**Pediatric Cardiac Anesthesia Rotation at Boston Children’s Hospital**

**Cardiac Info (**as of October 2017)

CPB Morning setup:

\*10cc syringes\*

Epi 1mcg/cc dilution

Neosyn 4mcg/cc dilution

Ephedrine 0.5mg/cc dilution

Epi 10mcg/cc nondiluted

Neosyn 40mcg/cc nondiluted (ask for cardiac pack from pharmacy: aka 2 sticks of phenylephrine instead of 1)

Ephedrine 5mg/cc nondiluted

Calcium Gluconate 100mg/cc

Vecuronium 1mg/cc

Atropine/sux with IM needles

Glycopyrrolate in 3cc syringe

Esmolol for tetrology cases

Fentanyl 50mcg/kg available is good amount (3cc syringes for <10kg, 5cc for >10kg)

Oral Premed: Midazolam 1mg/kg, Ketamine 5-10mg/kg

IM Premed: Midazolam 0.2mg/kg, Ketamine 5mg/kg

 ---Suggest and discuss with staff appropriate dose/route for premed

 ----Add sugar packet from pharmacy window to tip

 ----Often use 5mg/cc midazolam to keep volume low

 ----Bring Jackson-Rees circuit & mask with you (some children get essentially obtunded with dose)

Common infusions: (Obtain from cardiac pyxis outside OR 18)

**Dopamine**, start with 5 mcg/kg/min

1mg/cc (D10W) for <15kg

2mg/cc (D5W) for 15-30kg

~~8mg/cc (D5W) for >30kg~~

**Nitroglycerin**, start with 0.5 mcg/kg/min during rewarming

100 mcg/cc (D5W) for <10kg

200 mcg/cc (D5W) for 10-20kg

400 mcg/cc (D5W) for >20kg

**Epinephrine**, start with 0.02 mcg/kg/min (max 2.0)

5mcg/cc (D10W) for <3kg

10mcg/cc (D10W) for <10kg

~~40mcg/cc (D5W) for >10kg~~

**Nitroprusside**, start with 0.5 mcg/kg/min (max ~2.0)

100mcg/cc (D5W) for <10kg

200mcg/cc (D5W) for 10-20kg

800mcg/cc (D5W) for >20kg

**Milrinone**, start with 0.5mcg/kg/min, (load 50 mcg/kg over 30min via pump on bypass, diluted to 5cc volume)

100mcg/cc (D10W) for <5kg

200mcg/cc (D5W) for 5-20kg

400mcg/cc (D5W) for >20kg

**TXA**, set on alaris pump with preprogrammed bolus, vials are in bottom draw of pyxis, need 3-4 vials

 0-2 months 2-12 months >12 months

Bolus: 120mg/kg 65mg/kg 30mg/kg (max 2000mg)

Infuse: 16mg/kg/hour FOR ALL AGES

CPB: 30mg 30mg 2mg/kg (min 15mg)

(give this drawn up syringe to perfusionist with a stick of phenylephrine)

**Alaris Tower of Power Pump** (8 Channels:)

Unoccupied / Unoccupied / Nitroglycerin / Dopamine

Heparin A-line / Heparin CVP / Heparin Manifold / TXA

A-line, CVP, Manifold Channels are setup and preprogrammed already. You need to setup Nitro, Dopa, TXA channels

Coming off-pump/rewarming, you may add Epi, Milrinone, Nitroprusside, Esmolol, Propofol to Unoccupied Channels

**Common medications**:

Adenosine, 0.1mg/kg Heparin, 350u/kg Neosyn, 1mcg/kg

Atropine, 20mcg/kg Lidocaine, 1.5mg/kg Ephedrine, 0.1-0.5mg/kg

Ca Gluc, 30-60mg/kg Mg, 25-50mg/kg Epi, 1-10mcg/kg

Protamine, 4mg/kg

**General flow of a case:**

Meet attending 30 minutes before case in front of room. You, attending and circulator go see patient together.

Give agreed-upon dosage of premed and add pulse-oximeter when patient appears okay with it

 --Turn on monitor and turn down pulse-ox tone

Inhalational induction in OR with, typically, 4% sevoflurane and 100% FiO2 (even for L->R shunts)

Staff typically does IV while you mask

Staff will induce typically with fentanyl and vecuronium

Intubate and adjust vent settings (turn down sevoflurane to ~1%, Pressure Control 20/20, longer I:E, no PEEP, ~30-50% FiO2)

Arterial line: most attendings want “through and through method:” transfixation, ultrasound

--once wire is in, staff usually tell you to go scrub for CVL

CVL placement:

 -- Remember to put on EYE PROTECTION when scrubbing

-- CVL Sizing:

 <5kg: 4Fr 5cm antibiotic coated

<7kg: 4Fr 5cm double lumen

8-10kg: 5Fr 5cm double lumen

10kg- adult: 5F 8cm double lumen

adult: 7F 16cm triple lumen

After CVL: place TEE probe, NIRS, nasal temp probe, draw baseline ACT and ABG

Start TXA infusion through manifold stopcock farthest from patient (make sure unclamped and running)

Make sure CVL, Aline, Manifold heparin infusions are running (3 cc/hr)

Whole Blood nearly every time will be given pre-bypass by you in 60cc syringes

Heparin is passed to you from the surgeon when appropriate, dose is 350u/kg, drawn up by RN

-- Give heparin centrally and check ACT 2min later via CVL

Create a bypass dose and a rewarming dose of vec/fentanyl/versed to give to perfusionist (discuss with attending)

 --often approximately fentanyl 5-10mcg/kg, versed 0.05- 0.1mg/kg, vec 0.05-0.1mg/kg

--in one syringe to give to perfusionist at 1) going on pump and 2) rewarming

After this, typical pre-bypass course similar to adult cardiac

While on bypass:

Make sure CVP decreases and NIRS increases

Remember your pre-bypass and rewarming doses for perfusionist

Retrieve pacer box from nursing cart (2nd drawer), ensure it turns on and has battery

Setup an extra transducer line (ask staff how to do this or have someone show you if not familiar)

Prepare and label ABG syringe/ACT/paperwork

Prepare ICU transport bucket (airway, meds, last ABG, pertinent rhythm strips, et cetera)

Rewarming:

Start Nitro (ask staff earlier, some do and some do not)

Dopamine often started ~30-32 C, prior to clamp coming off . . . nitro turned off

Suction ETT during this time

Post-bypass:

- Nurses control defibrillator if shocks need to be given

- Give protamine 4mg/kg (drawn up by nurse) and redose antibiotics when prompted

- Give platelets, cryo, cell savor and rarely PRBCs as needed

- Fast track patients: Morphine, IV tylenol, propofol gtt on transport, goal extubation 2-3hrs post-op

- propofol gtt for ICU transport in older/school age/healthier children

ICU/Transport:

Remember your transport bucket with mask

8South signout order: ask staff about getting computer to finish record

 ----surgical Fellow/PA talks first about medical hx, cardiac defect, et cetera

 ----you talk about pre-bypass events

 ----surgical Fellow/PA talks about bypass/surgical correction

 ----you talk about post-bypass/transport events

**Pre-op:**

- Day sheets emailed out every Friday indicating OR assignments (OR 19 is always the call team)

- check cardiolinks → HC Scene for daily assignments → select patient name → conference for anatomy pictures

- check PACE to see if PAEF and/or consent has been completed

- call/page attending to discuss the cases for next day

**Misc:**

- call Cath 1 attending and call attending before leaving to see if you can go home

- Post call fellow should be the first to leave

- special cardiac lectures Tuesday and Thursday mornings at 6:30 in Bader conference room

- cath lab starts at 7:30 on Wednesdays so you’ll have to miss grand rounds if you’re assigned there on Wednesdays

- Sandra and Kate are AMAZING

- Formulas

Qp= Vo2/(SpvO2-SpaO2)

Qs=Vo2/(SaO2-SvO2)

Qp/Qs= (SaO2-SvO2)/(SpvO2-SpaO2)-------→These saturation values will occ. be drawn before coming off pump either in the field or by you, so be familiar with calculation

Sample CVICU Formula 1 Sign out

Pre-meds: Midazolam \_\_\_\_\_\_mg PO/ IV/IM and/or Ketamine \_\_\_\_\_\_mg PO/ IV/IM

Induction: Mask induction or IV induction

Intubation:

Blade: Miller or MAC or Video Laryngoscope

Size: 1 2 3

Grade: 1 2 3

ETT size: 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

Secured: @ lips/nares

Cuff pressure:

Lines:

 PIV:

 Arterial: right/left

 CVL: right/left

 Nerve catheter: yes/no

Pre-Bypass Maintenance: Medications: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Anesthesia: Isoflurane \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Analgesia: Fentanyl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Paralysis: Vecuronium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Antibiotics: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Pre-Bypass Issues:

X-clamp time: Induced Vfib time: Bypass Time:

Post-Bypass Issues:

 Vasodilators: Nitroglycerin or Nitroprusside or Milrinone

 Pressors: Dopamine or Epinephrine

 Rhythm abnormalities: Defibrillate x \_\_\_ or Pacing: AAI or DDD or \_\_\_\_\_\_

 Other:

Post-Bypass Maintenance

 Anesthesia: Isoflurane Medications: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Paralysis: Vecuronium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Antibiotics: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Post-bypass issues: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Sedation: Propofol / Midazolam / Fentanyl / Morphine / Precedex / Ativan

Labs:

 Hct: pH: Other:

 Calcium: pCO2:

 Magnesium: lactate:

Fluids:

 Crystalloid: Platelets: Urine Output:

 Colloid: Cryo: EBL:

 Cell Savor: PRBC: