Contributed May 2015 by Drs. Paolino and Saynhalath.

Updated Oct 2017 by Drs. Doherty, Lappin, and Vacula.

**Renal Transplant**

Pre-op

* When was last dialysis?
* Check labs, especially potassium and hemoglobin.
* NPO status?
* Is there a type and cross?
* Where is the patient’s fistula?
* If patient has a fistula, does it need to be accessed? Confirm with surgeon.
  + No if patient is to receive Basiliximab (Simulect) instead of Thymoglobulin.
  + If yes, STC3 should be called to access fistula.
* Central line is optional if patient has either/or:
  + Fistula.
  + Order to receive Basiliximab (Simulect).

MSMAID

* Machine
* Suction
* Monitors: +/- arterial line depending on staff and patient
* Airway: ETT, blade, oral airway, bite block
* IV: hot line

Drugs

* Basic drugs:
  + From the Pyxis: Midazolam, Fentanyl, Cisatracurium, Hydromorphone
    - Cisatracurium must be refrigerated and is therefore no longer placed in transplant drug bag.
      * May obtain short dated vials from pharmacy during business hours
      * At room temperature, it has a BUD of 21 days
  + Induction: Propofol, Lidocaine, Cisatracurium, +/- Esmolol
* Solumedrol 500 mg (push or in an IV bag)
  + Can be started as soon as patient is in the OR
  + Solumedrol must be completed before Thymoglobulin or Basiliximab is started.
  + For ongoing QA, fill out Thymoglobulin or Basiliximab (Simulect) Checklist\* prior to administration.
    - \*See SAMPLE checklist next page
  + **IF THYMOGLOBULIN OR BASILIXIMAB IS GIVEN WITHOUT SOLUMEDROL BEING GIVEN OR RUN TOO FAST, CONSEQUENCES MAY BE DISASTEROUS.**
  + Once Solumedrol is complete,
    - Fill out Thymoglobulin or Basiliximab Checklist with two person verification.
    - Then start Thymoglobulin or Basiliximab at the rate written on the bag via pump.
    - Thymoglobulin
      * Must be given through central line or fistula over 6 hours with a filter.
      * Dose is 2 mg/kg.
    - Basiliximab (Simulect)
      * Can be given via PIV over 30 minutes.
      * Dose is 20 mg.
* Pharmacy usually makes a renal transplant drug bag with the following:
  + Verapamil (5 mg in 2 mL) – give to circulating RN or directly to scrub tech
  + Albumin 25% or 5% may be requested and given depending on volume status.
  + Furosemide 100 mg x 1
    - The surgeon will tell you when to give Furosemide.
    - Usually give 100mg, but confirm first with surgeon.
  + Heparin x 4 (5,000 units/mL vs. the 1,000 units/mL we have in our boxes)
    - Surgeon will ask for one time injection of IV heparin just before clamping the vein.
    - Dose varies by surgeon, but usually 2000 – 5000 units.
    - Ok to use heparin vial from anesthesia box.
  + Dopamine gtt is the pressor of choice if needed.
    - Don’t spike unless needed.
    - Start at 2 mcg/kg/min and titrate to effect (up to 15 mcg/kg/min)
    - Watch for tachyarrhythmias!

Intra-op

* Keep MAP ~ 90
  + Surgeon will ask what the blood pressure intermittently: she wants SBP, DBP, and MAP
* Use volume for hypotension: crystalloids, albumin 🡪 then dopamine gtt if your BP is still low
* Depending on the patient’s volume status (when was last dialysis) and cardiac status, plan to give 2-3 liters of fluids.
  + Use NS over LR preferentially but if Day Surgery starts LR, Dr. Lappin is OK with it as long as you switch to NS for the next bag. (Check with your staff; they might be pickier.)
* Do NOT use vasoconstrictors 🡪 If BP is marginal to low, communicate with the surgeon.
* It doesn’t hurt to document “Palpable AV fistula thrill” every 15 minutes.
* At one point, you will be asked to clamp the Foley and start irrigation.

Order of events:

* Induction and intubation
* Place OGT for renal transplant patients. (For pancreas transplant patients, usually place NGT and leave in.)
* Start antibiotics
* Give Solumedrol first.
* Then fill out Thymoglobulin or Basiliximab (Simulect) Checklist with two person verification.
* Then start Thymoglobulin or Basiliximab.
* Give volume to treat low BP if necessary.
* Give heparin when surgeon requests it and start code timer (surgeon will want to know the 3 minute mark).
* Venous clamp on
* Arterial clamp on
* Keep track of urine output.
* Clamp Foley and open irrigation.
* The surgeon will tell you when the bladder anastomosis has been completed. Please dump the urine at this time so we can calculate how much urine is produced after the bladder is closed to differentiate any amount that may have been irrigation,

Post-op

* The patient will recover in the SICU but plan is always to extubate at the end.
  + Future plan to have patient recover in PACU, then transfer to STC3.
  + Transplant surgeons will notify when this goes into effect.
* The SICU resident does not take care of renal transplant patients; please direct questions to the Transplant Team.

Donor nephrectomy

* Give NS 1 liter per hour +/- albumin.
* Give Heparin 5,000 units just prior to renal artery clamping per surgeon notification. Notify surgeon when 3 minutes after administration.
* After the kidney is out, reverse with protamine 1:1 (ACT not checked).
* Keep MAP ~ 85.
* Please communicate if urine output is low, patient may need additional fluids.

**\*SAMPLE: Thymoglobulin or Basiliximab (Simulect) Operating Room Kidney/Pancreas Transplant Checklist**

Prior to giving Thymoglobulin

* Solumedrol IV is given first
* Central line or fistula accessed
* Ensure to be given over 6 hours with filter
* Two-person verification complete

Prior to giving Basiliximab (Simulect)

* Solumedrol IV is given first
* Two-person verification complete

By signing below, I attest the above checklist has been completed as per guidelines.

(Print and Sign Name) Date/Time

(Print and Sign Name) Date/Time

*NOTE: This checklist is to be scanned into Epic for ongoing QA.*

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**Pancreas Transplant**

Quick Notes

* If pancreas-kidney transplant, pancreas usually transplanted first
* Be mindful of how much IVF you are giving and use colloid > crystalloid because you don’t want to fluid overload a patient who is getting a pancreas transplant.
* Have dextrose in the room (1L bag of D5-1/2NS for an infusion and a syringe of D50 would be a good start) and watch out for hypoglycemia! Drs. Lappin and Doherty like a blood sugar ~150 during the kidney transplant part. Most afraid of hypoglycemia in brittle diabetics, so good to have D5 running.
* You may want an arterial line or a central line because you will be checking accuchecks frequently (like Q10”). Right after the pancreas is reperfused, you will check accucheck every 10 minutes and when stable for about 30 minutes, can check every 30 minutes.
* NGT should be placed in pancreas transplant patients and left in.

There will be a lot of unique medications for this case. Some will be provided, but others may not.

* Octreotide 100 mcg: Plan to give entire vial, but please confirm dose with the surgeon.
* Methylprednisolone 500 mg is to be given at the start of the case and completed before starting Thymoglobulin.
* Prior to starting Thymoglobulin, complete Thymoglobulin Checklist with two person verification.
* Thymoglobulin is given through central line or fistula over 6 hours with a filter.
* Dopamine is pressor of choice if needed.
* Insulin
* 25% Albumin
* Pancreas transplant patients receive the following antibiotic prophylaxis:
  + Vancomycin 1g IV
  + Fluconazole (Diflucan) 200mg IV
  + Piperacillin/Tazobactam (Zosyn) 3.375mg IV

After induction, place a central line. Thymoglobulin must be infused through a central line. A-line is not necessarily needed.

The timing of giving drugs will be told to you by the surgeons, and may look like this:

* Post-induction, give octreotide and start methylprednisolone at 100 mL/hr.
* After methylprednisolone is in, fill out Thymoglobulin checklist and start Thymoglobulin at 40 mL/hr.
* Every hour to hour and a half, give 100mL of 25% albumin. This is different than regular albumin and comes in 50mL bottles.

An abundant amount of crystalloid causes significant swelling of the pancreas gland, which may compromise the microvascular circulation and result in thrombosis of the pancreas. For this reason, crystalloid solutions are usually limited to approximately 2,000mL during the entire procedure. The remainder of the fluid is provided by colloid solution.

If hypotension is a problem, use dopamine infusion as a first line treatment over phenylephrine.

Insulin control is through IV regular insulin until the pancreas allograft is in place. At this time, no further insulin should be given as the pancreas should begin to work almost immediately. It is not uncommon to have blood sugars in the 80-100 range by the time the patient reaches the intensive care unit. Once pancreas is in, check glucose every 10 minutes x3. If needed, may return to insulin gtt.

This is a midline incision with abdomen open. Post-op pain control should be prepared for according to time constraints and lab values (i.e. epidural) – although Drs. Lappin and Doherty don’t want an epidural because the patient will be given heparin and there’s a risk of transplant thrombosis if it’s held.