EAU Guidelines on Renal Transplantation

Transplantation surgery. Part II

Organ retrieval and transplantation surgery:

Surgical approaches

Transplant (bench/back-table) preparation is a crucial step in the transplantation process. The kidney must be inspected whilst on a sterile ice slush, removing peri-nephric fat when possible to permit inspection of the quality of the organ and to exclude exophytic renal tumours.

- Biopsy of the kidney on the back-table may be performed to help in the multifactorial decision-making process regarding the quality and usage of the kidney.
- The number, quality and integrity of renal vessels and ureter(s) should be established and lymphatics at the renal hilum ligated.
- The quality of the intima of the donor renal artery should be evaluated.
- The length of the renal vein should be evaluated. For a deceased donor right kidney, lengthening the renal vein on the back table may be performed if needed with donor inferior vena cava (IVC)

Single kidney transplant - living and deceased donors

The standard surgical approach for first or second single kidney transplant (SKT) operations remains open kidney transplant (OKT).
Emerging surgical technologies using minimal access surgical approaches have been developed (minimally invasive open, laparoscopic and robot-assisted).

Recommendations	Strength rating
Choose either iliac fossa for placement of a first or second single kidney transplant.	Weak
Ligate peri-iliac vessel lymphatics (lymphostasis) to reduce post-operative lymphocele.	Weak

A variety of techniques have been described to help with the anastomosis of a short renal vein. This is most commonly encountered with a right kidney, especially from a living donor. To achieve equivalent outcomes with right kidneys appropriate surgical technical manoeuvres may be needed to optimise right kidney implantation.

- Transposition of the recipient iliac vein is an appropriate technical solution to compensate for the short length of the renal vein in right kidney.
- The living donor right kidney renal vein can be successfully lengthened using donor gonadal vein or recipient saphenous vein.

Recommendation	Strength rating
Assess the length of the donor renal vein and if it is short consider one of a variety of surgical techniques to optimise the venous anastomosis.	Weak

The external or common iliac arteries are equally good for arterial anastomosis. The internal iliac artery is more frequently affected by atherosclerosis than the external or common iliac arteries. End-to-side anastomosis of donor renal artery to recipient external and/or common iliac artery is recommended an end-to end anastomosis to the internal iliac artery.

Recommendations	Strength rating
Use the external or common iliac arteries for an end-to-side arterial anastomosis to donor renal artery.	Weak
Use an end-to-end anastomosis to the internal iliac artery as an alternative to external or common iliac arteries.	Weak
Check the intima of the donor and recipient arteries prior to commencing the arterial anastomosis to ensure that there is no intimal rupture/flap. If this is found it must be repaired prior to/as part of the arterial anastomosis.	Strong
Pre-operatively plan the surgical approach in third or further transplants, to ensure that appropriate arterial inflow and venous outflow exists with adequate space to implant the new kidney.	Strong

Robot-assisted kidney transplant surgery (RAKT)

Both trans- and extra-peritoneal approaches are described. Potential advantages of RAKT may exist (decreased postoperative pain, incision length and lymphocele rate). Potential issues with RAKT are the exclusion of recipients with severe atherosclerosis or third (or further) kidney transplants, a higher than expected rate of delayed graft function (DGF) and a small number of reported early arterial thromboses despite carefully selected cases. Evidence is too premature to recommend RAKT outside of prospective studies.

Dual kidney transplants (DKT)

DKT is performed when the quality of a single deceased donor kidney is thought to be insufficient for appropriate long-term graft function and that the outcome with both kidneys would be better. A variety of surgical techniques have been described to implant the pair of donor kidneys: unilateral extra-peritoneal (UEP) or intra-peritoneal (UIP) and bilateral extra-peritoneal (BEP) or intra-peritoneal (BIP) that can be via a midline or two lateral incisions.

Ureteric implantation in normal urinary tract

Ureteric anastomotic techniques described for renal transplant recipients with no underlying urological abnormality include: extra (Lich-Gregoir) or intra (Leadbetter-Politano) vesical uretero-neo-cystotomy and uretero-ureterostomy using native ureter.

Recommendations	Strength rating
Perform Lich-Gregoir-like extra-vesical ureteric anastomosis technique to minimise urinary tract complications in renal transplant recipients with normal urological anatomy.	Strong
Pyelo/uretero-ureteral anastomosis is an alternative especially for a very short or poorly vascularised transplant ureter.	Strong

Transplant ureteric anastomosis can be performed with or without a ureteric stent. Stents are recommended to reduce major urological complications, especially urinary leak. The optimal timing for stent removal has yet to be defined

Recommendation	Strength rating
Use transplant ureteric stents prophylactically to prevent major urinary complications.	Strong

Transplantation/ureteric implantation in abnormal urogenital tract

The following points should be considered when performing kidney transplantation in the abnormal urogenital tract:

- In patients with an ileal conduit, a kidney transplant may be placed upside down to align the ureter to the conduit and avoid a redundant ureter.
- The technique used to implant transplant ureter(s) into an ileal conduit is the same as the method used with native ureter(s) (Bricker; Wallace).
- In bladder augmentation or continent pouches, ureters should be implanted with a tunnel technique or extra-vesically (Lich-Gregoir).
- In patients with a Mitrofanoff catheterisable stoma or continent ileo-caecal pouch with catheterisable stoma, consideration should be given to the positioning of the catheterisable stoma (umbilical or iliac fossa - usually right-side) with clear communication with the transplant surgeons so that the position of any future transplant kidney is not compromised.