UCLA Health
POST LIVER TRANSPLANT
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Liver Transplant Coordinator II

Preparing for Discharge and Education
Discharge Planning

• Discharge Planning begins upon Admission.

• Identifying caregivers- This should take place in the pre-transplant/evaluation phase and in social worker’s biopsychosocial assessment. The Post-Transplant coordinator also assesses this again upon transplant to identify any changes in caregivers.

• Projected dates of discharge/disposition are determined on daily rounds.

• Education begins in the Pre-transplant phase and continues throughout the transplant experience.

• Post-Transplant Coordinator and Hospital Staff to start education immediately regarding Life Style, Complications, Medications, Nutrition, Diabetes, Wound care, t-tube care….etc
Signs and Symptoms of Infection include:

• Fever of 100.5 degrees Fahrenheit or higher
• Redness, swelling and/or purulent or foul smelling drainage from any wound incision or drain site
• A cough lasting longer than 2 days
• A rash or other lesion on the skin or inside the mouth
• Urinary frequency or burning
• Five or more liquid stools over 24 hours without improvement
Signs and Symptoms of Rejection include:

- Fever of 100.5 degrees Fahrenheit or higher
- Swelling or pain in the right upper abdominal quadrant
- Jaundice
- Dark Urine – the color of tea or Coca-Cola
- Light Stool – pale or clay colored
- Pruritis
- Liver Function tests will elevate well before these signs and symptoms appear. These are very LATE symptoms of rejection.
Danger signs:

- Chest Pain or Shortness of Breath, Dyspnea
- Sustained fever greater than 100.5 degrees Fahrenheit, any sign or symptom of infection.
- ANC less than 1000
- Persistent HTN
- Altered LOC or physical and mental behavior. Signs of medication toxicity such as seizure, chronic headache and severe tremors (Ex: PRES)
- Vomiting or diarrhea lasting longer than 24 hours.
- Acute abdominal pain or upper and/or lower GI bleeding
- **Acute** increase in serum Creatinine above 1.5. A magnesium less than 1.0.
- An Hematocrit less than 26 or signs and symptoms of anemia.
- Any sign or symptom of rejection or infection.
- Profuse wound drainage from an incision or drain entry site.
- An acute dehiscence of the wound.
- Dislodgement or manipulation of the T-Tube or other surgical tube or drain.
Nutrition

• Generally patients require a high protein, no added salt diet. Carbohydrate controlled diets should be given to patients with hyperglycemia. Low potassium diets should be given to patients with Hyperkalemia.

• Enteral feedings via a G-J tube are required only if the patient is unable to pass a swallow study or if oral caloric intake is not sufficient.

• Megace and/or Marinol are sometimes prescribed to increase the appetite.
Transplant Food Safety Guidelines

- High Risk Foods to Avoid:
  - Raw or undercooked meats or poultry
  - Raw/undercooked seafood
  - Raw/undercooked eggs
  - Unpasteurized (raw) milk or cheeses or other dairy
  - Unpasteurized fruit juice, cider, smoothies or homemade fermented foods
  - Cold hot dogs, dry/cured meats, jerky, or cold-sliced lunch/deli meats
  - Raw sprouts, mushrooms
  - NO grapefruit, pomegranate, starfruit and beverages containing these fruits (ex. Squirt, Fresca). These foods have an interaction with transplant medications and can affect levels.
  - No salad bar or any buffet type of eating area.
  - High potassium foods (potassium levels can be raised by transplant medications)
Transplant Food Safety Guidelines Continued

- **Safe Temperatures:** above 140 degrees F, or below 40 degrees F
- Refrigerate food within 2 hours of purchase or within 1 hour if the temperature outside is above 90 degrees F
TRANSPLANT MEDICATIONS
Tacrolimus (Prograf, FK506)

• Purpose: The most important immune suppressant used to prevent rejection of the transplanted organ.

• How Supplied: 5mg, 1mg, 0.5mg, Capsules. Also available in generic form

• Dosing and Route: given orally. Must be given on time and at the same time every day at 8AM and 8PM.

• Side Effects: Tremors, HA, Seizures, numbness of extremities, altered LOC, infection, alopecia, hyperglycemia, N/V/D, Hyperkalemia, HTN, Renal Toxicity, Hypomagnesemia, PRES (posterior reversible encephalopathy syndrome) – this is rare

• Danger Signs: a very narrow therapeutic range. If too low then rejection will occur. If too high then toxicity will occur. The signs and symptoms of toxicity are the same as the side effects only greatly increased.

• Must avoid Grapefruit, Pomegranate and Starfruit. This drug has many drug interactions. You must contact the transplant center before adding or subtracting any medication as it may affect the blood level.
Cyclosporine – Modified (Neoral, Gengraf)

- **Purpose:** Another primary immune suppressant used to prevent rejection of the transplanted organ. Used instead of Tacrolimus in certain patients who cannot tolerate Tacrolimus.

- **How Supplied:** 100mg and 25mg Capsules. Also available in generic form.

- **Dosing and Route:** given orally. Must be given on time and at the same time every day at 8AM and 8PM.

- **Side Effects:** tremors, HA, seizures, numbness of extremities, altered LOC, infection, alopecia, N/V/D, hyperkalemia, HTN, renal toxicity, hypomagnesemia, enlargement or overgrowth of gums, increased hair growth (often on face, arms & legs), elevated blood sugar (not as common as prograf), elevated cholesterol levels, oily skin, muscle and joint pain, runny nose, hot flashes, sweating.

- **Danger Signs:** a very narrow therapeutic range. If too low then rejection will occur. If too high then toxicity will occur. The signs and symptoms of toxicity are the same as the side effects only greatly increased.

- **Must avoid:** Grapefruit, Pomegranate and Starfruit. This drug has many drug interactions. You must contact the transplant center before adding or subtracting any medication as it may affect the blood level.
Sirolimus (Rapamune)

- **Purpose:** Another primary immune suppressant used to prevent rejection of the transplanted organ.

- **How Supplied:** 1mg and 2mg Pills. Not available in generic form

- **Dosing and Route:** given orally. Must be given on time and at the same time every day at 8AM, once a day dosing.

- **Side Effects:** high blood pressure, rash, acne, anemia, mouth sores, anemia, diarrhea, slow wound healing, increased cholesterol and triglyceride level, low platelet, pancytopenia, tremors, HA, seizures, numbness of extremities, altered LOC, infection, alopecia, hyperglycemia, N/V/D, hyperkalemia, HTN, renal toxicity, hypomagnesemia, hypercholesterolemia.

- **Danger Signs:** a very narrow therapeutic range. If too low then rejection will occur. If too high then toxicity will occur. The signs and symptoms of toxicity are the same as the side effects only greatly increased.

- **Must avoid:** Grapefruit, Pomegranate and Starfruit. This drug has many drug interactions. You must contact the transplant center before adding or subtracting any medication as it may affect the blood level.
Prednisone

- Purpose: A secondary immune suppressant used to prevent rejection of the transplanted organ.
- How Supplied: In 5mg tablets, this strength allows tapering.
- Dosing and Route: Starting dose is 20mg decreased in 2.5mg increments (half of a tablet). Team will provide dosing/tapering instructions. Should be given once daily at 8AM every day to prevent insomnia at night and to give better blood sugar control throughout the day.
- Side Effects: Insomnia, moonface, delayed wound healing, infection, muscle loss, osteopenia, ulcers, fluid and salt retention, blurred vision, HTN, Mood Swings, hyperglycemia, hunger, thin skin (bruising).
- Danger Signs: well tolerated if side effects are treated. Should not be discontinued all at once but must be weaned. Do not discontinue without instructions from transplant team.
CellCept (Mycophenolate Mofetil, MMF)

• Purpose: A secondary immune suppressant used in conjunction with a primary immune suppressant to prevent rejection of the transplanted organ.

• How Supplied: 250mg and 500 mg Capsules, available in generic form.

• Dosing and Route: given orally, must be given twice daily and at the same time every day at 8AM and 8PM.

• Side Effects: N/V/D. Anorexia, infection, Neutropenia.

• Danger Signs: chronic weight loss due to anorexia, Absolute Neutrophil count of less than 1000. Ongoing signs and symptoms of GI distress.
Myfortic (Mycophenolate Mofetil EC)

- **Purpose:** A secondary immune suppressant used in conjunction with a primary immune suppressant to prevent rejection of the transplanted liver. Enteric Coated to prevent the GI side effects of CellCept.
- **How Supplied:** 180mg and 360mg Capsules, not available in generic form.
- **Dosing and Route:** given orally, must be given twice daily and at the same time every day at 8AM and 8PM.
- **Side Effects:** Neutropenia.
- **Danger Signs:** chronic weight loss due to anorexia, Absolute Neutrophil count of less than 1000. Ongoing signs and symptoms of GI distress.
Immune Suppressant Absorption Guidelines:

- If the patient vomits within one hour of taking the medications or if you can see pills and capsules in the emesis, the doses must be repeated.
- If the patient vomits after one hour of taking the medications and no pills or capsules are seen in the emesis the doses do not need to be repeated.
- If a patient cannot keep medications down you must contact the liver team.
- Blood levels of Tacrolimus, Sirolimus, and Cyclosporine must be troughs. The blood for the trough must be drawn before the AM dose of the medication is given. If the patient takes the dose prior to the blood draw do not proceed with the blood draw, contact the transplant center and repeat the lab work the following day.
- These medications should be supplied to the patient to take with them on clinic days so that doses may be taken on time.
- If doses are missed you may take medications as long as eight hours exists between the current dose and the next dose. If this is not possible do not double up on the medications and notify the transplant center.
Fluconazole (Diflucan)

• Purpose: Prevents Fungal Infections
• How Supplied: 200 mg pills.
• Dosing and Route: given orally. 200mg QD for patients with renal insufficiency, otherwise 400mg QD as a single dose. Given for 42 days after transplantation of the liver. May be given for several months post heart/lung transplant to prevent certain fungal infections.
• Side Effects: generally well tolerated, but increases the levels of tacrolimus, cyclosporine and sirolimus in the blood.
• Danger Signs: This medication spares Immune Suppressants in the blood. If this medication is stopped the blood levels of Tacrolimus, Cyclosporine and Sirolimus will plummet. If the levels are not adequately followed and doses increased as indicated the patient will reject their transplanted organ. Please consult the transplant team.
• NOTE: LABS MUST BE DRAWN 3 DAYS AFTER STOPPING THIS MEDICATION
Voriconazole (V-Fend)

• Purpose: Prevents Fungal Infections. More powerful than Fluconazole and used when risk for fungal infection is greatest.

• How Supplied: 200 mg pills.

• Dosing and Route: given orally. 200mg QD for patients with renal insufficiency, otherwise 200mg BID. Given for a minimum of 42 days after transplantation for liver patients. May be given to heart/lung transplant patients for several months or lifetime depending if prior or current fungal infection/colonization.

• Side Effects: generally well tolerated but will increase blood levels of tacrolimus, cyclosporine and sirolimus.

• Danger Signs: This medication spares Immune Suppressants in the blood. If this medication is stopped the blood levels of Tacrolimus, Cyclosporine and Sirolimus will plummet. If the levels are not adequately followed and doses increased as indicated the patient will reject their transplanted organ.
Valganciclovir (Valcyte)

- Purpose: to prevent viral infections especially CMV infection.
- How Supplied: 450 mg pills.
- Dosing and Route: given orally, 450 mg. once daily for patients with renal insufficiency, 900 mg. once daily with normal renal function.
- Side Effects: generally well tolerated but can cause neutropenia.
- Danger Signs: Neutropenia, Absolute Neutrophil Count less than 1000
Posaconazole (Noxafil)

- **Purpose:** Prevents fungal infections.
- **How Supplied:** 100 mg pills or suspension. (brand name only, very expensive)
- **Dosing and Route:** Given orally. 300 mg QD. Given for several months post-transplant or lifetime depending if prior or current fungal infection/colonization.
- **Side Effects:** Generally well tolerated. Increases blood levels of tacrolimus, cyclosporine and sirolimus.
- **Danger Signs:** Do not stop this or any antifungal (even for a couple of days) without increasing dose of tacrolimus, cyclosporine or sirolimus as there is a drug interaction that increases these levels. If the immunosuppressant levels are not adequately followed the patient could reject their transplanted organ. Please consult transplant team.
Bactrim DS (sulfamethoxazole/trimethoprim)

• Purpose: Prevention of Pneumocystis jiroveci PNA (formally called Pneumocystis Carinii Pneumonia)

• How Supplied: 800/160mg tablets.

• Dosing and Route: Given orally.

• For liver patients: Given on M/W/F for patients with renal insufficiency, given once daily for normal renal function. If patient is taking Coumadin and has renal insufficiency the dose will be ½ a tablet daily.

• For heart/lung patients: given once daily on M/W/F or BID on M/Th only. Stopped after first year for heart patients, indefinite for lung patients.

• Side Effects: rash, sensitivity to sunlight, stomach irritation (give with large glass of water and food), neutropenia, thrombocytopenia.

• Danger Signs: signs and symptoms of allergic reaction, absolute neutrophil count of less than 1000. If patient has Sulfa allergy, will give Dapsone or Mepron instead. Some heart/lung recipients have formal desensitization to Bactrim in the hospital so they can take this medication (team will let you know).
Atovaquone (Mepron)

- Purpose: Prevention of Pneumocystis jiroveci PNA (formally called Pneumocystis Carinii Pneumonia), used when Bactrim is not tolerated.
- How Supplied: 750 mg (5cc suspension). Normal dose 1500 (10mL) daily.
- Dosing and Route: Given orally. Given twice daily.
- Side Effects: generally well tolerated.
- Danger Signs: generally well tolerated.
Dapsone

• Purpose: Prevention of *Pneumocystis jerovici pneumoni* (PJP), used when Bactrim or Mepron is not tolerated.

• How Supplied: 50 mg and 100 mg tablets

• Dosing and Route: Usual dose is 100 mg daily.

• Side Effects: Generally well tolerated.

• Danger Signs: Generally well tolerated.
Tenofovir (Viread)

- Purpose: to prevent re-infection of the transplanted liver with Hepatitis B virus.
- How Supplied: 300 mg pill
- Dosing and Route: given orally once daily.
- Side Effects: generally well tolerated.
- Danger Signs: A dose reduction is required for patients who develop renal insufficiency: a sustained GFR of 70 or less.
Vemlidy

- Purpose: to prevent re-infection of the transplanted liver with Hepatitis B virus.
- How Supplied: 25 mg pill
- Dosing and Route: given orally once daily with food.
- Side Effects: generally well tolerated.
- Other: cannot be used for patients with renal impairment
Ursodiol (Actigall)

• Purpose: Thins bile and facilitates flow of bile through narrowed bile ducts, also helps prevent biliary sludge and stones.
• How Supplied: 250mg and 300 mg pills.
• Dosing and Route: given orally twice daily or three times a day.
• Side Effects: generally well tolerated.
• Danger Signs: generally well tolerated.
Blood Pressure Medications

• Metoprolol (Lopressor)
  • Purpose: a beta blocker used to control HTN
  • How Supplied: 12.5 to 125 mg tablets
  • Dosing and Route: Given orally twice daily
  • Side Effects: Hypotension, Fatigue, Dizziness, Bradycardia
  • Danger Signs: measure blood pressure and pulse before giving and hold for a BPS < 110 or a heart rate of < 60.

• Amlodipine (Norvasc)
  • Purpose: Calcium Channel Blocker used to prevent HTN.
  • How Supplied: 5 and 10 mg tablets.
  • Dosing and Route: given orally once daily.
  • Side Effects: hypotension, fatigue, dizziness
  • Danger Signs: measure blood pressure before giving and hold for a BPS < 110. Adjustments in the dose of this medication can also affect the immunosuppressant medication blood level.
Baby ASA (81mg)

- Purpose: prevents clot formation in the hepatic artery and elsewhere.
- How Supplied: 81 mg. tablets.
- Dosing and Route: given orally once daily with food.
- Side Effects: increased risk for bleeding and stomach ulcers.
- Danger Signs: must be held for five days prior to any invasive procedure.
Warfarin (Coumadin)

- **Purpose:** Blood thinner
- **How Supplied:** 1 mg, 2 mg, 5 mg tablets
- **Dosing and Route:** Given orally once daily at bedtime. Monitored by INR blood testing (normal therapeutic range 2.0-3.0 unless otherwise ordered)
- **Side Effects:** Bleeding, including GI bleed
- **Danger Signs:** Watch for sudden anemia, altered mental status, new large bruises. Multiple food interactions can affect INR
Furosemide (Lasix)

- **Purpose**: diuretic used to remove excess fluid.
- **How Supplied**: generally prescribed by the transplant center in 20 mg. pills
- **Dosing and Route**: given orally, given in the Morning usually as a single dose so that diuretic effects will have worn off by bedtime. If ordered as twice daily the last dose should be given prior to 3PM to avoid excessive voiding during bedtime.
- **Side Effects**: hypovolemia, hypokalemia, increases the work of the Kidney.
- **Danger Signs**: signs and symptoms of dehydration, hypokalemia. Hyperkalemia may result if lasix is stopped abruptly. Can cause permanent hearing damage so hearing loss should not be ignored.
Pravastatin (Pravachol)

• Purpose: Statin medication to lower cholesterol
• How Supplied: 10 mg, 20 mg and 40 mg pills
• Dosing and Route: Given orally, at bedtime.
• Side Effects: Liver dysfunction, muscle pain or weakness
• Danger Signs: Can cause liver failure (rare) so monitor for jaundice, dark urine. Rhabdomyolysis (muscle breakdown) characterized by fever, dark urine and weakness. Serum CPK totals and/or LFT’s will be elevated and medication should be stopped immediately
Fludrocortisone (Florinef)

- Purpose: A glucocorticoid produced naturally by the body that exchanges sodium for potassium in the kidney, lowering potassium levels in the body.
- How Supplied: 0.1 mg pill
- Dosing and Route: given orally once daily
- Side Effects: water and sodium retention and HTN.
- Danger Signs: Hypokalemia, HTN, Hypervolemia, may not be effective in cases of renal insufficiency.
Docusate Sodium (colace)

- **Purpose:** stool softener
- **How Supplied:** 100 mg capsules
- **Dosing and Route:** given orally one to two capsules once or twice a day PRN for constipation. Should be given with narcotics unless diarrhea results.
- **Side Effects:** generally well tolerated.
- **Danger Signs:** diarrhea or continued constipation with no bowel movement produced within 48 hours.
Narcotics (Vicodin, Ultram, Oxycodone, Oxycontin, Fentanyl Patches)

- Purpose: relief of pain.
- How Supplied: varies depending on product
- Dosing and Route: varies depending on product
- Side Effects: somnolence, respiratory depression, anorexia, nausea, constipation
- Danger Signs: respiratory depression, constipation, altered level of consciousness, weight loss, failure to thrive
Insulins – fast acting (Humalog, Novalog)

- **Purpose:** to treat hyperglycemia, fast acting, begins to act within 10 minutes, peaks in one hour and lasts four hours.
- **How Supplied:** injectable
- **Dosing and Route:** given SC TID before meals, using set doses or a sliding scale.
- **Side Effects:** Hypoglycemia
- **Danger Signs:** Hypoglycemia, altered level of consciousness
Insulins – Regular (Humulin and Novalin)

- Purpose: to treat Hyperglycemia, onset in 30 min, peaks at 2-3 hrs and lasts 3-6 hours
- How Supplied: injectable
- Dosing and Route: SC TID AC
- Side Effects: Hypoglycemia
- Danger Signs: Hypoglycemia, altered level of consciousness
Insulins – Long Acting (Lantus, Levamir, Detemir)

- Purpose: to treat Hyperglycemia
- How Supplied: injectable
- Dosing and Route: Given SC once daily either at HS or in AM depending on pattern of hyperglycemia, may also be ordered as BID.
- Side Effects: Hypoglycemia
- Danger Signs: Hypoglycemia, altered level of consciousness
Magnesium Plus Protein (MgPlus)

• Purpose: Magnesium bound with protein to facilitate absorption in the gut, to treat hypomagnesemia.

• How Supplied: 133 mg tablets.

• Dosing and Route: given orally usually three to four times a day. One 133mg tablet of MagPlus is equivalent to 400 mg. of Magnesium Oxide. Maximum oral dose is 9-16 tablets a day. Should be given at the same time every day so that blood levels of immune suppressant medications are not affected.

• Side Effects: Nausea if taken on an empty stomach, diarrhea.

• Danger Signs: if the blood level of magnesium is too high diarrhea will result, an infection in the gut must be ruled out with stool cultures for any case of ongoing diarrhea.
Magnesium Oxide

• Purpose: Magnesium used to treat hypomagnesemia. Usually used in conjunction with MgPlus, when the maximum dose of MagPlus does not provide a normal blood magnesium level.

• How Supplied: 400 mg tablets.

• Dosing and Route: given orally usually two to four times a day. Should be given at the same time every day so that blood levels of immune suppressant medications are not affected.

• Side Effects: Nausea if taken on an empty stomach, diarrhea.

• Danger Signs: if the blood level of magnesium is too high diarrhea will result, an infection in the gut must be ruled out with stool cultures for any case of ongoing diarrhea.
MVI and Nephrovite

- Purpose: to supply multiple vitamins to a cachectic and debilitated patient.
- How Supplied: a standard tablet
- Dosing and Route: given orally once daily.
- Side Effects: generally well tolerated, the amount of iron in a multiple vitamin is not dangerous to the transplanted liver. Nephrovite should be used when renal insufficiency exists.
- Danger Signs: generally well tolerated.
PPI’s (Omeprazole, Lansoprazole, Esomeprazole, Pantoprazole)

- **Purpose:** to prevent stomach ulcer and gastritis in patients taking Prednisone and CellCept.
- **How Supplied:** varies according to brand.
- **Dosing and Route:** given orally QAM before the first meal of the day.
- **Side Effects:** generally well tolerated, may cause diarrhea and altered vitamin and mineral absorption with long term use.
- **Danger Signs:** generally well tolerated.
Medication Interactions

- Immunosuppressive medications are metabolized by the Liver’s Cytochrome P450 enzymatic pathways.

- Many medications Induce or Inhibit this pathway causing increased or decreased blood levels of tacrolimus, cyclosporine and sirolimus. Levels that are too high or too low can cause toxicity or rejection.

- The most significant of these are Biaxin and Erythromycin. These medications are NEVER to be given.

- The transplant center must be notified if antifungal medications and calcium channel blockers are added to the patient’s medication regimen. Additionally, we instruct patients to notify us if any new medications are added.
Over the Counter Medications

- Many OTC medications are compounded with medications that can interact with or increase the side effects of standard transplant medications.

- Medications containing Psuedoephedrine and Phenylpropanolamine must be avoided. A six hour nasal spray can be used as directed for nasal congestion.

- Medications for indigestion that are safe to use on a short term basis are calcium carbonates such as TUMS. Medications containing aluminum or magnesium such as MOM should be avoided.

- Medications that are safe to use to treat diarrhea include Kaopectate and Pepto Bismol. Medications such as Immodium that decrease gastric motility must be avoided until a gut infection is ruled out with stool cultures.

- Any medications containing aspirin or NSAIDs must be avoided, acetominophen is safe to use as directed.
Over the Counter Medications

- Herbal medications are not recommended at all as the interactions are unstudied and unknown.
- Multivitamins or other supplements are generally safe but should be approved by the transplant team.
- Most OTC allergy medications are safe to use with approval by the transplant team.
Other Patient Care Issues

• Staples, Sutures, Drains and Tubes will be removed by the Transplant Center during clinic visits.

• Fresh flowers and plants are allowed in patient rooms however the water tray must be kept dry and should not be handled by the patient. Fresh flowers should be discarded after two days.

• Bottled water is preferred. Municipal city water is allowed. No Showering while in a facility.

• If pets are allowed in patient rooms the patient must perform hand washing after the visit and should not directly handle pet waste.

• Patients are NOT to have any contact with birds
Other Patient Care Issues

- The patient must receive antibiotic prophylaxis prior to any dental visit. Dental work is discouraged until the patient’s prednisone dose is at 5 mg per day or less. An active dental infection should be treated.

- Eye exams are discouraged until the patient’s prednisone dose is 5 mg per day or less. Prednisone will affect the patient’s corrective lens prescription and will result in incorrect treatment.
Other Patient Care Issues

- The patient must limit his exposure to direct sunlight. A sunscreen with SPF of 15 or greater must be used on exposed skin.
- Hats, long sleeve shirts and long pants should also be worn.
Vaccines

• No live virus vaccines should be given to the patient.
• Killed virus vaccines such as the flu vaccine and the pneumovax vaccine are allowed after 6 months from transplant. Patient should not get the nasal “flu mist”.
• Patient cannot have a shingles vaccine (live virus) and cannot be near a family member with active shingles (lesions must be dry). Shingrix-no
• If patient plans to travel overseas at some point, they will need a UCLA Travel Clinic appointment to arrange appropriate vaccines or vaccine alternatives
• Recommended vaccines post-transplant:
  • Influenza yearly (inactivated only)
  • Tdap (tetanus/diphtheria/pertussis), Pneumococcus: Pneumovax (PPSV23) and Prevnar (PCV13), Hepatitis B (If have not had pre-transplant)
Care of the T-Tube

- The t-tube splints the fragile bile duct anastamosis and is not removed for three to six months after transplant.
- A suture secures the t-tube to the skin at the entry site.
- If the suture is not intact the tube can be dislocated. If the tube is pulled out more than 1 inch it can fail to drain the biliary system and bile peritonitis can result. Bile Peritonitis is a life threatening event.
- If the t-tube is dislocated or if the suture is no longer intact the t-tube must be secured to the skin with tape to prevent further movement in or out of the entry site. Notify UCLA immediately.
- If the t-tube begins to leak bile secure the t-tube and page UCLA immediately.
T-Tube Dressing Care

T-Tube dressing care must be done once a day, preferably after you have taken a shower.

- **SUPPLIES**
  1. Sterile applicators saturated in alcohol
  2. Sterile applicators saturated in betadine
  3. 2 x 2 sterile gauze pads
  4. Paper tape

- **INSTRUCTIONS**
  1. Wash hands thoroughly.
  2. Clean work area with soap and water or household cleaner.
  3. Set up supplies.
  4. Remove old dressing and discard.
  5. Wash hands thoroughly.
  6. Starting at the exit site, firmly press an alcohol swab in a circular motion around and away from the catheter exit site.
  7. Repeat step 6 with remaining 2 alcohol swabs and then with the 3 betadine swabs.
  8. Allow area to dry.
  9. Cover exit site with 2 x 2 sterile gauze pad and secure with tape.
  10. Notify your coordinator if the stitch holding the T-Tube breaks or falls off.
  11. Notify your coordinator if fluid starts draining from around the tube.
  12. Notify your coordinator if the rubber tube becomes open, it must be capped or connected to a bag if ordered by the doctor.

- **RESTRICTIONS**
  While you have a T-Tube in place you are not allowed to take a bath, go swimming or use a hot tub.
Wound Care
Diabetes

• New onset

• Diabetic Education to patient and caregivers
  a. glucose monitoring
  b. insulin administration

• Diabetic Supplies to be ordered (types depend on insurance) prior to discharge
Dialysis

• If a patient requires dialysis, an access catheter will need to be placed and used prior to discharge.
• Hepatitis B serologies will need to be obtained days in advance to secure a dialysis chair at a Dialysis Center.
ADMISSION CRITERIA FOR PROVIDENCE FACILITIES

Rehabs

Sub-Acute Rehab
1. Patient’s condition warrants 24-hour access to nursing care by a registered nurse.
2. Patient must meet one of the following:
   a. Patient has a trach and requires mechanical ventilation 50% of a 24-hour period.
   b. Patient has a trach and requires suctioning and room air mist or oxygen and one of the treatment procedures listed below:
      i. TPN
      ii. PT/OT and/or speech therapy at least two hour per day, five days per week
      iii. Tube Feedings
      iv. Respiratory Therapy treatments at least 4 times per 24 hour period
      v. Continuous or intermittent IV therapy via a peripheral or central line
      vi. Wound Debridement, packing and medicated irrigation with or without whirlpool therapy
   c. Administration of any three of the six treatment procedures listed above

Acute Rehab
1. Requires two types of therapy (PT/OT/ST) and is able to participate in a minimum of three hours of therapy every day.
2. Requires 24-hour rehab nursing for medical management and reinforcement of functional activities including night ADL and bowel and bladder programs.
3. Is able to follow simple instructions.
4. Has an identified discharge plan for home or the functional potential to go to a community setting such as assisted living or board and care.
5. Has a qualifying diagnosis:
   a. Stroke, brain or spinal cord injury
   b. Neurological Disorder (Parkinson’s, MS, Polyneuropathy, Guillain Barre)
   c. Orthopedic Condition (hip fracture/Joint replacement)
   d. Multiple Trauma Injuries
   e. Amputation
   f. Severe Debility

SNF (Transitional Care Unit) must include one or more of the following:
1. Respiratory Care.
   a. Maximum of four RT treatments in a 24-hour period
   b. Suctioning no more than every four hours.
2. Post-Operative Care
3. Pain Management – Comfort Care
4. Surgical wounds, or decubitus ulcers requiring wound management (patients with wound vacs will be assessed on a case by case basis)
5. Rehab Treatment (PT/OT/ST) daily (Sunday excluded)
6. Requires assessment no greater than every four hours, including neuro checks and vital signs.
7. Must have had a bowel movement within last 72 hours.
8. Intermittent or continuous tube feeding, TPN/lipids. No more than 3 different IV meds including PRNs.
9. Clamped only chest tubes with plan to remove in TCU, other drains to gravity or bulb suction (case-by-case basis).
10. Labs and X-Rays no more than daily.
11. Routine bedside or outside dialysis
12. Contact isolation if bed available.
13. 24-hour sitter
Potential Post-OLT Psycho-Social Concerns May Impact Rehab

- Donor guilt
- Stress
- Risk of long-term complications
- Finances (medications & follow-up care are expensive)
- Travel/moving to transplant location
- Medication side-effects
Medication Side Effects

- Weight gain/redistribution of body fat
- Proximal muscle weakness
- Impaired wound healing
- Glucose-intolerance/diabetes
- Osteoporosis
- Bone necrosis
- HTN
- Tremors
PT/OT Implications of OLT

• Disease process often leads to inactivity, resulting in muscle atrophy & limited strength & endurance.

• Immediate post-OLT state involves hypermetabolism w/ increased protein breakdown associated w/ glucocorticoid use.

• Potential for pathological fractures due to osteoporosis related to medications and disease process.

• PT/OT orders need to be placed early.
PT/OT Implications Continued

- Most common post-OLT complaints:
  - Proximal weakness, general deconditioning, fatigue & bone/joint discomfort,

- Pulmonary complications:
  - Diaphragm dysfunction
  - Increased fluid status

- Organ transplant recipients who engage in regular physical activity score higher on quality of life measures.
Goals of PT/OT Post OLT

• Improve pulmonary function
• Promote circulation to avoid DVT
• Return to independent ADLs & IADLs
  • Energy conservation due to decreased endurance/decreased exercise capacity

*Often have difficulty w/ sit to stand from low surfaces due to decreased proximal strength impacting all aspects of mobility and ADLs
Important Considerations When Mobilizing Patients Post-OLT

• Perform bed mobilization using log-roll technique to protect chevron incision & to promote healing of abdominal muscles

• Patient’s typically on Heparin
  • Increased risk of bleeding.

• Patient’s often require post-op HD
  • Often causes fatigue
  • Will have dialysis catheter (may be femoral or IJ)
  • CVVHD restrictions: avoid kinking femoral line & monitor patient for orthostatic hypotension
Important Considerations When Mobilizing Patients Post-OLT

- Pin drains to clothing to avoid pulling or accidental removal (may only have T tube upon dc to rehab)
- Place gait belt on chest above Chevron incision
- Osteoporosis & bone necrosis present increase risk for fracture
- Watch for incisional drainage
- May need to monitor labs: hgb, K, INR
Telehealth

• Using iPads and the Zoom Program (which has now been integrated in CareConnect) we are able to remotely round on patients in facilities once or twice weekly

• Telehealth Assessments include
  • Vital Signs, Daily Weight
  • Appetite, caloric intake, blood sugar control, bowel habits
  • Progress towards Physical Therapy Goals
  • Direct Visual assessment of incisions, t-tube sites, drains, tubes, wounds, lower extremity edema and mental status.
  • Any old or new issues can be addressed during a telehealth session.
Telehealth

- Telehealth also gives the patient more confidence in his care and makes him feel more connected with the transplant team.
Clinic/Lab Schedule

Post-Surgical Clinic every Thursday x 4 weeks
Post-Hepatology Clinic every other Tuesday x 2 weeks
    then every 4 weeks (advanced per Hepatologist)

Lab schedule
    1-2 times per week for 4 weeks
    advances to weekly then to monthly as labs stabilize and graft matures.
Pathway

• **Elevated Liver Function Test Pathway**-designed and implemented in order to address possible rejections episodes rapidly and to decrease ER admissions
  - Urgent ultrasound of liver
  - Urgent Liver biopsy of liver

• **ER referral**- streamlines ER admissions and also facilitates communication between the ER and the Liver Transplant Service.

• **Direct admissions**- Whenever possible utilized in order to cut down on ER saturation.
Summary

Education (identify caregivers)

Complications (infection and rejection)

Nutrition

Medications

Patient Care Issues (Lifestyle, wound care, t-tube, pets, vaccines..etc)

Diabetes

Dialysis

Physical Therapy/ Occupational Therapy

Clinic and lab follow-up