Primer on Living Liver Donor Care:

A small team of anesthesiologists care for living liver donors at the University of Colorado. Each member is considered an expert in the field.

Anesthesiologists who care for living liver donors use the following steps to guide care.

Preoperative

All living liver donor candidates meet with an anesthesiologist at least 48 hours in advance of surgery in order to review the patient's history and physical, obtain informed consent and address any remaining questions or concerns candidates may have about anesthesia care.

Pain Management

The University of Colorado has a protocol to treat postoperative pain. The protocol is modified by experts in the field of acute pain and transplant surgery as new evidence emerges about the efficacy and safety of pain management in living liver donors.

All pain management should adhere to the current recommendations.

Real time communication regarding pain treatment plans helps the acute pain, intraoperative and surgical team provide safe and effective care. Please have a preoperative huddle with key members of all 3 teams to confirm or modify the pain plan.

Intraoperative Care

Transfer to the OR: All sedation should be held until the organ verification is completed for ABO and donor and recipient identification in the Operating Room. The verification information should be recorded in the events section under "Transplant" and the "Organ Type".

Anti-emetics: Living liver donors have a high incidence of postoperative nausea and vomiting. They can be categorized as high risk and pre-emptively treated appropriately. Treatment includes dexamethasone (4 mg) following induction of anesthesia

and Ondansetron (4mg) at the end of surgery. For patients of female gender or age < 30 years a Scopolamine patch can be added. Neuroleptic-based drugs such as promethazine are avoided and only considered after all other therapies fail.

Anxiolysis: Lorazepam is a long acting benzodiazepine that may provide better anxiolysis with less sedation than midazolam.

Prophylactic Anticoagulation: The surgical team may ask the anesthesiologist to administer heparin to the donor as a onetime dose just prior to clamping the hepatic vessels. The average dose is 1000-1500 units. The administered dose is the decision of the attending surgeon. Please confirm the dose of heparin verbally with the surgeon before administering. The team should send a TEG with and without Heparinase within 30 minutes of case completion.

Blood Salvaging: Two techniques are used to limit the use of banked blood in all cases.

1) Cell Saver: Please ensure cell saver is available for each case.

2) Normovolemic Hemodilution: One unit of autologous whole blood is recovered during surgery and placed into a blood recovery bag containing anticoagulant and provided by pharmacy. The blood requires agitation during the case on a mechanical shaker to prevent platelet aggregation. The autologous unit should only be held for 4 hours. Therefore, timing for blood recovery should be decided based on the progress of the resection. Return of all salvaged blood should be a team decision between anesthesia and surgery. Please see instructions below on how to perform Normovolemic Hemodilution.

Intra operative monitoring: Consists of an arterial line, central venous access with a 9F triple lumen and Flo Trac.

All invasive monitors should be discussed with the surgical team prior to proceeding.

Four units of Type and Crossed blood should be held in the room in a standard cooler provided by the blood bank. The units should be checked and contain two signatures prior to or at the start of the case

Communication is an essential aspect of intraoperative care. The attending anesthesiologist should check in with the surgical team before leaving the room to be sure no operative problems are anticipated. The living liver donor should be the **only room assignment** for the attending. Anesthesiologist. Therefore, the resident and attending anesthesiologist can

provide each other with breaks. This eliminates the need for other providers to assume temporary care of the patient.

Helpful Hint: A) The response of living liver donors to opioids and muscle relaxants may change dramatically due to removal of liver mass and a reduction in the volume of drug distribution. This can cause an unexpected increase drug action with over sedation and difficulty in neuromuscular reversal.

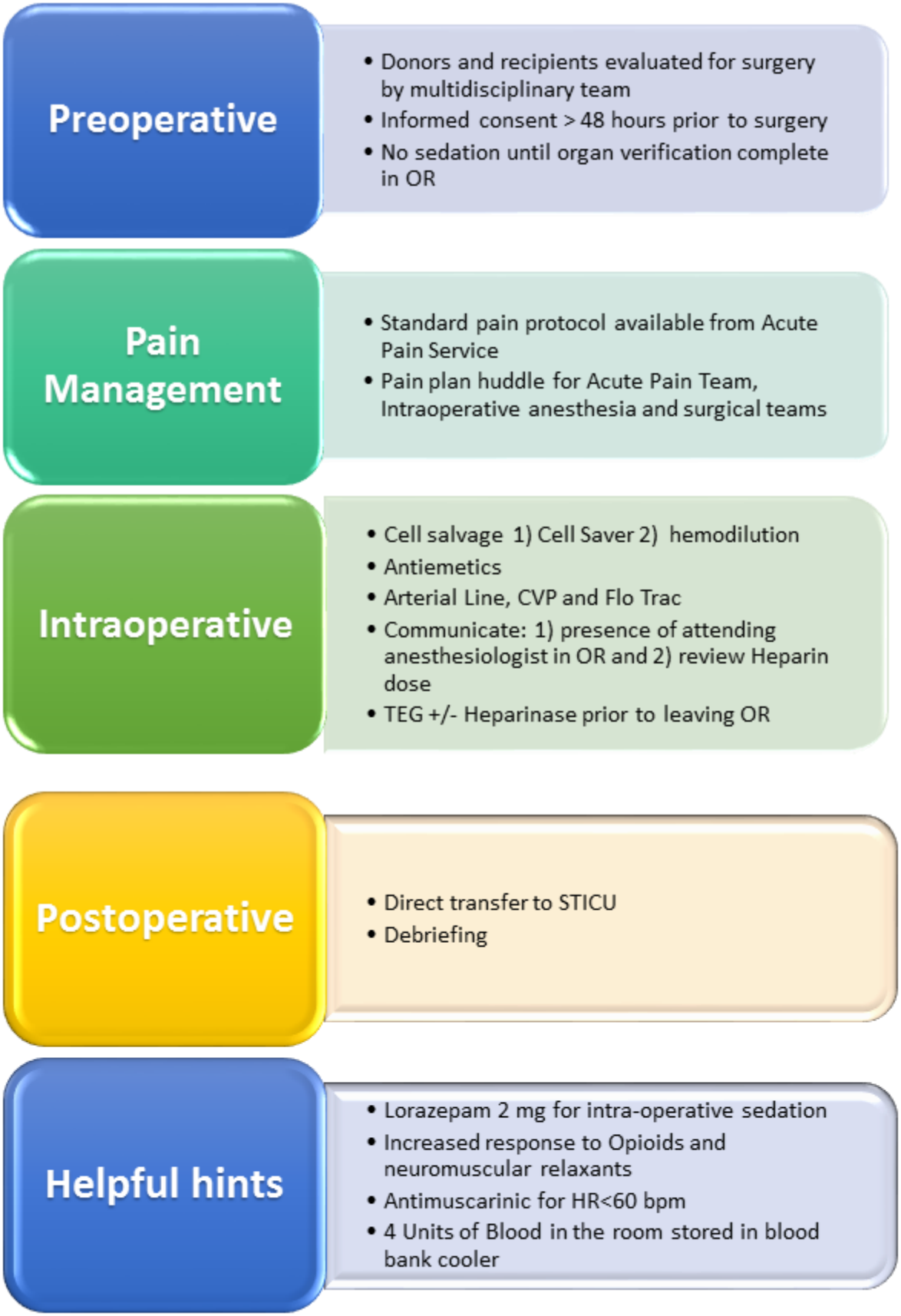
B) Healthy donors may have an exaggerated reduction in heart rate and blood pressure during insufflation for a laparoscopic assisted resection. Pre-treatment with an antimuscarinic is indicated for laparoscopic procedures when the heart rate is less than 60 bpm. Glycopyrolate is the drug of first choice. Dosing may be modified by the use of other drugs in this class including Scopolamine and Ipratropium Bromide.

Postoperative

All patients with an uneventful surgery can be extubated and transferred directly to the STICU

Debriefing

A questionnaire will be sent to the surgical and anesthesia attending for quality improvement. Please complete the form and return it as soon as possible


Preoperative
• Donors and recipients evaluated for surgery by multidisciplinary team
• Informed consent > 48 hours prior to surgery
• No sedation until organ verification complete in OR
Pain Management
• Standard pain protocol available from Acute Pain Service
• Pain plan huddle for Acute Pain Team, Intraoperative anesthesia and surgical teams
Intraoperative
• Cell salvage 1) Cell Saver 2) hemodilution
• Antiemetics
• Arterial Line, CVP and Flo Trac
• Communicate: 1) presence of attending anesthesiologist in OR and 2) review Heparin dose
• TEG +/- Heparinase prior to leaving OR
Postoperative
• Direct transfer to STICU
• Debriefing
Helpful hints
• Lorazepam 2 mg for intra-operative sedation
• Increased response to Opioids and neuromuscular relaxants
• Antimuscarinic for HR<60 bpm
• 4 Units of Blood in the room stored in blood bank cooler