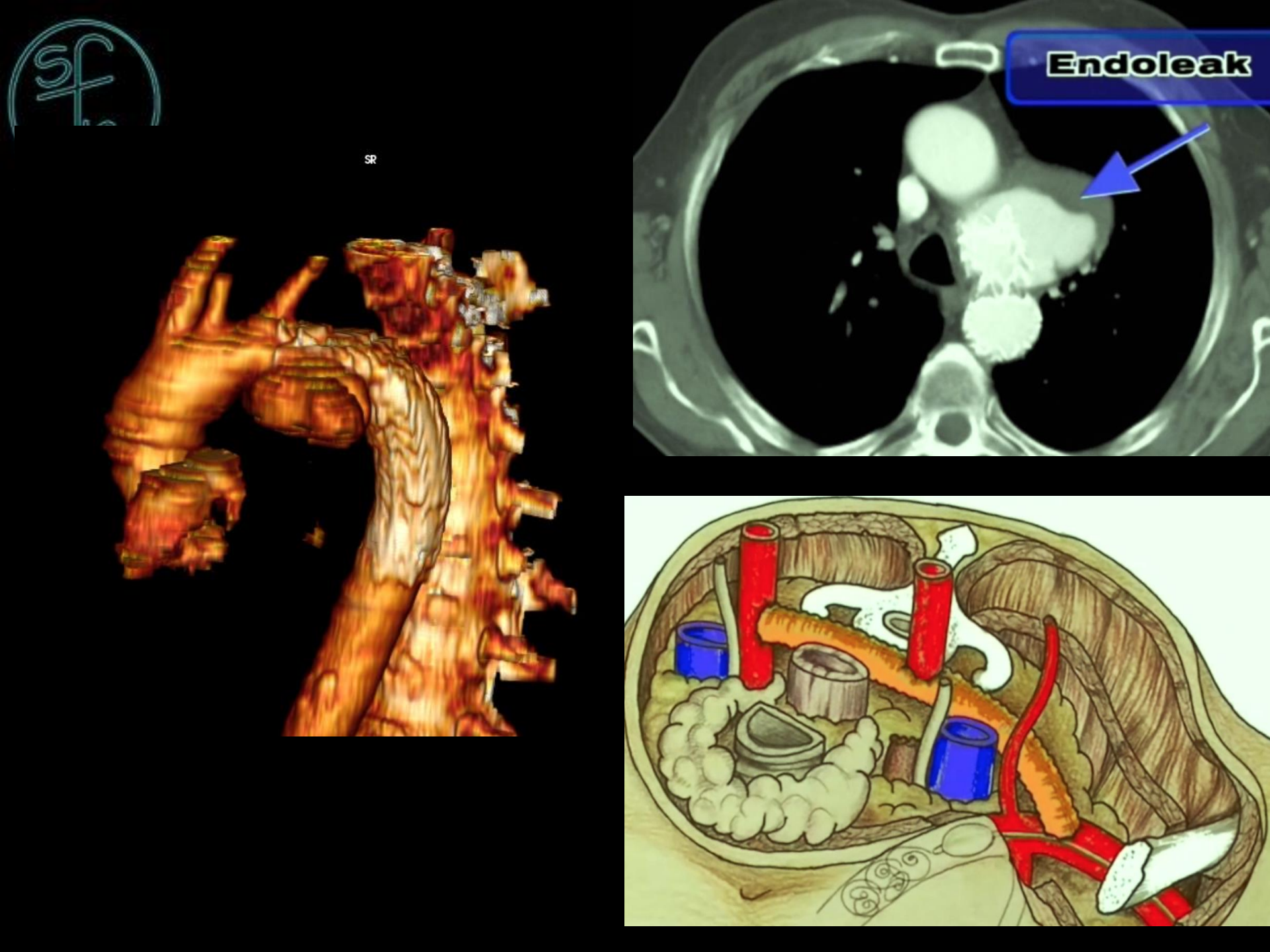
✓Mean age 71.2 (range 53-86)



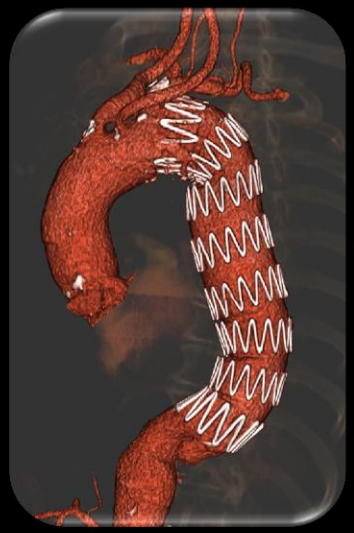
OUR EXPERIENCE JUN 2002-OCT 2013

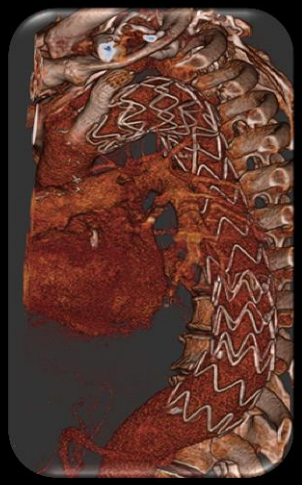
- INDICATIONS
  - EMERGENCY 7 (5 salvage) 26.9%
  - PLANNED 19 73.1%

- PATHOLOGY
  - TAA 13 50.0%
  - TYPE B DISS 11 42.3%
  - EL type I (TEVAR) 2 7.7%


SR
Endoleak

S
I





GORE TAG	Zenith TX2	RELAY	Medtronic Valiant
19	3	3	1
(9 TAG +10 c-TAG)			

SURGICAL DEBRANCHING	11	42.3%
– RCCA-LCCA-LSA	4	
– RCCA-LCCA	1	
– LCCA-LSA	6	

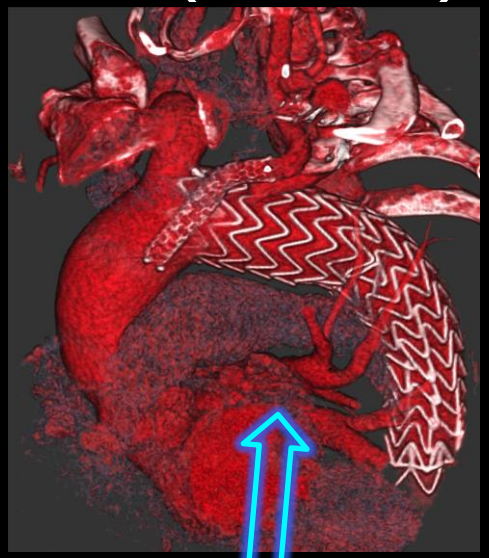
OVERSIZING 20-30%

19	3	3	1
(9 TAG +10 c-TAG)			

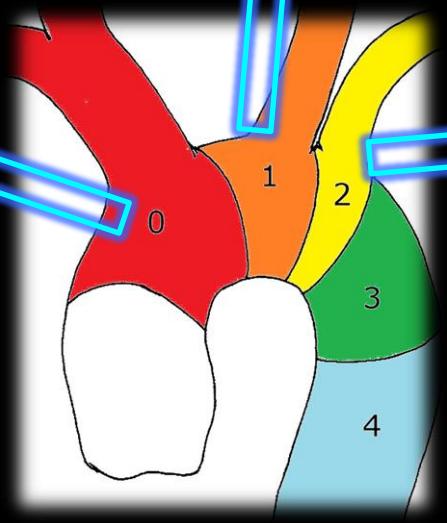
SURGICAL DEBRANCHING	11	42.3%
– RCCA-LCCA-LSA	4	
– RCCA-LCCA	1	
– LCCA-LSA	6	

CHIMNEY IMPLANTATION

10 (35.7%)



7 (25.0%)



11 (39.3%)

CHIMNEY GRAFT 28

- CHIMNEY GRAFTS
  - HEMO/VIABAHN 18 (11 REINF)
  - GORE LEG 1
  - ADVANTA 1 (REINF)
  - WALLSTENT 2
  - BIOTRONIK 2
  - PROTEGE' 3
  - VISI-PRO 1

30 DAYS RESULTS

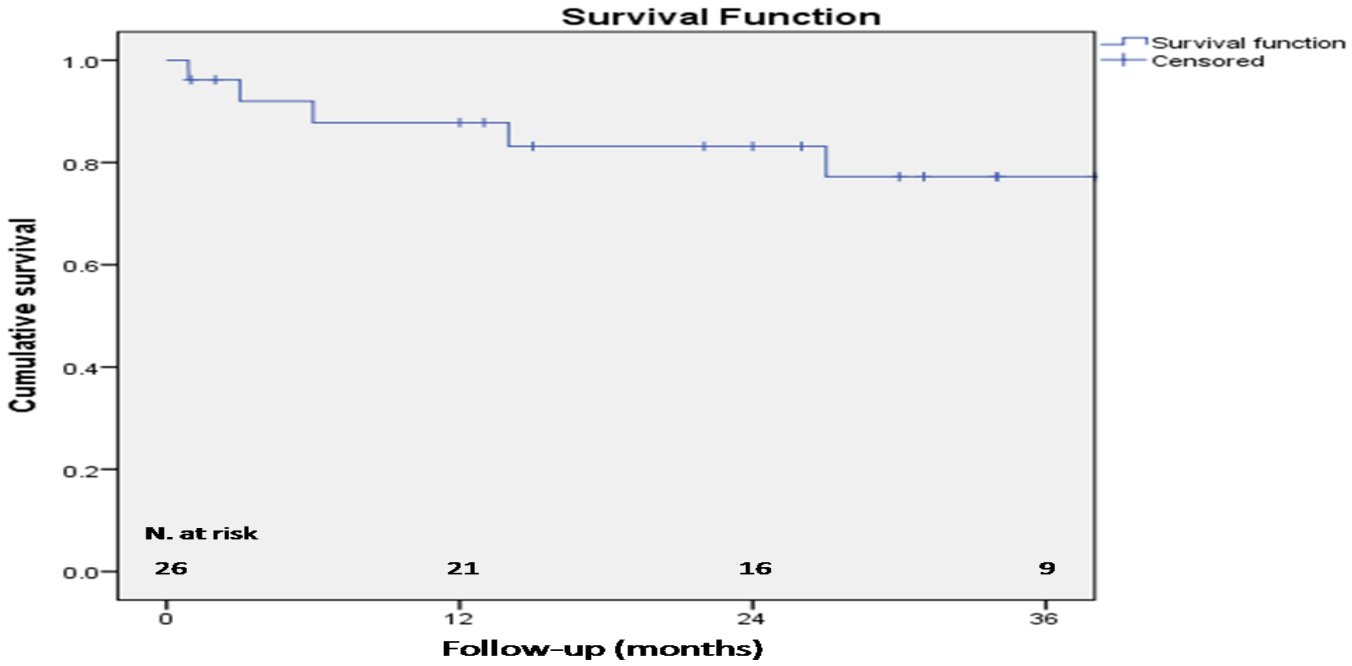
- TECHNICAL SUCCESS 100%

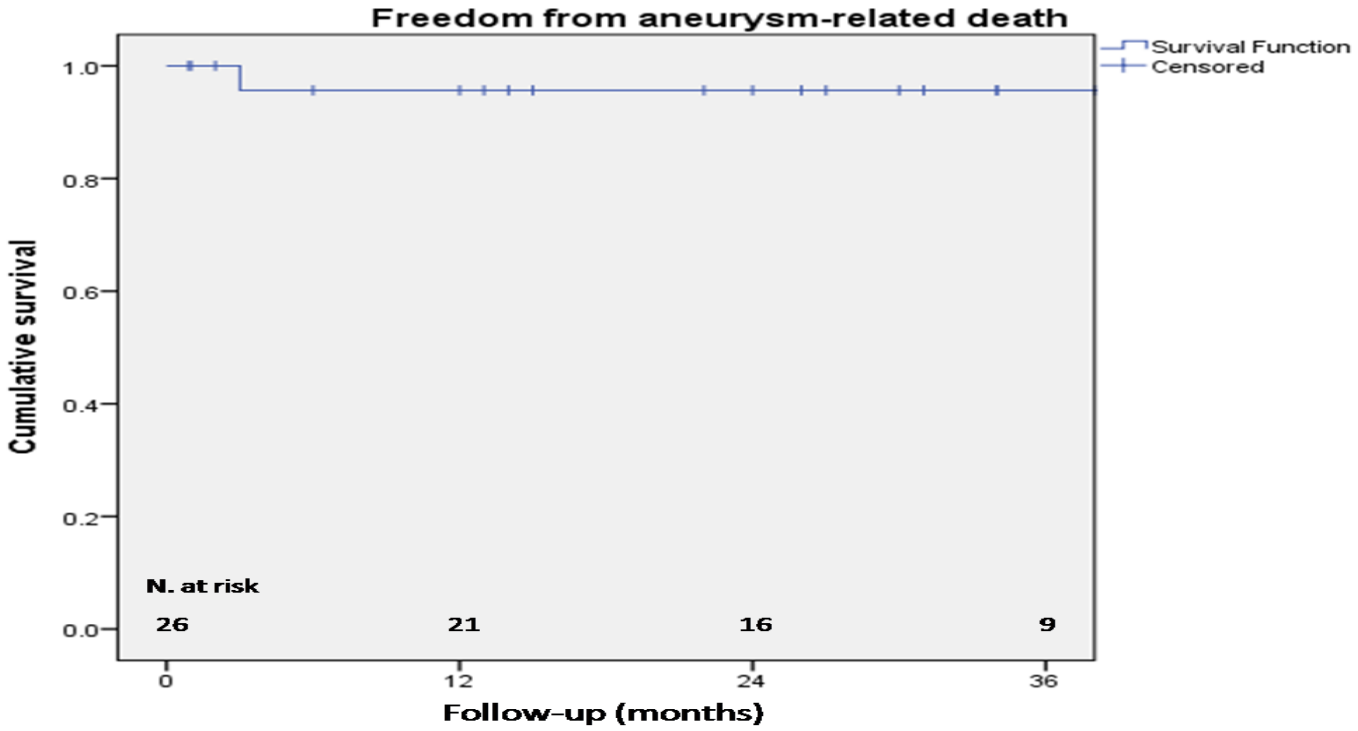
- MORTALITY (CEREBR HEMORR) 1 3.8%
- COMPLICATIONS 7 26.9%
  - MINOR STROKE (2 RUPT-1 ELECT) 3
  - PARAPARESIS 1
  - TYPE I EL 0
  - OTHERS (minor) 3

MORTALITY(15%)

MEAN F-UP 36.8 (MIN 1-131)

– ANEUR RUPT (MYCOTIC)	1	(3 MTHS)
– CONG HEART FAIL	1	(27 MTHS)
– RESPIRATORY FAILURE	1	(6 MTHS)
– LUNG CANCER	1	(14 MTHS)


Survival Function
Survival function
Censored
Cumulative survival
1.0
0.8
0.6
0.4
0.2
0.0
N. at risk
26
21
16
9
0
12
24
36
Follow-up (months)


Freedom from aneurysm-related death
Survival Function
Censored
Cumulative survival
1.0
0.8
0.6
0.4
0.2
0.0
N. at risk
26
21
16
9
0
12
24
36
Follow-up (months)

CHIMNEY GRAFT COMPLIC.(15.3%)

MEAN F-UP 36.8 (MIN 1-131)

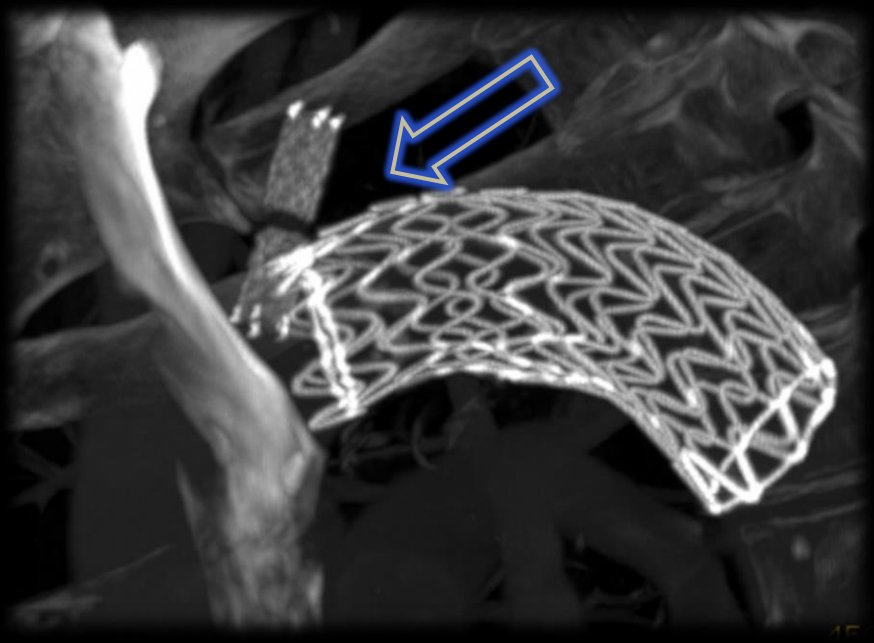
- LSA ASYMPT OCCL 1 (11 MTHS)
- LCCA ASYMPT OCCL 1 (22 MTHS)
  (TREATED → BYPASS)

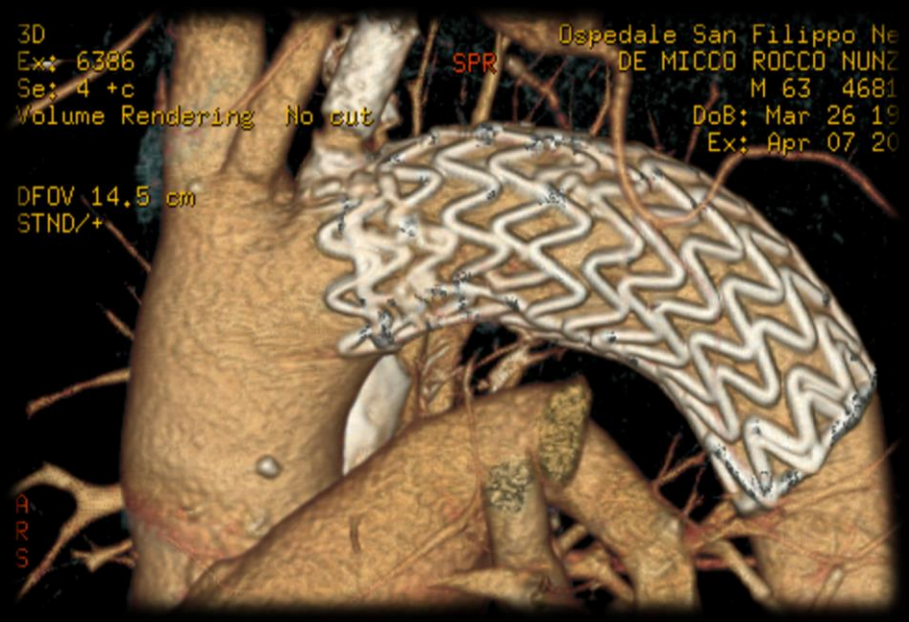
- STENT FRACTURE (ASYMPT) 1 (2 MTHS)
- VIABAHN STENOSIS 1 (24 MTHS)

STENT FRACTURE

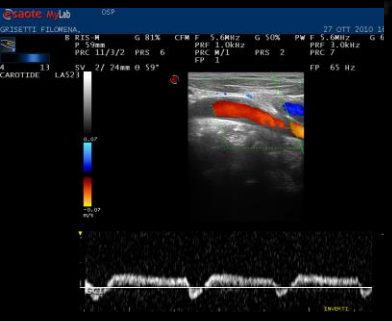
LSA Stent Fracture after 2 months

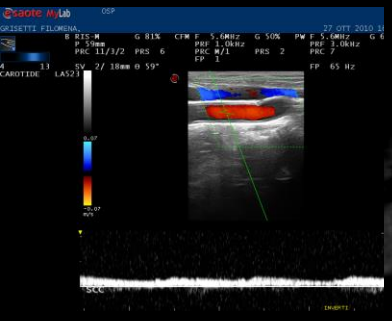
PATENT AT 42 mths

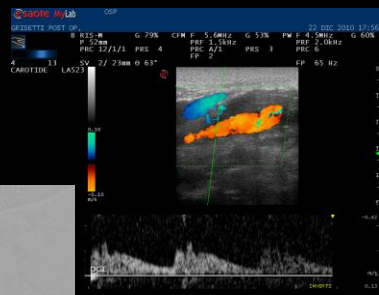


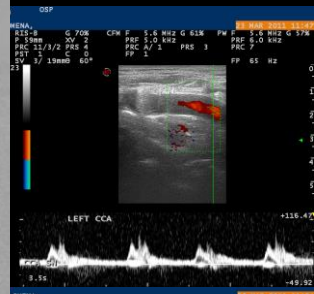


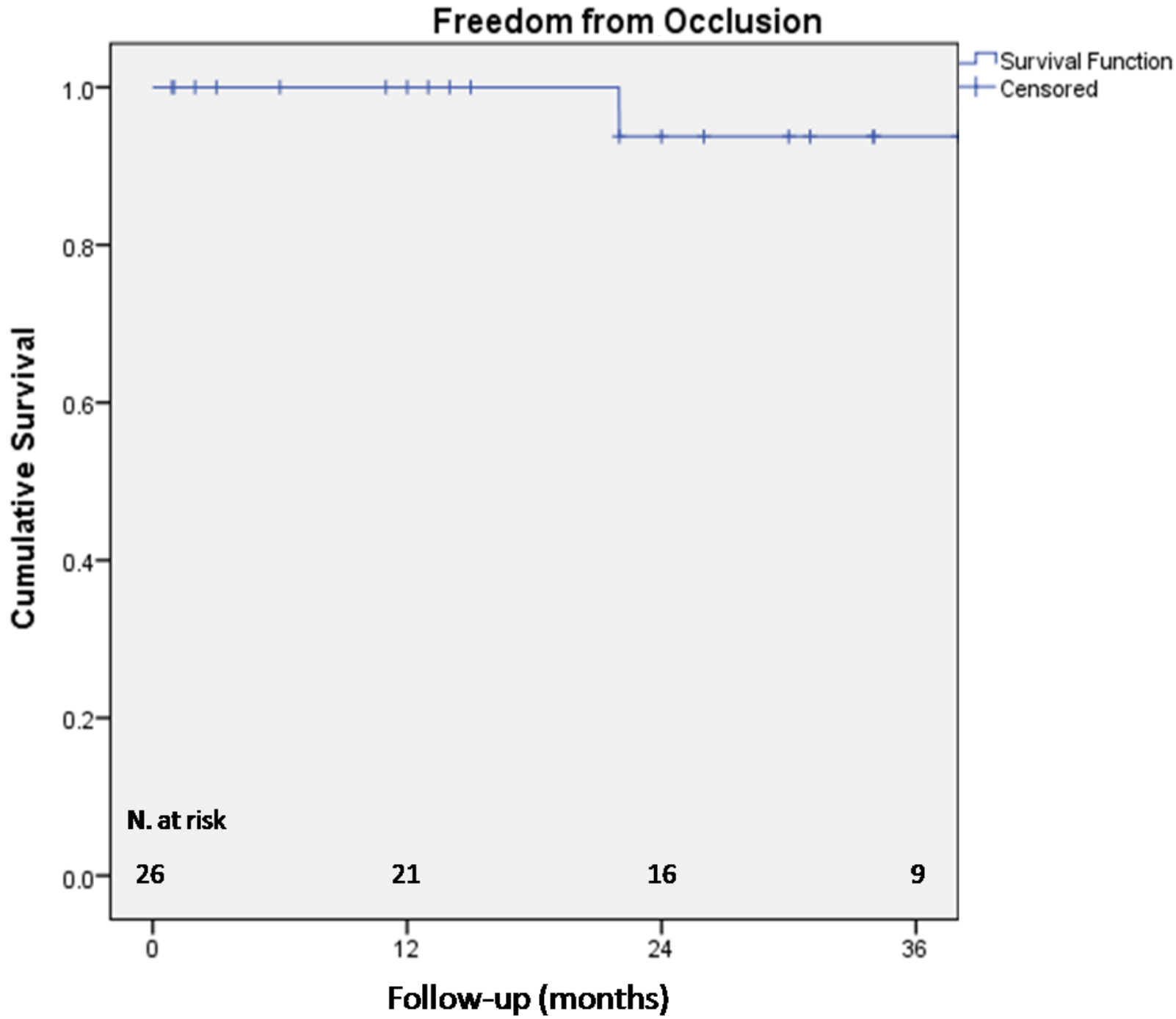
VIABAHN STENOSIS










Freedom from Occlusion
Survival Function
Censored
Cumulative Survival
1.0
0.8
0.6
0.4
0.2
0.0
N. at risk
26
21
16
9
0
12
24
36
Follow-up (months)

TYPE I ENDOLEAK(24%)

MEAN F-UP 36.8 (MIN 1-131)

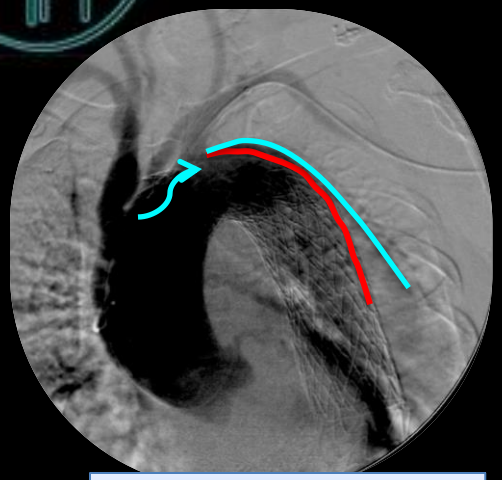
- Ia 5
  - Sac enlargement 2 (IA 6 mths - LSA 10 mths)

    (embolization)
  - w/out sac enlargement 3 (LCCA)(IA)(LCCA+LSA)

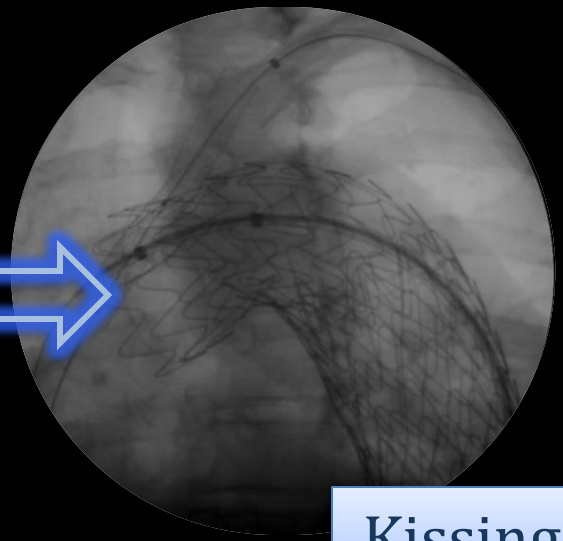
    (91 yrs / lung K →death / COPD & tracheostomy)
- Ib 1 (47 mths)

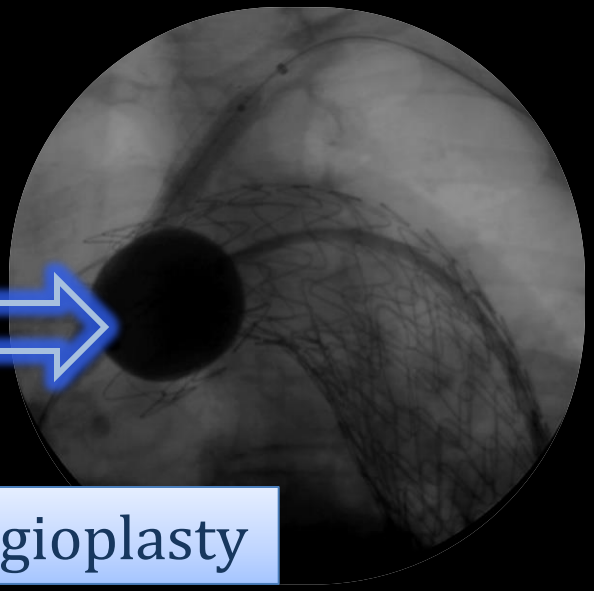
  (distal extension)

ENDOLEAK: GUTTERS EMB/

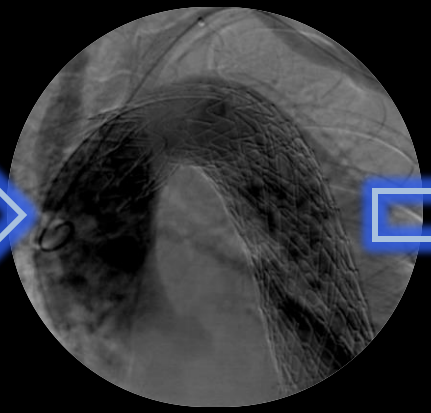


I Type EL

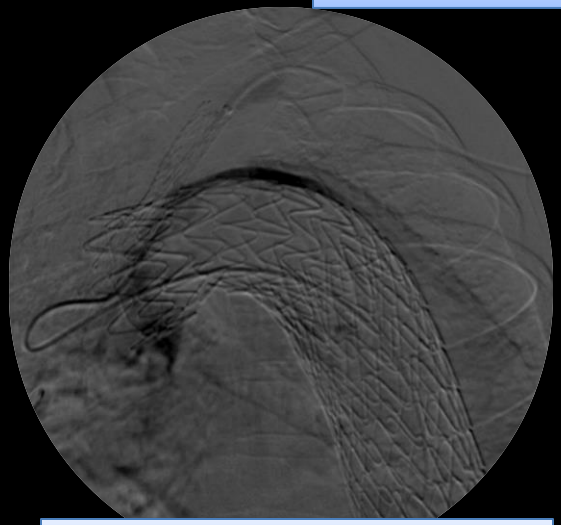




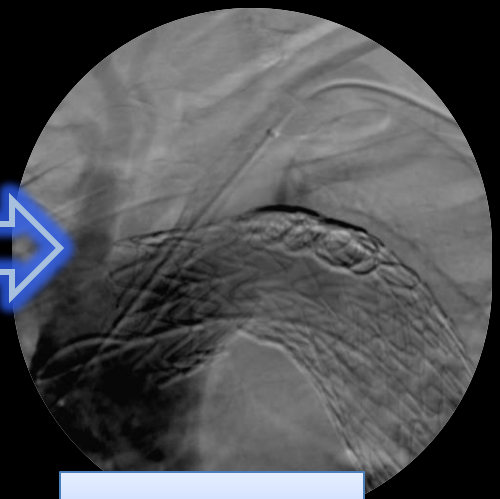
Kissing angioplasty



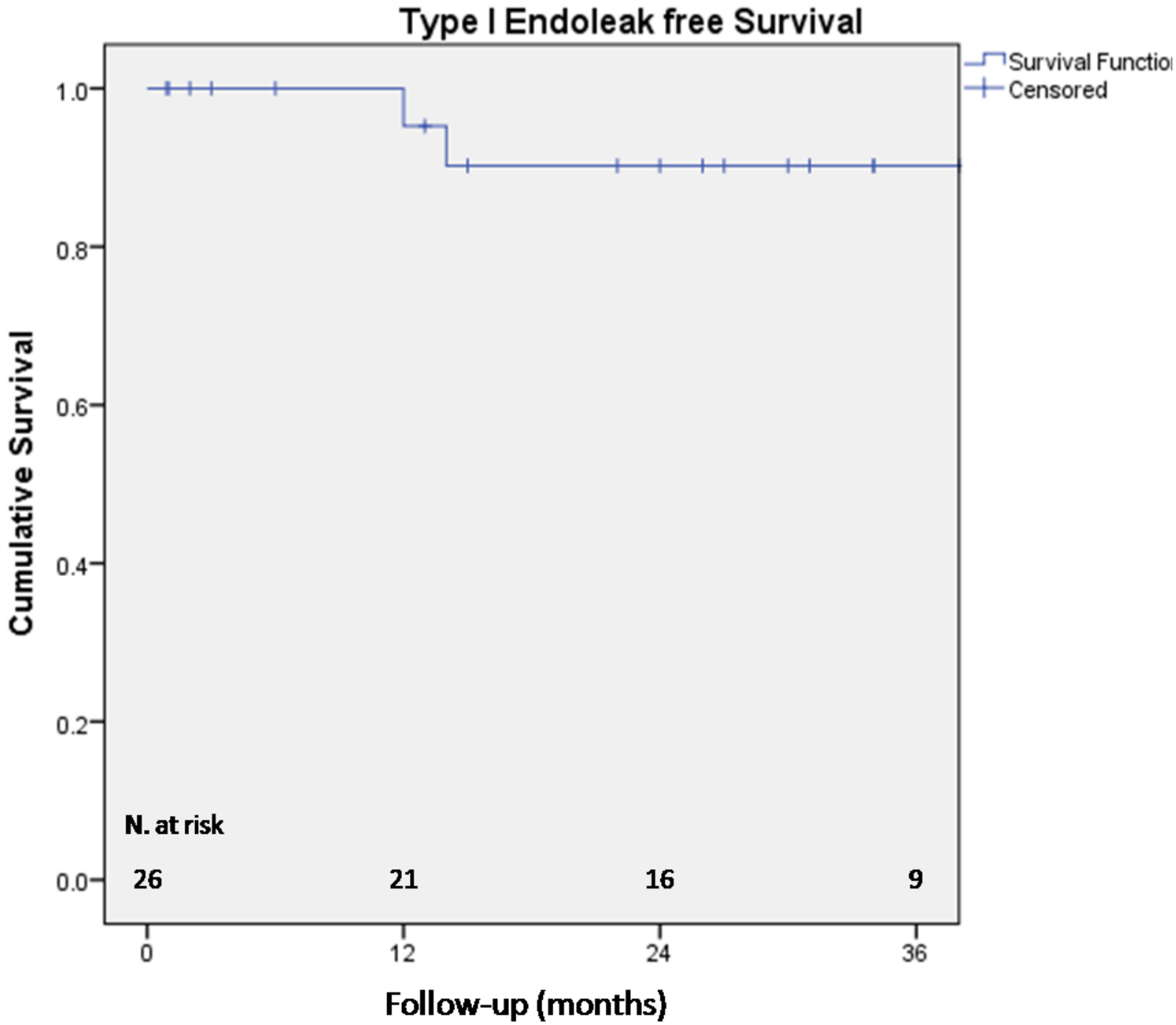
I Type EL



Gutter select cat



Coils


Type I Endoleak free Survival
Survival Functio
Censored
Cumulative Survival
1.0
0.8
0.6
0.4
0.2
0.0
N. at risk
26
21
16
9
0
12
24
36
Follow-up (months)

FOCUS ON F-UP > 48 MTHS

12 PTS – 13 chimney

MEAN F-UP 76.6 MTHS (MIN 48 – MAX 136)

- DEATH (<48MTHS) (1 micotic TAA rupt) 4

- LCCA STENT OBSTR (WALLSTENT) 1 (BYP)
- LCCA VIABAHN STENOSIS 1(STENT)
- TYPE Ib EL 1 (TREAT)

FOCUS ON F-UP > 48 MTHS

12 PTS – MEAN F-UP 76.6 MTHS

(MIN 48 – MAX 136)

- ALIVE PTS 8 66.6%

63% PRIMARY PATENCY (6/8)

87.5% SECONDARY PATENCY (7/8)

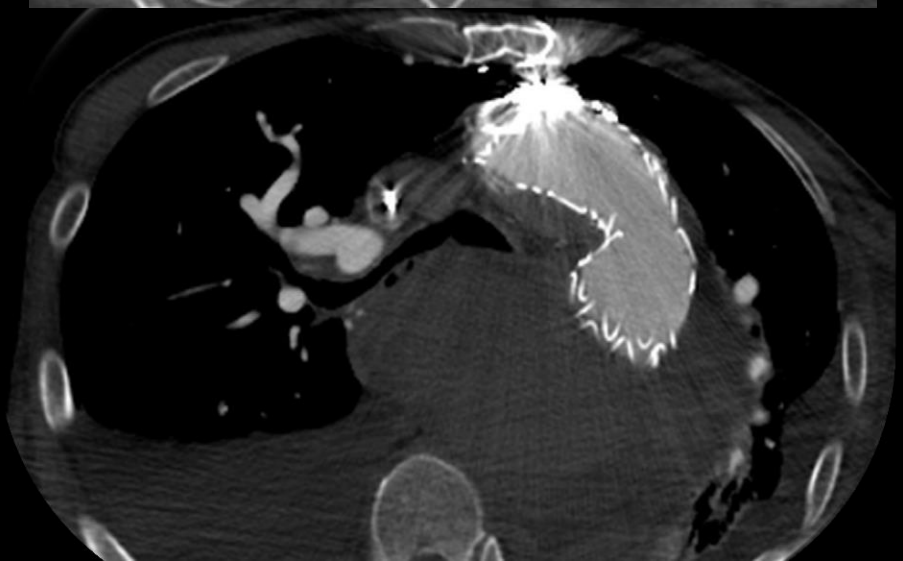
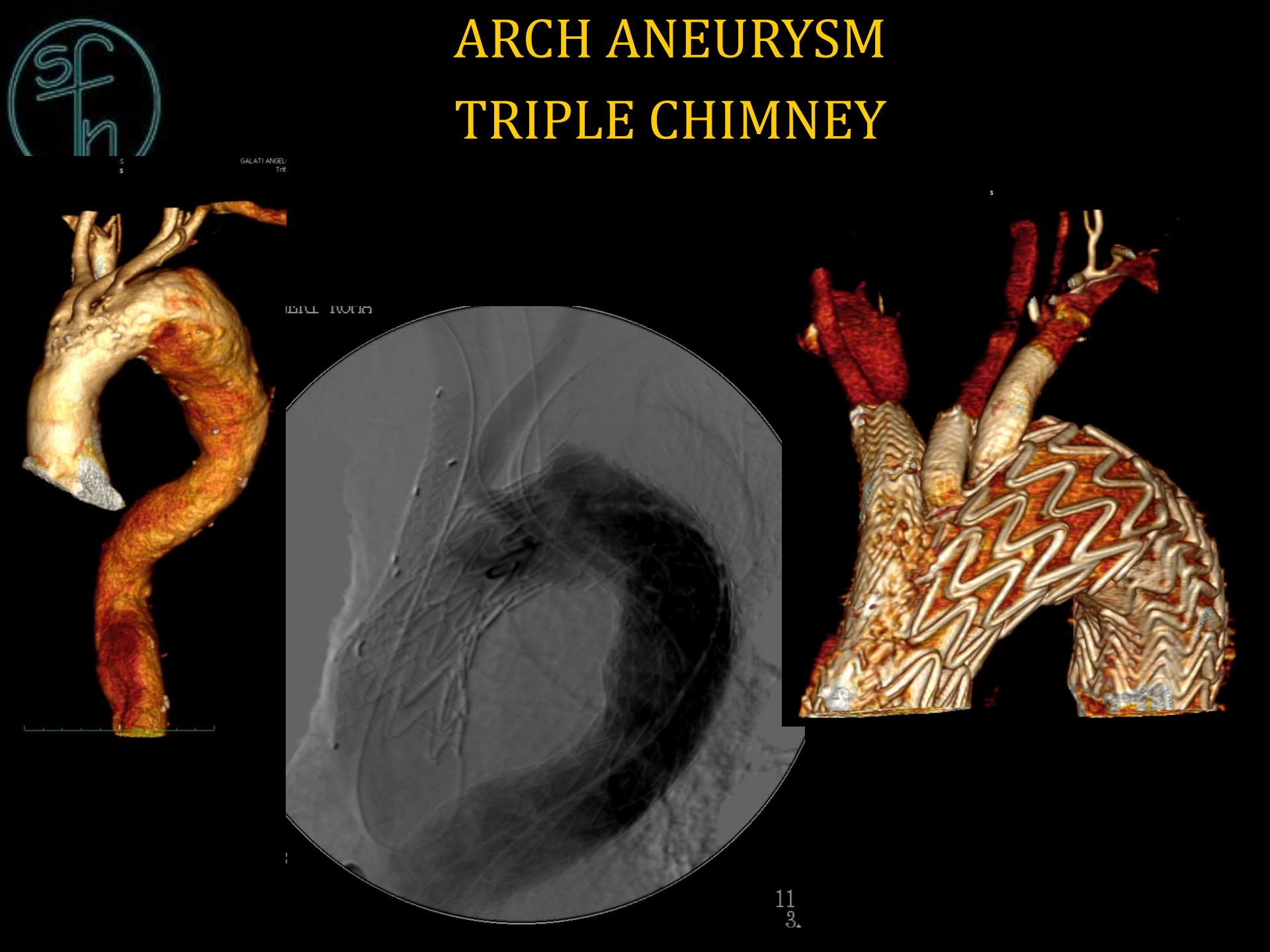
CONCLUSIONS

- FEASIBLE
- SAFE

- DURABLE

- TYPE I E-LEAK

RUPTURED DISSECTED ARCH AN IA CHIMNEY



ARCH ANEURYSM
TRIPLE CHIMNEY