given instead. Various factors had to be given to normalize clotting, and the patient also received 10,000 IE erypo (JANSSENCILAG Pharma, Vienna, Austria) daily. Unfortunately, direct damage of the spinal cord at the level of the 10th thoracic vertebra resulted in complete paraplegia. The patient was extubated on postoperative day 3 and transferred to his home town on day 7.

Discussion

Impalement injuries usually occur at construction sites or in motor vehicle crashes or are caused by falling objects. It is crucial to leave the impaling object in situ and remove it under controlled conditions in the hospital. Careful extraction with minimal movement of the impaling object prevents further tissue damage and blood loss. Therefore, most authors advise removal under direct vision.1,3

In our case a computed tomographic scan revealed a bilateral hematothorax. Chest tubes were inserted to drain both sides, and 1.5 L of blood was removed from the left side within a few minutes. The patient was immediately taken to the operating room with the aim of controlling bleeding and removing the iron rods from the left thoracic cavity under direct vision. The situation was rendered even more dramatic because the patient had refused to receive blood under any circumstances. The rapid loss of more than 40% of blood volume is usually life-threatening.4 For acutely anemic patients, the American Society of Anesthesiologists Task Force on Blood Component Therapy has advised that transfusion is almost always indicated when hemoglobin concentration decreases to less than 6 g/dL.5

Our patient, however, survived a much lower concentration without organ damage apart from paraplegia caused by one of the impaling rods. His survival is certainly not a common clinical experience.

The lesson we learned from this case is that an otherwise healthy subject can tolerate the loss of more blood than is commonly believed.

Rapid assessment of the injury with careful hemostasis after removal of the impaling objects under direct vision together with appropriate fluid replacement was able to save a patient with an extremely unusual and severe impalement injury.

References


Reimplantation of a left internal thoracic artery during repeat coronary artery revascularization: Early and midterm results

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W hen used as an aorta-coronary bypass graft, the left internal thoracic artery (LITA) might remain open, despite significant restriction of flow through the graft. Potentially, a patent but nonfunctioning LITA might be reharvested and reused for repeat coronary artery bypass surgery (so-called LITA recycling). We report on our experience with successful reimplantation of the LITA during redo bypass surgery in 12 patients.

Patients and Methods

Between 1997 and 2003, the LITA was reharvested and reinserted in 12 patients undergoing repeat coronary artery bypass grafting. There were 3 women and 9 men. The mean ± SD age of the patients was 64 ± 7 years (range, 53-74 years). Written informed consent was obtained from all patients. The patients’ mean left ventricular ejection fraction was 38% ± 16% (range, 25%-60%). The patent but nonfunctioning LITA was reused only if preoperative coronary angiography showed that the diameter of the LITA lumen was normal or almost normal. This was assessed by the respective surgeon according to his experience, and he considered it to be feasible.

The causes of LITA dysfunction were anastomotic problems in 7 patients and progression of atherosclerotic disease of the native vessel distal to the previous anastomosis in 5 patients. Stenosis of the anastomosis between the LITA and the left anterior descending coronary artery (LAD; Figure 1) was found in 5 patients and...
between the LITA and another vessel in 2 patients. Two patients had minimally invasive bypass grafting (off pump) in another institution and were referred to our hospital for redo operations. Reimplantation of the LITA was performed 6 months to 11 years (mean, 4.3 ± 3 years) after the first operation. In 7 patients with anastomotic problems, the interval between the first LITA implantation and LITA reimplantation ranged between 6 months and 6.6 years (mean, 2.6 ± 2.3 years). In 5 patients with distal progression of the atherosclerotic process in the native coronary artery, the interval was between 2.1 and 11 years (mean, 6.5 ± 2.8 years).

During the operation, the LITA graft was identified and carefully dissected, retaining its original pedicle. To gain more length of the LITA pedicle, the LITA was always additionally dissected proximally toward its origin. In 8 patients the LITA was then directly reinserted into the distal LAD (Figure 2). In 4 patients the LITA graft was assessed as still too short, and additionally, it was either skeletonized (in 1 patient) or prolonged with a short (2-4 cm) segment of the greater saphenous vein (in 3 patients) before reimplantation into the distal LAD. The LITA graft was reimplanted during redo coronary artery bypass surgery as a single bypass in 3 patients, in combination with mitral valve reconstruction in 1 patient, and in combinations with mitral valve replacement in 1 patient. The procedures were performed either conventionally by using cardiopulmonary bypass with mild hypothermia (32°C) or as a minimally invasive procedure on the beating heart without cardiopulmonary bypass (off pump). There were no technical problems during the operations, and the postoperative course was uneventful in all patients. The mean follow-up after surgical intervention was 4.4 ± 2.4 years (range, 4 months to 7 years). Coronary artery angiographic examination was performed in 10 patients postoperatively. Two patients refused angiography because they had no symptoms. The examinations demonstrated patent LITA grafts with excellent flow in all patients. No stenosis was found in any reused LITA graft.

Discussion
The reimplantation of a patent but nonfunctioning LITA graft is an infrequent clinical situation for which no evidence-based therapeutic strategy is established. Our experience shows that the reuse of a patent but nonfunctioning LITA graft is a feasible, safe, and effective option in selected situations. There was no early mortality, and the midterm postoperative results were excellent.

The incidence of the patent but nonfunctional LITA is very low because the LITA has the best patency among all bypass grafts for coronary artery revascularization. There are only exceptional reports on the reimplantation of a LITA graft during repeat coronary artery bypass revascularization and only in few patients.\textsuperscript{1-6} Although our experience includes only 12 patients, it represents the worldwide largest experience in dealing with reuse of the LITA. The results are favorable and encourage further use of such patent but nonfunctional arterial grafts. Therefore, we suggest that the reimplantation of the LITA graft should be used in ideal circumstances.
Open-window thoracostomy and microvascular muscle flap for severe intrathoracic infection around aortic prosthetic graft

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A 74-year-old male patient was transferred to our institute with a history of persistent fever after 6 weeks’ antibiotic treatment for mycotic aortic aneurysm. Imaging study revealed multiple ruptures of the descending aorta, with pseudoaneurysm formation and marked inflammation (Figure 1, A). Blood culture yielded group D Salmonella species. Surgical debridement and replacement of the descending aorta from the high thoracic level to the level of the 10th intercostal artery with a knitted double-velour graft (Hemashield; Boston Scientific Corp, Natick, Mass) was performed under cardiopulmonary bypass and temporary hypothermic circulatory arrest through a lateral thoracotomy. Unfortunately, fever relapsed 10 days after the operation despite continuous antibiotic use. Three weeks postoperatively, follow-up computed tomography revealed severe periprosthetic abscess accumulation (Figure 1, B). Because the medical treatment appeared ineffective, we designed a 2-stage surgical procedure to control the infection.

Meticulous debridement of necrotic and infected tissue was performed through the previous thoracotomy. After partial resection of 2 ribs, an open-window thoracostomy was created by using the Eloesser flap technique (Figure 2). The aortic prosthetic graft was exposed in the thoracostomy cavity, which was later filled with iodine-soaked pads. The dressing was changed every 8 hours at bedside, and the patient’s fever gradually subsided. Two weeks later, when the local condition of the thoracostomy cavity appeared much improved, further infection control and obliteration of the cavity were achieved with a 25 × 12 × 6-cm free vastus lateralis muscle flap harvested from his left thigh. The flap survived well, and the patient was discharged in stable condition 3 months after the initial operation (Figure 1, C, and 2, B). At 6 months of outpatient follow-up, the patient was well and without recurrence of intrathoracic infection with long-term oral antibiotics.

Discussion

Open-window thoracostomy is a well-established procedure for chronic empyema and other refractory intrathoracic infections. The subsequent large thoracic cavity might require microvascular muscle flap transfer.1 Whether this 2-stage surgical procedure can be used safely and effectively in patients with periprosthetic infection after surgical treatment of mycotic aortic aneurysm has not been described before. The presented case demonstrated its successful application in the management of severe intrathoracic infection around the aortic prosthetic graft.

Mycotic aortic aneurysm was reported to have a high operative and follow-up mortality rate, especially in patients presenting with ruptures of the aorta.2 Although recurrent infections are not uncommon, immediate surgical debridement and in situ grafting was considered the only treatment option for this patient because of his uncontrollable infection3 and the proximity of the ruptures to the aortic arch.4

For management of aortic prosthetic graft infection, several methods were reported in the literature, including in situ homograft replacement and extra-anatomic grafting.5 Because the aortic graft is in the vicinity of the aortic arch in this case, replacement of the infected graft necessitates another major operation with cardiopulmonary bypass and circulatory arrest, which could be devastating considering the patient’s unfavorable clinical condition. Therefore, we applied the