

Surgical management of thoracic and thoracoabdominal aortic graft infections

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* Equal contribution

Objective

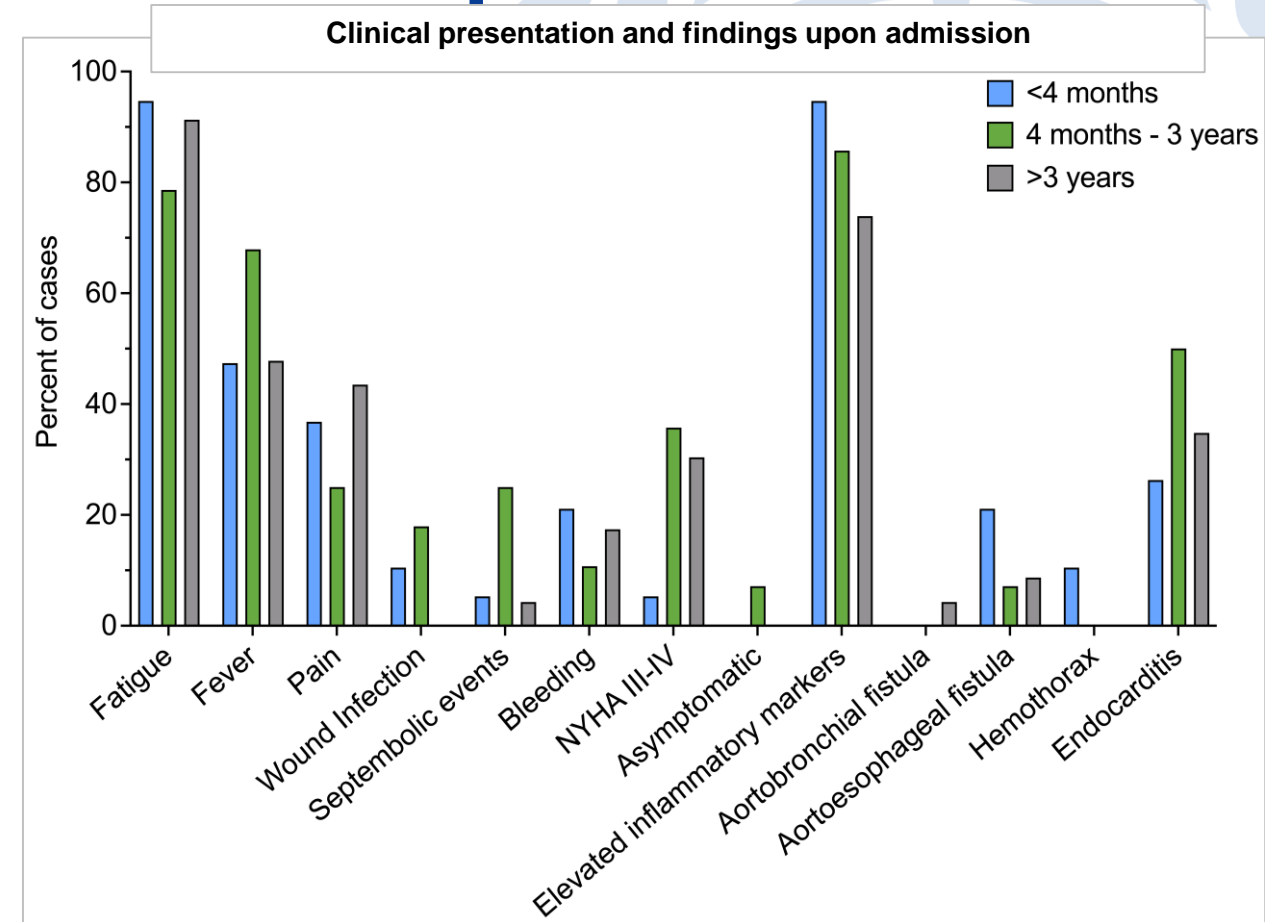
- Aortic graft infection is a rare but devastating complication of open or endovascular aortic repair
- It is associated, even when surgically treated, with high morbidity and mortality
- From January 2000 to June 2023, a total of 6240 open surgical or endovascular repairs of thoracic or thoracoabdominal aorta were performed at our institution. Aortic graft infection was diagnosed in 72 (1.2%) cases
- **Aim of the study was to analyze the early and long-term outcomes of surgical treatment in patients with thoracic and thoracoabdominal aortic graft infection**

Methods

- **From January 2000 to June 2023, a total of 70 patients** underwent surgical treatment for aortic graft infection at our center and were retrospectively analyzed
- **Medical records** of these patients were reviewed with regard to clinical presentation of infection, pathogens obtained pre- or intraoperatively, interval between the previous surgery and infection, and surgeries performed
- **Early and late results** of surgical treatment were included in the analysis
- Cases with infection of native aorta, and patients with aortic graft infection who did not undergo surgical treatment were not included in the analysis

Patient characteristics and clinical presentation

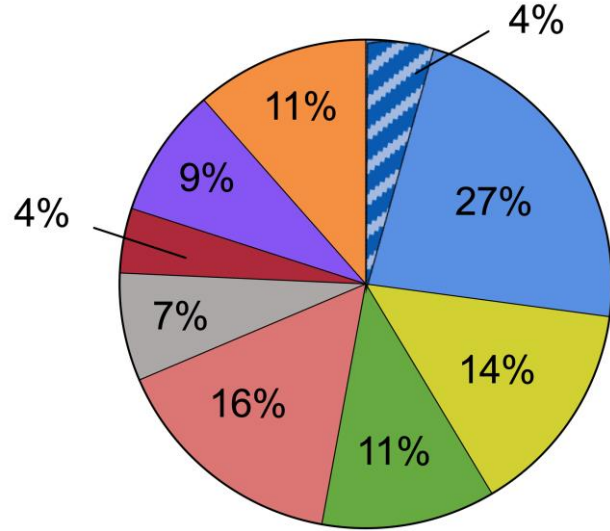
Patient characteristics	n (%)
Age, years	61.2 ± 10.8
Male	52 (74.3)
Peripheral arterial disease	9 (12.9)
Prior stroke or spinal cord injury	16 (22.9)
GFR < 50 mL/min/1.73m ²	20 (28.6)
Preoperative LVEF, %	54.3 ± 10.3
EuroSCORE II, %	23 (17 - 36)
Obesity	25 (35.7)
Diabetes mellitus	15 (21.4)
Immunosuppression	4 (5.7)
Prior emergency surgery	22 (31.4)
Prior surgery for endocarditis	3 (4.3)
Complications of prior surgery:	
Reexploration for bleeding	16 (22.9)
Wound infection	9 (12.9)
Pericardial effusion requiring draining	4 (5.7)
Tracheostomy	9 (12.9)
Mechanical circulatory support	1 (1.4)



Time between primary intervention and redo for infection	n (%)
< 4 months	19 (27.1)
4 months – 3 years	28 (40.0)
> 3 years	23 (32.9)

Pathogens detected and interventions prior to graft infection

Pathogens



- Staphylococcus aureus
- MRSA
- Coagulase-negative Staphylococci
- Other Gram-positive cocci
- Gram-negative bacilli
- Polymicrobial
- Fungal
- Others
- Culture negative

Surgeries and interventions prior to graft infection	n (%)
Ascending aortic replacement	22 (31.4)
Aortic valve and ascending aortic replacement	13 (18.6)
Bentall procedure	19 (27.1)
David or Yacoub procedure	6 (8.6)
Hemiarch	17 (24.3)
Total arch replacement	4 (5.7)
Elephant Trunk procedure	2 (2.9)
Frozen Elephant Trunk procedure	5 (7.1)
TEVAR	15 (21.4)
Thoracoabdominal aortic replacement	3 (4.3)
Mitral valve repair/replacement	3 (4.3)
<i>Mechanical aortic valve</i>	12 (17.1)
<i>Biological aortic valve</i>	17 (24.3)

Operative data

Surgical exposure	n (%)
Sternotomy	52 (74.3)
Left thoracotomy	4 (5.7)
Sternotomy and thoracotomy	4 (5.7)
Thoracoabdominal incision	8 (11.4)
Clamshell	2 (2.9)

- **Wound irrigation with povidone-iodine solution prior to redo surgery was performed in 8 (11.4%) patients**
- **Omentum flap was used in 3 (4.3%) cases**
- **Concomitant esophageal resection was required in 3 patients**

Extent of redo-procedure	n (%)
Ascending aortic replacement	16 (22.9)
Ascending aortic and noncoronary sinus replacement	3 (4.3)
Aortic valve and ascending aortic replacement	11 (15.7)
Bentall procedure	30 (42.9)
Hemiarch	26 (37.1)
Total arch replacement	13 (18.6)
Elephant Trunk or Frozen Elephant Trunk	3 (4.3)
Descending aortic replacement	11 (15.7)
Ascending-to-descending aortic bypass	1 (1.4)
Thoracoabdominal aortic replacement	6 (8.6)
Mitral valve repair / replacement	8 (11.4)
Coronary bypass grafting	6 (8.6)
Vascular graft type:	
Dacron	43 (61.4)
Dacron combined with xeno- / homograft	5 (7.1)

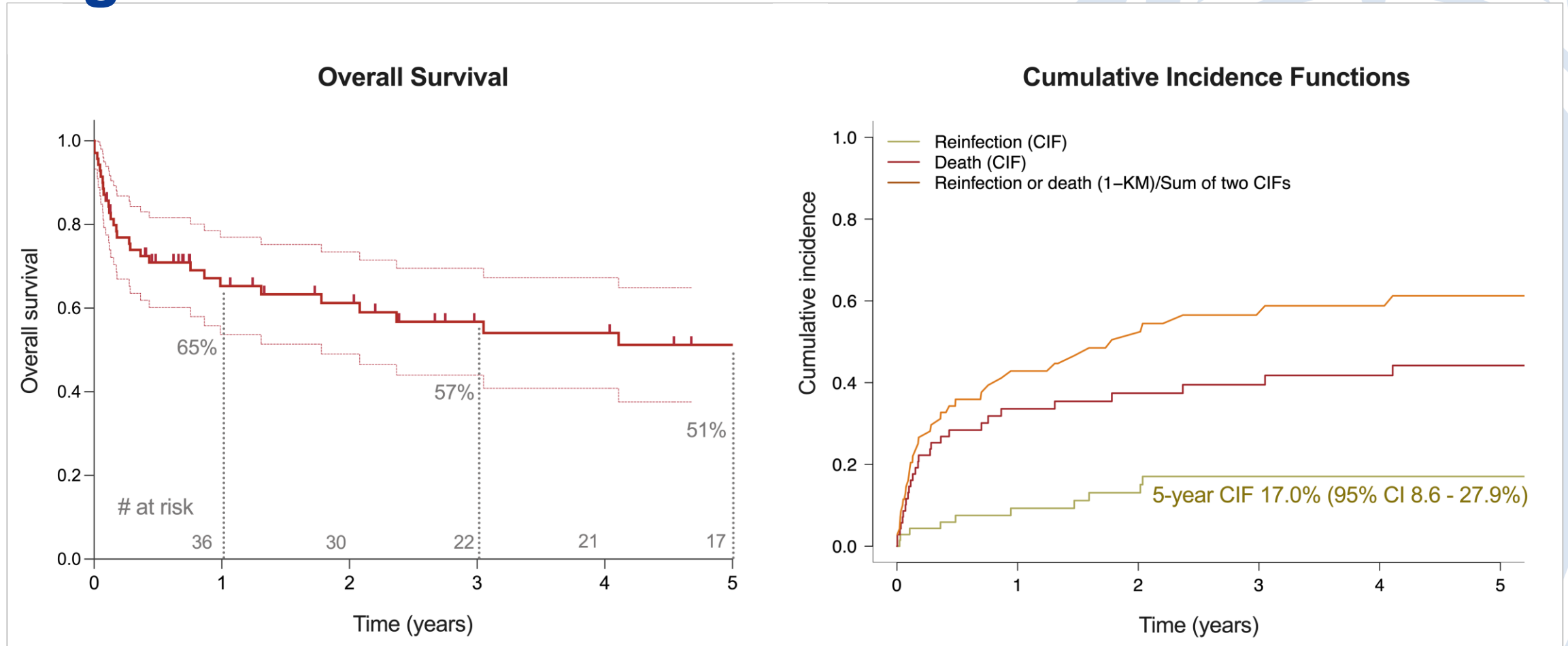
Early outcomes

Early outcomes	n (%)
Reexploration for bleeding	17 (24.3)
Myocardial infarction	0
ECMO/IABP	5 (7.1)
Reintubation or tracheostomy	23 (32.9)
Stroke	4 (5.7)
Transient ischemic attack	4 (5.7)
Paraplegia	0
Renal failure requiring dialysis	17 (24.3)
In-hospital mortality	7 (10.0)

ECMO - Extracorporeal membrane oxygenation; IABP - intra-aortic balloon pump

<u>Causes of in-hospital death:</u>	n
Hemorrhagic shock	3
Hemorrhagic shock and low cardiac output	1
Septic shock	3
<u>In-hospital death and pathogens:</u>	
<i>Staphylococcus aureus</i>	3
<i>Coagulase-negative Staphylococci</i>	1
<i>Listeria monocytogenes</i>	1
<i>Cutibacterium acnes</i>	2

Long-term outcomes



- **Overall estimated survival** was $65.3 \pm 11.6\%$ at 1 year and $51.2 \pm 13.7\%$ at 5 years
- **Survival after discharge** was $72.6 \pm 11.6\%$ at 1 year and $56.9 \pm 14.5\%$ at 5 years

- **Cumulative incidence of reinfection** (aortic graft infection or endocarditis) evaluated with mortality as a competing event was **17.0% at 5 years**
- **Early reinfection** (<3 months) was observed in 4 cases

Conclusions

- Aortic graft infections represent a challenging group of patients with very high surgical risk
- The current study reports surprisingly good early results of treatment
- However, long-term survival was limited with approximately half the patients being alive 5 years following surgery for graft infection
- A significant proportion of patients required readmission during the follow-up due to reinfection