Regional & APS Rotations

(Slides by Randall Malchow, MD)
Block Room

- Privacy
- Monitors (visible and complete)
- IV Premed
  - Increase Sz Threshold
  - Decrease Vasovagal
  - Anxiolysis
  - Judicious

- Equipment
  - Airway
  - Suction
  - Block Cart

- Emergency Drugs
  - Induction agent and Sux
  - Intra-lipid immediately available
Positioning

- Patient comfortable/privacy
- Operator/assistant should be able to see monitor
- Provider comfortable
  - Elevate Bed prn
- N. Stim Tech:
  - Hold shaft of needle at final position
  - Freeze position during injection
- USG:
  - US machine opposite side of bed
  - Mobile needle to above/below nerve
Sensory vs Motor

- Paresthesia may occur before Nerve Stimulation
  - Choyce, ‘91: Ax Blk; ndl adv to paresthesia, then n.stim. 23% n. stim >0.5
  - Urmey, ‘00: ISB: 25% had n. stim up to 1.0
- N.Stim tech may involve advancing needles deeper than paresthesia tech
- Nerve Stim patients more sedated
- No difference in safety/efficacy between paresthesia and n. stim
- Upshot: min sedation for both best protection against intraneural risk
- Pressure monitoring
Mobile Needle

- **Pro:**
  - Greater Safety (injecting 5-7cc aloquots)
  - More effective (block dependent)
  - Less total dose
  - More imp for distal blocks (eg. AXB)
  - < Onset Time

- **Con:**
  - ? More time-consuming
  - More difficult to learn
  - Nerve injury concern?
Choose the Equipment:

Stimulators, Needles, and

- **Single shot:**
  - B-Braun/Stimuplex
  - Pajunk Sonoplex
  - Arrow
  - Havel (Echostim)
- **Insulated**
- **B-bevel**
  - Blunt (12-45 deg)
  - < intraneural inj, but
- **Catheter Systems:**
  - B-Braun Contiplex
  - Pajunk Plexolong
  - Arrow Stimucath
*Constant current gen (ie voltage varies depending on resistance)
*Lg, myelinated fibers (sens fibers req > volt)
*Negative, cathode, needle
*Flashing “yellow” light/curved line indicates proper connections
*HNS 11 model allows change in Pulse Width 0.1-1.0ms
Insulated vs

Uninsulated Needle

Insulated Needle

Electrophoretic Simulation of the zones of depolarization occurring around uninsulated and insulated needles
Nerve Stimulation

• Avoid accepting:
  – Direct muscle stim
  – collateral nerves

• Current:
  – Initial: 1.2-1.5mA (higher as needed)
  – Caution <0.2 mA

• Frequency: 1-2

• Ablate w/ 1cc, “Raj test”
  – confirms correct placement
  – N.B. – persistent stim “intraneural” test dose
Stimuplex®
Insulated Needles

- Insulated, atraumatic needles increase accuracy
- Pre-attached extension tubing
- Variety of sizes:
  - 24 Ga. x 1 in.
  - 22 Ga. x 2 in.
  - 21 Ga. x 4 in.
  - 20 Ga. x 6 in.

(Avoid smaller than 22gu or sharp needles near nerves)
18G × 2 inch non-winged Tuohy needle
18G × 4 inch winged Tuohy needle
18G × 6 inch winged Tuohy needle
all with 20 gu (epidural) catheter
Pajunk Plexolong

- Open Tip Catheter
- Stylet in catheter
- 0.5-2cm in sheath
- Screw type connector
**Arrow Stimucath, 19 gu**

**Figure 2: Catheter – distal tip**
- 5mm tip exposed
- blunt, single orifice
- inner steel stylet

**Figure 3: Catheter – proximal tip**
- 5mm exposed
- inner reinforced spring
- 1 cm/5cm markings
- unable to cut/”unravel”
If muscle twitches decrease during catheter advancement:

Carefully withdraw catheter to where catheter point is again inside the shaft of the needle.

(If withdrawal of the catheter is not possible, withdraw the catheter and the needle as a unit and start again.)
Benefits of Perineural

- Decreased Opioid Need
  - (decreased OIH, tolerance, nausea, sedation, constipation, etc)
- Better Analgesia
- Increased function/rehab
- Improved Pulmonary
- Decreased LA toxicity w/ incremental dosing
- Less motor block (eg if concerned about compartment syndrome)
Solutions

• Local Anesthetics:
  – Bupivacaine 0.125% (NSC and VUH)
  – Ropivacaine 0.2%

• Rates: 6-14 ml/hr

• PCA settings: helpful 2-5ml/dose
  q30-60 min

• “10/5/30” common settings for
  single CPNB
Adjuncts-rare w/ CPNB

- **Epinephrine:**
  - decr LA plasma levels
  - decr neural perfusion (therefore avoid)

- **Clonidine:**
  - 1ug/ml void of side effects
  - improved analgesia

- **Opioids:**
  - ? benefit if inflammation present ?
Upper Extremity

- Deep Cervical (C4):
  - Mid-clavicular ORIF

- Interscalene:
  - Total Shoulder Arthroplasty
  - Proximal Humeral Fx’s
  - Open Shoulder Cases

- SCB/(ICB):
  - Mid-Dist Humeral ORIF
  - Major Elbow, Forearm, Hand Surgery
    - Amputations
    - Elbow Arthroplasty
  - Burns
FNB (or LPB) Catheters

- Efficacious for TKA, Fem ORIF, AKA, BKA, Tib Plat ORIF
  - decr hosp stay
  - decr duration of rehabilitation
- Insert 1-3cm in sheath
- 0.4% complication

NB: Fascia Iliaca Catheters similar to FNB catheters; used more in pediatrics
Popliteal/Sciatic

- **Indications:**
  - Calcaneal ORIF
  - Ankle Reconstruction
  - Ankle arthrodesis
  - AKA, BKA

- **Lat Popliteal more secure**

- **Sciatic:**
  - Sciatic vs Popliteal:
    - Tourniquet location
    - Intraop prep (is cath in the way?)

- **USG:**
  - Circumferential prep
Contraindications

- Allergy
- Patient Refusal
- Infection at site

Anticoagulation considerations:
- Consider R/B if lovenox/plavix and deep catheters (esp LPB, ? PVB, ? ISB)
- Superficial blocks/catheters prob safe
Tunneling vs Lock-It

• Benefits:
  – secures catheter (esp ISB/FNB, etc)
  – decr infection ?
  – keeps catheter out of surgical field

• Technique:
  – pull needle back few cm’s (protect cath)
  – 16gu x 5.5in angiocath thru same hole, adv SQ 8-10cm, then exit skin
  – remove both needles, cut hub, adv cath
• **Elastomeric Pumps**
  - I-Flow/On-Q: (VUH)
    • Select-a-Flow 2-14ml/hr
    • On-Demand 5ml/dose
    • Both Select-a-flow and On-Demand
    • APS (pick up fr Core, hand-carry to pharm)
  - Accufusor Moog (NSC)

• **Electronic**
  - Stryker and Sorenson Ambit
  - More expensive, programmable
Patient

- Large Tagaderm over yellow connector (prevent disconnects)
- Patient Handout, Brochure with APS/OPS pager/cell phone
- At least 2 patient numbers
- Protecting limb, Avoiding falls
- Observe for signs of infections
- Plan for Breakthrough Pain
- Plan for Removing Catheter