SHORT REPORT

Drainage Surgery Followed by Postoperative Irrigation with Gentian Violet for Prosthetic Graft Infection Caused by Methicillin-resistant Staphylococcus aureus

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Abstract
Introduction: Infection of a prosthetic graft is still associated with considerable morbidity and mortality. Conventionally, this vascular complication is treated by excising the infected graft, although prosthetic graft preservation is possible in selected cases.
Report: We report the successful treatment of prosthetic graft infection caused by methicillin-resistant Staphylococcus aureus (MRSA) in three patients, by performing drainage surgery with postoperative irrigation using gentian violet.
Discussion: The combination of drainage surgery and irrigation with gentian violet solution provides an alternative option to graft excision for prosthetic graft infection.

Prosthetic graft infection is a rare complication of bypass procedures. However, its mortality rate is up to 50%. Despite advances in antibiotic therapy, the critical issue appears to be the inability to control infection in the presence of prosthetic material.

We report three cases of prosthetic graft infection. As patients were in poor general health, we performed drainage surgery followed by postoperative irrigation with gentian violet (GV), instead of excising the infected graft.

Report

Case 1

A 79-year-old man underwent aortofemoral bypass surgery for pseudo-aneurysm at the proximal anastomosis of the iliofemoral bypass graft. He was readmitted 3 months later...
with a high-grade fever. The white blood cell (WBC) count was 8300 mm$^{-3}$ and the C-reactive protein (CRP) level was 11.24 mgd l$^{-1}$. Hybrid positron emission tomography (PET) and computed tomography (CT) using fluorodeoxyglucose (FDG) showed increased FDG uptake (maximum standardised uptake value (SUV max) 7.7) around the prosthetic graft (Fig. 1(a)). We performed drainage surgery, as he was in poor health due to lung carcinoma. At the operation, there was purulent discharge around the graft, and culture of the drained fluid yielded methicillin-resistant Staphylococcus aureus (MRSA). Postoperatively, he was given vancomycin (VCM) intravenously, and the graft and the drainage cavity were irrigated with 0.02% GV solution, 500 ml/time, once every day, through the drainage tube. By postoperative day (POD) 28, laboratory findings were better, being within the normal range; hence, we finished the irrigation therapy, and FDG uptake became down (SUV max 2.7) (Fig. 1(b)), without wound dehiscence. Four months later, he died due to lung carcinoma.

Case 2

An 88-year-old man with foot ulceration underwent iliofemoral bypass surgery. On POD 22, CT revealed a retroperitoneal fluid collection around the graft. On POD 55, because of high-grade fever, he was commenced on intravenous imipenem/cilastatin sodium for 5 days; after that, VCM for 4 days. However, on POD 63, the WBC count was 46,200 mm$^{-3}$ and the CRP level was 18.3 mgd l$^{-1}$. Because of septic shock, we performed surgical drainage. At the operation, there was purulent discharge around the graft. Postoperatively, the retroperitoneum was irrigated with GV, 500 ml/time, once a day, and he was given VCM intravenously for 20 days. By POD 14, laboratory findings had decreased to within the normal range; therefore, we finished the irrigation. On POD 33, CT showed no fluid collection around the graft. He had no signs of infection for 6 months after the drainage surgery, and CRP level was within the normal range.

Case 3

A 65-year-old man on haemodialysis underwent two operations, including aneurysmectomy for infrarenal abdominal aortic aneurysm (AAA) with Y graft replacement, and aneurysmectomy for suprarenal AAA with tube-graft replacement with coeliac, supramesenteric and bilateral renal arteries reconstructions. The expanded polytetrafluoroethylene graft for haemodialysis was infected with MRSA after the last operation, so we excised the infected graft. Five months later, he was admitted to another hospital with a high-grade fever. As prosthetic graft infection of reconstruction surgery was suspected, the patient was commenced on intravenous VCM and referred to our hospital for evaluation and treatment. FDG PET/CT showed increased FDG uptake (SUV max 7.7) around the graft (Fig. 2). Because removal surgery of the complicated graft was impossible, we performed drainage surgery. After that, the cavity around the graft was irrigated with GV, 500 ml/time, once a day. On POD 33, laboratory findings had decreased to within the normal range, hence we finished the irrigation. He had no signs of infection for 15 months after the drainage surgery.

Discussion

Complete or partial graft preservation is an option when conventional treatment requiring total graft excision is precluded because of severe health condition.2

Figure 1 a: Preoperative fluorodeoxyglucose (FDG) positron emission tomography and computed tomography (PET/CT) showed focal abnormal FDG uptake localized in the prosthetic graft. b: Postoperative PET/CT showed low FDG uptake localized around the prosthetic graft.

Figure 2 Fluorodeoxyglucose (FDG) positron emission tomography and computed tomography (PET/CT) showed localization of the abnormal FDG uptake in the prosthetic graft.
We used GV for our graft infection cases because it is highly effective against some Gram-positive cocci, including MRSA. Furthermore, it is clinically recognised to be safe for medical use. For these reasons, GV is preferable to povidone iodine, which is disadvantaged by the need for high concentrations and toxicity. It has been used in various fields, for example, mediastinitis in thoracic surgery. However, to our knowledge, there is no report of GV being used against prosthetic graft infection in the field of vascular surgery.

In conclusion, for MRSA infections, GV can be used before surgery.

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References