

SURGICAL MANAGEMENT AND BACTERIOLOGICAL OUTCOME OF INFRARENAL ABDOMINAL AORTIC GRAFT INFECTION AT A SINGLE CENTRE

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Abstract

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Aim:

Primary outcome measures was to analyze the clinical consequence of patients who treated for infrarenal aorta synthetic graft infection (SGI) with extra-anatomical bypass (axillobifemoral (AXF)) or in situ reconstruction (ISR). Secondary outcome measure was to show bacteriological analysis of abdominal aorta graft infection.

Method:

Analysis of medical records of 24 patients treated for SGI at Jordanian Royal Medical Services between June 2010 and Aug 2020 were retrospectively reviewed. For all patients, we recorded clinical features , morbidity and mortality , as well as bacteriology results, and antibiotic treatment .

Result:

We identified 24(3%) patients with SGI .The median follow up duration was 22 months range (8-84months). The median age was 52 years and 18 were males. An in situ prosthetic graft replacement, using rifampin-soaked polyester graft was performed in 10 patients(42%) and AXF in 14 patients((58%). The early hospital mortality rate was 4 (17 %.) owing to bowel ischemia 1 patient, 2 patients with septicemia and one patient with aortic stump blowout . There were no late procedure-related deaths during follow up period Primary patency and limb salvage rates at 3 years were 80 %(2 patients) for ISR and 90%(2 patients) for AXF. The incidence of graft reinfection was 10% (1 patient) for ISR and 8 %(2 patients) for AXF. . Graft reinfection occurred in 3 patients (12.5%) was not associated with procedure-related death .Microbiology specimens obtained from the graft and the tissues were positive in 21 patients(88%). Poly microbial Gram-positive organisms were the most dominant bacteria found in 10 patients (42%). The mean length of hospital stay was 17 days .

Conclusion

According to our study ISR and AXF is a safe and effective in treatment of aortic graft infection. Graft reinfection occurred in 12.5% of the patients. The graft patency and limb salvages rates were considered satisfactory.

Introduction

The incidence of infection involving a vascular graft varies; infection occurs after 0.2% to 5% of operations and is affected by the implant site, indication for surgery, clinical history of the patient, and host defense mechanisms. the risk of infection is increased with emergency, extended-length, and reoperative reconstructions. (1) .

Infection of an aortobifemoral graft (ABFG) carries a mortality of 15% to 72% with an 11% to 27% rate of limb loss. (2) Traditional management of ABFG infection includes removal of graft with extra-anatomic bypass or complete

graft excision followed by in-situ aortic reconstruction with antibiotic-soaked synthetic graft, harvested femoral vein reconstruction to create new aorto-iliac system (NAIS), or cryopreserved allograft.(3-5). We began to use in situ Rifampin-soaked graft replacement in 2001.

The purpose of this study was to analyze the clinical outcome in patients treated with axillofemoral reconstruction (AXFR) and in situ prosthetic reconstruction (ISR) for aortic graft infections .

Methods

We identified 24 patients treated for aortic graft infection at Jordanian Royal Medical Services (JRMS) between June 2010 and Aug 2020. Data on symptoms, treatment options, and outcome were retrospectively obtained from the medical records. Patient demographics and clinical issues are listed in(Table 1). The study was approved by the JRMS Ethics Committees.

Treatment was excision of the infected graft and soft tissue debridement with AXF in 14, prosthetic ISR in 10 patients. grafts material were either polytetrafluoroethylene (PTFE) or antibiotic-soaked synthetic Dacron graft. patients with other methods of treatment like NAIS and conservative medical management were excluded from this study.patients with aortoenteric fistula , Mycotic aortic aneurysm and infected aortic stent treated by endovascular graft ,descending aorta or suprarenal graft infection were excluded also. Initial aortic reconstruction was for Aneurysmal disease and Occlusive disease either end to end anastomosis or end to side anastomosis of infrarenal aorta.

All patients diagnosed by ultrasound or computed tomography(CT) and microbiological finding, some patients underwent endoscopic examination..management of suspected graft infection was empirical treatment with antibiotics (ABs) coverage for both gram-positive and gram-negative organisms . The bacterial strains were isolated from wound discharges and pus collection perigraft fluid and blood, identified with a VITEK2 ID/AST Testing System (BioMerieux, UA).

Patient's characteristics were summarized using descriptive statistics analysis count and percentage for categorical variables. Results of continuous variables were given as mean and standard deviation. All statistical analyses were performed with the PASW Statistics ver. software (IBM Co, USA)

Result

24(3%) patients had Infection of infrarenal aortic grafts . The mean age \pm SD of the patients was 52 ± 20 (range 44-72 years). The median follow up duration was 22 months range (8-84 months).18 (75%) patients were males.

The clinical presentation varied from patient to patient, but, most patients presented with abdominal and low back pain, fever of unknown origin, cellulitis or cutaneous draining sinus tract at groin area . Graft infection occurred at a mean of 4.5 years following initial implantation.

The primary diagnostic test was ultrasound and CT scan .90% of patients have fat stranding and . purulence collection around the graft, the rest of patients have groin cellulitis or cutaneous draining sinus.

The microbiological analysis yield polymicrobial (42%) infection in 10 patients. The monomicrobial infections were typically due to gram positive species isolated from 7 patients (29%) mainly coagulase-negative Staphylococcus,methicillin-resistant ,Staphylococcus aureus, Streptococcus viridans and Enterococcus. Gram negative organisms were cultured in 4 patients (17%) with Enterobacter species , Klebsiella and Escherichia coli being most bacteria were isolated . Patients were treated with perioperative intravenous and life-long oral antibiotic .

All infected grafts were excised unless the main body of the graft is incorporated in this case we anastomosed the new graft to the main body in case of in situ bypass .The old infected aortic grafts were consisted of 6 aortobi-iliac grafts, 2 aorto-aortic grafts, and aortobifemoral in 16 patients. all ISR grafts conduit were polyester . this grafts soaked in Rifampin solution for 30 minutes. Usually we do Omental coverage of the aortic graft to cover the aortic

anastomosis and to separate the graft from the intestens. we performed in patients AXF using PTFE grafts or polyester in 14 patients with double layers oversewing of the aortic stump.

The early hospital mortality rate (first 3 months) was 4 (17 %). one patient died owing to bowel ischemia, bowel resection was done but unfortunately he died after few days, 2 patients died owing to septicemia both are immunocompromised(one patient on hemodialysis and the second had uncontrolled blood glucose),the fourth patient died due to aortic stump blowout. There were no late procedure-related deaths during study period. The mean length of hospital stay was 17±10 days.

Primary patency and limb salvage rates at 3 years were 80 % (2 patients) for ISR and 90% (2 patients) for AXF. Patients with AXF underwent graft limb thrombectomy with excellent result , one patient with ISR underwent femoro-femoral cross over the second patient underwent graft thrombectomy with femoro-popliteal bypass .

The incidence of graft reinfection was 10% (1 patient) for ISR and 8 %(2 patients) for AXF Graft reinfection occurred in 3 patients within first 2 years (12.5%) was not associated with procedure-related death. Infection was limited to the femoral limb in the groin they were treated by partial graft excision and saphenous vein by pass in patient with ISR . One patient with infected axillobifem graft partially replaced by omniflow biosynthetic graft but unfortunately he underwent amputation due to bad outflow .

Discussion

The main issues in managing vascular graft infections involve initial and long-term eradication of septic process and preservation of normal arterial perfusion to organs and limb tissues. Many approaches have been advocated; use of in situ replacement modalities or conventional (total graft excision and extra-anatomic) and, occasionally, graft preservation techniques. (1-6)

Selection criteria for specific treatment modalities are based primarily on the clinical findings, extent of graft involvement, and microbiology(1). Several general treatment tenets are imperative. Our group has advocated a patient-specific treatment according to patients' clinical picture and surgeons preference.

Antibiotic impregnated graft can decrease the incidence of graft colonization and decrease the risk of reinfection (7). We use of Rifampin-soaked grafts which have safe, durable and effective option (8). We did not report amputations, conduit failures or early mortalities related to use of antibiotic soaked graft but other studies showed reinfection was worst for rifampicin-bonded prostheses (9).

Nowadays, inline replacement over extra-anatomic reconstruction is more favorable (10-12). Whatever the conduit to be used; femoral vein or synthetic graft They have their own unique set of conduit-specific complications. using rifampin-soaked Dacron grafts is associated with a recurrent infection rate of up to 17%, with low overall mortality (10). We had 10% rate of reinfection. However, the infection was limited to the groin and replaced by saphenous vein and Sartorius muscle flap with good outcome. we did not observe proximal graft infection.at our center, in situ reconstruction may have more preferable for patients whose proximal aortic graft anastomoses are near the renal arteries or who have aneurysmal aorta at anastomosis site to decrease the risk of aorta blow out but in general, it depends on patient co-morbidities and hemodynamic status of the patient. surgeons at our center preferably nowadays doing ISR using silver or rifampin impregnated grafts, we did scattered cases of NAIS using femoro-popliteal veins but the result not included in this study

Patients with perigraft abscess preferable underwent AXF. The risks of this procedure include aortic stump blow out and the risk graft occlusion compared to an in situ graft (13). amputation rate is by extraanatomical bypass range between 10% to 25% and reinfection in axillobifemoral bypass can be seen in 3% to 25% (14). amputation rate was 7% and Graft patency and limb salvage rate were 90% of patients in our series underwent AXF. In case of severely infected surgical field and the surgeon worries about reinfection this makes AXF a valid option.

The results of cultures of infected tissue obtained during work up were negative in 12% of the patients in this cohort. Other studies have showed negative biopsies and culture results in 20%–30% of cases (8,15) We think the culture was negative as a result of the preoperative administration of antibiotics. We have routinely administered cephalosporin antibiotic perioperative because of its broad-spectrum activity. We impregnate the synthetic graft with rifampin before the implantation. Rifampin usually is considered a broad-spectrum antibiotic and has activity against most bacteria (1,8,16). By local administration, we amplify the transfer of the antibiotic to the infected perigraft tissues to protect the graft from any colonization of microorganisms. We think it is an important strategy to decrease the risk of reinfection beside systemic antibiotic.

With respect to the different surgical options, mortality and morbidity of patients, our results are comparable with publications of other substitutes. Oderich et al (17), reported major complications or procedurally related deaths in 60% of patients undergoing axillofemoral bypass. Batt et al,(18) reported that in situ reconstruction with antibiotic-coated polyester grafts 37.5% of patients required early or late intervention due to graft reinfection. To allow for better comparison with the literature we need big number of patients. . Nevertheless, subclinical persistent SGI during the period of follow up cannot be assuredly excluded. We do not do radioisotope scan, laboratory, or imaging if the patients are asymptomatic during our surveillance protocol.

Our study has a number of limitations. First, a single-centre study retrospective in nature makes it vulnerable to collection bias Second, owing to a small sample size and events, we could not do comparative analysis to get meaningful comparison. Despite these limitations, our study showed the most important clinical events, highlights our protocol of management and outcome of PGI.

Conclusion

Aortic grafts infection can develop from various causes and organisms. The treatment of infected aneurysms consists of surgical debridement of the infected field, revascularization, and prolonged antibiotic therapy. Revascularization can be performed safely either by in situ repair or extra-anatomical bypass, followed by aggressive prolonged antibiotic therapy.

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