

Kidney Transplant

Anesthesia tech needs:

- Double transducer (Arterial pressure and CVP)
- Arterial line kit with Arrow Cath
- Triple Lumen Catheter 7Fr 20cm
- Ultrasound
- Hotline
- Drug runner with 3 standard pumps and 1 syringe pump
- 0.22 micron filter for thymoglobulin (between thymoglobulin and drug runner; FDA requirement)
- Kidney transplant box from Central Core Pyxis (usually obtained by circulator)

Pharmacy Needs:

- Methylprednisolone 500mg IV (in kidney transplant box)
- Thymoglobulin=anti-thymocyte globulin-circulator to call immediately before going to get the patient from pre-op
- Mannitol (verify dose with surgeon) (in kidney transplant box)
- Lasix (verify dose with surgeon) (in kidney transplant box)
- Basiliximab (alternative therapy if contraindication for thymoglobulin)
- Vasopressor/Vasodilator available of provider's choice

Lines:

- Arterial Line
- CVL-typically a 7Fr triple lumen-if no plan to place a CVL, then this must be discussed with the surgeon
- +/- additional IV access

Maintenance:

- General anesthesia
- Paralysis-consider cisatracurium
- Fluid management-for healthy donors, aggressive fluid resuscitation (generally 2-4L crystalloid) prior to harvest. For kidney transplant recipients: fluid goals tailored to patient based on history, last dialysis, cardiac studies, cvp, etc - generally, surgeons prefer at least 2L crystalloid given prior to reperfusion of new kidney.
- Hemodynamic goals-Normotension, and communicate with surgeons if vasopressors/inotropes are needed during the case.

Emergence:

- Commonly extubate if clinically stable and appropriate
- Avoid significant hypertension on emergence (titrate narcotics as clinically appropriate)
- Thymoglobulin infusion will continue into the post-operative period

Neuro (CEA/TCAR)

Anesthesia Tech Needs

- Single transducer (may ask for second transducer set up to measure stump pressure depending on surgeon preference)
- Arterial line kit with Arrow Cath
- Drug runner with 3 standard pumps
- Ultrasound
- Cerebral Oximetry

Pharmacy Needs

- Vasopressor (typically phenylephrine or norepinephrine)
- Vasodilator (Nicardipine or Clevidipine)
- Heparin (10,000 Units) drawn up- surgeon will specify heparin dose (typically 80-100u/kg)
- Protamine available

Lines

- PIV x2 (one volume line (at least an 18G) and an additional IV for drug runner)
- Pre-induction arterial line on every patient (contralateral side to the carotid lesion)

Maintenance

- May be done under a MAC with regional anesthesia, however, typically done under GA with volatile agent of choice
- Paralysis is appropriate
- Some surgeons may use multi-lead EEG for neuromonitoring, however, if not used then bilateral cerebral oximetry is a good alternative monitoring strategy.
- Hemodynamic goals-maintain MAP around patient's baseline, and increase MAP 10-20mmHg during carotid clamping (confer with surgeon prior to carotid clamping about certain hemodynamic goals)
- Caveat for TCAR-a representative will be present with hemodynamic parameters to maintain during carotid cross clamping**

Emergence

- Prompt wake up for neuro-evaluation (limit aggressive narcotic/sedative use)
- Minimize hypertension-may titrate anti-hypertensives during emergence

Other

- Draw baseline ACT at start of case (ask surgeon q30 mins following heparin administration if repeat ACT is needed)
- Draw baseline ABG-goal is to maintain normocarbia (PaCO₂ ~40)
- Patient position-supine with arms tucked-consider IV tubing extensions, and ensure patency after arms are tucked.

Neuro (Spine)

Anesthesia Tech Needs

- Single transducer
- Arterial line kit with Arrow Cath
- Drug runner with 3 standard pumps and 1 syringe pump
- +/- Ultrasound
- BIS monitor

Pharmacy Needs

- Vasopressor (typically phenylephrine)
- Vasodilator available (provider preference)
- Remifentanyl (typically in Spine OR Pyxis in 1mg and 2mg concentrations-dilute in 40cc NS to make a concentration of 50mcg/mL or 50cc NS to make a concentration of 40mcg/mL)
- Large Propofol vial (50cc/100cc vial if not already in OR Pyxis)

Lines

- PIV x2
- +/- arterial line-confer with surgeon about expected length of case, patient position, need for hemodynamic goals (particularly with spinal cord injury), and patient comorbidities that would necessitate arterial line monitoring

Maintenance

- Spinal surgeries involving MEP/SSEP neuromonitoring require TIVA for maintenance (typically Remifentanyl and Propofol infusion), but may switch to volatile agent once final motor test is performed. Confer with surgeon, if no neuromonitoring then maintenance with volatile agent is appropriate.
- If MEP/SSEP neuromonitoring then paralysis with Succinylcholine on intubation (Rocuronium with Sugammadex reversal if contraindication to Succinylcholine). If no MEP/SSEP monitoring, then paralysis throughout case is appropriate.
- Hemodynamic goals-confer with surgeon during pre-operative timeout if certain hemodynamic goals are needed
- Fluids-maintenance fluids through drug runner. Avoid large volume crystalloid administration secondary to patient positioning (prone) unless clinically indicated.

Emergence

- Prompt wake up for neuro-evaluation (limit aggressive narcotic/sedative use)
- Maintain normotension

Other

- Patient position-prone with prone mirror.

Vascular (EVAR)

Anesthesia Tech Needs

- Single transducer
- Arterial line kit with Arrow Cath
- Ultrasound (surgeons prefer ultrasound during arterial line placement to limit multiple sticks in this patient population).
- Hot-Line
- Drug runner with 4 standard pumps

Pharmacy Needs

- Vasopressor (provider preference)
- Vasodilator (provider preference)
- Heparin for bolus (confirm dosing with surgeon prior to administration, typically dosed 80-100 units/kg)
- Protamine available
- Consider insulin gtt. (high rate of DM in this patient population)

Lines

- PIV x 2 (18G or greater)
- Arterial line (typically placed on right UE, however, confirm with surgeon prior to placing to determine need for A-line/anatomic location of placement if needed)
- Rarely need central venous access, however, may place if inadequate access or expect significant blood loss/need for inotrope or vasopressor support

Maintenance

- General anesthesia, but may be done under MAC/local. Discuss with surgeon prior to case.
- General anesthesia maintenance with volatile of choice
- Paralysis appropriate-can assist with breath holds during angiography
- Fluid management: consider pre-hydration with at least 1L crystalloid to reduce the risk of contrast induced nephropathy followed by standard maintenance fluids based on patient's clinical needs
- Hemodynamic goals: Maintain BP within +/- 20% of baseline-discuss with surgeon hemodynamic goals at beginning of case

Emergence

- Controlled emergence-avoid significant hypertension
- Titrate narcotics/antihypertensives as appropriate

Other

- Draw baseline ACT at start of case (will re-check ACT ~5 mins following initial dose of heparin, then q30mins thereafter once therapeutic). Surgeon will communicate if additional dosing is needed.
- Discuss protamine reversal with surgeon

- Supine position, limited access to LUE and bilateral LE-take into consideration when placing IV access/arterial line

Vascular (TEVAR-Standard)

Anesthesia Tech Needs

- Single transducer, double transducer if plan for spinal drain
- Arterial line kit with Arrow Cath
- Ultrasound
- Drug runner with 4 standard pumps
- Cerebral oximetry available

Pharmacy Needs

- Vasopressor (provider preference)
- Vasodilator (provider preference)
- Heparin for bolus (confirm dosing with surgeon prior to administration, typically dosed 80-100 units/kg)
- Protamine available
- Naloxone drip (prepared by pharmacy)-started before induction @ 1mcg/kg/hr
- Corticosteroids-confer with surgeon medication/dosing as there is variability between surgeons

Lines

- PIV x 2 (18G or greater)
- Arterial line
- +/- central venous access
- +/- spinal drain (placed by Neurosurgery)

Maintenance

- General anesthesia maintenance with volatile of choice
- Paralysis is appropriate
- Fluid management: consider pre-hydration with at least 1L crystalloid to reduce the risk of contrast induced nephropathy followed by standard maintenance fluids based on patient's clinical needs
- Hemodynamic goals-maintain MAP >80mmHg at all times for standard TEVAR. Hemodynamic goals should be discussed in high risk cases (extensive TEVAR/open TAA)
- If spinal drain placed-confer with surgeon about goal spinal fluid pressures (typically 8mmHg during procedure and 10mmHg after procedure)

Emergence

- Assess for appropriateness of extubation if standard TEVAR vs. extensive TEVAR.
- Smooth emergence with limited hemodynamic changes

Other

- Patients are at risk for paraplegia following procedure

Vascular (Thrombolysis initiation/relook)

Anesthesia Tech Needs

- Single transducer
- Arterial line kit with Arrow Cath
- Ultrasound (surgeons prefer ultrasound during arterial line placement to limit multiple sticks in this patient population)
- Drug runner with 4 standard pumps (will need alaris pumps for heparin and tPA infusions to be continued in post-operative period depending on the case)

Pharmacy Needs

- Vasopressor available (provider preference)
- Vasodilator available (provider preference)
- Heparin for bolus (confirm dosing with surgeon prior to administration, typically dosed 80-100 units/kg)
- Protamine available

Lines

- PIV x 2 (18G or greater)
- Arterial line

Maintenance

- Thrombolysis initiation typically done under GA (volatile of choice), relook may be done under MAC with local-confer with surgeon and patient prior to proceeding.
- Paralysis is appropriate (can facilitate breath hold during angiography)
- Fluid management-goal directed fluid replacement
- Hemodynamics-maintain BP +/- 20% baseline. Confer with surgeon of any hemodynamic goals.

Emergence

- Smooth, controlled emergence. Patient's are at risk for hematoma formation around sheath insertion site.
- Titrate narcotic/antihypertensive medications as appropriate to avoid significant hypertension.

Other

- Patient supine, arms typically tucked-consider IV tubing extension and ensure patency of IV
- If arterial line placed, draw baseline ACT and confer with surgeon q30 mins if repeat ACT is necessary
- Lead available-fluoroscopic procedure

Vascular (Bypasses (fem-fem, ax-fem, etc.)

Anesthesia Tech Needs

- Single transducer
- Arterial line kit with Arrow Cath
- Ultrasound (surgeons prefer ultrasound during arterial line placement to limit multiple sticks in this patient population)
- Drug runner with 4 standard pumps
- Hot-Line

Pharmacy Needs

- Vasopressor available (provider preference)
- Vasodilator available (provider preference)
- Heparin for bolus (confirm dosing with surgeon prior to administration, typically dosed 80-100 units/kg)
- Protamine available

Lines

- PIV x 2 (18G or greater)
- +/- Arterial line-confer with surgeon prior to placement

Maintenance

- General anesthesia with volatile agent of choice
- Paralysis is appropriate (can facilitate breath hold during angiography)
- Fluid management-goal directed fluid replacement
- Hemodynamics-maintain BP +/- 20% baseline. Confer with surgeon of any hemodynamic goals.

Emergence

- Smooth, controlled emergence. Patients are at risk for hematoma formation around sheath insertion site.
- Titrate narcotic/antihypertensive medications as appropriate to avoid significant hypertension.

Other

- Patient supine
- If arterial line placed, draw baseline ACT and confer with surgeon q30 mins if repeat ACT is necessary
- Lead available-fluoroscopic procedure

ERCP

Anesthesia Tech Needs

- Alaris pump available

Pharmacy Needs

- Glucagon
- Pressor available (typically phenylephrine or norepinephrine)

Lines

- PIV x1-2 (usually a 20g or larger)

Maintenance

- Typically performed under general anesthesia with ETT
- Paralysis typically not required

Emergence

- Patients may be at risk for aspiration given their comorbid conditions, ensure airway reflexes intact prior to extubating

Other

- Patients will be prone during the procedure with their head turned 90 degrees, ensure adequate range of motion pre-operatively
- Lead available-fluoroscopy utilized during procedure

Brachytherapy

Anesthesia Tech Needs

- Alaris pump available

Pharmacy Needs

- None

Lines

- PIV x1 (22G or greater sufficient)

Maintenance

- May be performed under epidural/spinal and sedation or GA-discuss with surgeon prior to procedure
- Hemodynamic goals-maintain BP/HR within 20% of baseline
- Fluid management-goal directed fluid management (UOP, BP, HR)

Emergence

- If GA used, then smooth, controlled extubation.

Other

- Patient position-lithotomy with arms out

Thrombectomy

Anesthesia Tech Needs

- Single transducer
- Arterial line kit with Arrow Cath
- Ultrasound
- Drug runner with 4 standard pumps
- Hot-Line

Pharmacy Needs

- Vasopressor available (typically phenylephrine)
- Vasodilator available (typically nicardipine)
- Propofol vial for transport

Lines

- Arterial line (pre or peri-induction)
- PIV x2 (one for hot-line and one for drug runner)

Maintenance

- General anesthesia with volatile agent of choice
- Fluid management-goal directed fluid replacement

- Hemodynamic goals-SBP typically +/- 20% of baseline prior to thrombectomy, SBP goal <140 post-thrombectomy. Discuss hemodynamic goals with interventionalists

Emergence

- Typically remain intubated and transported to ICU intubated and sedated

Other

- Limited access to patient, will need circuit extensions, EtCO2 sample line extension, arterial line tubing extension, and IV tubing extensions