

Rethinking Optimal Management of Aortic Graft Infection

Chenshu Li¹ and Ruihua Wang^{1,2*}

¹Department of Vascular Surgery, The Affiliated Chuzhou Hospital of Anhui Medical University, Anhui, China

²Department of Vascular Surgery, Shanghai JiaoTong University School of Medicine, Shanghai, China

*Corresponding author: Dr. Ruihua Wang, Department of Vascular Surgery, Shanghai JiaoTong University School of Medicine, Shanghai, China, E-mail: wangruihua0330@sina.com

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Abstract

After undergoing repair for an abdominal aortic aneurysm, it is crucial to address the complication of abdominal aortic graft infection. In this study, we examined the indications for different surgical approaches and sought to determine the most suitable method by evaluating both short-term and long-term outcomes. Our analysis revealed that partial resection combined with *in situ* reconstruction offers a more favorable prognosis. Thus offering valuable guidance to healthcare professionals in making surgical decisions.

Keywords: Aortic graft infection; Complete resection; Partial resection; Extra-anatomic repair; *In situ* graft repair

Description

Aortic Graft Infection (AGI) is a rare but serious complication following abdominal aortic aneurysm repair, with an incidence ranging from 0.5% to 5%. Despite its low occurrence, AGI is associated with a high mortality rate of up to 55% [1]. Patients typically present with symptoms such as pain, fever, leukocytosis, fatigue, weakness, and weight loss. The diagnosis of AGI is based on clinical, microbiological, and radiological findings, with gram-positive bacteria being the most common causative agents. Contrast-Enhanced CT Angiography (CTA) is the preferred imaging modality for diagnosing AGI.

Surgical intervention following treatment of aortic graft infection with antibiotics may involve Complete Resection (CR) or Partial Resection (PR) of the infected graft combined with Extra-Anatomic Repair (EAR) or *In situ* Graft Repair (ISR) [2].

CR+EAR

While CR+EAR is considered the standard approach, it carries the risk of serious complications such as aortic stump rupture. It may be more appropriate to address aortic graft infection with perigraft abscess and pus accumulation. Our meta-analysis showed that the 30-day and 1-year mortality rates for CR+EAR are 16.6% and 41.4%, respectively. The study also reported 3-year and 5-year mortality rates of 90% and 67.9%, respectively, with a re-infection rate of 22.4% [3].

CR+ISR

ISR refers to the implantation in the infected regions. The Neo-Aortoiliac System (NAIS) procedure is constructed through ISR, involving the implantation of autografts (superficial femoral vein), cryopreserved aortic allografts, and rifampicin or silver-coated prosthetic grafts in the infected area. ISR is recommended as the initial treatment for low-grade infections and negative blood cultures in current

guidelines [2]. The use of the superficial femoral vein is suggested for infections caused by limited, low-virulence pathogens, while the long-term efficacy of cryopreserved aortic allografts remains uncertain because of deterioration and degeneration. Rifampicin-coated prosthetic grafts have been applied in patients with high virulence infection and abdominal abscesses. Additionally, conduits constructed from equine or bovine pericardium, whether straight or forked, also could be utilized for *in situ* replacement [4]. A lot of studies have demonstrated that *In situ* Replacement (ISR) is significantly more effective in terms of infection-free survival compared to Extra-Anatomic Replacement (EAR), although its efficacy is limited against polymicrobial or Methicillin-Resistant *Staphylococcus aureus* (MRSA) infections [5]. The 30-day and 1-year mortality rates for patients treated with CR+ISR are 11.9% and 23.8%, respectively, with 3-year and 5-year mortality rates of 32.1% and 45.6% in our meta-analysis. The re-infection rate is reported to be 8%[3].

PR+EAR

Partial graft resection means putting the aortic graft remains in the infected place due to the degree of infection, anatomy, or technique. This intervention may be considered in cases where the infection is confined to the remaining graft, the remaining graft is well integrated, and there is a high risk of complete graft resections [6]. Additionally, this intervention is typically accompanied by ISR. In instances where patients develop postoperative infections, the bacterial species isolated from the primary body or contralateral graft limb are the same or distinct, and further investigation is needed to determine whether it is a recurrence or a new infection. The 30-day and 1-year mortality rates for PR+ISR are 0% and 6.1%, respectively, representing the lowest rates in this meta-analysis. The 3-year mortality rate is 11.8%. The re-infection rate was found to be 9.3%, leading to the consideration of partial graft resection combined with *in-situ* replacement (PR+ISR) as a viable option for certain patients [3].

Conclusion

In conclusion, there is currently no consensus on the optimal treatment strategy for abdominal aortic graft infection, but initial findings suggest that PR+ISR may offer better short-term and long-term outcomes and lower re-infection rates compared to other approaches. This information may assist clinicians in making informed treatment decisions for different patients. However, there is limited research on this technique and it has not been compared with other methods.

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