ROPER ST. FRANCIS HEALTHCARE

The Thoracic Aorta

J. Matthew Toole MD
RSFPP Cardiac Surgery

10/22/2022

Thoracic Aortic Anatomy

Aortic root
- -valve
- -sinuses
- -coronary ostia
- -sinotubular junction (STJ)

Ascending aorta
- -STJ-Innominate artery

Aortic arch
- -Innominate
- -left carotid
- -left subclavian

Descending thoracic aorta

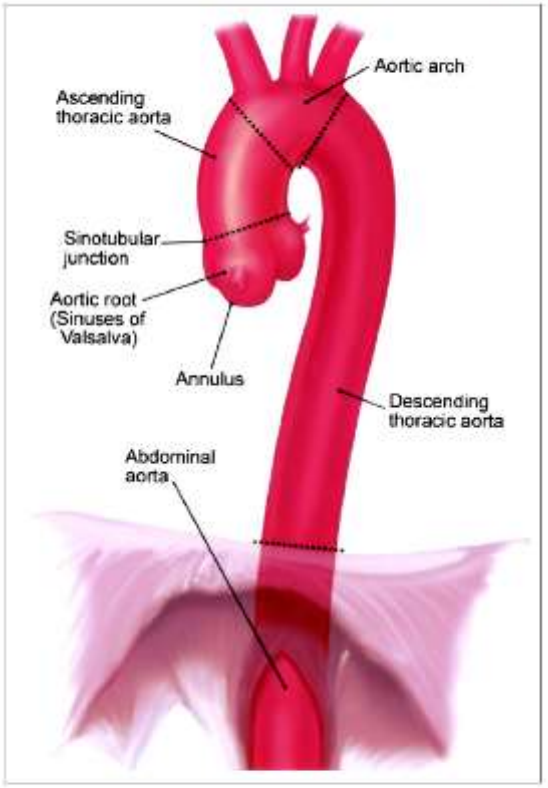


Figure 1. Anatomy of thoracic and proximal abdominal aorta. (©Massachusetts General Hospital Thoracic Aortic Center. Used with permission.)

Aortic Root Replacement

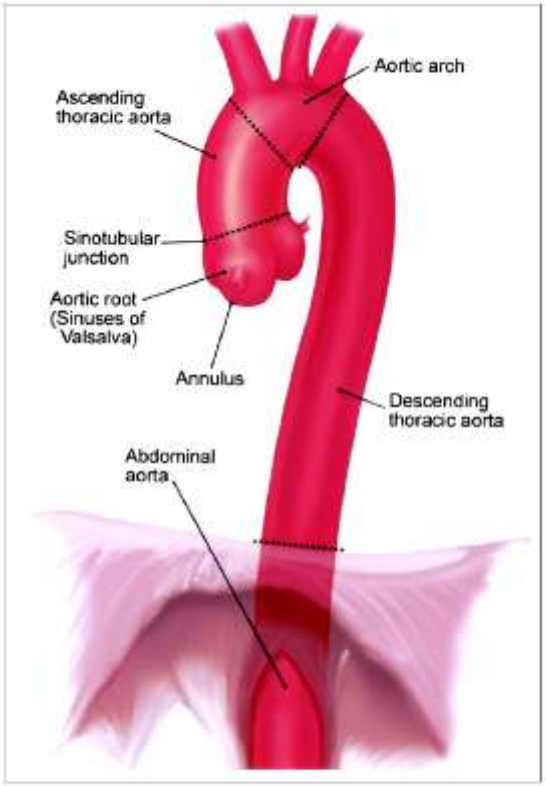
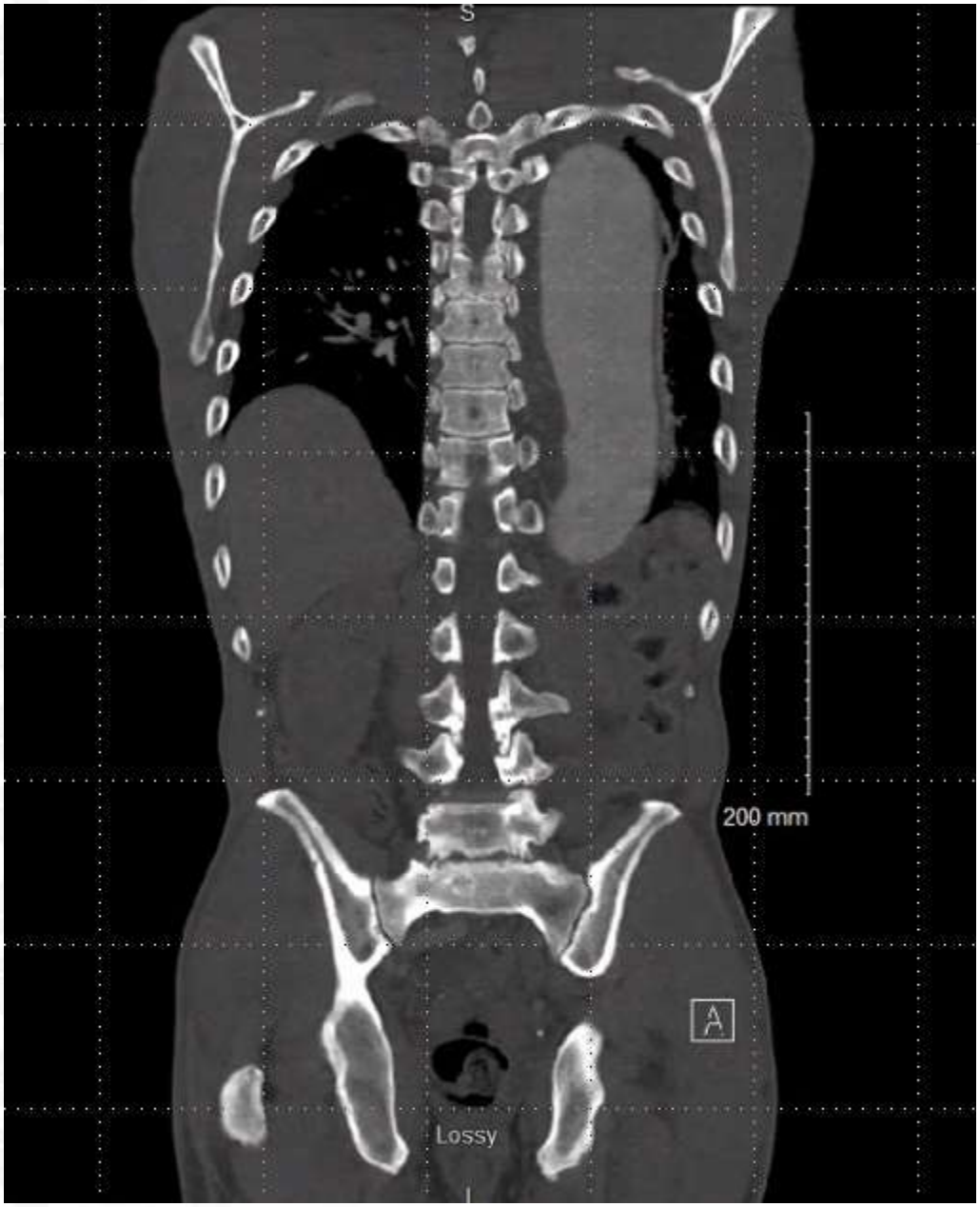


Figure 1. Anatomy of thoracic and proximal abdominal aorta. (©Massachusetts General Hospital Thoracic Aortic Center. Used with permission.)

Case presentation

- ES is a 55-year-old male who presented with 6-month history of left sided chest/back pain which had been acutely worse for 12 hours.
  - Homeless
    - Poor medical compliance
      - Social
      - Economic
    - Unreliable follow up
      - Communication
      - Transportation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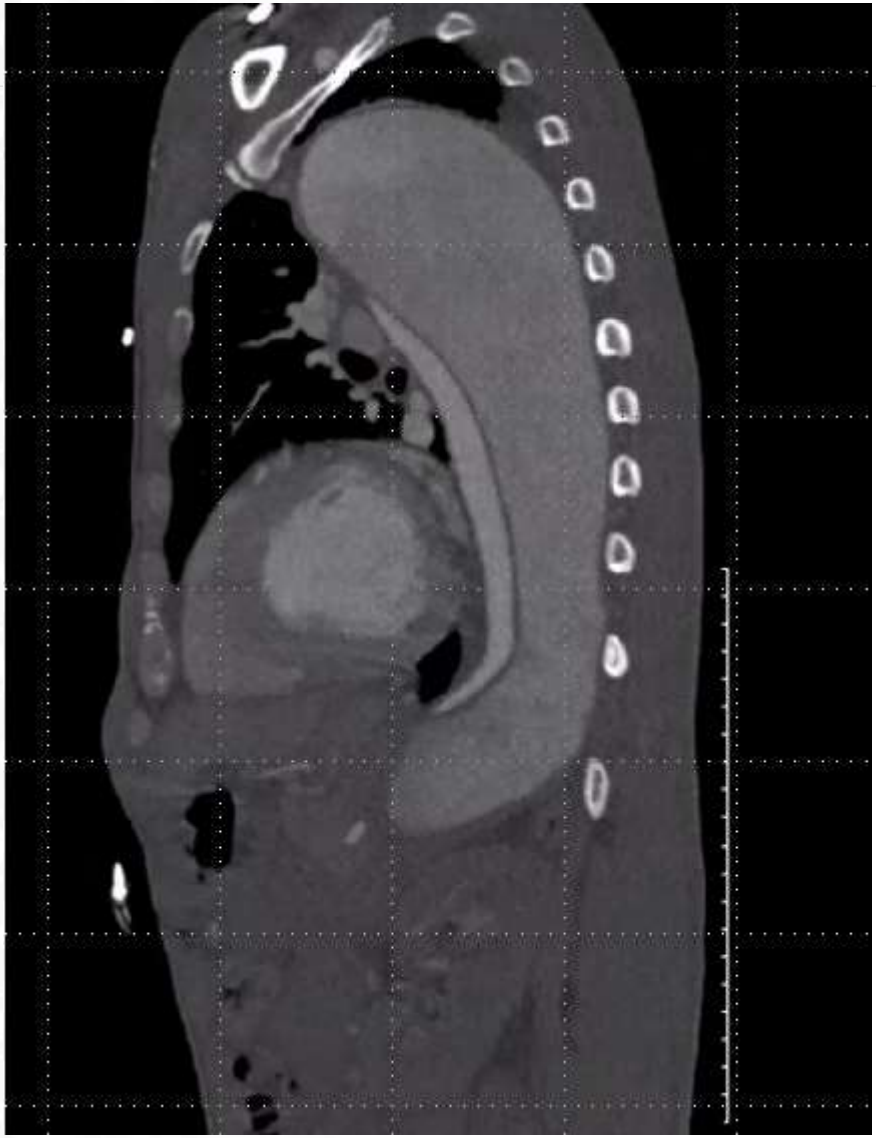
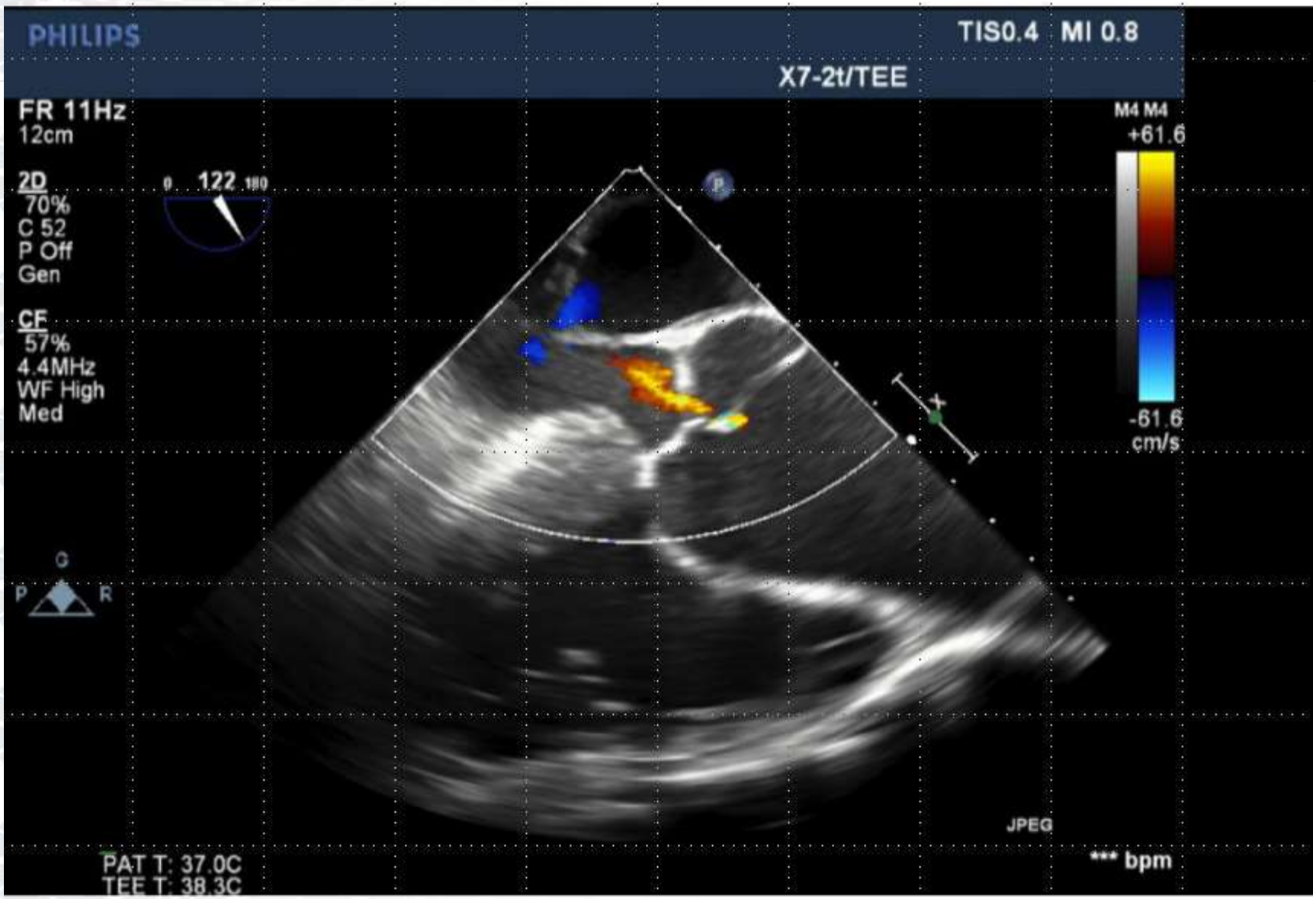
200 mm
A
Lossy

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Med
0 122 180
M4 M4
+61.6
-61.6
cm/s
JPEG
*** bpm
PAT T: 37.0C
TEE T: 38.3C

Operative decision making

-Descending first

-Prioritizes lethal segment

-TEVAR not an option

-Requires hypothermic circulatory arrest(as will the ascending)

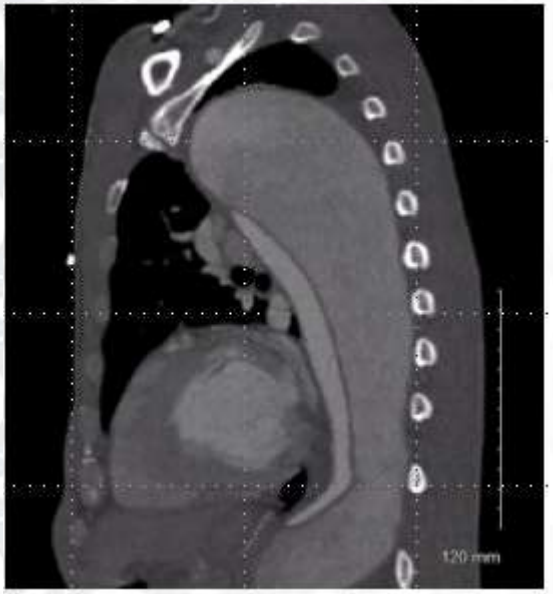
-Difficult exposure

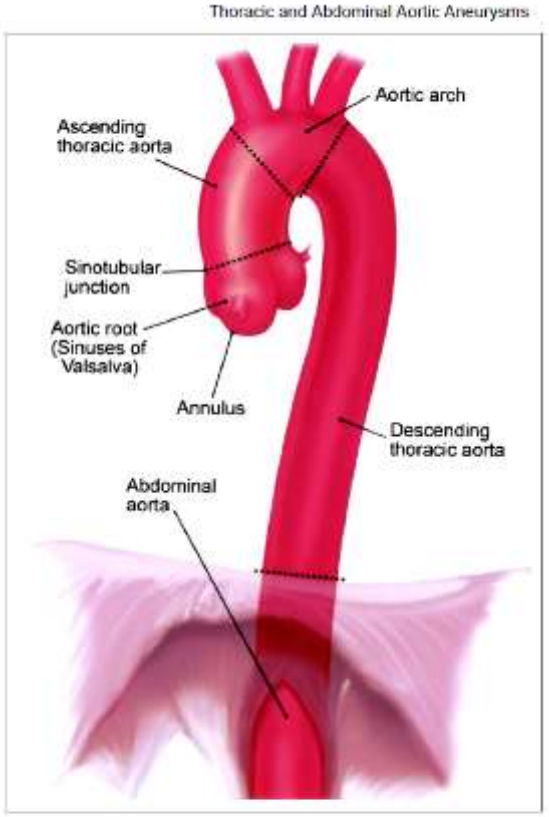
-Aortic root and ascending first

-Addresses aortic root, ascending and arch directly and allows for TEVAR of descending thoracic type B dissection

-Hypothermic circulatory arrest required once

-Root replacement options





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Operative plan

Aortic root replacement

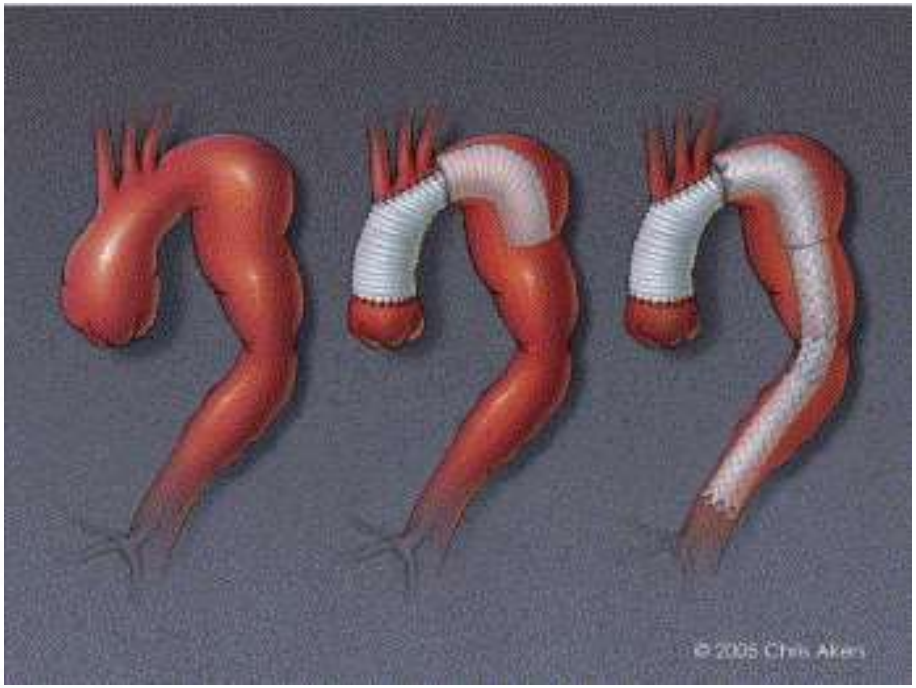
-Bioprosthetic valve conduit
-Mechanical valve conduit
-Valve sparing root replacement

+

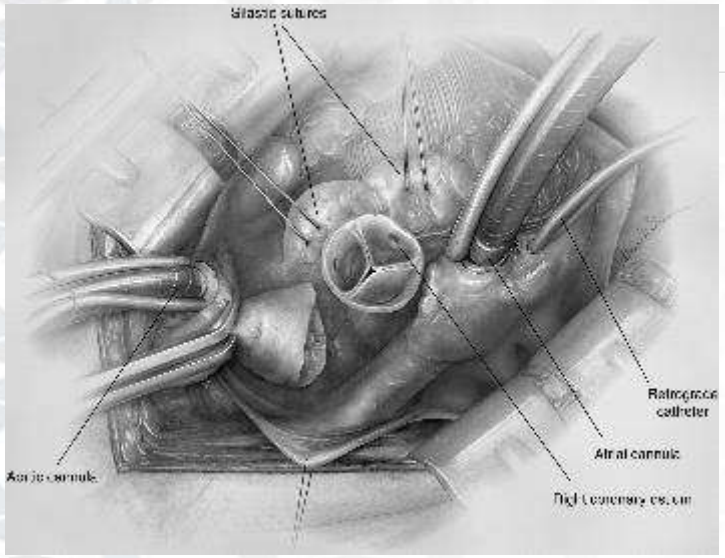
Ascending and aortic arch replacement with elephant trunk

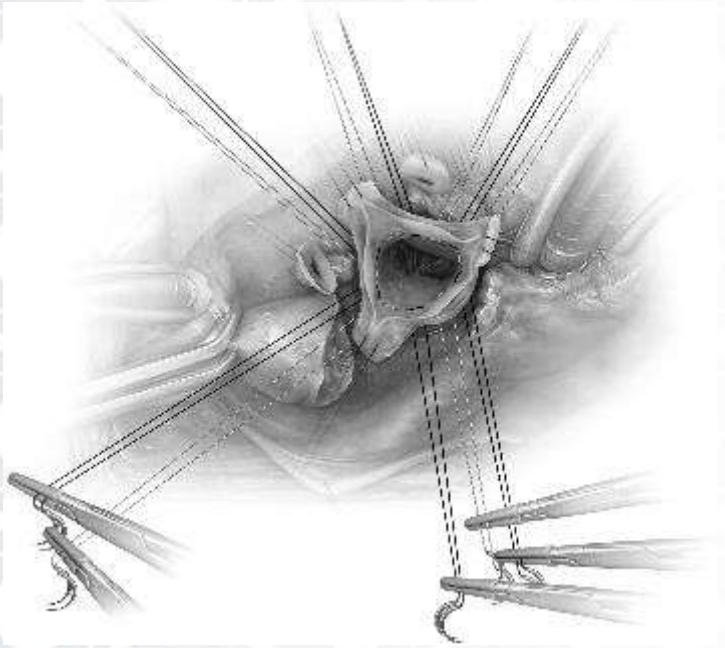
+

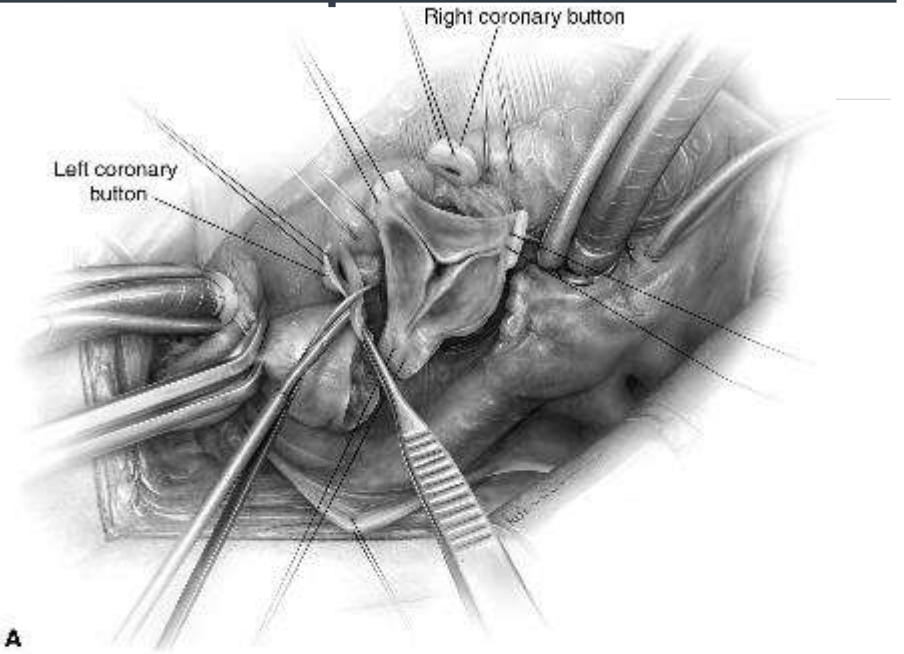
Endovascular repair of the descending aorta

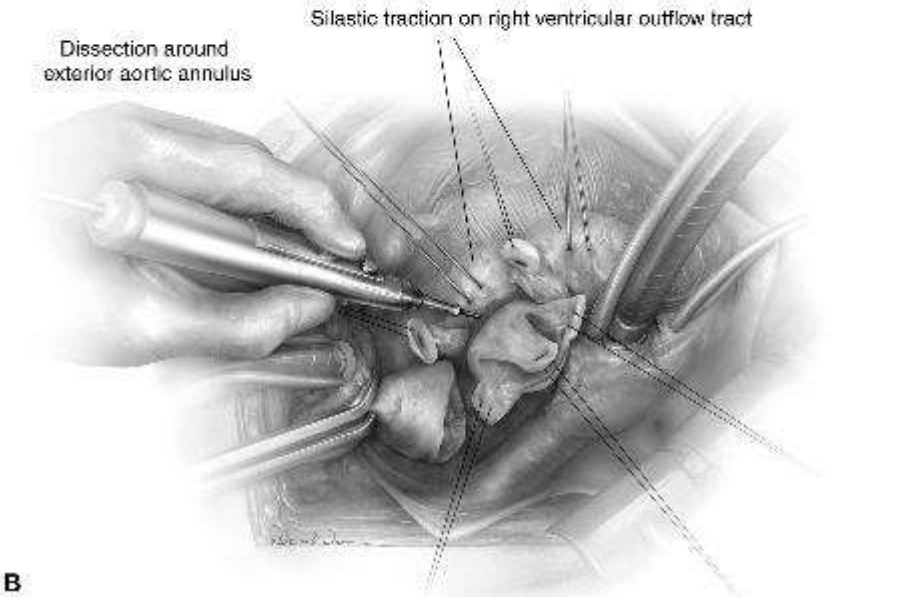


Valve Sparing Root Replacement









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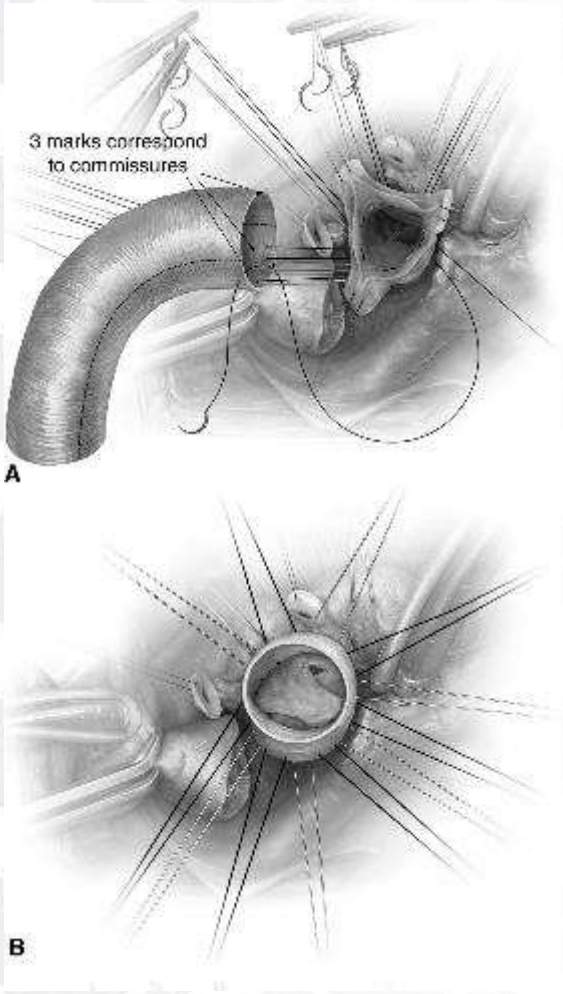
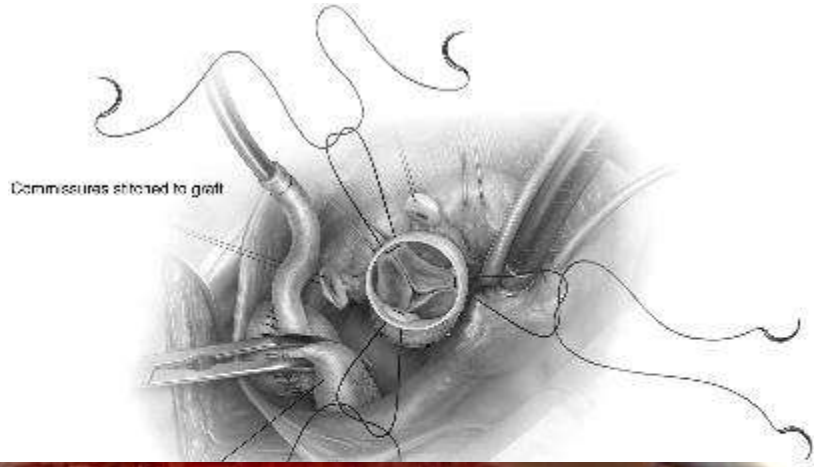
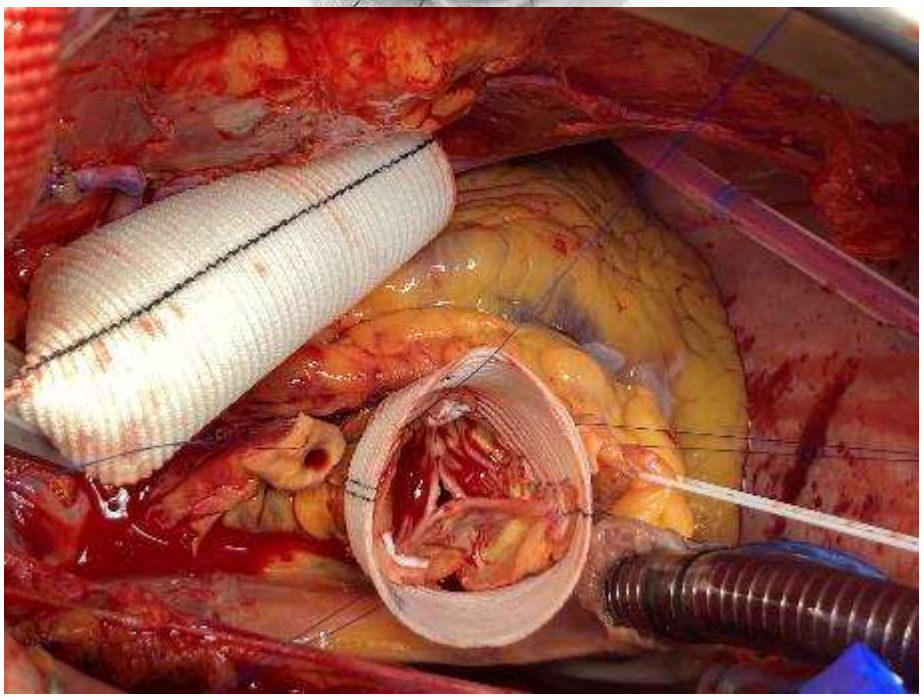
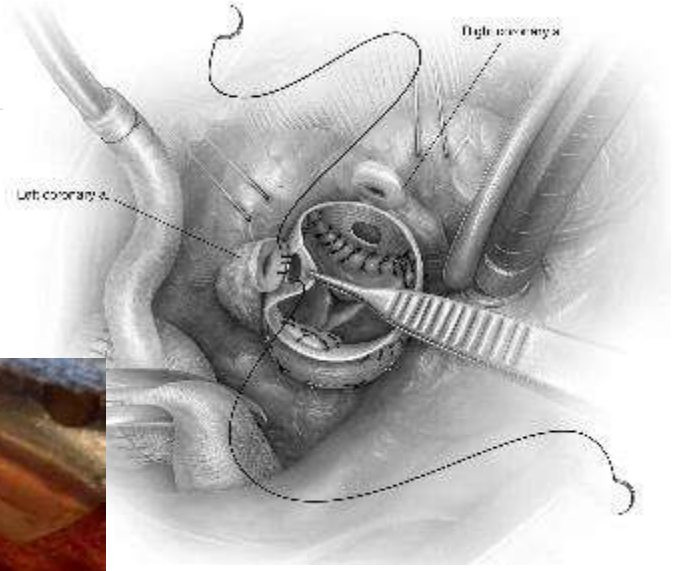
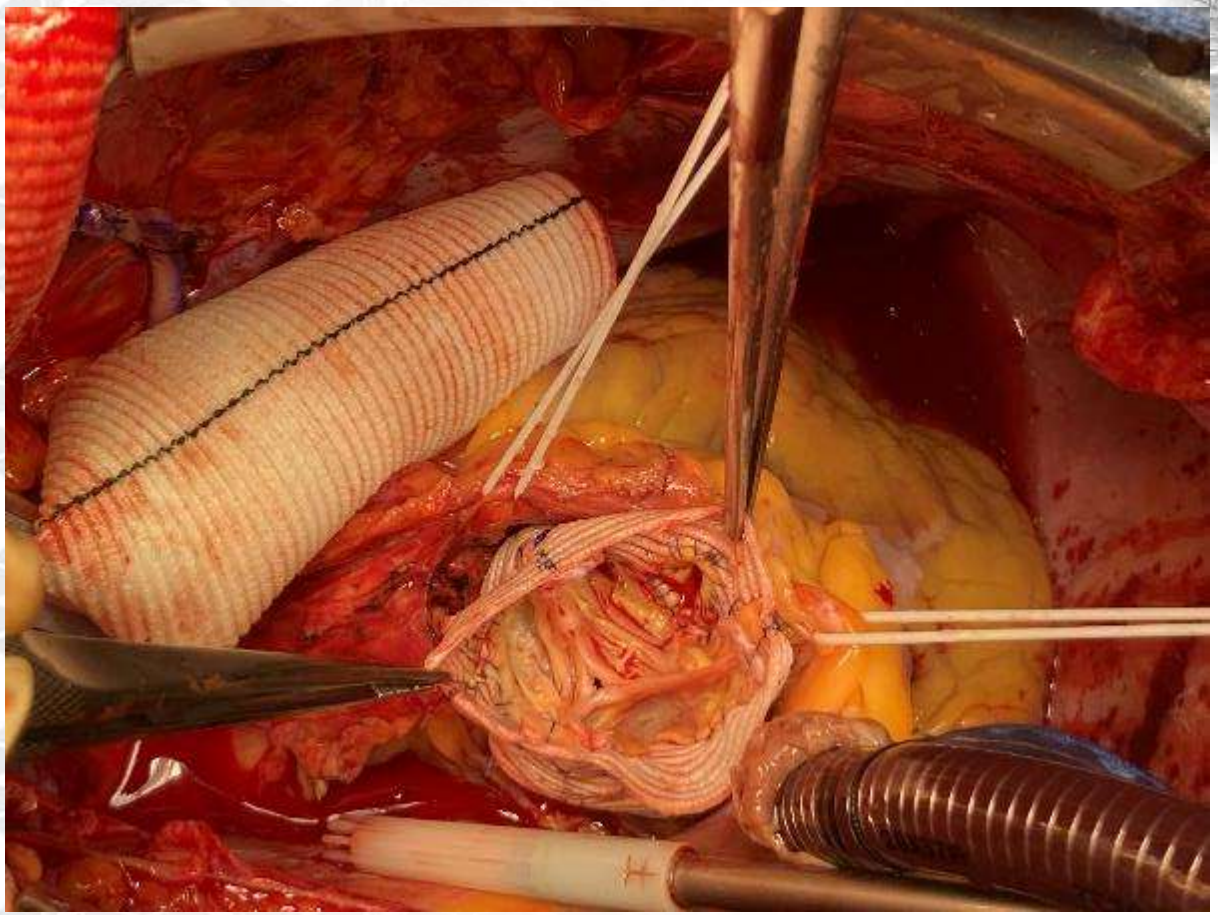


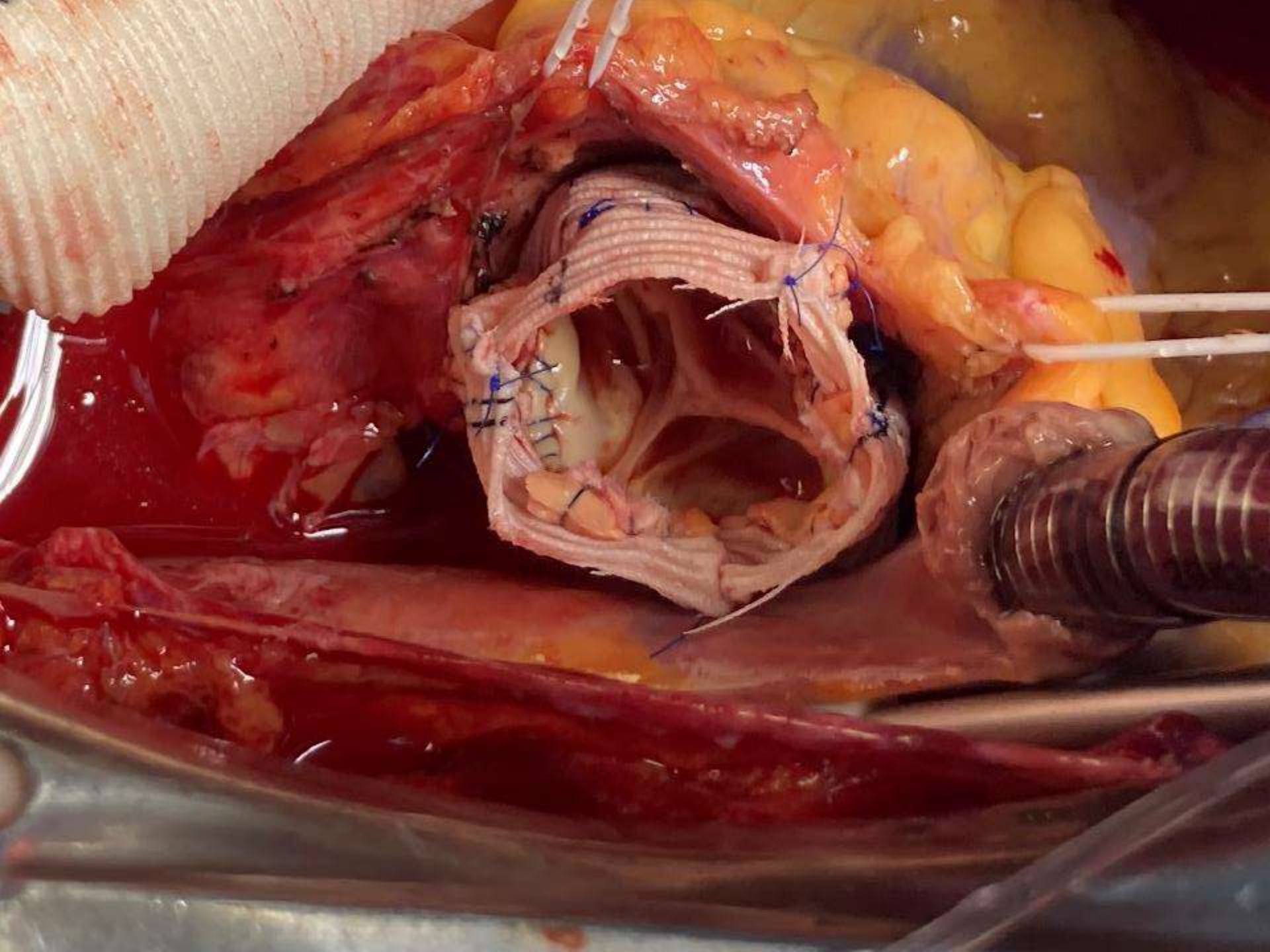




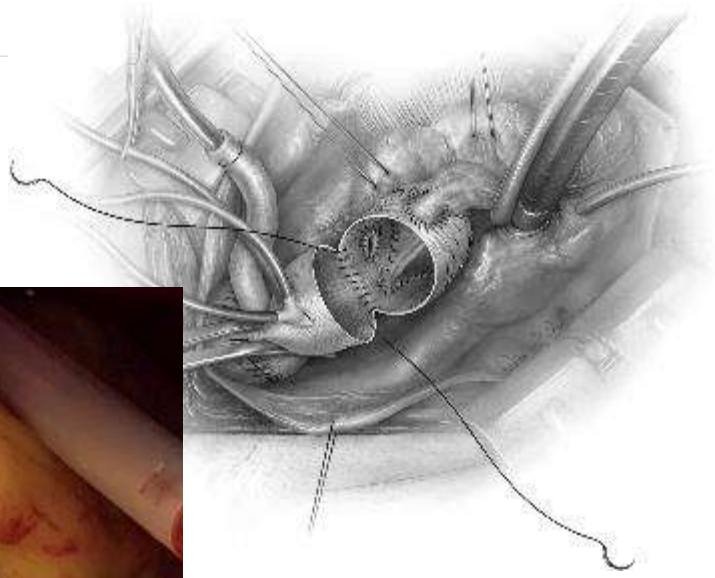
Valve Sparing Root Replacement

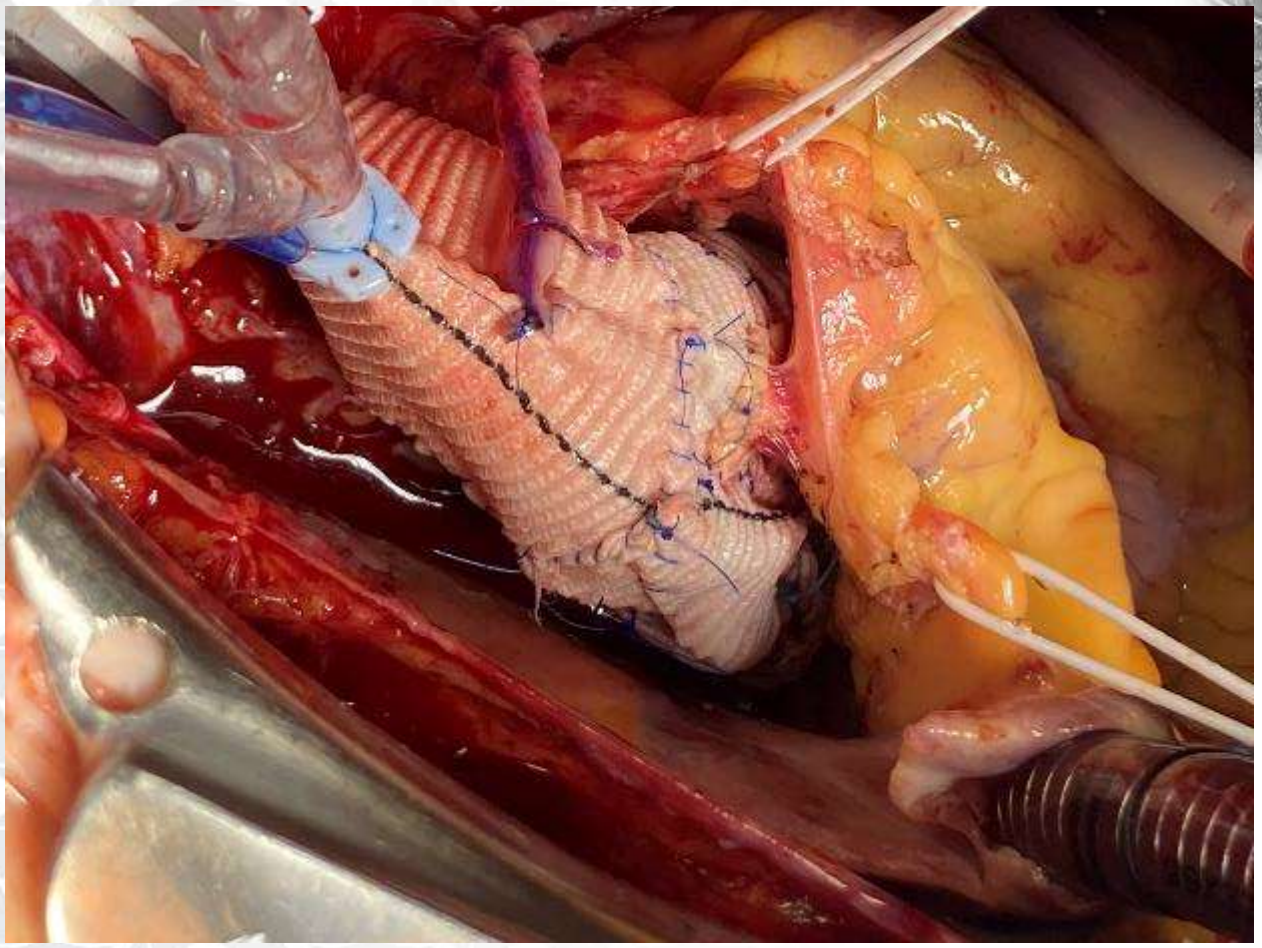


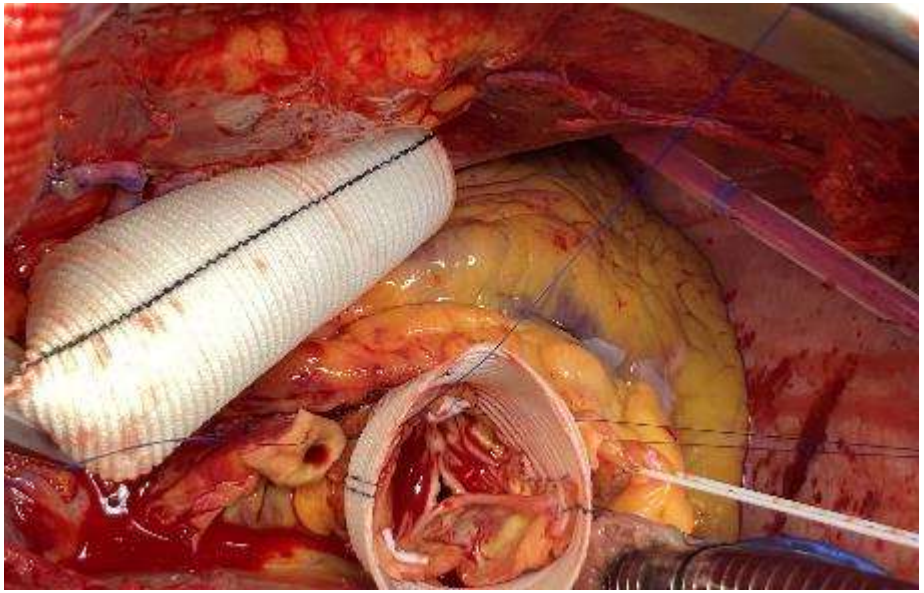


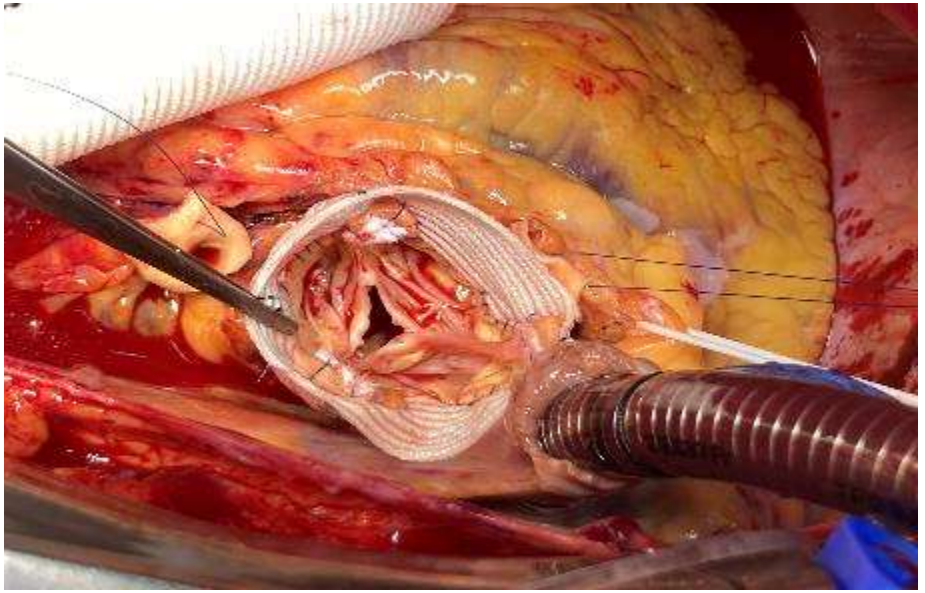


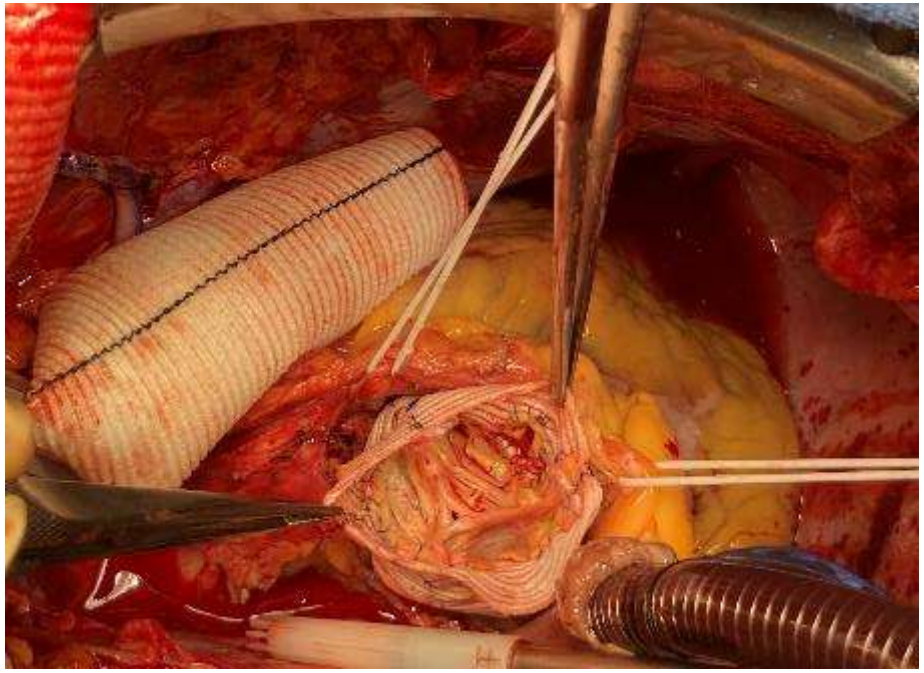
Valve Sparing Root Replacement

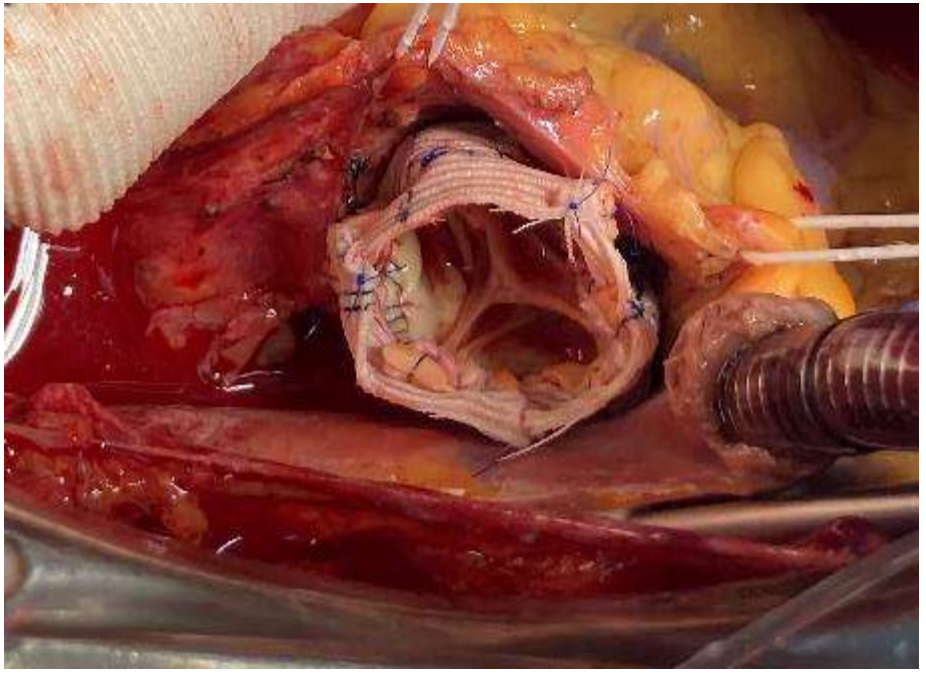


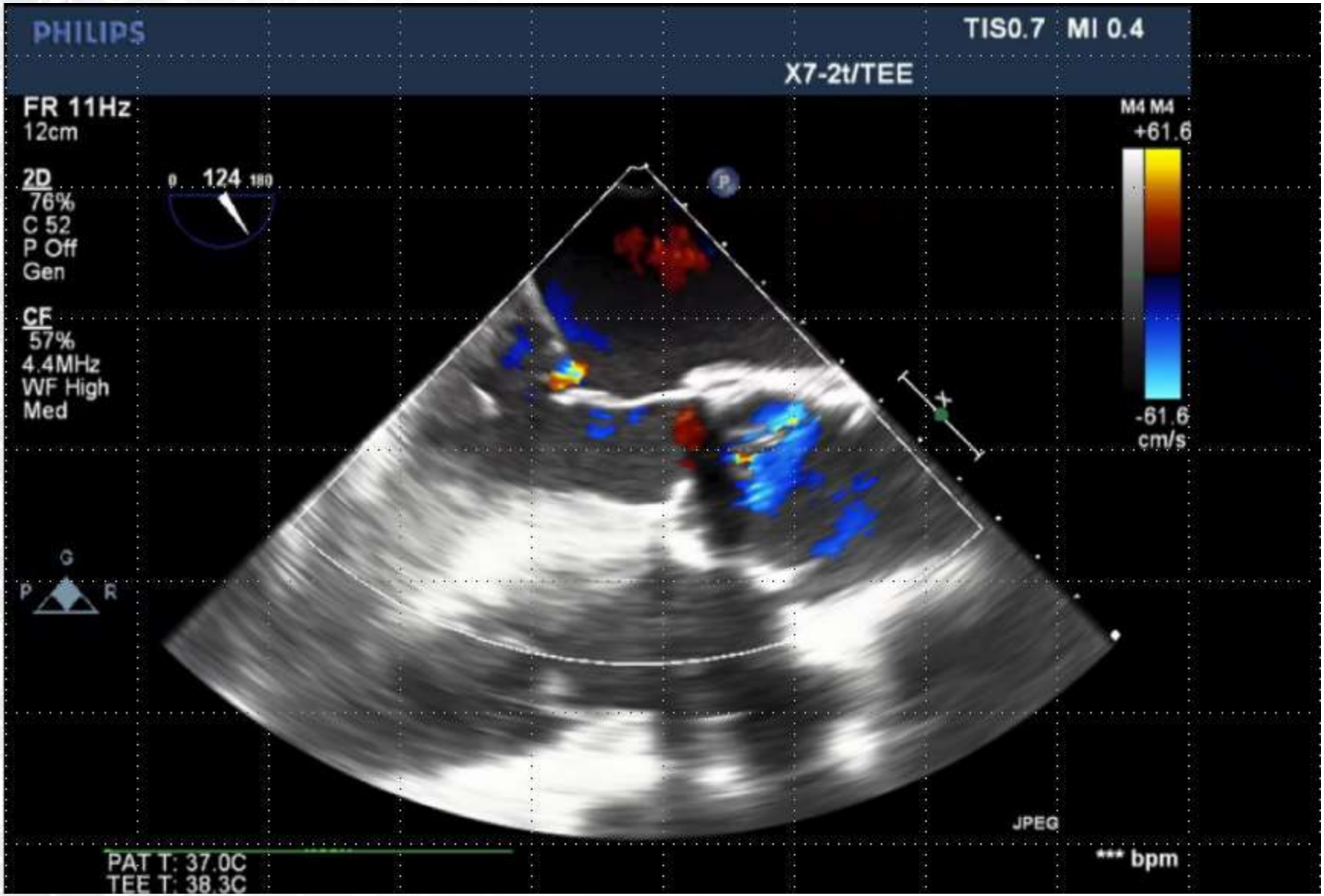








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PAT T: 37.0C
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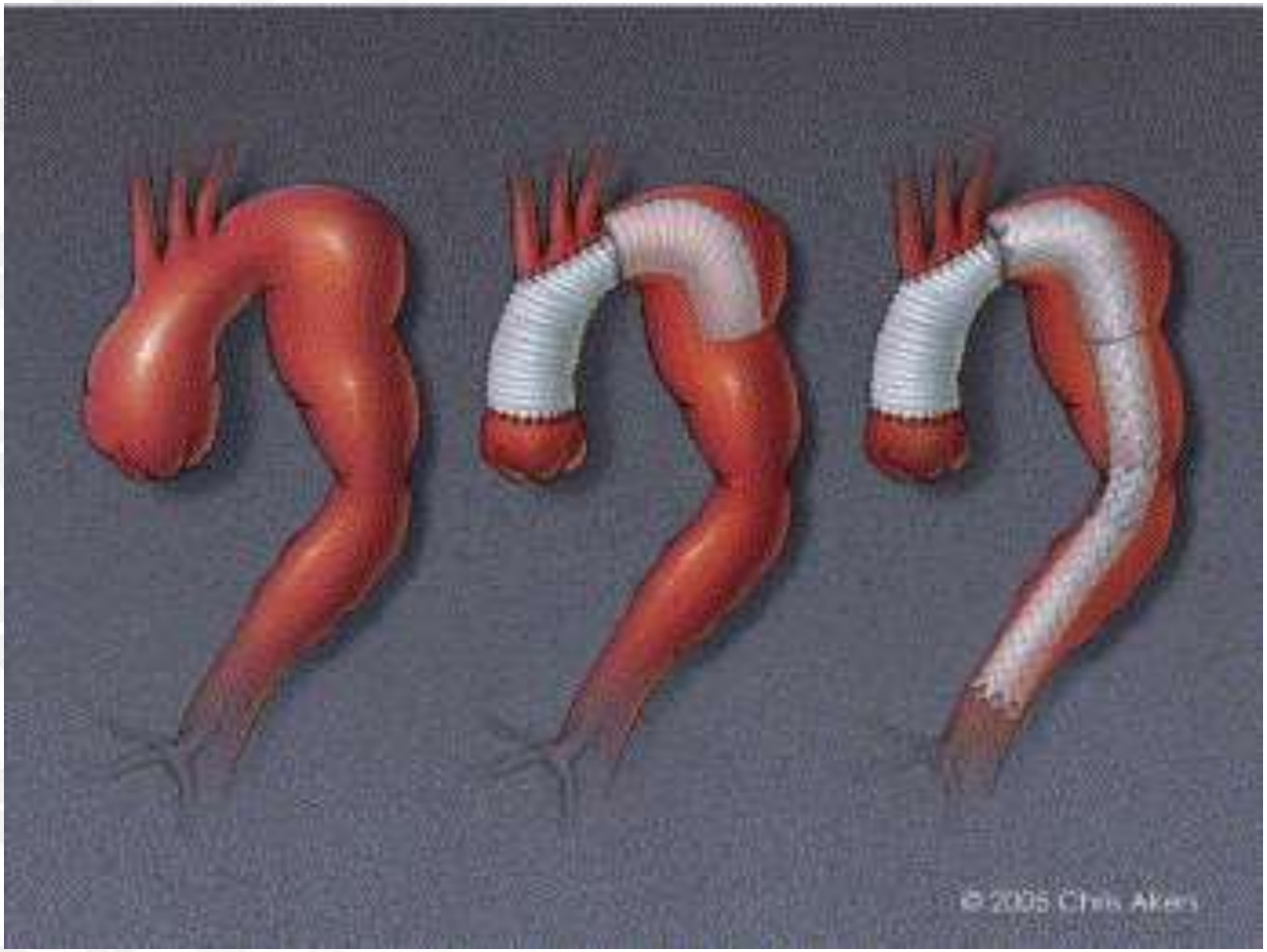
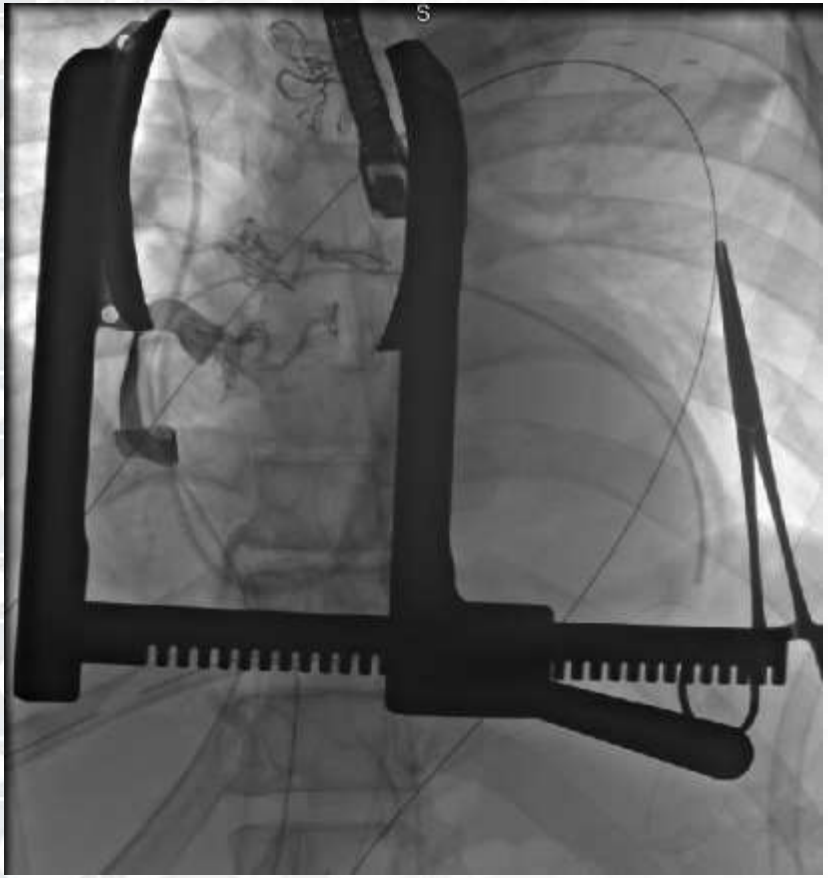
Arch replacement and elephant trunk

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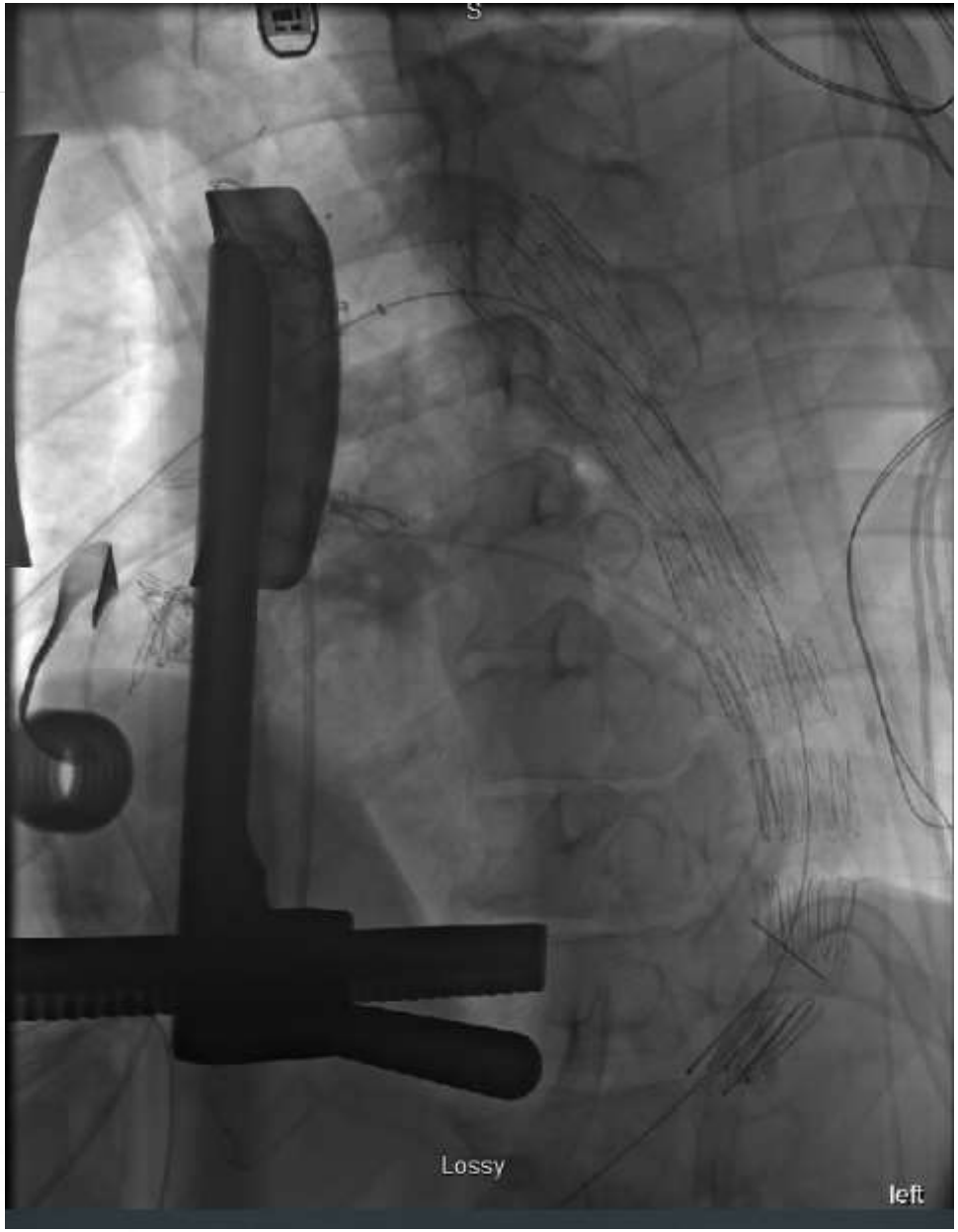
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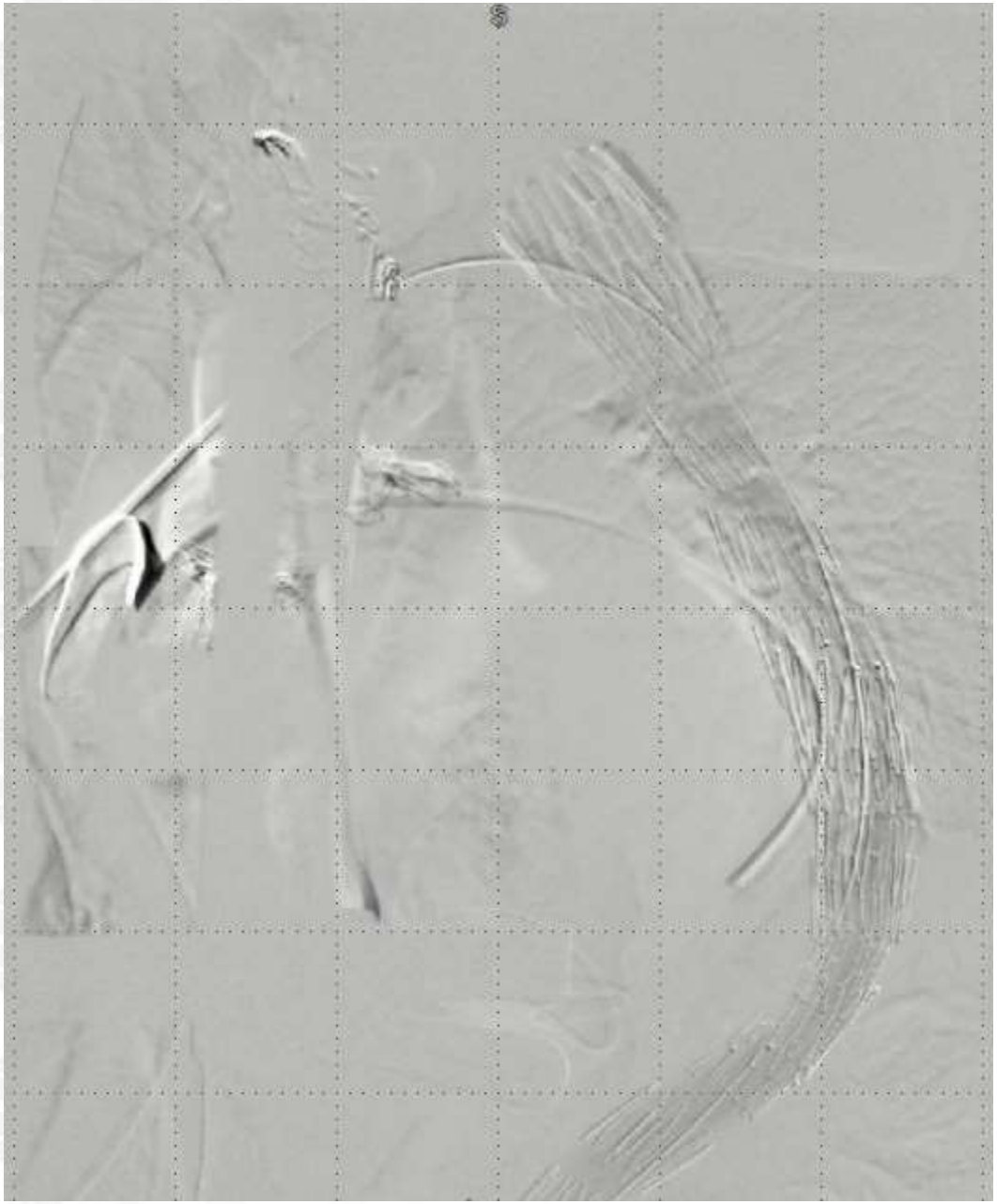
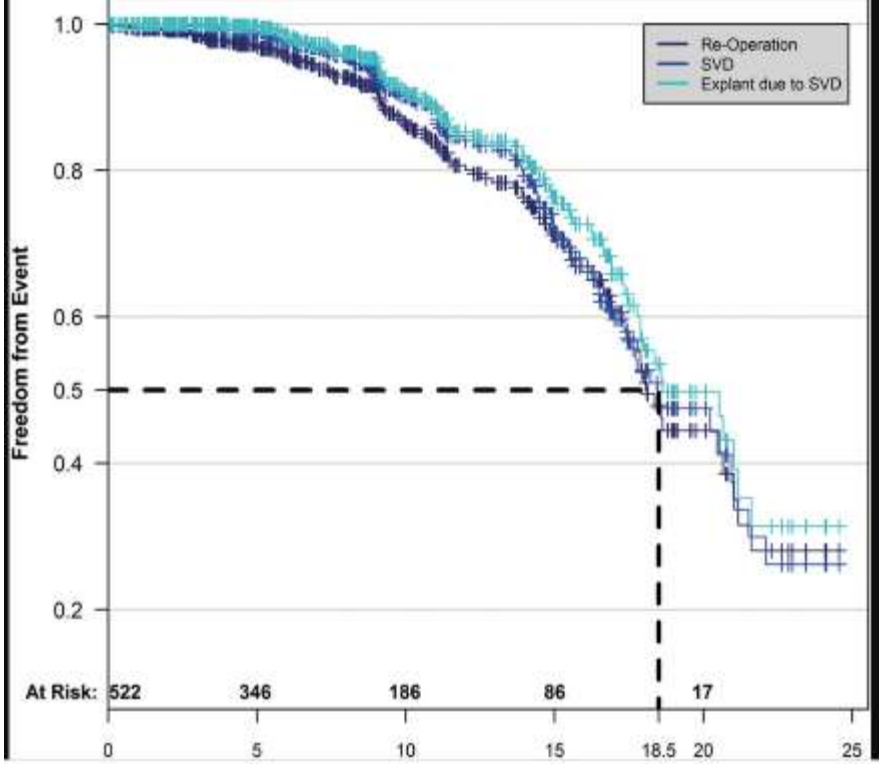
left



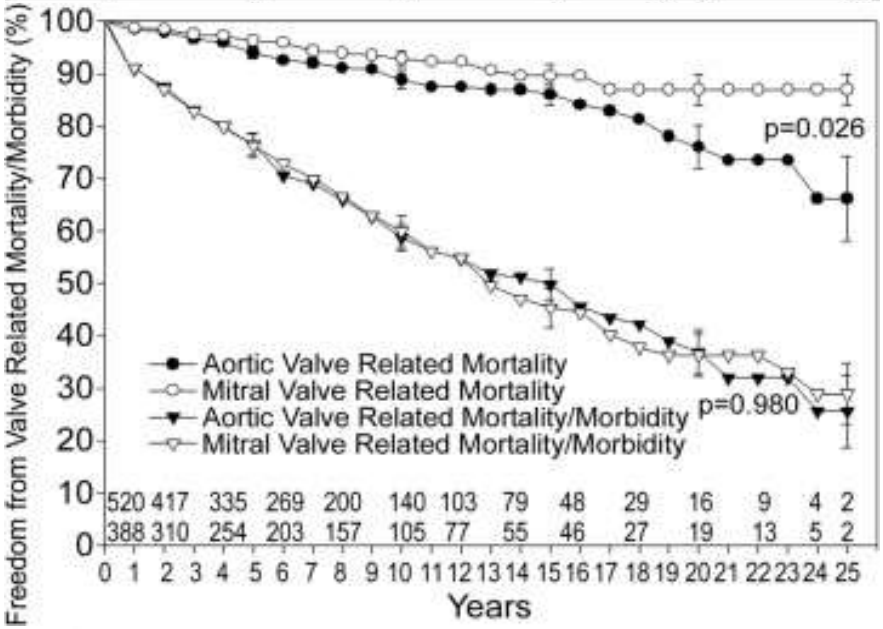
Bioprosthetic valve

-Structural deterioration

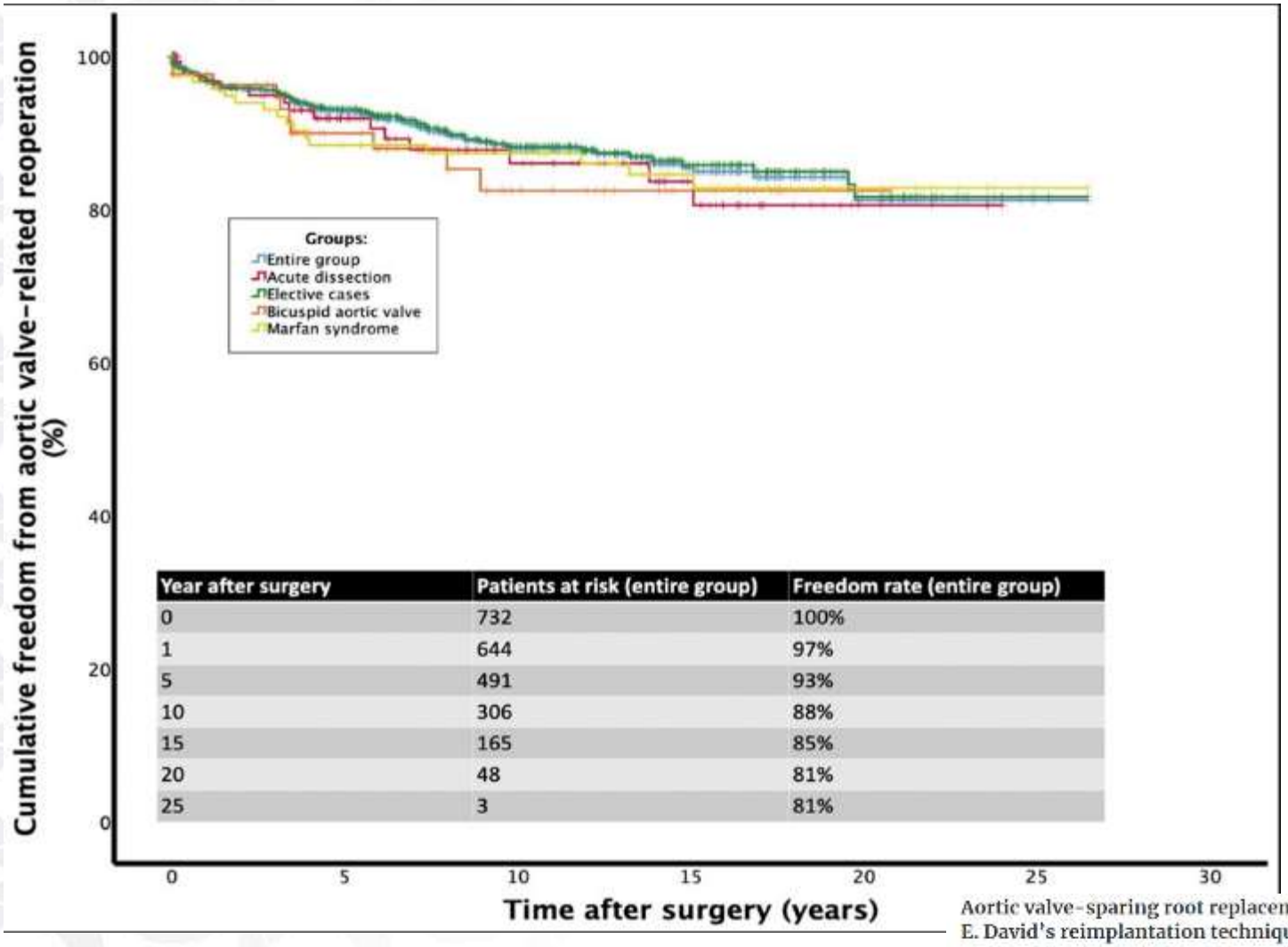


Mechanical valve

-Bleeding and TE



Freedom from reoperation



Year after surgery	Patients at risk (entire group)	Freedom rate (entire group)
0	732	100%
1	644	97%
5	491	93%
10	306	88%
15	165	85%
20	48	81%
25	3	81%

Aortic valve-sparing root replacement with Tirone E. David's reimplantation technique: single-centre 25-year experience

Erik Beckmann, Andreas Martens, Heike Krüger, Wilhelm Korte, Tim Kaufeld, Alissa Stierlinger, Axel Haverich, Malakh Lal Shrestha

European Journal of Cardio-Thoracic Surgery, Volume 60, Issue 3, September 2021, Pages 642–648, https://doi.org/10.1093/ejcts/ezab136
Published: 29 March 2021 Article history

Thoracic aortic surgery at Roper

Indications for surgery

-Symptoms

-Size

-Rate of change

-Aortic insufficiency

Aortic surgical size criteria

Ascending aorta

55 mm standard
Adjust for body size

BSA x 2.75= SSC

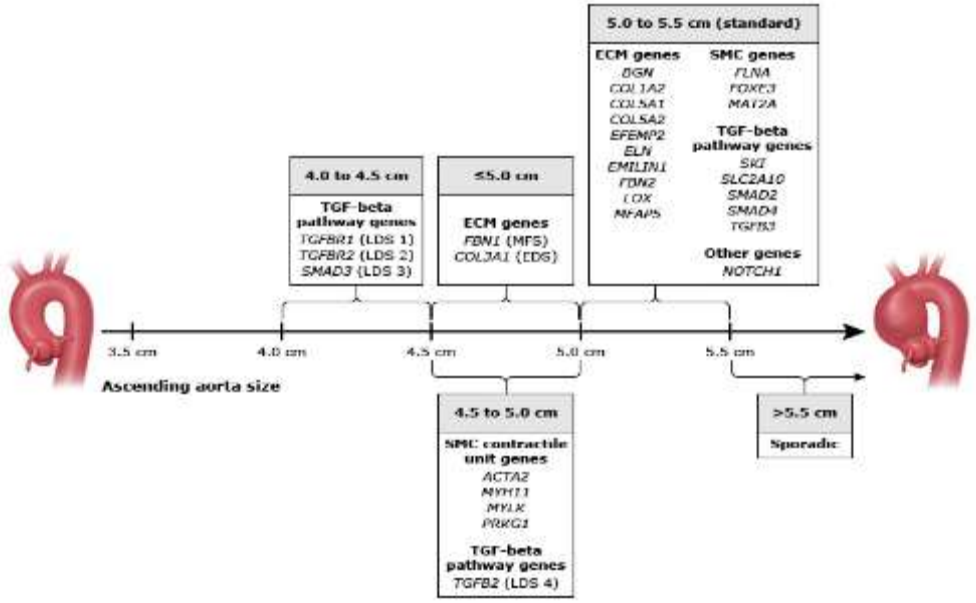
	Aortic size (cm)									
BSA	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
1.30	2.69	3.08	3.46	3.85	4.23	4.62	5.00	5.38	5.77	6.15
1.40	2.50	2.86	3.21	3.57	3.93	4.29	4.64	5.00	5.36	5.71
1.50	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33
1.60	2.19	2.50	2.80	3.13	3.44	3.75	4.06	4.38	4.69	5.00
1.70	2.05	2.35	2.65	2.94	3.24	3.53	3.82	4.12	4.41	4.71
1.80	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17	4.44
1.90	1.84	2.11	2.37	2.63	2.89	3.16	3.42	3.68	3.95	4.22
2.00	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00
2.10	1.67	1.90	2.14	2.38	2.62	2.86	3.10	3.33	3.57	3.80
2.20	1.59	1.82	2.05	2.27	2.50	2.72	2.95	3.18	3.41	2.64
2.30	1.52	1.74	1.96	2.17	2.39	2.61	2.83	3.04	3.26	3.48
2.40	1.46	1.67	1.88	2.08	2.29	2.50	2.71	2.92	3.13	3.33
2.50	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20

= low risk (~4% per yr)
= moderate risk (~8% per yr)
= severe risk (~20% per yr)

Adjust for risk factors

connective tissue disorders
Varies by disease

Personal or family history
Subtract 5 mm or
BSA x 2.5= SSC



Roper Thoracic Aortic Clinic

Purpose:

- grow volume
- increase efficiency

State of the art care

- Guideline driven
- Medical optimization focused on prevention and disease progression
- Surgical expertise
- Genetic testing and counseling
- Personalized approach
  - risk factors
  - body size

Roper Thoracic Aortic Clinic

Roper thoracic aortic clinic volume

Year	New	Follow up	Total
2019	65	39	104
2020	76	58	134
2021	127	79	206

Roper thoracic aortic surgical volume

	Isolated Aortic (elective)	Aortic + Additional Procedure	Emergent Aortic Procedures	All Aortic Procedures
2017	13	12	6	31
2018	15	5	9	29
2019	19	9	9	37
2020	23	9	7	39

Roper thoracic aortic surgical quality

	Isolated Aortic (elective)	Stroke (N)	Mortality (N)	Absence of Stroke or Mortality (N)	Absence of Stroke or Mortality (%)
2017	13	0	0	13	100%
2018	15	0	0	15	100%
2019	19	0	1	18	95%
2020	23	1	0	22	96%
2017-2020	70	1	1	68	97%

Thoracic aortic disease

Take home messages

-Valve sparing root is an attractive option in select patients

-VSR is a durable technique that combines the longevity of mechanical valve conduit and freedom from bleeding and thromboembolism of a bioprosthetic valve conduit.

-Aortic surgery requires a multidisciplinary approach

-Endovascular options for the descending thoracic aorta can be facilitated or enhanced by open ascending aortic procedures

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Questions?