Management of prosthetic graft infection after surgery of the thoracic aorta: Removal of the prosthetic graft is not necessary

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Prosthetic graft infection (PGI) after surgery to reconstruct the thoracic aorta is a devastating complication. The reported incidence is between 1% and 3%.[1] Treatment of this complication remains a challenge for surgeons, and chances of a successful outcome are considered low. Mortality rates range from 25% to 75%, and morbidity in surviving patients is high.[2]

Most reports advocate a management strategy that combines removal of all the prosthetic material, removal of surrounding tissue, and extra-anatomic arterial reconstruction.[3-5] However, such a major surgical undertaking may not be possible in most cases because of the technically challenging nature of the surgery, and because most patients usually have multiorgan dysfunction caused by sepsis, making the procedure risky.

In this report, we define the outcome and management strategies for PGI after surgery to reconstruct the thoracic aorta. We report our experience of managing PGI with a more conservative approach.

Clinical Summary

From 1996 to 2005, all the names of patients undergoing prosthetic graft replacement of the thoracic aorta in a single unit were prospectively placed in a database. A retrospective review of case notes was performed.

A diagnosis of PGI was made in patients with signs of sepsis, namely, pyrexia, leukocytosis, and increased C-reactive protein coupled with evidence on computed tomography scanning of peri-graft collection or air.

Results

During the study period, more than 400 consecutive patients underwent graft replacement of the thoracic aorta. The following procedures were undertaken: aortic arch replacement (38 cases, 9.5%), composite aortic root replacement (162 cases, 40.5%), and interposition graft to the ascending aorta plus aortic valve replacement (200 cases, 50%). The mortality for the entire group was 13%.

Eight patients (2%) had PGI. They underwent the following procedures: aortic arch replacement (2 cases), composite aortic root replacement (3 cases), and interposition graft to the ascending aorta plus aortic valve replacement (3 cases). Demographic details for individual patients are shown in Table 1. The mean age was 63 years (15); 6 were elective cases and 2 were urgent cases.

In 6 patients, PGI was associated with sternal wound sepsis. Of these 6 patients, 5 with sternal wound involvement underwent surgical reexploration, extensive debridement of necrotic tissue within the mediastinum, mediastinal irrigation with dilute Povidine iodine, and sternal reconstruction. All survived. One patient with sternal wound sepsis was treated conservatively. This patient underwent an aortic valve replacement and replacement of the ascending aorta for an intraoperative ascending aortic dissection. A methicillin-resistant *Staphylococcus aureus* PGI developed in the patient, which was complicated by a pseudoaneurysm of the proximal aortic anastomotic suture line. She died 27 days after the initial surgery.

TABLE 1. Demographic features of the cohort

Patient	Age	Sex	Euroscore	Procedure	Priority	Redo	Circulatory arrest
1	80	M	10	AVR + CABG + composite root replacement	Elective	No	Yes
2	61	M	9	Aortic homograft root replacement	Emergency	Yes	No
3	71	M	10	AVR + CABG + composite root replacement	Elective	No	No
4	34	M	8	AVR + composite root replacement	Elective	No	No
5	70	F	10	Aortic arch replacement	Elective	No	Yes
6	49	M	13	AVR + interposition graft	Elective	Yes	No
7	73	F	10	AVR + interposition graft	Elective	Yes	No
8	66	M	8	Hemiarch replacement	Emergency	No	Yes

AVR, Aortic valve replacement; *CABG*, coronary artery bypass graft.

TABLE 2. Outcome of the cohort

Patient No.	Days from surgery to infection	Pathogen	Sternal wound involvement	Operative procedure	ICU stay	Hospital stay	Outcome
1	10	*Staphylococcus aureus*	Yes	Mediastinal debridement	4	38	Survived
2	6	Enterobacter D species	Yes	Mediastinal debridement	26	53	Survived
3	8	Coagulase-negative *S. aureus*	Yes	Mediastinal debridement	5	23	Survived
4	30	*Candida albicans*	No	Redo aortic root replacement	2	11	Survived
5	10	*C. albicans*	No	Nonoperative	74	74	Died
6	12	*S. aureus*	Yes	Mediastinal debridement	3	8	Survived
7	9	Methicillin-resistant *S. aureus*	Yes	Nonoperative	11	27	Died
8	26	Coagulase-negative *S. aureus*	Yes	Mediastinal debridement	32	76	Survived

ICU, Intensive care unit.

Two patients had infection of aortic graft prosthesis without sternal wound involvement. One patient had Marfan syndrome and had originally undergone a composite aortic root replacement with a mechanical valve conduit. He presented 28 days after surgery with a *Candida albicans* PGI. This was complicated by false aneurysm of the ascending aorta. This patient underwent a successful redo aortic root replacement with a composite porcine xenograft.

The second patient underwent a composite aortic root replacement plus partial replacement of the aortic arch. She presented weeks after surgery with *C. albicans* PGI. It was elected to treat her conservatively with antifungal agents. She died of multiorgan failure secondary to mediastinal sepsis 10 weeks after the initial operation.

The median intensive therapy unit stay was 8 days (range 3–74 days). The median survival for the 6 patients discharged from the hospital was 5.8 years (range 0.25–7 years). There was 1 late death 6 years after the procedure. No patient had recurrence of sepsis affecting either the wound or the aortic prosthesis (Table 2).

Discussion

PGI after aortic reconstruction represents a difficult problem to mange. Redo surgery is technically challenging and mortality rates remain high, up to 42% even with an aggressive surgical strategy.[1,2]

In this report we showed that the incidence of PGI after surgery of the thoracic aorta is low (2%) and mostly related to sternal wound sepsis. When associated with sternal wound sepsis, a limited surgical strategy involving extensive mediastinal debridement and mediastinal irrigation resulted in a good outcome in the majority of cases. Removal of the infective prosthesis was not required. Cases in which the graft was infected without sternal wound involvement were unusual. In these cases, removal of the infected prosthesis and reconstruction of the aorta are recommended. In all cases, the best outcome was achieved with prompt surgery.

References

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