UCSF Liver Transplant Anesthesia OR Setup Guide

V 5.0;

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The original "handbook" has evolved continuously since the first liver transplant at UCSF in 1988 and was created by former members Jeffrey White, Denna Washington, and Scott Kelley.

(Please also refer to the “Goals and Objectives for Anesthesia Residents on the Liver Transplant Service” document for additional background information under “Clinical Resources” – “Transplantation”)

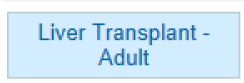
General Considerations:

1. ALWAYS preoxygenate!
2. One adequately running peripheral IV is usually sufficient to start the case.
3. Rapid sequence or modified rapid sequence induction with Propofol and Rocuronium.
4. Maintenance w/ Sevoflurane/Fentanyl and a Cisatracurium or Rocuronium infusion.
5. Consider premedication with Midazolam in patients who are very anxious (only in the absence of hepatic encephalopathy).

Contents:

1. Medications to Order & Charting

- Order the following medications from pharmacy as soon as you start setting up:
    - Albumin 5%, 2-3L (500ml x4-6, discuss w/ attending)
    - Octreotide 500mcg/vial. One vial for most deceased donor livers, two for living donor cases
    - Insulin 1unit/ml, 100-unit bag
    - Ask the anesthesia tech to pick them up
- The circulating nurse will provide Zosyn (3 vials / 3.375g) and Methylprednisolone (1 vial 500mg). Verify that the patient is not already on regularly scheduled antibiotics.
- Please use the "*Liver Transplant - Adult*" macro



- Use the barcode scanner to document blood products. Scan PRBCs before they are washed or hung for administration. Use the default volume for blood products (300 ml for PRBCs, 250 ml for FFP & PLT). Do not use 301/251 ml.

- Please make sure all infusions are charted with the correct units (mcg/kg/min vs. mcg/min) - it's easy to get these wrong in Apex.

2. Liver table & auxiliary equipment

- 8 syringe pumps, 1L NS carrier on micro-dripper, 8 stopcocks, extension, assembled and provided by anesthesia techs.
- In high blood loss cases ask for 3 additional pumps to be placed on the IV pole on the patient's right (for PCC/Fibrinogen and Dextrose).
- Make sure all 3-way stopcocks on the liver table are de-aired.
- Use Alaris caps on the syringes to make it easy to refill when needed. The infusion line connects to the side port of introducer, VIP port or triple lumen catheter.
- Blue and purple top tubes for CBCs, Coags and lots of ABG syringes
- 2 or 3 hot lines with Plasma-Lyte (1 or 2 on liver table and 1 on IV pole on patient's right, discuss w/ attending based on case complexity and hot line supply)
- Liver auxiliary cart should be in the room (contains extra medications, syringes, and equipment for lines)

- Triple transducer
- Zoll pads for defibrillator
- Radiometer ABL ABG machine (make sure it's plugged in!)
- Ultrasound
- Consider TEE probe

3. **Infusions**

- **Norepinephrine:** 4mg in 250mL NS to make 16 mcg/ml. Draw up in 60mL syringe.
    - Set pump at 0.04 mcg/kg/min.
    - Draw up a 10 mL syringe for the back table.
- **Calcium:** Draw up 2 vials of 100mg/mL in a 30mL syringe (5 vials in 50ml syringe for high blood loss case).
    - Set infusion at 500mg/hr.
    - Draw up 10mL syringe for back table.
- **Fentanyl:** 10mL of 50mcg/ml. Use for induction, then set pump at 100mcg/hr. Average patient receives about 750mcg fentanyl by end of case.
- **Paralytic:** Rocuronium or Cisatracurium infusion (consider cisatracurium if compromised renal function):
    - 10mL of 10mg/ml Rocuronium. Set infusion at 5 mcg/kg/min OR
    - 10mL of 2mg/ml Cisatracurium. Set infusion at 1 mcg/kg/min
- **Octreotide:** Used to reduce portal HTN. Each vial contains 500mcg. Dilute 1 vial in 50ml NS to make 10mcg/ml. Set infusion at 100mcg/hr. Then go to options— bolus and set a 100mcg bolus over 15 mins. When the bolus is done, the pump will automatically start the infusion if you set it this way.

Variations:

- **Vasopressin:** 1unit/ml (20ml syringe), for sicker patients

Please set up the infusions on the liver table with vasopressors/inotropes preferentially on the right side closer to the patient. Example:

Left:	**Right:**
Fentanyl	Norepinephrine
Paralytic	Vasopressin (if needed)
Octreotide	Calcium chloride
Insulin (if needed)	Zosyn

4. **Back table medications/induction**

- **Antibiotic:** Zosyn 3.375g over 30 minutes, re-dosed every 2 hours (3 doses total). If compromised renal function, re-dose at 4-hour intervals if CrCl 10-

50mL/min and 8-hour intervals if CrCl <10mL/min. Discuss dosing changes with attending and refer to adult antimicrobial surgical prophylaxis guidelines for further details.
If severe penicillin allergy, vancomycin and aztreonam are the antibiotics of choice.

- Draw up 3 vials of zosyn 3.375g in one 60cc syringe
- Program intermittent bolus (infuse over 30 minutes with 2 hours between starts, 3 doses total).
- Use a separate port (or PIV) (intermittent bolus will affect your infusion speed).

- **Methylprednisolone:** (Solumedrol) 500mg IV over 30 minutes
  - Dilute in 100ml NS bag with micro-dripper, or 50ml syringe pump
  - Administer through a separate port as it precipitates with other infusions!
- Induction medications
  - Propofol
  - Lidocaine
  - Rocuronium
  - Esmolol
  - (Fentanyl rarely)
- Additionally:
  - Epinephrine 10 mcg/ml x2 syringes [please make a 100-cc bag!]
  - Norepinephrine 16 mcg/ml x1 syringe
  - Phenylephrine 100 mcg/ml x1 syringe
  - Calcium 100 mg/ml x1 syringe
  - Glycopyrrolate 0.2 mg/ml x1 syringe
- Verify to be in room:
  - Code-dose 1mg epinephrine vials
  - Ample supply of calcium chloride 100mg/ml vials
  - Vasopressin vials
  - Atropine syringe box

5. **Airway/Equipment setup**
   - Heated, humidified circuit filled with sterile water
   - Working laryngoscope
   - Size 7.0 or 7.5 ETT. Consider ETT with subglottic suction if high likelihood of postoperative intubation

- Oral airway
- Tegaderm for eyes
- OG tube
- SedLine forehead sticker

6. Lines

Standard liver setup includes (usually in this order)

- 20g left radial arterial line
    - US guided, <u>do not go through and through</u> – high risk of hematoma formation with coagulopathy
- 14g or 16g right upper extremity PIV volume line
- 7 French left antecubital rapid infusion catheter (RIC)
    - Placed with prep, sterile blue towels, and gloves
- Central Line: PSI (7 French), MAC (9 French), or trialysis catheter in right internal jugular

7. Monitors

- Standard ASA Monitors
    - Typically, a temp Foley is placed
- A-line
- CVP
- Zoll pads
- 3rd pressure channel occasionally used to check portal pressures (routine in living donor cases)

8. Starting the case

- Position on table: supine (right arm will be tucked and left arm out on an arm board). Perform frequent position checks and ensure no cables beneath patient's head or on pressure points as long cases are high risk for pressure injuries and pressure alopecia.
- Place 18Fr OG after all lines are in
- Temperature control: Heated humidified breathing circuit (provided by anesthesia tech), 2 or 3 hotlines, forced air warming (the circulator usually takes care of this, please double check), and Gaymar underbody warmer.

9. **Labs**
    - **ABGs** will be run in the room (no order needed)
    - For "**labs**", order the following STAT tests (instead of CBC and OR Coag Panel – faster turnaround time this way!):

        (1 blue citrate tube & 1 purple EDTA tube)

        - Platelet count
        - PT & INR
        - Fibrinogen, Functional

    Please use Collection Manager to label the vials. Call your anesthesia tech to pick up the tubes and remind them to take the samples to the 5th floor lab for priority processing.

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