

RENAL TRANSPLANT SURGICAL PROCEDURE

Surgical Procedure Sequence for Patients <20 kg:

1. Venous anastomosis
 - a. Side clamp IVC for venotomy
 - b. Allograft renal vein to recipient vena cava
 - c. Clamp renal vein distal to anastomosis
 - d. Unclamp IVC
2. Arterial anastomosis
 - a. Cross clamp aorta above and below aortotomy site
 - b. Allograft renal artery to recipient aorta
3. Reperfusion
 - a. Unclamp renal vein and aorta

ANESTHETIC GOALS: CVP usually 10-15, SBP > 120 (for reperfusion and thereafter), UOP 5-10 ml/kg/h – may require blood transfusion and vasoactive infusion to reach goal. Titrate CVP goal to urine output after reperfusion of renal allograft. Discuss transfusion and vasoactive infusions with surgeons as PRBC exposures affect recipient antibody profile and vasoactive infusions may affect perfusion to renal allograft.

4. Ureteral implantation over stent
 - a. Clamp foley upon surgeon's request for infusion of methylene blue solution retrograde into bladder via foley catheter
5. Plan to go to PICU with patient intubated given high volume resuscitation.

Surgical Procedure Sequence for Patients >20 kg:

1. Venous anastomosis
 - a. Cross clamp iliac vein for venotomy
 - b. Allograft renal vein to recipient iliac vein
2. Arterial anastomosis
 - a. Cross clamp iliac artery above and below aortotomy site
 - b. Allograft renal artery to recipient iliac artery
3. Reperfusion
 - a. Unclamp vein and artery

ANESTHETIC GOALS: CVP 10-12, SBP > 120 (for reperfusion and thereafter), UOP 5-10 ml/kg/h. Plan to extubate if no contraindications. Maintenance fluids – Normosol versus Normal Saline – consider pros and cons of large quantities of each and in context of the specific patient population. Normosol has potassium and in preemptive kidney transplant recipients this fluid choice may put them at risk for hyperkalemia after reperfusion in starting with high potassium or there is delayed graft function. Normal saline in large quantities can lead to hyperchloremic metabolic acidosis.

4. Ureteral implantation over stent
 - a. Clamp foley upon surgeon's request for infusion of methylene blue solution retrograde into bladder via foley catheter

RENAL TRANSPLANT SET UP AND INTRAOPERATIVE MEDICATIONS

Lines:

1. Arterial line
2. Central venous line – multi-lumen is needed
 - a. May use existing hemodialysis catheter
 - i. If so, remember to remove 5 ml heparinized blood from catheter prior to use
 - b. One lumen for CVP monitoring
 - c. One lumen for thymoglobulin infusion (needs dedicated line)
3. Large peripheral venous access

Perioperative Antibiotics:

1. Cefazolin or Zosyn – determined by transplant surgeons, check with them for drug choice if no preoperative orders placed.

Infusions:

2. Dopamine – start 3-5 mcg/kg/min prior to reperfusion
3. Thymoglobulin – see below

Timing of Drug Dosing:

1. Immunosuppression (Please verify plan with transplant surgeon timing of each immunosuppression)
 - a. Cellcept – may be given preoperatively but most likely will need to start and finish infusion intra-operatively. This infusion is ideally precedes the thymoglobulin infusion but may run concurrently with it if approved by the transplant surgeon.
 - i. Infused over 2 hours via peripheral or central venous access
 - b. Thymoglobulin (need 0.2 micron filter from anesthesia workroom)
 - i. Infuse over 6-8 hours via dedicated central venous access port because dilution used is caustic to peripheral veins.
 - ii. Premedicate to avoid adverse reaction – can give at time of anesthesia induction.
 1. Solumedrol IV 10 mg/kg (this is both premed and induction dose of steroid)
 2. Tylenol IV 15 mg/kg
 3. Benadryl IV 1 mg/kg
 - iii. Watch for pulmonary edema
2. Arterial anastomosis
 - a. Heparin 10 units/kg just before renal artery anastomosis started (NOTE: this is only if anastomosis is to aorta or common iliac artery....ask surgeons), notify surgeon 2 minutes after given
3. Prophylaxis for Ischemia/Reperfusion Injury

- a. Mannitol 0.5 gram/kg give just prior to unclamping artery
- b. Lasix 1 mg/kg give after mannitol