Renal autotransplantation in open surgical repair of suprarenal abdominal aortic aneurysm

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INTRODUCTION

Although the standard treatment of abdominal aortic aneurysm has shifted from open surgery to endovascular repair, open surgery has remained the standard of care for complex aneurysms involving the visceral arteries and in patients unsuitable for endovascular aneurysm repair. Postoperative renal insufficiency may occur after open surgical repair of suprarenal abdominal aortic aneurysm. Methods of minimizing renal ischemic injury include aortic cross-clamping and renal reconstruction techniques. This report describes the use of renal autotransplantation for renal reconstruction during open surgical repair of a suprarenal abdominal aortic aneurysm. This technique was successful, suggesting its feasibility for open suprarenal abdominal aortic aneurysm repair, minimizing renal ischemic injury and optimizing postoperative renal function.

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Key Words: Aorta, Aneurysm, Kidney, Transplantation

CASE REPORT

A 53-year-old man was admitted to Asan Medical Center with a diagnosis of asymptomatic suprarenal AAA. Except for hypertension, he had no other risk factors for atherosclerosis, and his medical and family histories were unremarkable. Preoperative contrast-enhanced CT showed a fusiform AAA...
extending from below the level of the superior mesenteric artery to both common iliac arteries, with a maximal diameter of 7.1 cm (Fig. 1). The relatively young age of this patient suggested the feasibility of OSR, rather than the fenestrated or chimney EVAR technique, with bilateral renal autotransplantations to avoid suprarenal aortic cross-clamping.

During OSR procedures, the left kidney was harvested first, with kidney preservation solution immediately infused for cold preservation. Cutting and side-to-side angioplasty were performed on the 8-shaped renal artery. About 20 minutes later, the right kidney was harvested and infused with kidney preservation solution. Side-to-side angioplasty of the two renal arteries was performed. Because of the exceptionally short right renal vein, renal vein extension with an autologous gonadal vein was performed as previously described [7]. Both upper polar renal arteries were sacrificed. The aneurysm was resected and a Y-graft interposition was performed using a polytetrafluoroethylene vascular prosthetic graft (GORE-TEX, W. L. Gore & Associates Inc., Newark, DE, USA) (Fig. 2). Both harvested kidneys were implanted using the standard method of retroperitoneal placement in the iliac fossa. Both renal arteries and veins were anastomosed to both external iliac arteries and veins, respectively, in an end-to-side fashion. The left kidney had a cold ischemia time of 210 minutes and a warm ischemia time of 30 minutes. 3 minutes for harvest and 27 for anastomosis. The right kidney had a cold ischemia time of 316 minutes and a warm ischemia time of 32 minutes. 2 minutes for harvest and 30 for anastomosis. Uretero-neocystostomy was performed using the standard technique.

The postoperative course of this patient was uneventful, with well-preserved renal function. Nineteen months after the operation, contrast-enhanced CT scan and renal Doppler ultrasonography confirmed the patencies of the aorto-iliac graft and both renal arteries, with both kidneys having a normal parenchymal echo and perfusion.

**DISCUSSION**

The decision to perform OSR with bilateral renal autotransplantation rather than a fenestrated or chimney EVAR...
Renal autotransplantation, first described for high ureteric injury, has been shown to be safe and effective in the treatment of ureteric length deficiencies, loin-pain syndrome, and renovascular disease [10]. Warm ischemia time during renal autotransplantation, however, may be prolonged in patients undergoing anastomosis of renal vessels to external iliac vessels. Because kidneys preserved under cold conditions have already undergone renal vascular angioplasty for anastomosis, the warm ischemic time can be reduced, thus optimally preserving renal function.

This case report described the use of renal autotransplantation for renal reconstruction during OSR in a patient with suprarenal AAA. A good clinical outcome was obtained with renal function being well preserved. These findings suggest that renal autotransplantation during OSR offers an appropriate alternative for younger patients with suprarenal AAA who have any conditions that restrict the use of routine renal construction methods. Widespread application of this method may allow statistically meaningful comparisons of postoperative renal function preservation, long-term patency, surgical costs, and technical feasibility.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reports.

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