

## Surgical Treatment for Abdominal Aortic Aneurysm in a Patient with Urinary Diversion

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**In two cases of abdominal aortic aneurysm (AAA) with urinary diversion after radical cystectomy, surgical aneurysm repair was successfully performed. Based on comprehensive preoperative examinations, the surgical strategy for aneurysm should be carefully planned so as not to injure diverted ureters. (Ann Thorac Cardiovasc Surg 2005; 11: 214–6)**

**Key words:** abdominal aortic aneurysm, urinary diversion, ileal conduit, ureterocutaneostomy

### Introduction

Recently, operation for abdominal aortic aneurysm (AAA) has become common even in the patients having had radical operation for malignant abdominal tumors.<sup>1)</sup> However, in patients with urinary diversion, care must be taken not to injure the ureter, because it often crosses over the aneurysmal artery. We present two cases of successful surgical repair for AAA with radical cystectomy with urinary diversion.

### Case Report

**Case 1:** A 70-year-old man was referred to our hospital with diagnosis of AAA. He had undergone a radical cystectomy with ileal conduit in the right lower abdominal quadrant for bladder carcinoma 18 years previously. His computed tomography (Fig. 1A) showed AAA of 60 mm in maximum diameter with a daughter aneurysm of the infrarenal aorta. At the late phase, his aortography revealed the diverted left-side ureter crossing over the left and right common iliac arteries (Fig. 1B). At operation, a left pararectal transperitoneal approach (Fig. 1C) was employed because of the presence of urinary diversion and

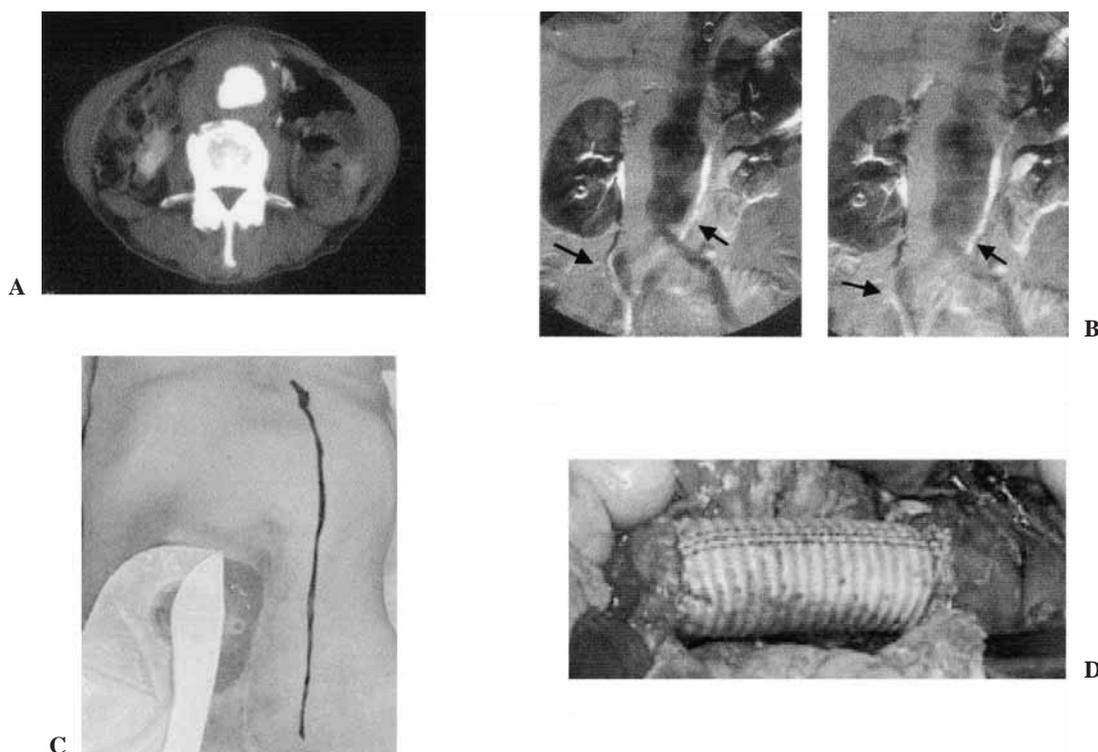
cicatrical adhesion in the left retroperitoneal space. The aneurysm, including the daughter one, was replaced with a straight woven Dacron graft of 18 mm in diameter without damaging the diverted ureter (Fig. 1D). His postoperative course was uneventful, and he is alive and well three years after the surgery.

**Case 2:** A 80-year-old man complained of severe back pain and had a pulse rate of 90/min and a blood pressure of 150/80 mmHg; he was referred to our hospital with a diagnosis of an impending rupture of AAA. He had undergone a radical cystectomy with single-stoma ureterocutaneostomy in the right lower abdominal quadrant for bladder carcinoma six months previously. At that time, AAA had been left *in situ*, because it was shown to be 34 mm in maximum diameter. On admission, his abdominal echography showed a remarkable enlargement of AAA. After insertion of the J-wire catheters into the respective ureters under fluoroscopy, his computed tomography (Fig. 2A) showed AAA of 70 mm at the maximum diameter and the diverted left-side ureter crossing over the aneurysm. The emergency operation was performed through a left pararectal transperitoneal approach (Fig. 2B). The diverted left-side ureter was identified and marked using digital palpation and intraoperative fluoroscopy without dissection (Fig. 2C). The aneurysm was opened longitudinally, avoiding the marked wall, and was replaced with a straight woven Dacron graft of 20 mm in diameter tunnelled under the marked wall (Fig. 2D). His postoperative course was uneventful, and J-wires were removed two weeks after surgery. One year later, he is leading an active life.

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**Fig. 1.** **A:** Enhanced computed tomogram shows abdominal aortic aneurysm. **B:** Aortograms show the diverted left-side ureter (arrows) crossing over the left and right common iliac arteries at the late phase. **C:** A left pararectal transperitoneal approach. **D:** The aneurysm was replaced with a straight graft without damaging the diverted ureter.

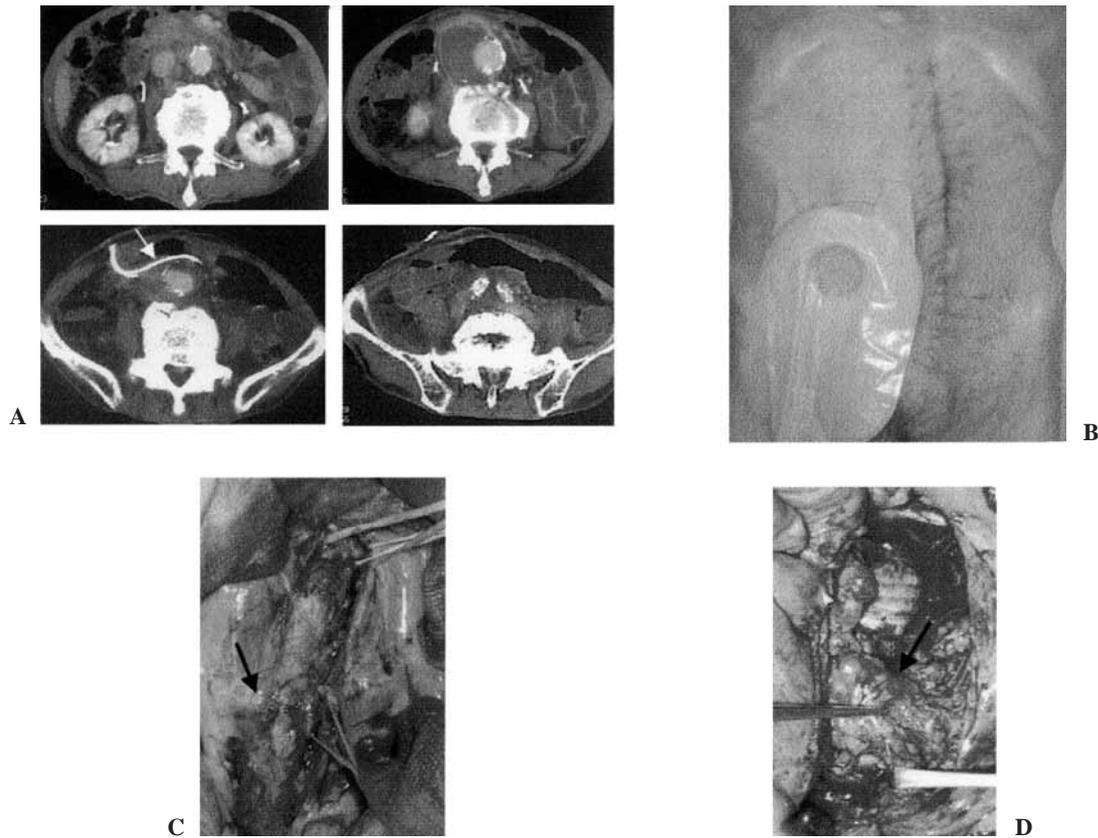
## Discussion

The frequency of both AAA and visceral malignant disease increases with advancing age. Malignancy has been reported in up to 12.7% of patients with AAA,<sup>2)</sup> and the incidence rate of concomitant AAA and carcinoma of the bladder was 3% in the recent literature.<sup>3)</sup> Simultaneous cystectomy, urinary diversion and aneurysm repair would be a difficult procedure with the potential for graft infection from spilled bowel contents and urine.<sup>3)</sup> In a staged operation, initial tumor resection may risk aneurysm enlargement leading to rupture reportedly due to the high rate of collagen turnover after major operations.<sup>4,5)</sup> In addition, subsequent aneurysm repair may also risk ureteral or bowel injury because of the presence of urinary diversion and cicatricial obliteration or vascular compromise.<sup>3,6)</sup> In fact in the present report in case 2, AAA had shown a rapid enlargement from 34 mm to 70 mm in diameter within six months of the radical cystectomy, and the diverted left-side ureter crossed over the aneurysm. This suggests that even such a concomitant small aneurysm should have been surgically treated simultaneously, because mortality and morbidity rates have been compared

with control matched patients undergoing surgery for either AAA or bladder carcinoma as individual procedures.<sup>3,7)</sup>

Regarding AAA repair after radical cystectomy in a staged operation, the retroperitoneal approach could have the advantage of being better tolerated by the patients, with avoidance of the risks of intraperitoneal adhesions. However, because of retroperitoneal fibrosis and possible adhesions between the aneurysmal wall and diverted ureters, access to aneurysm and common iliac vessels could prove equally treacherous.<sup>3)</sup> Therefore, in both of the present cases, a pararectal transperitoneal approach was employed on the opposite side of the ureter conduit, on condition that the course of diverted ureters was identified preoperatively. Especially in case 2, J-wire catheters were inserted into the respective ureters to use as an intraoperative landmark, because the diverted left-side ureter crossed over the aneurysm.

In these patients with urinary diversion and cicatricial obliteration, endovascular treatment represents an appealing alternative.<sup>3)</sup> Unfortunately, not all aneurysms are anatomically suitable for endovascular repair, and despite the improvements of second-generation devices, the in-



**Fig. 2.** **A:** Enhanced computed tomograms show an enlarged abdominal aortic aneurysm and the diverted left-side ureter (arrow) crossing over it. **B:** A left pararectal transperitoneal approach. **C:** The aneurysmal wall including the diverted left-side ureter was identified and marked (arrow). **D:** The aneurysm was replaced with a straight graft tunneled under the marked wall (arrow).

idence rate of graft failure is still significantly higher in endovascular compared with open AAA treatment.<sup>8)</sup> However, when anatomic characteristics are suitable and medical insurance covers such procedures in Japan, endovascular intervention will be a more fascinating treatment for these cases.

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