

Successful living donor transplantation of a kidney with horseshoe malformation: extending the donor pool

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The necessity of organ split with an increased donor risk limits the use of horseshoe kidneys (HSKs) in living donor transplantation. We report a case of HSK transplantation from a 59-year-old living donor to his 33-year-old daughter suffering from end stage renal disease. Preoperative investigations focused the anatomical and functional attributes of the HSK. Communicating caliceal systems, urinary stasis or reflux were excluded by descending urography. Organ perfusion was homogeneous and a renal function almost equally distributed in renal scintigraphy. Intra-arterial renal angiography and angi-magnetic resonance imaging showed a narrow fusion of the lower pole veins, no communicating caliceal system, two arteries and two veins on each side (Fig. 1). The arteries were too distant for the creation of a common anastomosis, therefore the right side bearing longer arteries was chosen for transplantation allowing an easier microsurgical reconstruction in the recipient.

The parenchymal junction was divided by electrocautery. Hemostasis was achieved using argon beamer coagulation, fibrin glue, a fibrin-coated collagen fleece (TachoComb®; Nycomed, Unterschleissheim, Germany) and a polyglactin net (Vicryl®; Ethicon, Norderstedt, Germany) to avoid the parenchyma-consuming cone-like excision. The lower pole vein equally drained the left and right kidney. In order to create a common venous ostium in the recipient, a patch was dissected. The remaining donor-vein was reconstructed by means of a new anastomosis in the vena cava.

The graft showed two equally calibered veins, thus ligation of one vein was obsolete. The inferior pole vein was anastomosed end-to-side with the superior renal vein. The superior graft vein was anastomosed to the external iliac vein of the recipient; the two graft arteries had to be separately anastomosed to the external iliac artery. After declamping the graft was homogeneously perfused and started clearing immediately. The connection of the ureter to the bladder was established using the anti-reflux technique according to Gregoir.

Immunosuppressive and supportive medication was given following to our routine protocol. Graft function is still excellent up to the point of this report (16 months

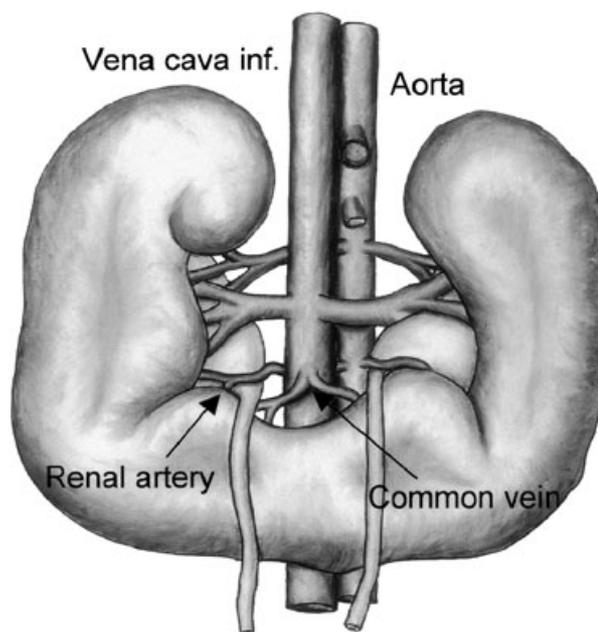


Figure 1 Anatomical situation of the horseshoe kidney: narrow fusion of the lower poles, separate caliceal system, two arteries and veins with common orifice of the lower pole veins.

after transplantation) and no operation-associated complications occurred in neither donor nor recipient.

Literature reports several cases of HSK transplantation from cadaveric origin, both split and *en bloc*. HSKs represent the most frequent renal anatomical variation [1], with a fusion at the lower poles in the majority of cases [2]. HSK transplantation is associated with a higher percentage of primary nonfunction, in most cases because of thrombosis of the vessels [3]. To prevent such fatal scenery in a living donor setting, the knowledge about the exact vascular supply of the HSK is essential and therefore has to be studied by angiographic imaging of the abdominal aorta and its branches. As the split procedure might compromise the remaining part of the HSK, it is compulsory to measure renal function and its distribution by renal scintigraphy. Furthermore, both ureters have to be pictured in a descending urography.

To our knowledge three cases of a HSK transplantation from a living donor have been reported [4,5]. In two cases urinary leakage was seen after the split procedure. As intraoperative perfusion of the graft with methylene blue could not sufficiently detect leakage of the urinary system [5], we advocate the use of descending urography to exclude a communicating caliceal system.

Exclusion criteria for HSKs in LDT are a donor history of urinary tract disease, a communicating caliceal system or a common vascular supply. As most contraindications can be ruled out by preoperative examinations, the presented case demonstrates the suitability of HSKs for living kidney transplantation in certain cases.

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