CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 15 (2015) 21–25

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Transplantation of a horseshoe kidney from a living donor: Case report, long term outcome and donor safety

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ARTICLE INFO

Article history:
Received 25 June 2015
Accepted 5 August 2015
Available online 12 August 2015

Keywords:
Horseshoe kidney
Renal transplantation
Kidney abnormalities
Kidney surgery

ABSTRACT

INTRODUCTION: The use of a horseshoe kidney in renal transplant remains controversial, when it is found in the evaluation of a living donor, anatomical, surgical and ethical issues are involved.
PRESENTATION OF CASE: An uncomplicated horseshoe kidney was detected in a 51-year-old woman who was the only suitable donor for her 30-year-old son. Kidneys were fused in the inferior pole and no vascular or urinary abnormalities were detected during imaging evaluation. The surgical procedure was approved by the hospital transplant committee. A laparotomy was performed by means of a medial upper incision. The isthmus of the kidney was divided using a harmonic scalpel and the left segment was used; it had 2 arteries too distant to create a common one, thus anastomosed separately. The renal vein was side-to-side anastomosed to the right external iliac vein and a Lich-Gregoir ureteral implant was made. There were no intraoperative or postoperative complications in the donor who currently remains asymptomatic. Recipient developed a delayed graft function (DGF), and was discharged on the 12th day after surgery. After 24 months of surgery, renal function has remained stable with a serum creatinine of 128 μmol/L (1.45 mg/dL).
DISCUSSION: There are 7 reports of a horseshoe kidney from living donors in 8 patients without morbidity and a good long term outcome of all recipients.
CONCLUSION: If we anticipate a low operative risk and there is a suitable anatomy, we may consider the use of horseshoe kidneys from living donors a viable alternative.

1. Introduction

Horseshoe kidney is the most common urinary congenital abnormality. When it is found at the time of operation in a deceased donor, it can be divided and transplanted into two different recipients or as a unit in a single receptor; depending on the vascular and urinary anatomy [1,2]. When found during the preoperative work up of a living donor, its use is controversial. There are previous reports in which 8 living donors were used without morbidity or mortality and with good long term results in the recipients (Table 1) [2–8]. This report describes the case of a successful transplantation of a horseshoe kidney from a living donor; and emphasizes the fact that the decision must be made once the absence of abnormalities that may increase the risk in the surgical donor is established. To our knowledge this is the 9th case reported worldwide.

2. Presentation of case

A 51 year old woman was considered as a kidney donor to her 30 year-old son. Recipient was transplanted 11 years before with his father's right kidney and implanted in the left side of the lower abdomen. After 10 years of adequate renal function, he developed chronic rejection and returned to hemodialysis. A new transplant was proposed and the mother was found to be the only available donor. Mother's preoperative study protocol was uneventful, except for the finding in the renal artery resonance of a horseshoe kidney with fused lower poles and no major vascular or urological abnormalities (Fig. 1). The case was presented to the hospital transplant committee and surgery was authorized.

A medial upper abdominal incision was made in order to approach the left segment of the kidney mobilizing the left colon

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http://dx.doi.org/10.1016/j.ijscr.2015.08.008

Table 1
Living donor horseshoe kidneys transplants.

Author/Reference	Year	Transplants	Donor/age	Follow up	Surgical approach/ Segment used	Complications
Aikawa [3]	1998	1	Father/55	20 months	Medium T.P./Left	Urine leakage
Inoue [4]	2000	1	Father/55	54 monthss	Medium T. P./Left	Urine leakage
Goyal [5]	2003	2	Sister/47Mother/55	Case 1: 18 months Case 2: 12 months	Rigth flank/Rigth Left flank/Left	No Urine leakage
Hüser [6]	2005	1	Parent/59	16 months	N.R./Rigth	No
Dinckan [7]	2007	1	Sister/42	30 months	Left flank/Left	No
Sezer [2]	2013	1	Sister/43	8 months	Left flank/Left	Ureteral obstruction
Kumar [8]	2015	1	Wife/44	N. R.	Left flank/Left	N. R.
Justo–Janeiro	2015	1	Mother/51	24 months	Medium T. P./Left	No

T.P.: Trans peritoneal
N.R.: Not reported

until the isthmus was exposed (Fig. 2). A left renal artery was found and occluded temporarily in order to reveal the limit with the right segment of the kidney. This was not achieved because another inferior artery was found. No other vascular abnormalities were encountered and the only urological abnormality present was an anterior renal pelvis.

Separation was made through the ischemic line with a harmonic scalpel, left nephrectomy ended with negligible bleeding, transected surface of the remaining kidney was sutured using an oxidized cellulose matrix (Surgicel™, Johnson & Johnson, Pisacatay, New Jersey, USA) and a soft drainage was left in the operating area which was retired at the third post-operative day.

Excised kidney was perfused with a histidine-tryptophan solution (Custodiol™ HTK, Dr. Franz Köhler Chemie Gmbh, Bensheim, Deutschland) and was implanted in the right iliac fossa, with an end-to-side anastomosis of the renal vein to the external iliac vein.

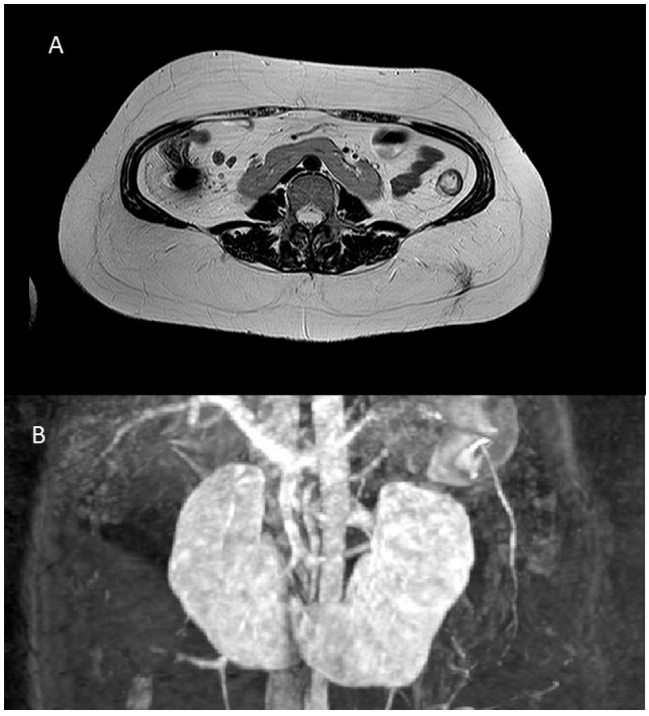

Fig. 1. Magnetic resonance images, axial view (A) and coronal view (B).

The two arteries were too distant to make a common one (Fig. 3), thus the superior artery was anastomosed end-to-end to internal iliac artery and inferior end-to-side to the external iliac artery; transected edge was left with no further treatment or suture (Fig. 4). The ureter was implanted with the Lich-Gregoir technique and a "double J" catheter was left inside, total ischemic time was 125 min.

Immunosuppression was carried in the standard way, induced with 20 mg IV basiliximab on days 0 and 4, oral mycophenolate 1 g twice a day. An intravenous infusion of methylprednisolone was begun for the first 3 post-operative days, followed by oral prednisone at 2 mg/kg/day and tapered it until a target dose of 0.2 mg/kg/day; oral cyclosporine was begun at 3 mg/kg/day when a serum creatinine below 176 μmol/L (1.99 mg/dL) was reached, which was achieved at the 20th P.O. day.

Donor evolution was uneventful and was discharged at the fifth postoperative day; protocol laboratories 24 months after the nephrectomy remain normal.

Recipient developed a DGF and the laboratory tests showed acute tubular necrosis with good arterial perfusion demonstrated in Doppler ultrasonography (Fig. 5) and scintigraphy (Fig. 6) showing isotope's concentration without elimination. Patient began diuresis at the 8th postoperative day and a progressively achieved normal renal function. After 3 months of surgery renal function stabilized, and at the end of the first year serum creatinine was found to be

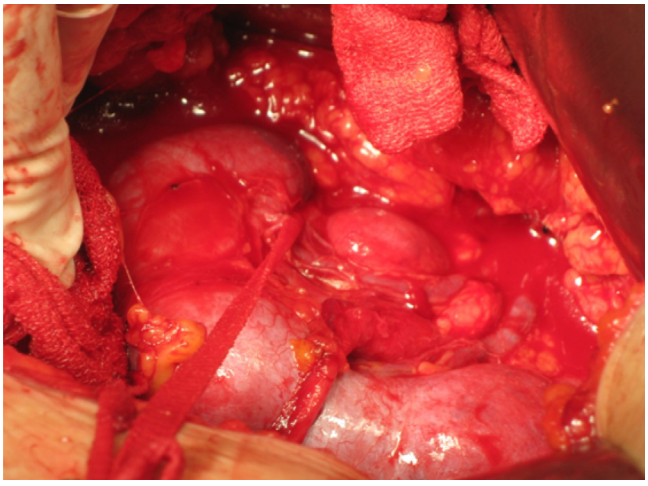

Fig. 2. Isthmus of the horseshoe kidney in situ.