



Non-CME Webinar Series
designed with the trainee in mind

first Tuesday of the month



Intrathecal Pump for Cancer Pain: Management

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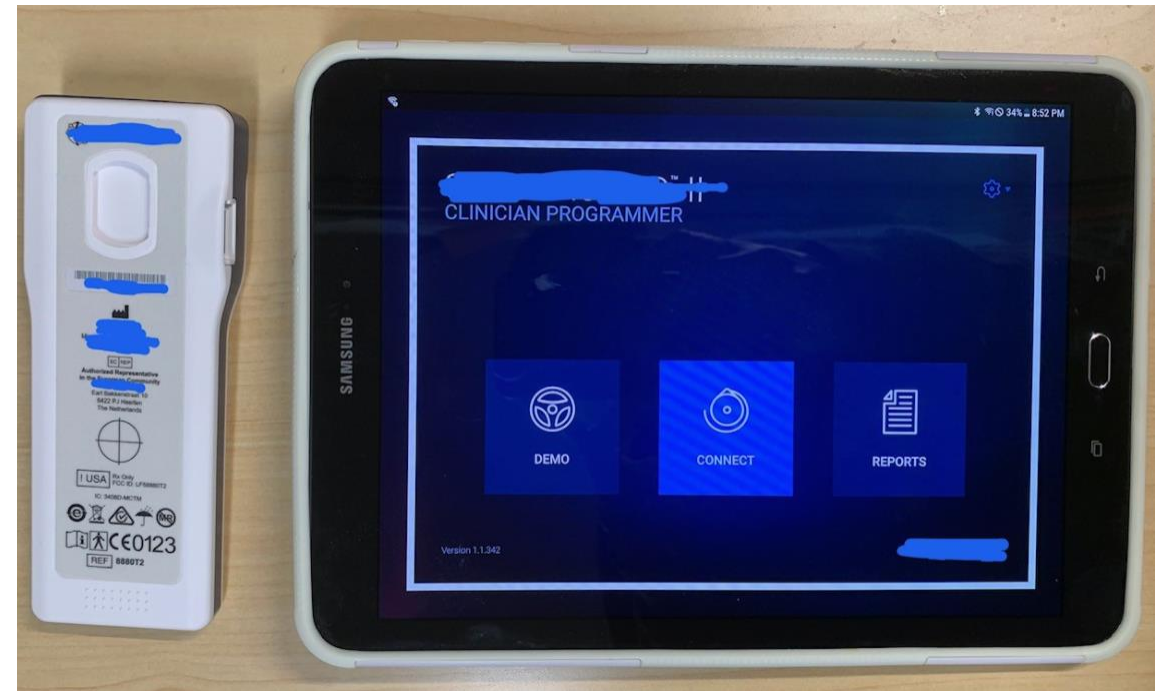
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PROGRAMMING





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- **Keep dosages as low as possible!**
- PACC guidelines recommendations for start dose:
 - Morphine: 0.1–0.5 mg/day in opioid-naive patients
 - Opioid tolerant >1mg/day (avoid >20mg/day)
 - Ziconotide: 0.5–1.2 mcg/day
 - May increase 0.5 mcg/day every week until effective analgesia/tolerability is reached
 - Max dose 19.2 mcg/day
- Requirement for dose adjustments at clinic
- Opioids: Tolerance may develop – Frequent adjustments and dose increase
- Ziconotide does not develop tolerance – Does not require as frequent dose adjustments. Dose may be reduced overtime
 - Distribution within the CSF may be greater with bolus administration than with continuous infusion



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MODES OF DOSING

1. Continuous infusion
 - Rate/day
2. Flex dosing
 - Scheduled bolus doses or different infusion rates through the day
 - Baclofen
 - Ziconotide night time bolus (effect up to 24 hours)
3. Patient controlled IT administration
 - Similar to PCA (Patient Controlled Analgesia)
 - PTM: Personal Therapy Manager
 - Usually 10% of continuous dose
 - Not common with Ziconotide
 - Configure dose, frequency, max activations per day, time that another bolus is not allowed



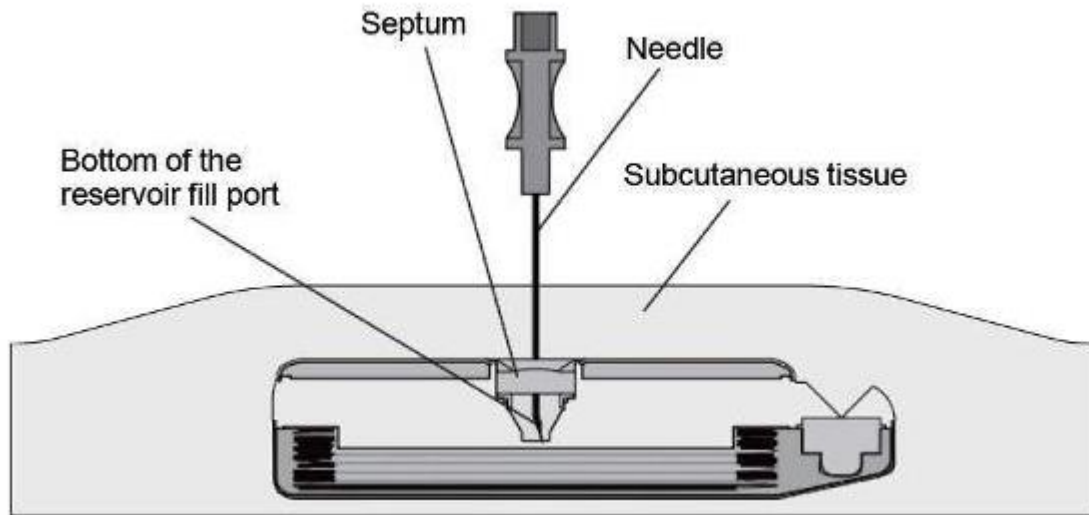
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REFILL



- Catheter access point
- Catheter port
- Reservoir port



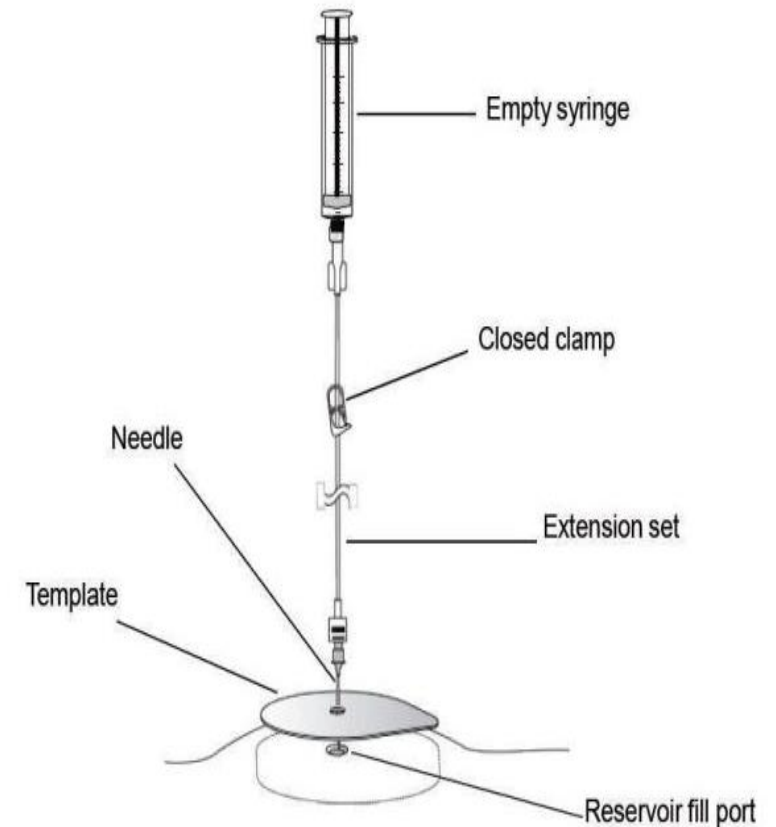
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- Step 1: Interrogate pump (note remaining volume)
- Step 2: Clean skin at site of IT pump using aseptic technique
- Step 3: Place template provided in kit over the IT pump to detect site of pump reservoir fill port, or, alternatively, use ultrasound or fluoroscopy
 - Fill port located centrally within IT pump
- Step 4: Insert the access needle (tubing clamped) provided in the kit through the skin and self-sealing silicone septum located in the middle of the fill port
- Step 5: Unclamp the tubing and aspirate any remaining drug from the reservoir. Then clamp
 - Assess proper pump function by comparing the volume of remaining drug with the calculated volume that should remain based on the programmed flow rate





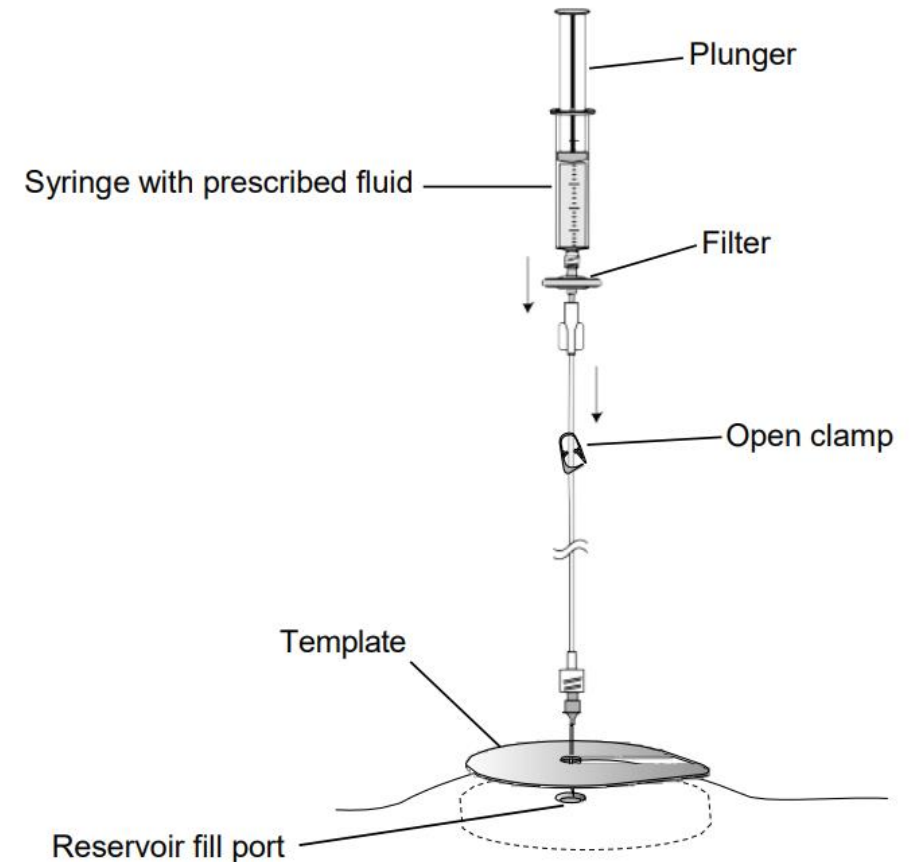
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- Step 6: Confirm patient/concentration, attach filter to medication syringe, and connect to tubing.
- Step 7: Unclamp and slowly refill the pump.
 - Utilize fluoroscopy or ultrasound, if needed
- Step 8: Clamp when all the medication has been injected.
- Step 9: Remove needle and reprogram the IT pump with the new volume and/or concentration of drug (write down new refill date)

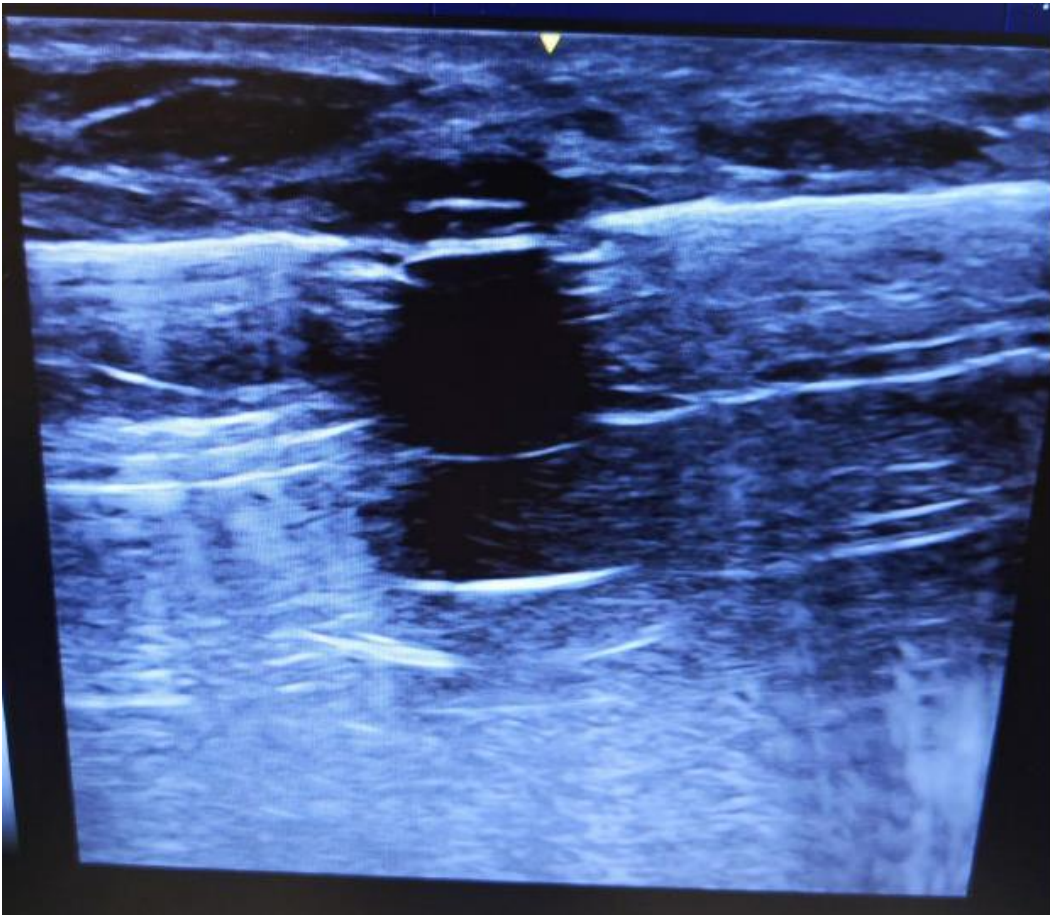




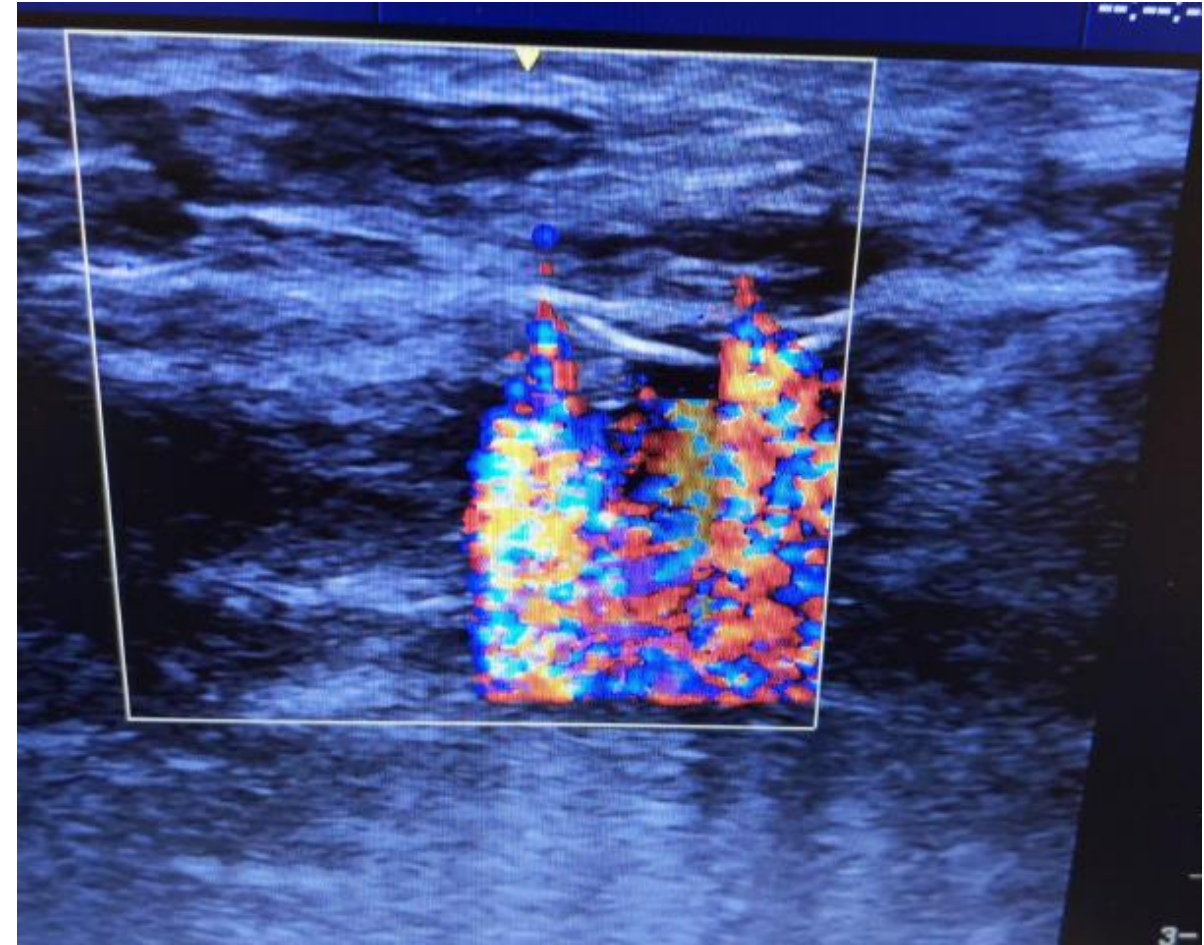
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Look for tissue dissection above the pump



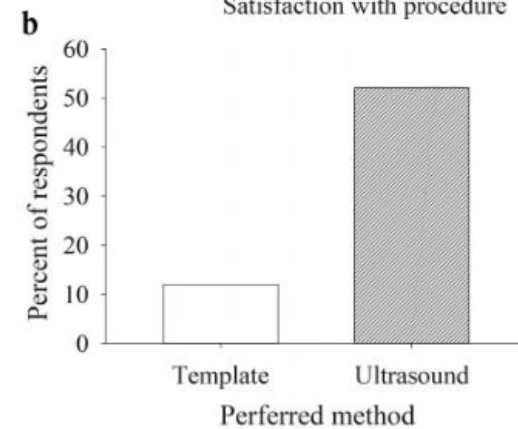
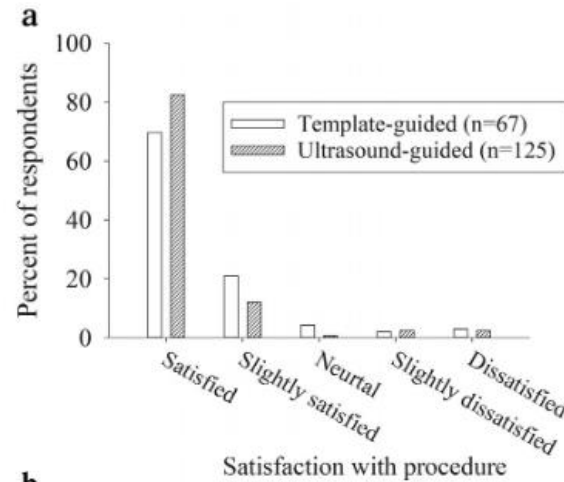
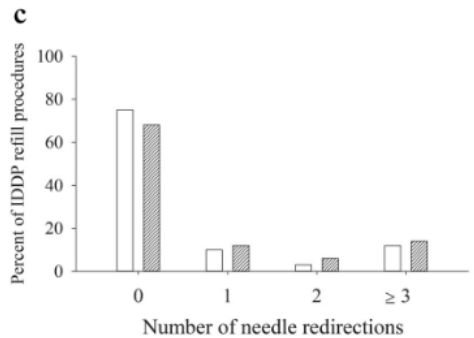
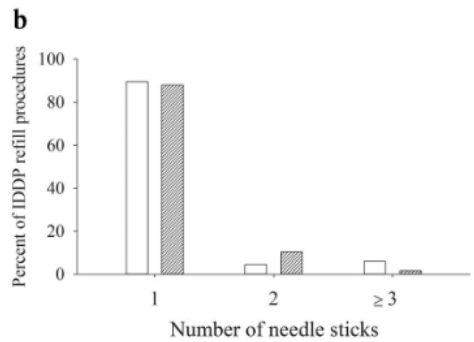
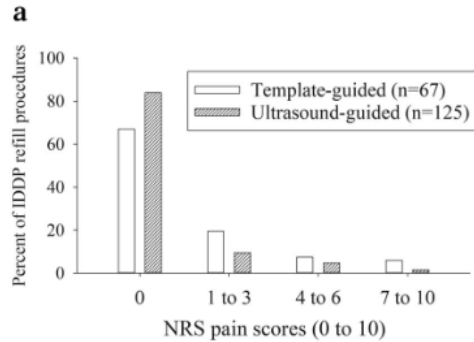
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R M. Singa, A Buvanendran, R J. McCarthy, A Comparison of Refill Procedures and Patient Outcomes Following Ultrasound-Guided and Template-Guided Intrathecal Drug Delivery Systems With Recessed Ports, *Neuromodulation: Technology at the Neural Interface*, Volume 23, Issue 7, 2020, Pages 938-943, ISSN 1094-7159,



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COMPLICATIONS



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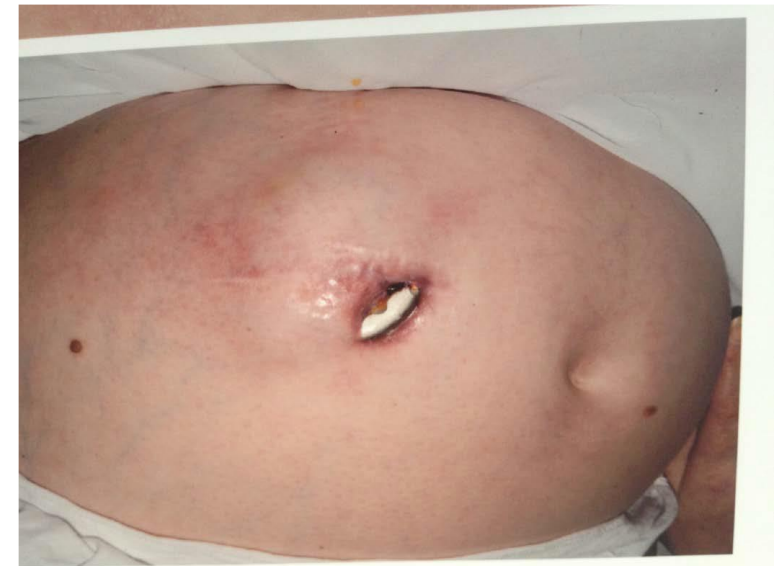
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- Closed claims analysis:
 - Surgical chronic pain procedure with highest closed claims
- Procedural, mechanical and pump management.

1. Procedural

- #1 – Wound infection (2.5 - 12%)
 - Can cause meningitis
 - Mainly at the pocket side
- Seroma formation
 - Pocket is larger than needed
- Headache (PDPH) leak around catheter
- Nerve injury
 - Spinal cone assessment before placement





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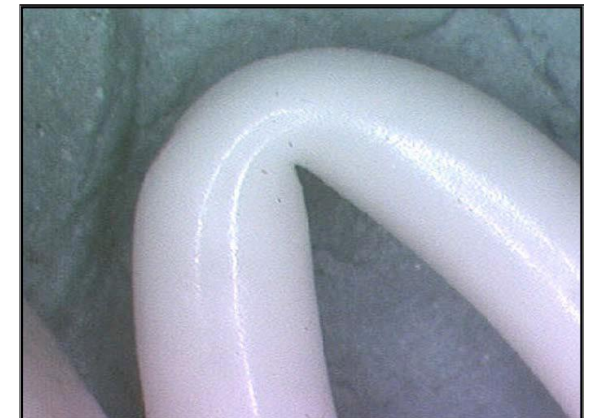
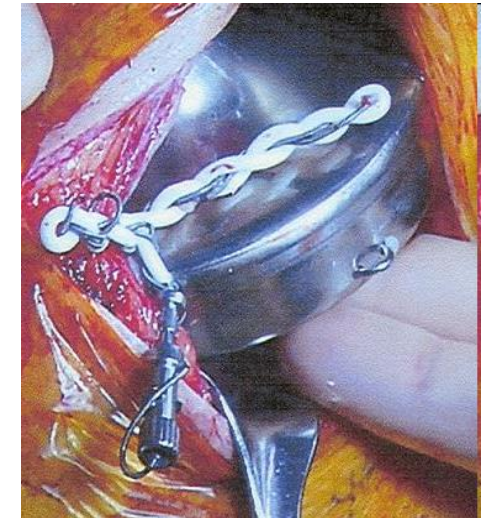
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2. Mechanical

- Catheter related problems
 - Most common complication.
 - Migration, fracture, puncture, disconnection, kinking.
 - Accidental disconnection
 - CSF leak, headache, hygroma
- Pump related problems
 - Rare
 - Magnetic field exposure during MRI
 - End of life battery



HOT
TOPICS

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3. Pump management

- Granuloma
 - High dosages and concentration of Morphine (15mg/ml) and Hydromorphone.
 - Decrease analgesia, neurologic symptoms (mass effect on spinal cord)
- Programming mistakes
 - Wrong dose, dilution, type of medication
 - Overdose, withdrawal respiratory arrest
- Pump refill
 - Pocket refill, air entrapment in reservoir.
 - Wrong patient/medication.
- Abrupt discontinuation of medication
 - Opioids, baclofen, clonidine.





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Device-related adverse events/adverse effects for intrathecal infusion of opioids for persistent pain	No. studies that reported the complication	Total no. patients in studies reviewed	Rate or range of complication, %
Meningitis	6	318	0-4
CSF leaks	3	165	0-17
CSF seroma development	1	30	10
Wound infection	5	274	0-22
Pump pocket infections	1	39	5
Catheter kinking	4	222	2-39
Catheter breakage	2	162	1-4
Catheter obstruction or occlusion	3	129	0-10
Catheter closure/occlusion or disconnection	3	164	12-27
Catheter displacement or blockage	2	132	21-25
Catheter migration or dislodgment	6	338	2-17
≥1 catheter-related complication	2	39	6-26
Mechanical failure of the pump or battery	5	104	0-17
Pump malposition	3	129	6-22
Pump replaced	2	136	6-12
≥1 equipment revisions (reoperation)	5	191	3-40
Requiring additional surgery	4	212	13-76
Device permanently removed	8	269	0-21

CSF, cerebrospinal fluid.



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TROUBLESHOOTING

Prevention is key!



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- **Lack of efficacy:**

- Dose issue
 - Tolerance (opioids)
 - Change in patient's pain
 - Consider bolus or increase dose
- Medication issue
 - Consider using combinations vs switching meds
- Rule out complications
 - Clinical concern for granuloma?
 - Imaging, neuro deficit? Saline vs Ziconotide.
 - Catheter malfunction?
 - Imaging: X-ray initial, fluoroscopy
 - Aspirate fluid from the pump side port
 - Dye study
 - Surgical exploration
 - Replace catheter
 - Pump malfunction?





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- **Adverse effects:**
 - Always use minimal effective dose
 - Ziconotide: Flex dose
 - Consider switching/combining medications
- **Overdose:**
 - Refer to acute care center (hospital)
 - Antidote (Opioids vs Baclofen)
 - Interrogate pump: decrease dose, confirm dose, concentration, dosages are correct.
 - Rule out pocket injection of medication.
- **Infection:**
 - Explant
 - ICU admission?
 - Cultures, ID consult



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PERIOPERATIVE MANAGEMENT

- Obtain pertinent information:
 - Last interrogation: Dose, medication, brand, pain management physician.
- Avoid changes in dosing:
 - If possible, continue baseline infusion
 - Avoid adjusting to control acute pain
 - May consider decrease dosing as patient will receive external opioids to avoid overdose.
- Recognize withdrawal symptoms if present.
- Regional/neuraxial anesthesia is not contraindicated.
 - Placement and location of catheter information before proceeding.
- Interrogation recommended after cardio-defibrillation, MRI.
- Electrocautery should not interfere with functioning. Bipolar recommended.



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Thank you!