Renal Autotransplantation as Savior in Hybrid Surgery for Aortic Aneurysm Repair

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Key Words

Autotransplantation · Hybrid procedure · Aortic aneurysm

Abstract

Renal autotransplantation is a safe and effective procedure to reconstruct the urinary tract. The current indications for autotransplantation include renal vascular disease, severe ureteral damage, tumours of the kidney and ureter, complex nephrolithiasis and retroperitoneal fibrosis. We report a rare case where we had to perform renal autotransplantation along with hybrid surgery for aortic aneurysm repair. To our knowledge, this is the first case report of its kind for this specific condition.

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Case Report

A 39-year-old female presented with left flank pain and repeated episodes of non-bilious vomiting for 15 days' duration. She also had a history of pain in the upper back for which she was investigated 5 months previously and diagnosed to have Pott's spine and started on antitubercular therapy. For her abdominal pain she was investigated initially with ultrasonography that showed

an aortic aneurysm and a left small contracted kidney. CT angiography was done which revealed a well-defined saccular aortic aneurysm, size 3.2 × 4.3 cm, arising from the left posterolateral side of the aorta eroding the spine and involving the visceral blood vessels at the level of the renal arteries (fig. 1). The coeliac trunk was occluded at its origin, with the common hepatic artery reformed by collaterals from the superior mesenteric artery. The left renal artery was occluded at its origin and the right renal artery was arising from the aneurysm site (fig. 1). A DTPA scan was done which showed a glomerular filtration rate of 76.2 ml/min of the right kidney and of 7.29 ml/min of the left kidney. Thus, the management issues in this case were a solitary functioning right kidney with its renal artery arising from the aneurysm site and the left renal artery occluded at its origin with a poorly functioning contracted left kidney. The patient underwent right renal autotransplantation and two-stage hybrid endovascular surgery. Surgery was jointly done along with vascular surgery. In the first stage, we performed visceral debranching after bypassing to all the visceral vessels along with renal autotransplantation and, in the second stage, endovascular stent deployment across the aneurysm covering all the branches after 8 weeks (fig. 2). Postoperative recovery was uneventful.

There was a brisk diuresis in the immediate postoperative period which was managed with fluid restriction. After 1 year of follow-up, the patient has preserved her renal function. The DTPA scan showed a glomerular filtration rate of 76 ml/min on the right side and of 4 ml/min on the left side. The aneurysm was excluded with a reduction in diameter and without any endoleak.

Fig. 1. CT angiography of the abdominal aorta showing a well-defined saccular aortic aneurysm, size 3.2 × 4.3 cm, arising from the left posterolateral side of the aorta at the level of the renal arteries.

Fig. 2. Postoperative CT angiography showing excluded aneurysm with the stent inside the aorta and the autotransplanted kidney in the right iliac fossa.

Discussion

Hardy [1] reported the first successful renal autotransplantation for iatrogenic ureteral injury during an aortic operation in 1963. The common indications for renal autotransplantation are renovascular hypertension, extensive ureteral damage and, in nephron-spar-

ing surgery, renal cell carcinoma. It has also been reported successfully in a variety of other urological conditions like nephrolithiasis, idiopathic retroperitoneal fibrosis, localized amyloidosis of the ureter, severe loin pain/haematuria syndrome, and echinococcosis of the kidney [1–4].

The technique of renal autotransplantation is relatively simple and has been summarized on several occasions by Marshall et al. [2], Novick et al. [3] and Ching et al. [4] since Hardy's original description of a patient. However, there are many details of the procedure that can be varied. It may be desirable to leave the ureter intact and to only transfer the blood supply. In most patients, a full autotransplantation will be the easiest, carrying the kidney into the iliac fossa of the same or opposite side, with ureteroneocystostomy for restoration of urinary tract continuity.

Renal autotransplantation offers specific advantages in severe renal trauma, extensive ureteral loss and complicated renovascular disease. This approach has become the treatment of first choice in each of these conditions, including the option of extracorporeal repair of the kidney, if necessary. While renovascular disease is presently the most common indication for autotransplantation [5, 6], this novel technique can be used in cases of aortic aneurysm repair by hybrid technique.

Endovascular abdominal aortic aneurysm (AAA) repair has gained increasing popularity as an alternative to open AAA surgery over the last decade [7]. Visceral artery revascularization is necessary in cases where visceral arteries arise from the aneurysmal sac. The primary association of surgical and interventional radiological procedures is called 'combined or hybrid strategy' [8]. This technique is advantageous in being haemodynamically less stressful and in non-clamping AAA repair. As a renal artery bypass has a high incidence of renal insufficiency, renal autotransplantation is the better and safer option.

In conclusion, in conditions faced with an AAA complicated by renovascular anomalies, there are two objectives to be fulfilled in tandem: the safe repair of the life-threatening aortic lesion and renal function preservation. The surgical tactic depends on the documented anatomical variations of each patient and on the surgeon's familiarity with the different protective measures. Because of advances in surgical techniques, organ preservation-autotransplantation is a safe and successful procedure and provides the best long-term results as far as renal functions are concerned.

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