

Renal Autotransplantation After "Bench Work" Surgery

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Abstract

An aneurysm of the right renal artery which otherwise would have been treated by nephrectomy is resected with the use of "bench work" surgery and subsequently transplanted back into the patient.

Key words: renal autotransplantation, renal artery aneurysm, bench work surgery

HARBORING a renal artery aneurysm is like carrying a bomb - we do not know when it will explode. Regardless of the type of renal artery aneurysm or its low incidence of 0.09 to 0.30 per cent, its mere existence presents enough danger of rupture to justify arterial reconstruction or nephrectomy if reconstruction fails.^{1,2,3,4} This report presents the surgeon's experience on a combination of nephrectomy, ex vivo perfusion of the kidney, excision of the renal artery aneurysm, reconstruction of the artery and autotransplantation of the kidney. This is probably the first "bench work" surgery for repair of a renal artery aneurysm followed by an autotransplantation performed in the Philippines. Outright nephrectomy of the involved kidney in this particular patient would double her chances of developing renal failure. Thus the plan was to save the kidney by an unusual method.

Case Report

A 60-year-old female who is a known diabetic and hypertensive for 20 years, with a history of transient

ischemic attack five years previously, consulted for a routine checkup. Aside from confirmation of the diabetes mellitus and hypertension, she was also diagnosed by ultrasound to have cholecystolithiasis and "nephrolithiasis" on the right kidney. The urologist, with a high index of suspicion, doubted the ultrasound findings and requested a digital subtraction angiography of the renal artery. It revealed a saccular aneurysm (2 x 1.5 cm) of the right renal artery at the dorsal segment of the renal hilum (Figure 1).

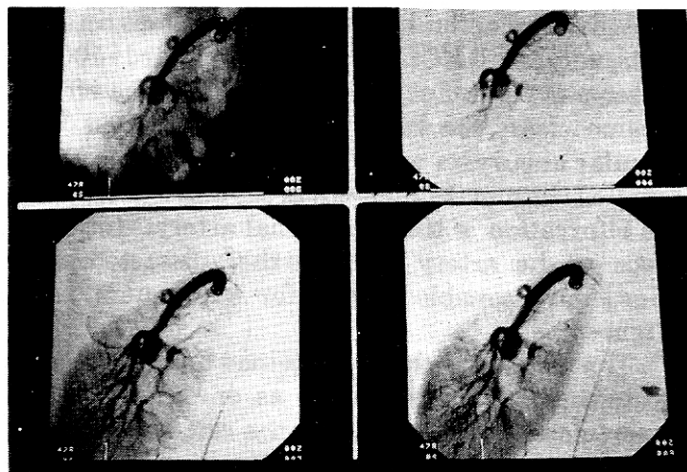


Figure 1. Digital subtraction angiography of the right renal artery

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Radionuclide glomerular filtration rate (GFR) (99mTc-DTPA) study revealed a low normal GFR of 81.9 ml/min (N.V. - 80 to 120 ml/min). Differential GFR showed that the right kidney contributed 55.5 per cent of the total GFR and the left, 45.5 per cent. The plan was to save the kidney if this was possible (Figure 2)

A standard right lumbotomy incision was performed and the kidney was mobilized and explored. The renal artery aneurysm was identified at the hilum. Surgical judgement dictated that in situ repair of the aneurysm was technically not feasible. Nephrectomy with good length of the renal artery, renal vein and the ureter was performed with the contemplated autotransplantation in mind. The lumbotomy incision was subsequently closed.

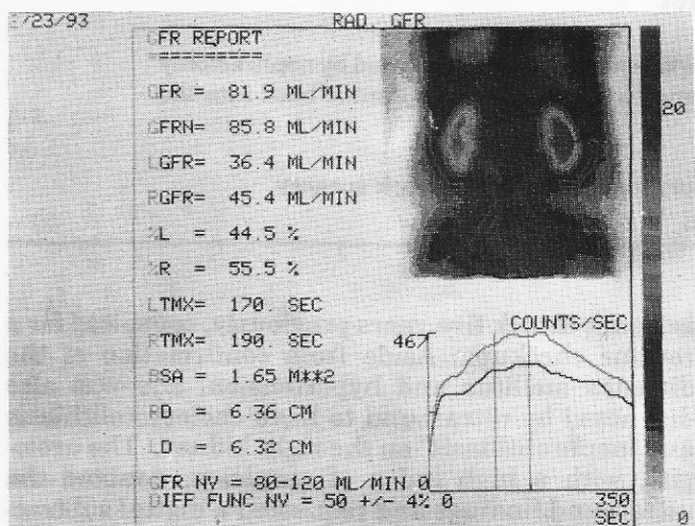


Figure 2. Radionuclide glomerular filtration rate (99mTc-DTPA)

At the "bench", the kidney was perfused with chilled commercial Eurocollins organ preservation fluid (per liter of fluid with additives of heparin - 5000 units, verapamil HCL - 40 mg, and xylocard - 100 mg). As soon as the kidney turned pale and the effusate became clear, the hilar area was dissected. The saccular aneurysm was 2 cm in size, with a partially calcified rim and thinned-out areas and was located at the bifurcation of the right renal artery. Intrahilar limbs of the artery were further dissected which afforded reasonable length for subsequent repair (Figure 3).

The distal branches were joined to each other in a pantaloon fashion converted as one and was then anastomosed end-to-end with the renal artery using polypropylene suture size 7-0. The kidney remained immersed in Eurocollins solution during the entire procedure (Figure 4).

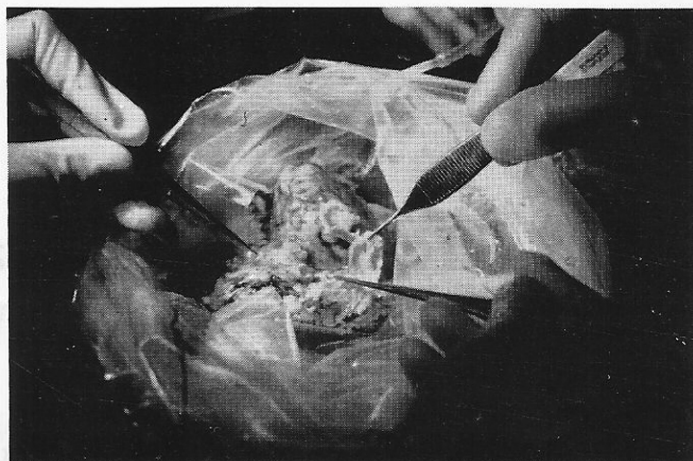


Figure 3. Saccular aneurysm at bifurcation of right renal artery

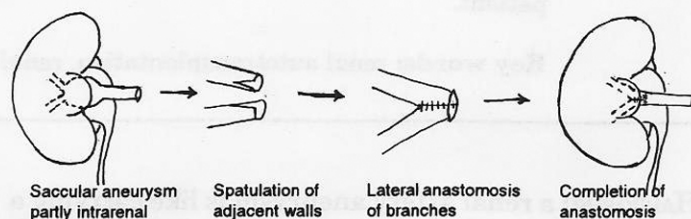


Figure 4. Operative technique of "bench work" surgery

The kidney thereafter was placed on cold storage (approximately 4 degrees centigrade) inside a bag of chilled commercial Eurocollins solution within a basin of iced normal saline solution while awaiting implantation.

The patient was then placed in the supine position, re-prepped and re-draped. A right iliac curvilinear incision was made and retroperitoneum dissected to expose the external iliac vessels. The kidney was subsequently implanted with the reconstructed artery anastomosed end-to-side to the external iliac vein and the ureter to the bladder in a posterior ureteroneocystostomy fashion (Leadbetter-Politano). Total cold ischemia time was two hours. The kidney perfused well and graft function was immediate as shown by an almost instantaneous passage of urine. A Jackson-Pratt drain was placed in the renal fossa and the wound was subsequently closed. Cholecystectomy was thereafter performed and the postoperative course was uneventful. Autograft ultrasound was normal and the radionuclide renogram (99mTc-DTPA) showed good transplant perfusion and excretory function.

She was discharged after eight days. To this writing she remains asymptomatic and has become normotensive.

Discussion

"Bench work" surgery performed by Guerriero and colleagues involved temporary nephrectomy with ex vivo perfusion combined with microvascular surgery repair.⁵ Ex vivo perfusion and repair are also done in renal transplantation while preparing the donor kidney, i.e. in repairing iatrogenic injury to the kidney and its vasculature, reconstruction of multiple vessels or repair of damage to the collecting system.⁶ The kidney is more tolerant to cold ischemia up to 30 times than warm ischemia. It may even be placed on cold storage for as long as 92 hours depending on the type of organ preservation fluid used.

"Bench work" surgery has also been applied to various renal affections to save the kidney as in patients with a solitary kidney or in tumors which may otherwise indicate outright nephrectomy. It has also been used to repair traumatic injuries of the renal vasculature especially at the region of the hilum.⁷ In

this case, "bench work" surgery technically facilitated excision of the aneurysm and arterial reconstruction with minimal blood loss and manipulation to the kidney. The kidney which contributed 55.5 per cent of the renal function already compromised by her diabetes had been "salvaged."

References

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