

Trouble Shooting Regional Catheters

Frequently Asked Questions

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Common Problems


- Patient is crying
- Leaking
- Contamination
- Resistance/obstruction
- Disconnection/breakage
- Motor Block
- Pruritus
- Oversedation
- Hypotension/bradycardia
- Toxicity
- LAST (Local Anesthesia Systemic Toxicity)

Always call the attending if you have ANY questions or concerns

Is the Catheter Working?

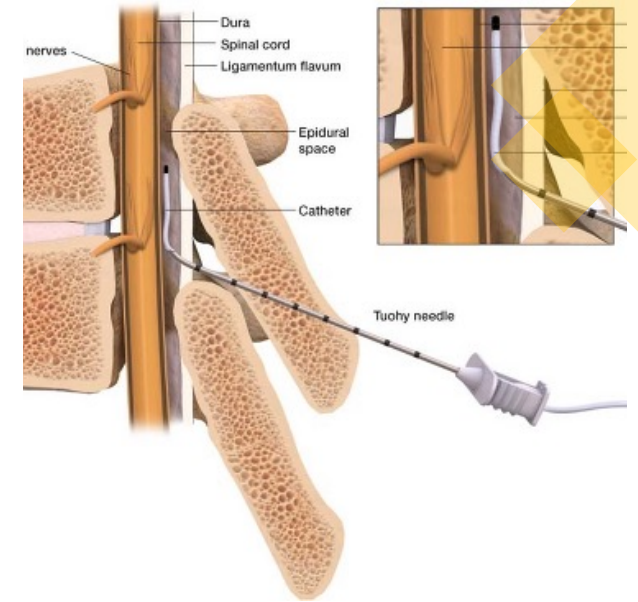
- Since many catheters are placed under GA or sedation w/wo US it is sometimes hard to know if the technique will cover the site causing pain.
- Crying child may or may not be having pain
- First check the patient
 - Use ice to check dermatomes
 - Sometimes tough to tell, parental input is important
 - Bolus with catheter with 0.25ml/kg of a short acting local anesthetic (LA) such as lidocaine or chlorprocaine
 - Three strikes rule: after 3rd call about patient discomfort, d/c catheter and start systemic IV analgesics

Leaking

- Very common especially in smaller children with minimal body fat, small catheter passes through large needle, fluid can back track
 - Is pain control adequate? Consider  dose
 - Assess site, tamponade, dermabond and redress
 - Is pain inadequate? –Decrease volume and use higher concentration or add adjuvants (clonidine, opioids)

When should you d/c catheter

- Excessive or purulent fluid
- Inadequate pain relief
- Fever/signs of infection
- Family/patient request



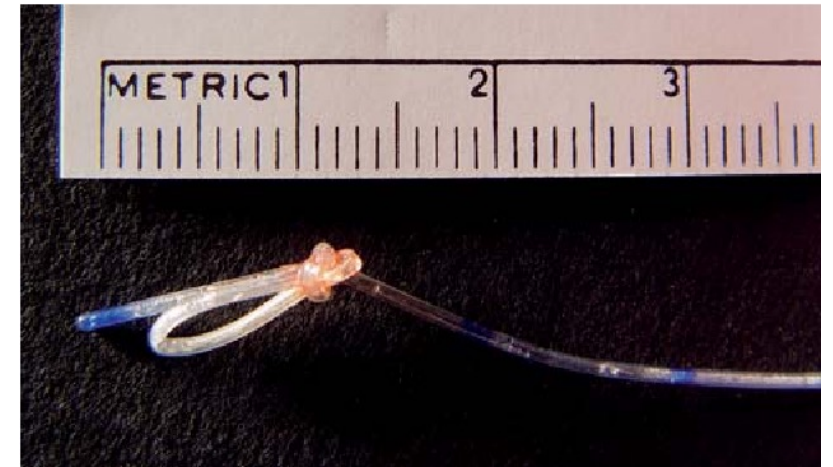
Contamination

- If the dressing has come undone and catheter site is exposed- pull the catheter
- If the dressing is loose but catheter site is covered
 - Assess and redress
- Stool on the dressing is probably not Ok since it is difficult to ensure that the dressing is completely intact
- Stool under the dressing- d/c the catheter urgently



Resistance

- Pump alarming obstruction or increased resistance to infusion
 - Check for obvious kinks or obstruction
 - Try a manual bolus through the catheter
 - If able to bolus, consider decreasing programmed intermittent bolus (PIB) dose or switching to continuous infusion
 - If unable to bolus - pull catheter back a little, sometimes kink is under skin
 - If still unable to infuse - pull catheter.



Published in Acta anaesthesiologica Belgica 2007
[Knotting of an epidural catheter: a rare complication.](#) H. Arnaoutoglou, P. Tzimas, G. Papadopoulos



: <https://www.saudija.org/text.asp?2020/14/2/231/280077>

Disconnection/Breakage

- Unless the disconnection is witnessed and both ends of the catheter are kept clean, the catheter may need to be removed
- Check with your attending
- Catheter may be cleaned with chlorhexidine, cut at the cleaned site and inserted into a NEW connector.
- If the catheter is accidentally pulled out, the bedside nurse MUST save it to show you (per policy, but you can remind them) so that you can check to make sure the distal tip of the catheter is intact. It's not verified as intact if YOU (or another MD from our service) doesn't see it – that's our rule. If not intact, call attending

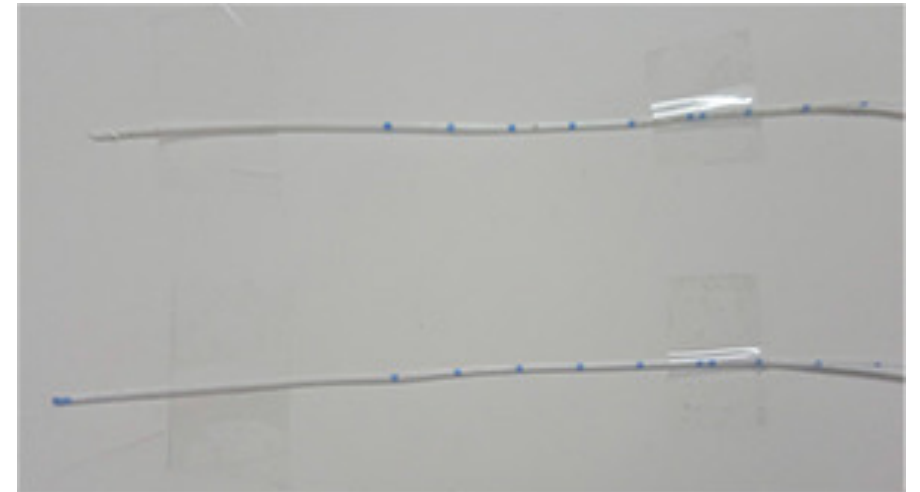
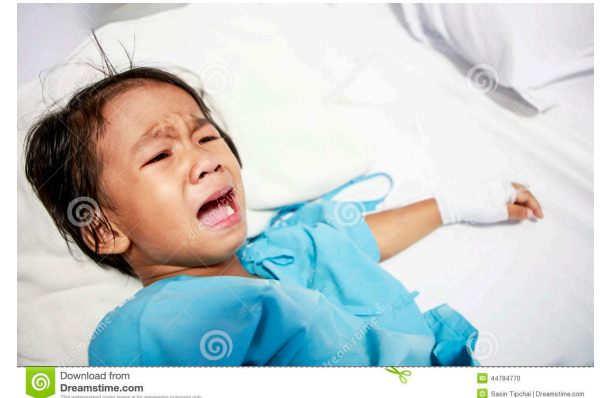


Fig.1: Broken epidural catheter (blue tip missing).

<http://www.casereports.in/articles/7/1/Broken-Epidural-Catheter.html>

Child is crying, unclear if catheter is working

- Go see the patient
- Try gently touching or pressing on or around the surgical site to assess for response.
- Check dermatomes with ice
- Bolus catheter with 0.25ml/kg of a short acting LA (lidocaine or chlorprocaine)
- Discuss with attending: may need to add adjuvants to infusion and/or may need to remove opioids from neuraxial catheter and start systemic opioids
- Ensure there are additional pain medications available in cases where catheter is unlikely to cover all sites of discomfort
- Three strikes rule: after 3rd call about patient discomfort, d/c catheter and start systemic IV analgesics



Patient is getting patchy
pain/asymmetric/inadequate relief from the
catheter

- Go see the patient
- Calculate toxic dose of LA (see table)
- Increase dose if possible
- Increase bolus frequency (and decrease volume if needed to keep dose < toxic max)
- Add adjuvants
- Add systemic medications
- Attending is available to discuss any/all options



Local Anesthesia Dosing

Local Anesthetic	Maximum Bolus Dose	Maximum Hourly Dose (with catheter)
Ropivacaine	<2 months 4 mg/kg >2 months 5 mg/kg	<2 months 0.3 mg/kg/hr >2 months 0.6 mg/kg/hr
Bupivacaine	<2 months 2.5 mg/kg >2 months 3 mg/kg	<2 months 0.25 mg/kg/hr >2 months 0.5 mg/kg/hr
Lidocaine	< 1 year 4.5 mg./kg With epinephrine 7 mg/kf	>1 year 2mg/kg/hr
Chloroprocaine	10-12 mg/kg	10-15mg/kg/hr

Ropivacaine is less cardiotoxic than bupivacaine

To convert LA concentration from % to mg/kg multiply by 10. E.g. 0.2% Ropi = 2mg/ml

10kg child should get no more than 6mg/hr = 3ml/hour 0.2% Ropi

Side Effects

- Motor Block
 - Flaccid paralysis is NOT normal with *epidural* blocks. Stop infusion, call attending, call MRI
 - Unwanted motor weakness
 - Decrease LA concentration
 - Decrease rate
 - May need to stop infusion for 1-2 hours **and then reassess**
- Pruritus
 - Nalbuphine – agonist/antagonist that is helpful for pruritus
 - Decrease or remove opioid from LA solution
 - Low dose naloxone infusion 0.25 $\mu\text{g}/\text{kg}/\text{hr}$ starting dose
 - Diphenhydramine is often used, but primary effect is sedation



Oversedation/Respiratory Depression

- Usually only occurs with neuraxial opioids or excessive systemic opioids
- Significant respiratory depression and/or if pt unresponsive
 - Naloxone 1 $\mu\text{g}/\text{kg}$ (we order this on all patients, RN should have available q 2-3 min)
 - Remember to stop infusion and PALS algorithm to support airway, breathing and circulation
- If oversedated without significant resp depression
 - Decrease dose
 - Remove opioids +/- clonidine from infusate
- Assess other medications that can cause sedation



Hypotension/Bradycardia

- Epidurals may contribute to hypotension in older children and teen but are rarely the sole cause.
- Can decrease dose or stop infusion
- Remove clonidine +/- opioids from infusate (discuss with attending)
- Treat BP with fluids as appropriate



Toxicity

- Neurologic toxicity –Facial tingling, distal tingling, dysgeusia, dizziness, sense of impending doom, Irritability, jitteriness, tremors, random myoclonic jerks, feeling of falling
- Seizures
- LOC
- Ventricular Arrhythmias
- PVCs
- Couplets, triplets, etc
- Vtach/Vfib.

Use LAST algorithms (PediCrisis)

- Stop local anesthetic
- Request Intralipid kit
- Secure airway and ventilation
- Give 100% O₂
- Confirm or establish adequate IV access.
- Confirm & monitor continuous ECG, BP, and SaO₂
- Seizure treatment:
 - Midazolam 0.05-0.1 mg/kg IV
 - Be prepared to treat resultant hypoventilation
- Treat hypotension with small doses of EPINEPHrine 1 MICROgram/kg
- **Avoid** propofol, vasopressin, calcium channel blockers and beta blockers
- Start Intralipid therapy (see inset box)
- If cardiac instability occurs:
 - Start CPR/PALS
 - Continue chest compressions (lipid must circulate). May need prolonged compressions
- Consider: alert nearest cardiopulmonary bypass/ECMO center & ICU if no ROSC after 6 min
- Monitor and correct acidosis, hypercarbia and hyperkalemia
- Monitor for recurrence for 4-6 hours following the event
- Consider Differential (partial):
 - Anaphylaxis: go to Anaphylaxis card
 - Air, fat, thrombotic, or cement embolus: go to Air Embolism card

Intralipid Dosing

- Bolus Intralipid 20% 1.5 mL/kg over 1 min
- Start infusion 0.25 mL/kg/min
- Repeat bolus every 3-5 min up to 4.5 mL/kg total dose until circulation is restored
- Double the rate to 0.5 mL/kg/min if BP remains low
- Continue infusion for 10 min after hemodynamic stability is restored.
- MAX total Intralipid 20% dose: 10 mL/kg over first 30 min