Non-CME Webinar Series
designed with the trainee in mind
second Tuesdays of odd-numbered months

Brought to you by ASRA & THE ASSOCIATION OF PAIN PROGRAM DIRECTORS

Intrathecal Drug Delivery: Surgical Techniques, Complication, and Troubleshooting

Kelly D. Foote, MD
Professor, Department of Neurosurgery
Co-Director, Fixel Institute for Neurologic Diseases
University of Florida

Tuesday, March 9, 2021

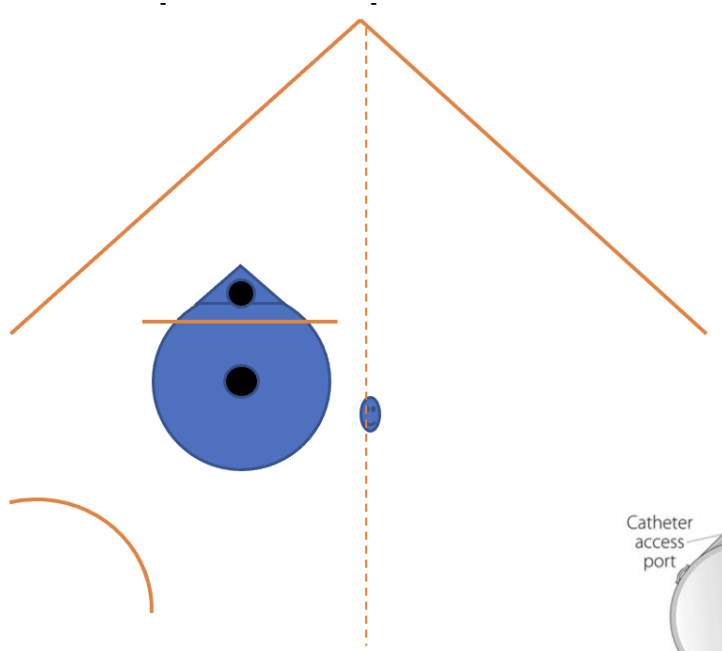
7:35-7:50 pm ET

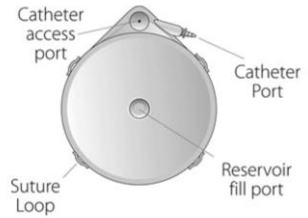
Positioning

- Mark abdominal site/incision with patient supine prior to positioning
- Lateral decubitus, operative side up, pillow between the knees
- Moldable beanbag with gel pad
  - Superior edge of beanbag 3 cm below axilla
  - Ensure access to both abdominal and lumbar incisions
- Large foam axillary roll under superior aspect of rigid, deflated beanbag
- Support head with a gel doughnut on stacked folded blankets
- Arms hugging pillows
- Stabilize legs with strap, stabilize upper torso with blue foam and tape
- Slight reverse Trendelenberg (head up) position to plump lumbar cistern

Pump implantation

- Anterior abdominal wall (not lateral, not flank or buttock)
- 10 cm horizontal incision at superior aspect of intended subcutaneous pocket
- 3 cm away from costal margin, iliac crest
- 1 to 2 cm from midline
- Mind the umbilicus, ostomies
- Incise perpendicular to surface
- Tension and monopolar cautery
- Optimally, pump anchored to rectus fascia
  - (after connection of tunneled IT catheter)
- Consistent orientation (I like point up)
- Surgery basics (meticulous hemostasis, minimize tissue damage)





IT Catheter Insertion

- 5 to 8 cm vertical midline upper lumbar incision (depending on adipose layer)
- Fluoroscopic guidance, L2/3 or L3/4 access
- Incise perpendicular to surface, tension and monopolar cautery to expose 2.5 x 5 cm of paraspinous fascia eccentric to dependent side
- Palpate interspinous space, needle entry 1 cm lateral (dependent) to midline and 1 cm inferior to interspinous space
- Needle angle superior and medial to enter interspinous space in midline
- Needle tip displaces the posterior thecal sac prior to penetration, resulting in deep position of needle tip within the spinal canal
- Thread catheter with wire until it gently bumps into anterior wall, withdraw needle slightly as the catheter is advanced to allow the catheter to pass superiorly without resistance

Securing IT catheter

- Intraoperative fluoroscopy to ensure that catheter tip is at desired level and is not kinking or turning
- Withdraw wire and ensure excellent CSF flow
- Anchor catheter, aiming inferiorly, to paraspinous fascia slightly inferior to its fascial egress with a deployable butterfly anchor and silk sutures
- Develop proximal suprafascial tunnel toward abdomen with blunt digital dissection
- Pass curved tunneling tool from lumbar to abdominal wound (tissue is mobile)
- Remove handle, pass catheter, advance tunneler over the catheter, through the tunnel and remove through abdominal incision
- Ensure gentle turn of catheter in inferior aspect of lumbar wound with no kinks
- Cut excess catheter in abdominal pocket and measure cut segment for bolus calculations, ensure persistent CSF flow, connect to connector and pump

Intra-operative trouble

- Exceptionally fat patient (3 cm)
- Exceptionally thin patient (20 ml, subfascial)
- Bleeding (NAV, bipolar)
- Scoliosis (plan, position, paraspinous muscle asymmetry)
- Difficulty with lumbar puncture (rev T'berg, lumbar stenosis, fluoro)

Post-operative trouble

- Pocket hematoma (NAV, evacuate surgically)
- Avoid pseudomeningocele/CSF fistula (LP skill, close fascial punctures, ?purse string, lay flat)
- Delayed pseudomeningocele (Lumbar drain?, explore and repair)
- Overdose/underdose (narcotics, Baclofen, admit at least one day, O2 sat, early dose titration)
- Absence of predicted benefit (check pump logs, check residual volume, dye study via CAP)

- Infection (see next slide)

- **Infection**
  - Increasing inflammation (rubor, tumor, calor, dolor, functio laesa)
  - Wound dehiscence, purulent drainage
  - Explant pump and catheter (hold Abx until after intra-op culture, 0-silk closure of cicatrice at fascial egress, debridement, antibiotic irrigation, closure, +/- drain)
  - Admit post-op
    - ID consult, culture results, sensitivities, tailored Abx plan, PICC, home IV Abx plan
    - Manage narcotic or Baclofen withdrawal (opioids, oral Baclofen, benzodiazepines, determine home regimen until reimplantation)
  - Monitor site off Abx for 4 weeks after completion of IV Abx course
  - Reimplant pump on opposite side of abdomen if possible

Pump replacement

- Local with sedation (GETA not required—adds risk)
- Use initial incision, elliptically excise widened scar tissue if possible
- Capsulotomy to ***diminish tension on the wound closure*** or to address pump position issues or tension over prominent edges of pump
- …

- **<u>Interesting case</u>**
  - 70 year old man with h/o complete T7 SCI 14 years ago
  - IT Baclofen pump implanted 13 years ago for intractable spasticity
  - History of repetitive urosepsis (suprapubic cath, left colostomy)
  - Excellent benefit at ITB dose of 1496 mcg/day
  - 3rd right abdominal pump replacement October 2020
  - Admitted Nov 2020 for recurrent urosepsis—improved with IVAbx, d/c home
  - Presented to our clinic with apparent cellulitis at lateral aspect of pump/incision, no fluctuance or drainage—opted for trial of oral Abx
  - Presented 1 week later with increasing erythema, induration around tunneled catheter, dehiscence at lateral aspect of wound

- **Interesting case (continued)**
  - Explantation of pump and catheter (silk!)
  - Insertion of lumbar drain catheter with connection to external pump
  - ICU pharmacist compounded IT Baclofen concentration to deliver his normal daily dose at a rate of 1 ml hour
  - ID consult, IV Abx x 4 weeks, infection resolved, ID clearance for reimplantation of pump, reimplanted in same site (nowhere else to go)
  - Now doing well 2 months later, back to normal with no evidence of infection

Non-CME Webinar Series
designed with the trainee in mind

second Tuesdays of odd-numbered months

Brought to you by ASRA & THE ASSOCIATION OF PAIN PROGRAM DIRECTORS

Thank you