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Clinical Research

Open Surgical Repair for Inflammatory Abdominal Aortic and Iliac Artery Aneurysms

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Background: This study was performed to investigate the outcomes of surgical treatment for inflammatory abdominal aortic aneurysms (IAAAs) and inflammatory iliac artery aneurysms (IIAAs).

Methods: We retrospectively reviewed the charts of patients who underwent open surgical repair (OSR) between January 2000 and June 2013.

Results: Nine male and 2 female patients (median age, 67 years) were treated. Five of the 11 patients who underwent OSR developed hydronephrosis, and ureteral stents were placed preoperatively. There were no intraoperative complications during OSR. After OSR, the conditions of 4 of 5 patients with preoperative hydronephrosis improved. During the follow-up period with a mean of 51 months (range, 6–120 months), 2 patients with OSR developed aneurysmal changes at the anastomosis site (84 and 21 postoperative months, respectively), and reintervention for both patients was needed. One patient died because of malignant disease at 96 months postoperatively.

Conclusions: OSR can be safely performed for IAAAs and IIAAs. When an inflammatory aneurysm, especially an IIAA, is complicated by hydronephrosis, OSR might be an effective treatment procedure.

INTRODUCTION

Inflammatory abdominal aortic aneurysms (IAAAs) comprise a minor subgroup of the total number of abdominal aortic aneurysms, with an incidence ranging from 2.2% to 18.1% in published data.[1] In 1972, Walker et al.[2] reported a series of 19 patients who had abdominal aortic aneurysms and retroperitoneal fibrosis. They were the first to use the term ''inflammatory aneurysms,'' which was described as a white glistening fibrotic surface with a thickened aneurysmal wall. The inflammatory reactions often involve the surrounding organs, such as the ureters, duodenum, or vena cava.[3,4]

Although IAAAs have been traditionally treated by conventional open surgical repair (OSR), the associated inflammatory reaction leads to significant adhesion formation within the retroperitoneum which thus increases the morbidity of OSR.[5] Recently, it has been demonstrated that endovascular aneurysm repair (EVAR) could offer some advantages in the treatment of IAAAs. Some groups have reported favorable perioperative morbidity and mortality rates for EVAR compared to OSR.[6,7] It is, however, unclear whether EVAR has similar benefits to OSR in patients with IAAAs, and the long-term durability has not yet been verified. Furthermore, EVAR procedures for IAAAs are considered to be off-label use in Japan; therefore, we have attempted to treat IAAAs by OSR when possible.

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This study aimed to describe our experience with IAAAs and inflammatory iliac artery aneurysms (IIAAs) and evaluate the outcomes of OSR during a long-term follow-up period.

MATERIALS AND METHODS

Patient Selection

A retrospective review was performed on all consecutive patients with a diagnosis of IAAA and/or IIAA who underwent surgical treatment at Tokyo Medical and Dental University Hospital between January 2000 and June 2013. All patients provided their informed consent, and approval was obtained from our institutional review board for a retrospective review of the patients' medical records and images. The diagnosis of IAAA and/or IIAA was made according to the clinical signs, findings of computed tomography (CT), and intraoperative findings such as a thick, shiny white aneurysmal wall. The triad characteristics of IAAAs generally consist of abdominal/lower back pain, anorexia/weight loss, and inflammatory symptoms, such as an elevated body temperature.[2] To describe these findings objectively for the individual patients, we defined a fever as a body temperature >37.5°C and weight loss as that >5 kg/year. Furthermore, we evaluated C-reactive protein as increased levels might reflect inflammatory conditions. These clinical symptoms are similar to those of patients with infected aortic aneurysms,[8] and we excluded any patients with infectious etiologies from this study. CT scans showed the aneurysm and the thickened aortic wall, which is characterized as periaortic fibrosis (PAF). Data from the medical records were extracted to collect basic demographic information, preoperative symptoms, aneurysm size measurements, intraoperative details, perioperative complications, and the long-term imaging findings.

Surgical Management

All surgical procedures were performed under general anesthesia. Most patients underwent conventional OSR through a midline incision. In patients with hydronephrosis, some patients were treated by ureteral stent placement 2 or 3 days before OSR, and some underwent simultaneous stent placement and OSR. The stents assisted with the identification of the ureters intraoperatively. Furthermore, ureterolysis was performed in patients with ureteral stenting.

Postoperative Follow-up

We evaluated the postoperative complications and 30-day mortality. Preoperative CT scan was available for all patients. During the follow-up period, CT scanning was performed at 3, 6, and 12 months and then biannually after surgery. In the cases where the use of iodinated contrast medium was contraindicated, such as in patients with renal dysfunction, duplex scanning was performed following the same schedule as CT scanning. We investigated PAF, hydronephrosis, and aneurysmal change at anastomotic sites. PAF was measured as the maximum radial diameter from the aneurysm wall to the outermost edge of the inflammatory reaction.[9] We also evaluated the diameter of the aneurysm and graft patency. We defined the improvement of hydronephrosis as the resolution of hydronephrosis with an unobstructed drainage pattern with radiologic findings. During the follow-up period, we investigated the mortality and the aneurysm-related morbidity.

RESULTS

Patient Demographics

Eleven patients (9 men, 2 women) were treated for IAAA and/or IIAA with OSR. The median age at initial intervention was 67 years (range, 56–82 years). Most patients experienced symptoms of pain (9 of 11); however, 2 patients were asymptomatic. All patients were diagnosed to have IAAAs and/or IIAAs by CT scanning (Fig. 1A). The median abdominal aortic aneurysm diameter was 55 mm (range, 45–65 mm), and the median common iliac artery aneurysm diameter was 25 mm (range, 20–30 mm). Hydronephrosis was seen preoperatively in 5 patients, and all these patients underwent preoperative ureteral stent placement (Table I).

Intraoperative Management

Ten of the 11 patients were treated by replacement of the aneurysm with a prosthetic Y-shaped graft, whereas the other patient with an isolated inflammatory internal iliac artery aneurysm underwent aneurysmorrhaphy and straight bypass grafting between the common iliac artery and external iliac artery. Two of the 11 cases were juxtarenal aortic aneurysms and required suprarenal cross clamping. One patient (case 4) underwent left renal artery reconstruction, and the other patient (case 8) underwent graft replacement with proximal anastomosis just below the renal arteries. In the 5 cases