PEDIATRIC SURGERY

Preference Card

ECMO Cannulation

Depending upon the condition of the baby, ECMO may be veno-venous (V-V) or veno-arterial (V-A). In general, if the infant's cardiovascular system doesn't require much support, V-V is satisfactory and less invasive. Otherwise, V-A is used. The preparation and setup is the same for V-V and V-A, the operation itself is slightly different.

Setup and prep

1. Procedure is done in the NICU on an "ECMO bed", which is higher.
2. Place an x-ray cassette under the baby before prepping so that an x-ray may be obtained without disrupting the drapes.
3. Extend the baby's neck by placing a rolled washcloth under the shoulders and turn the head to the left so as to expose the right neck. Take care not to dislodge the ET tube, particularly when the baby is on the oscillator which has very little slack in the tubing.
4. Put on 1000 drapes to square off the neck and upper chest then prep.

V-A ECMO

1. Longitudinal incision on anterior border of SCM.
2. Dissect out the IJ and carotid and put red and blue vessel loops around each. Potts tie the proximal loops.
3. Heparinize systemically with 100U/kg.
4. Tie off distal artery and vein.
5. Determine the maximal size of cannula that the vessels will accept. Artery usually 10 or 12 Fr and vein usually 12 or 14 Fr.
6. Make a transverse venotomy and pass the cannula about 7 cm. Tie down the proximal vessel loop.
7. Make a transverse arteriotomy and pass the cannula about 3.5 cm.Tie down the proximal vessel loop.
8. Tie the distal vessel loops around the cannulas.
9. Pull out the obturators in the cannulae and clamp the ends with tubing clamps. Attach the cannulae to the circuit, as you would when putting someone of bypass in the OR--squirting heparinized saline on the junction as you put it together.
10. Clear bubbles from both cannulae meticulously--a bubble in the arterial line will go straight to the brain.
11. Go on bypass. Make sure that someone is **always** holding the lines so that they don't become dislodged form the vessels--this tends to be messy.
12. Close the sub-q with a running 4-0 vicryl and the skin with a running 4-0 nylon.
13. Sew each cannula to the upper neck/post-auricular area with 2-0 silks.
14. Obtain a chest x-ray before taking off the drapes. The tip of the arterial cannula should be at about T3, to ensure that it is in the innominate artery, not the arch. Usually we will obtain an ultrasound before putting on the dressing to confirm the cannula placement.
15. The ECMO nurses will put on an elaborate dressing to secure the cannulas

V-V ECMO

1. Make a short transverse incision anterior to the mid-portion of the SCM on the right.
2. Dissect down to the IJ and expose only the anterior portion of it. There is no need to dissect out the vessel completely--this would only predispose to hematoma formation.
3. Determine the appropriate size of venous cannula--usually a 15 Fr.
4. Make a small stab incision about a centimeter superior to the previous incision.
5. Pass the needle through the stab and into the exposed vein then pass the guide wire.
6. Place a dilator over the guide wire. Remove the dilator then place the cannula.
7. Attach the cannula to the circuit.
8. Secure the cannula as above and apply the dressing.