Transplant Institute

Beth Israel Deaconess Medical Center

A teaching hospital of Harvard Medical School

KIDNEY TRANSPLANT RECIPIENT CLINICAL PATHWAY

All patient variances are to be circled and documented in the progress notes. This Clinical Pathway is intended to assist in clinical decision making by describing a range of generally acceptable intervention and outcomes. The guidelines attempt to define practices that meet the needs of most patients under most circumstances. However, the ultimate judgment must be made based on circumstances that are relevant to that patient and treatment may be modified according to the individual patients needs.

	PRE-OP FARR 10 OR PERIOP HOLDING AREA Date:	DAY 0 OR Date:	DAY 0 PACU Date:	POD#1 FARR 10 Date:	POD#2 FARR 10 Date:	POD#3 FARR 10 Date:	POD#4 FARR 10 Date:	Discharge Criteria
NOTES	● Check if patient is on study ● Surgery consent ● Research consent, if applicable ● Health Care Proxy designation per RN protocol	● Verify and sign ABO compatibility form pre-incision ● Review hardcopy crossmatch ● Time-out to confirm patient identity and planned procedure		● MD and nursing to review and reconcile all pre-transplant medication ● Restart home meds as appropriate	● MD and nursing to review and reconcile all pre-transplant medication	● MD and nursing to review and reconcile all pre-transplant medication	● MD and nursing to review and reconcile all pre-transplant medication	● MD and nursing to review and reconcile all pre-transplant medication
TESTS	● History and physical including weight ● Labs: CBC, Chem 7, Ca, Mg, Phos, alb, UC, ALT, AST, ALK Phos, Bili, INR, PTT, CXR, EKG, Type & Cross 2 units PRBC, if female and less than 55 years old, STAT HCG. Attending surgeon to review results before patient goes to the OR. ● Review all luminex anti-HLA antibody results	● Glucose per anesthesia protocol	● VS per PACU protocol (see trigger criteria at right of page) ● Labs: CBC, Chem 7, CXR, EKG ● Fingerstick glucose q1h (call MD if >150), if diabetic; otherwise per protocol	● VS per RN protocol (see trigger criteria at right of page) ● Daily weights, I&Os ● Labs: CBC, Chem 7, Mg, Ca, Phos ● Fingerstick glucose 4X/day (if diabetic or glucose >150) ● Duplex US per attending surgeon ● Tacrolimus trough prior to 6am dose (after minimum 1 dose tacrolimus)	● VS per RN protocol (see trigger criteria at right of page) ● Daily weights, I&Os ● Labs: CBC, Chem 7, Mg, Ca, Phos ● Fingerstick glucose 4X/day (if diabetic or glucose >150) ● Tacrolimus trough prior to 6am dose ● Duplex US per attending surgeon	● VS per RN protocol (see trigger criteria at right of page) ● Daily weights, I&Os ● Labs: CBC, Chem 7, Mg, Ca, Phos ● Fingerstick glucose 4X/day (if diabetic or glucose >150) ● Tacrolimus trough prior to 6am dose ● Duplex US per attending surgeon	● VS per RN protocol (see trigger criteria at right of page) ● Daily weights, I&Os ● Labs: CBC, Chem 7, Mg, Ca, Phos ● Fingerstick glucose 4X/day (if diabetic or glucose >150) ● Tacrolimus trough prior to 6am dose	● VS measured and recorded within 1h of discharge. Call attending if any new: ○ HR <40 or >130 ○ Systolic BP<90 ○ Temp of >100.5 ○ Marked Nursing Concern ● Tacrolimus trough prior to 6am dose
CARDIOVASCULAR	● **Cardiology consult if new EKG changes** ● Beta blocker per protocol ● If Plavix, or Warfarin, or Aspirin check with **MD for continuation** ● Hold statins, ACE inhibitors, ARBs ● Surgeon to recheck crossmatch results ● Heparin 5,000 units SC q 12h	● Furosemide 20-100 mg IV prior to reperfusion per surgeon request ● Compression boots	● Compression boots ● Heparin 5,000 units SC q12h	● Same as prior day ● Do not restart statins, ACE inhibitors, ARBs during this admission	● Same as prior day	● Same as prior day	● Same as prior day	
RESPIRATORY		● Intubation ● Extubate in OR whenever possible	● O2 by face mask or nasal cannula	● Nasal cannula O2 at 2 l/min as long as patient requires PCA for pain management. ● Discontinue O2 if pulse Ox>92% after 15mins of room air once PCA has been discontinued ● Incentive spirometer X10 q1h while awake	● Same as prior day	● Same as prior day	● Same as prior day	● VS measured and recorded within 1h of discharge. Call attending if any new: ○ SaO2<90% and/or RR <8 or >30
IV FLUIDS/ RENAL	● **D5 ½ NS @ 75cc/hour** ● Do not give Kayaxalate ● If peritoneal dialysis, drain fluid out and examine line for signs of infection and send fluid for cell count ● Protect fistula/graft ● Palpate and document patency	● **Normal saline or D5 NS, depending upon BS** ● Mannitol 12.5→25g IV ● Ureteral stent per attending	● D5 1/2NS @50 cc/hr AND 1/2NS @ cc/cc urine output	● D5 1/2NS @50 cc/hr AND 1/2NS @ cc/cc urine output ● Assess need for dialysis with renal fellow on transplant rotation	● IVF: D5 1/2 NS@ 50cc/h AND 1/2 NS @ 1/2 cc/cc urine output	● D5 ½ NS @ 50 cc/h until taking adequate PO , then saline lock ● If outpatient dialysis will be needed, begin planning for post discharge	● IV discontinued and saline lock removed	● Arrangements made for outpatient dialysis if indicated ● VS measured and recorded within 1h of discharge. Call attending if any new: ○ Urine output <50cc in 4h
DRAINS, LINES & WOUND CARE		● R IJ Triple Lumen catheter placed by Anesthesia ● Discuss with surgical attending if tunneled cath is to be used ● Close section drain: JP drain/ Blake per attending ● PA catheter if clinically indicated. Use permacath for central monitoring and infusing after clearing by wasting 10cc of blood from line ● Foley catheter placement in OR (3 way per attending) ● NG tube placement in OR	● Adhere to BIDMC central access device guideline for insertion and care ● JP to bulb suction- record q4-8h depending on drainage ● Continue IJ Triple Lumen catheter ● Foley catheter- record output q1h ● NG@WS (flush with 10cc NS q shift)	● Same as prior day	● Same as prior day ● Remove surgical dressing	● Same as prior day ● Change dressing daily or PRN ● Check with attending surgeon to D/C foley	● Remove JP if output is <30cc/day before ● Remove IJ Triple Lumen catheter at DC ● Change dressing daily or PRN	● Patient able to care for wound and drains ● Drain care set up if patient is not independent with their care ● JP drain management taught
GI/ENDOCRINE/ NUTRITION	● NPO, except for PO Mycophenolate Mofetil ● Insulin per protocol; if patient on insulin pump, then D/C	● NPO ● If diabetic, regular Insulin IV infusion to keep **BS 100-150 mg/dl**	● Docusate Sodium 100mg PO BID ● Insulin per protocol if diabetic ● Sips if tolerated	● Start clear liquids ● Do not prescribe Kayaxalate for inpatients with no gut function ● **IV insulin 1-3units/h or sliding scale. Call attending if glucose>150** ● Joslin consult if diabetic-insulin per Joslin MD ● Famotidine 20mg PO daily (may use pantoprazole or omeprazole only if part of home meds) ● Docusate sodium 100mg PO BID	● Advance diet as tolerated ● Insulin per Joslin consult if diabetic ● Famotidine 20mg PO daily (may use pantoprazole or omeprazole only if part of home meds) ● Docusate sodium 100mg PO BID	● Regular diet ● Same as prior day	● Same as prior day	● Adequate PO intake
NEURO/PAIN/ COMFORT	● Anesthesia consult	● Blanket warmer on lower body	Target pain score 1-4 ● PCA Morphine 1mg IV. Lockout 6 minutes. 0 Basal 1-hr max. 10mg. **If Morphine not tolerated or ineffective:** ● Ondansetron 4mg IV q8h PRN nausea AND/OR Prochlorperazine 5-10mg IV q6h PRN nausea	Target pain score 1-4 ● Same as prior day	Target pain score 1-4 ● Same as prior day, except begin transition to PO ● Oxycodone 5-10mg PO q4-6h (1st choice) **OR** ○ Hydromorphone 1-2mg PO q4-6h **OR** ○ Hydrocodone/APAP 1 tablet PO q4-6h ● Prochlorperazine 5-10 mg PO q6-8h PRN	Target pain score 1-4 ● See prior day for transition to PO	Target pain score 1-4 ● Same as prior day	● Pain controlled on oral meds (target score 1-4)
IMMUNOSUPPRES-SION	● Mycophenolate Mofetil 1000mg PO give on Farr 10, if female <55 years old, confirm negative pregnancy test prior to giving Order "on call to OR" ● Methylprednisolone 500 mg IV **AND** ● ATG 1.25 mg/kg IV (central formulation) **OR** ● Simulect 20mg IV instead of ATG if 2 haplotype match sibling donor or recipient > 70 years old	● Methylprednisolone 500 mg IV, infuse over 20 minutes ● After Methylprednisolone and prior to reperfusion of kidney, begin ATG 1.25 mg/kg at 42 cc per hour central formulation via filtered central line and pump ● If unable to obtain central access, use peripheral formulation at same rate (over 6hrs)	● Continue ATG 1.25 mg/kg IV @42cc/h from OR ● Consider starting Tacrolimus 0.05mg/kg with target trough of 10-12mg/mL	● Mycophenolate Mofetil 1000mg q12h PO/NG ● Steroid per protocol (SEE RIGHT) ● ATG 1.25 mg/kg at 42 cc/h central formulation via central line ○ Give half dose if platelets 50,000-80,000 or WBC 2000 to 3000 ○ Hold if Platelets <50,000 or WBC <2000 ● Consider starting Tacrolimus 0.05mg/kg with target trough of 10-12mg/mL	● Same as prior day, except: ● MMF, steroid and Tacrolimus per protocol	● MMF, steroid and Tacrolimus per protocol ● If delayed graft function, continue ATG as per previous day	● MMF, steroid and Tacrolimus per protocol	● Immunosuppression medication management taught
ID	***HAND HYGIENE*** ● If Vancomycin to be used, consider administration in the holding area ● Surgical CLIP with electric razor and prep	***HAND HYGIENE*** Perioperative antibiotic prophylaxis: ● Cefazolin 2g IV within 30 min prior to incision and complete infusion before incision **OR** If life-threatening allergy to penicillin or cephalosporins or if known MRSA colonization or infection: ● Vancomycin 1 g IV x 1 dose and Levofloxacin 500 mg IV x 1 dose within 60min prior to incision and completed prior to incision	***HAND HYGIENE*** ● Post-operative dosing up to a max of 24h: Cefazolin 2g IV q8h **OR** Vancomycin 1g IV q24h **AND** Levofloxacin 500mg IV q24h (redose not needed) **Adjust antibiotics for renal function per POE as needed ● Valganciclovir 900mg PO daily adjust for renal function ● Nystatin 5cc Swish and Swallow 4X/day ● Sulfamethoxazole/Trimethoprim Single Strength 1 tab PO daily **OR** ● If sulfa allergy, wait until POD#4 and give Pentamadine 300mg via inhalation	***HAND HYGIENE*** ● Same as prior day	***HAND HYGIENE*** ● Same as prior day	***HAND HYGIENE*** ● Same as prior day	***HAND HYGIENE*** ● Same as prior day ● If sulfa allergy, Pentamadine 300mg via inhalation	
PATIENT EDUCATION/ COPING/ MENTAL STATUS/ PSYCHOSOCIAL	● RN reviews clinical pathway with patient and family ● Farr 10 RN provides handout "What to expect after your surgery for the Kidney transplant" ● Transplant surgeon to visit with patient on Farr 10 or in holding area		● RN to review volume management with patient	● Case Management consult ● Transplant medication teaching by transplant pharmacist/coordinators with patient/family ● Transplant folder given to patient ● Farr 10 RN to assess eligibility for enrollment in transplant self medication program ● Self medication and transplant care teaching	● Self medication and transplant care teaching ● Begin discharge planning	● Same as prior day ● Social worker assessment of psychosocial functioning and needs	● Same as prior day ● Transplant psychologist conducts compliance intervention with patient and primary caregiver ● Case Management evaluation for post discharge needs	Indications for Home Care Services VNA ● PT or OT recommend home PT/OT ● Home IV, antibiotics, TPN or tube feeding ● Wound Care: VAC dressings, draining wounds, wounds that require packing
ACTIVITY				● Fall risk assessment per nursing ● Out of bed to chair 3X day ● Ambulate 2X day (more often as tolerated)	● Fall risk assessment per nursing ● Out of bed to chair 4X day ● Ambulate 3X day (more often as tolerated) ● PT consult if needed	● Fall risk assessment per nursing ● Out of bed to chair 4X day ● Ambulate 3X day (more often as tolerated)	● Same as prior day	● Ambulatory for home and/or PT clearance

Discharge Checklist (Check when complete)

- ☐ Adjust Tacrolimus dose for discharge
- ☐ Adjust Valganciclovir dose for discharge
- ☐ Discharge medications available
- ☐ Arrange for routine immunosuppression drug levels and other phlebotomy
- ☐ Set up clinic appointment in 1 week
- ☐ 7Feldberg arrangements for weekend phlebotomy if needed
- ☐ Appointment for monthly Pentamadine for Sulfamethoxazole/Trimethoprim-allergic patients
- ☐ **Transplant Coordinator paged (even on weekends)**
- ☐ If ureteral stent placed, appt. to urology for removal in 4-6 weeks
- ☐ Outpatient dialysis arranged (if approp)
- ☐ Contact referring nephrologist
- ☐ SW referral (if covered)
- ☐ VNA set up (if approp)

SERVICE	NAME	PTS	PAGER	PHONE
Kidney	Betsy Gray-Chrzan	A-K	36833	2-9830
Transplant	Linda Walsh	L-Z	32125	2-9827
Coordinators	*On-Call		39756	2-9700

BIDMC "Trigger" Criteria

- Heart Rate <40 or >130
- Systolic Blood Pressure < 90
- Respiratory Rate < 8 or > 30
- SaO2 <90% with Oxygen Therapy
- Urine Output <50cc in 4 hours
- Acute Change in Conscious State
- Marked Nursing Concern

TRANSFUSION TARGET GUIDE
(after POD#2 transfuse for symptoms)

NON-BLEEDING			BLEEDING		
	Day 0	POD#1		Day 0	
Hct	>30	>28	Hct	>30	>30
Plt	>50k	>50k	Plt	>100k	>100k
	<2.0	<2.0	INR	<1.5	<1.5
	>100	>100	Fibr	>150	>150

Kidney Steroid Tapering Protocol

Methylprednisolone	☐ POD#1: 100mg IV ☐ POD#2: 50mg IV ☐ POD#3: 50mg IV
Prednisone	☐ POD#4: 25mg PO ☐ POD#5: 25mg PO

**Resume pre-op Prednisone dose POD #6 (if appropriate)*

VALGANCICLOVIR Maintenance/Prophylaxis Renal Dose Adjust

CrCl	Dose	Interval
>60ml/min	900mg	Daily
40-59ml/min	450mg	Daily
25-39ml/min	450mg	q 48h
10-24ml/min	450mg	2X/week
<10ml/min	Use Ganciclovir	

CREATININE CLEARANCE EQUATIONS

MALE

IBW=50kg+(2.3kgxea.in>60 in)_____Kg
EST. CrCl=(140-age) (IBW)/(72) (SrCr)=_____mL/min

FEMALE

IBW=45Kg+(2.3kgxea.in>60in)_____Kg
EST. CrCl=(140-age) (IBW)x(0.85)/(72) (SrCr)=_____mL/min

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