EC-IC Bypass Surgery (CPT 61711)

General: Extracranial-intracranial bypass is done to increase/maintain cerebral blood flow, or to allow occlusion of a surgically inaccessible intracranial aneurysm. Patients may be symptomatic or asymptomatic. Patients with limited cerebral blood flow may be at risk for perioperative cerebral ischemia/infarction. The most common procedures involve a superficial temporal artery (STA) to middle cerebral artery (MCA) bypass or a carotid artery to MCA bypass using a radial artery or saphenous vein graft.

Preop: Premedicate with up to 2 mg iv midazolam depending on patients mental status.


Anesthesia: Goals are to avoid perioperative cerebral ischemia/infarction by maintaining adequate CPP, and to allow intraoperative SSEP and EEG monitoring. Patients typically receive 1-2 g of Cefazolin, 10 mg of decadron and 1 gm/kg of mannitol on skin incision (verify all with surgeon). Induction of anesthesia with propofol. Fentanyl 5 µg /kg in divided doses throughout induction, prior to intubation. In patients with high risk for cerebral ischemia, consider use of a CVP catheter, and use phenylephrine as needed to maintain mean arterial pressure (MAP) above awake baseline MAP (do not allow any sustained decrease in MAP). Tape eyes, insert esophageal temperature probe, and at least one additional large bore IV. Patient is normally in supine position. Maintain anesthesia with oxygen, a propofol infusion, and a fentanyl infusion 2 µg/kg/hr. Obtaining good baseline SSEPs is important. Avoid nitrous oxide and minimize halogenated anesthetics, as both have a negative effect on SSEPs. Maintain euvoolemia (Lactated Ringer’s). Maintain arterial pCO₂ around 40 mmHg (no hyperventilation). Maintain muscle relaxation throughout the procedure. Record all temporary vessel clamping/unclamping times. For EEG burst suppression have additional propofol available. When requested, increase propofol infusion to 150 µg/kg/min and administer 50 mg propofol boluses, till burst suppression is achieved. Administer additional propofol boluses to maintain burst suppression (communicate with neurophysiologists). As high dose propofol provides anesthesia and may delay awakening, reduce/eliminate the use of other anesthetics. If use of propofol decreases MAP, you may need to start a phenylephrine infusion to maintain adequate CPP. Fentanyl infusion is usually stopped at the beginning of burst suppression. Use of propofol is usually stopped about 10-15 min before end of surgery. Discuss postoperative blood pressure control with the surgeon before waking up the patient.

Potential complications: Cerebral ischemia/infarction from temporary blood vessel occlusion and anesthetic related reduction of cerebral blood flow: (maintain adequate intravascular volume, maintain CPP, do not hyperventilate).

Recovery: Wake the patient up and extubate, if possible, immediately after the operation to allow neurologic examination. This may not be possible if a large quantity of propofol was used for EEG burst suppression. Use a hemodynamic monitor and supplemental oxygen during patient transport to ICU.