

Creating an environment of safety for patients receiving intraspinal analgesia for pain management at home

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Objectives

1. Review the literature about cancer-related pain
2. Provide a theoretical understanding of intraspinal analgesia
3. Describe the monitoring and management of a patient receiving intraspinal analgesia
4. Review recommendations for safe delivery of intraspinal analgesia
5. Discuss nursing and patient education

End stage Cancer Patient -a Case Study

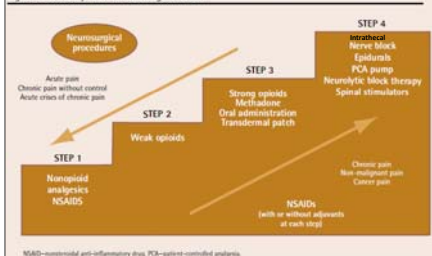
- intrathecal infusion of hydromorphone & bupivacaine via Computerized Ambulatory Delivery Device (CADD) pump
- inserted in an academic setting
- infusion was being managed by home care team a few weeks pass...
- the pt experienced a pain crisis as result of an insufficient amt of analgesics and visited the local ER
- IV was interstitial →the subcutaneous port was mistaken for a vascular access device...
- pt seized as a consequence of the large amt of fld that was delivered to the intrathecal space and later died

Institute for Safe Medication Practices. (2005). Turned! Intrathecal Catheter Mistaken as Central Venous Line Access. Vol 5 Issue 8

Literature Review

- 5-10% of cancer patients will suffer from intractable pain unresponsive to conventional pharmacologic management

Figure 2. New adaptation of the analgesic ladder



Hawley, P. et al. (2009). Intrathecal infusions for intractable cancer pain: A qualitative study of the impact on a case series of patients and caregivers. *Pain Research & Management*, 14 (2), 171-179.
 Myers, L. et al. (2010). Intraspinal techniques for pain management in cancer patients: a systematic review. *Supportive Cancer Care*, 18, 337-349.
 Vargo-Schaffner, G. (2010). Is the WHO analgesic ladder still valid? *Canadian Family Physician*, 56, 254-257.

Literature Review

- Neuraxial or intraspinal analgesia may be an option for patients with:
 - pain unresponsive to the usual routes of analgesia
 - dose limiting side effects

Hawley, P. et al. (2009). Intrathecal infusions for intractable cancer pain: A qualitative study of the impact on a case series of patients and caregivers. *Pain Research & Management*, 14 (2), 171-179.
 Myers, L. et al. (2010). Intraspinal techniques for pain management in cancer patients: a systematic review. *Supportive Cancer Care*, 18, 337-349.

Advantages of Intraspinal Analgesia

- Delivery of adequate pain control
- ↓ side effects
- enhance functional abilities and physical and psychosocial well-being
- enhance quality of life
- some interventions (Intrathecal Drug Delivery System, celiac plexus neurolysis) confer a survival benefit

Kin, P. (2005). Interventional Pain Therapies. *Seminars in Oncology*, 32, 194-199.
 Cancer Care Ontario, 2005.
 Crooks, P. & Moolenaar, G. (2008). Interventional Pain Treatments for Cancer Pain. *Annals of the New York Academy of Sciences*, 1148, 262-269.

Intraspinal Routes

Epidural

- A potential space b/w the dura and connective tissues covering the vertebrae and ligamentum flavum

Intrathecal (within the sac)

- In the subarachnoid space containing CSF
- located b/w arachnoid membrane and pia mater

Figure 7-1 (A and B). Neuraxial opioid administration sites. (A) Epidural. (B) Intrathecal.
 Christophers, P. & Maslowski, D. (2008). Interventional Pain Treatments for Cancer Pain. Annals of the New York Academy of Sciences, 1138, 299-328.
 Rathwell, I. et al. (2005). The Role of Intrathecal Drugs in the Treatment of Acute Pain. Anesth & Analges, 110, 530-543.

Intraspinal Routes

Epidural

- insertion technically more challenging
- prolonged infusion
 - obstruction
 - catheter fibrosis
 - loss of analgesic efficacy
- requires larger drug dose & volume → ↑ risk of infection
- useful for focal analgesia
- ability to deliver large amts of local anesthetic in opioid intolerant pts
- preferred when analgesia is required for a short time

Intrathecal

- superior analgesia:
 - presence of epidural pathology (mets, vertebral compression)
 - large or multiple painful regions
 - pain location distant from catheter tip
- ↓ catheter problems (migration, tip occlusion)
- ↓ dose requirements (a 1/10 of the epidural dose), ↓ side effects
- more suitable for long term use
- infection has more potential harm

Hawley, P. et al. (2005). Intrathecal infusions for intractable cancer pain: A qualitative study of the impact on a case series of patients and caregivers. Pain Research & Management, 14 (3), 371-379.
 Barton, A. R. (2004). Epidural and intrathecal Analgesia is Effective in Treating Refractory Cancer Pain. Pain Medicine, 5 (3), 233-247.
 Christophers, P. & Maslowski, D. (2008). Interventional Pain Treatments for Cancer Pain. Annals of the New York Academy of Sciences, 1138, 299-328.
 Rathwell, I. et al. (2005). The Role of Intrathecal Drugs in the Treatment of Acute Pain. Anesth & Analges, 110, 530-543.

Intraspinal Opioids- Pharmacokinetics

Epidural

- opioids cross the dura into the CSF
- vascular uptake
- systemic absorption

Intrathecal

- disposition of opioids complex and multicompartamental
- travel cephalad in the CSF
- bind with opioid receptors in the dorsal horn
- transverse the dura and bind to epidural fat
- enter plasma through vascular uptake

all medicines delivered via the intraspinal route should be preservative free

Rathwell, I. et al. (2005). The Role of Intrathecal Drugs in the Treatment of Acute Pain. Anesth & Analges, 110, 530-543.
 Christophers, P. & Maslowski, D. (2008). Interventional Pain Treatments for Cancer Pain. Annals of the New York Academy of Sciences, 1138, 299-328.

Intraspinal Local Anesthetics

eg. Bupivacaine

all medicines delivered via the intraspinal route should be preservative free

- produces analgesia by blocking Na channel → prevents the generation and conduction of nerve impulses
- more effective than opioid alone in managing neuropathic pain
- side effects of bupivacaine are dose related and include paresthesia, motor and sensory block and urinary retention
- inadvertent intravascular administration can result in cardiovascular depression and arrest

The goal is analgesia not anesthesia.

Block, M. et al. (2012). Reducing Risk of Epidural – Intravenous Mismatches. <http://www.aspf.org/newsletter/html/2012/winter/15epidural.htm>.
 Burton, A. (2004). Interventional Management of Cancer Pain. <http://www.painmanagementjournal.com>.
 Ghahoor, V. et al. (2007). Intrathecal drug therapy for long-term pain management. *American Journal of Health-System Pharmacy*, 64, 3447-3461.

Local Anesthetic Toxicity


caused by inadvertent intravascular administration

Signs & Sx (in order of severity as plasma concentration rises)

- light headedness
- circumoral numbness & numbness of tongue
- tinnitus, metallic taste, visual disturbances
- muscular twitching
- drowsiness
- unconsciousness
- seizures
- coma
- respiratory arrest
- cardiovascular depression and arrest

Wheetman, A. (2009). Use of epidural analgesia in post-operative pain management. *Nursing Standard*, 20, 44, 54-64.
 McCaffery, M. & Pasero, C. (1999). *Pain Clinical Manual*.

Methods of Drug Delivery



delivery device selection based on:

- pain diagnosis
- survival prognosis
- cost

Figure 15-7 Intraspinal delivery systems for persistent pain. This figure shows three intraspinal opioid delivery systems for treatment of persistent pain.

Pasero, C. & McCaffery, M. (2011). *Pain Assessment and Pharmacologic Management*. Elsevier, Mosby, St. Louis Missouri.
 Ghahoor, V. et al. (2007). Intrathecal drug therapy for long-term pain management. *American Journal of Health-System Pharmacy*, 64, 3447-3461.

Back to our original case...

Patient Safety

- near fatality and death where:
 - IV medicines were given by the intrathecal route
 - local anesthetics were given intravenously
 - tunneled intrathecal catheter was mistaken as central venous line access
- since 1999, the US Pharmacopeia has received 1600 reports of epidural to central line or peripheral IV connection errors
- a technological solution creating barriers for misconnection errors is on the horizon but until then...

Block, M. et al. (2012). Reducing Risk of Epidural – Intravenous Misconnections. <http://www.aspc.org/newsletters/Item/2012/winter/Epivascular.htm>
Institute for Safe Medication Practices. (2008). Epidural IV route mix-ups: Reducing the risk of deadly errors. From the July 3, 2008 issue, 3-4.
Institute for Safe Medication Practices. (2005). Tunneled Intrathecal Catheter Mistaken as Central Venous Line Access. Vol 5, Issue 3.

Implementation

- Cancer Care Ontario

- equipment
- aftercare
- monitoring
- hospital discharge
- follow up
- practice team
- professional education & competency
- pt & family education
- pt safety

requires a clear discharge plan prior to insertion

Myers, J. et al. (2010). Intrathecal techniques for pain management in cancer patients: a systematic review. Supportive Cancer Care, 18, 337-346.
Cancer Care Ontario, 2010.

Equipment

Storage

- intrathecal medications with overwraps differentiate them from other meds
- separate from intraspinal medications from IV solutions (including those that are locked up)
- keep an extra bag of solution in the home

Site

- location of the port or dome
- no alcohol and acetone to cleanse the site
- support for chlorhexadine with alcohol- ↓epidural infection rate
- cleansing agents containing alcohol must dry prior to procedure
- transparent dsq and label

Myers, J. et al. (2010). Intrathecal techniques for pain management in cancer patients: a systematic review. Supportive Cancer Care, 18, 137-148. Cancer Care Ontario, 2009
Institute for Safe Medication Practices. (2008). Epidural-IV route mix-ups: Reducing the risk of deadly errors. From the July 2, 2008 issue, 1-4.

Equipment

Pumps and Infusion sets

- containers should be clearly labelled
- continuous infusions should be administered via pump with anti-free-flow protection
- select a pump that looks different than IV pump (avoid dual-channel pumps, create barriers cassettes and bags)
- label the pump- epidural or intrathecal only
- use of smart pump (drug library, hard and soft limits)
- use yellow striped tubing without injection ports/? different colours for epidural and intrathecal
- 0.2 micron filter
- Huber needles should not have a side port
- label the tubing with neon sticker -epidural or intrathecal

Myers, J. et al. (2010). Intrathecal techniques for pain management in cancer patients: a systematic review. Supportive Cancer Care, 18, 137-148. Cancer Care Ontario, 2009
Institute for Safe Medication Practices. (2008). Epidural-IV route mix-ups: Reducing the risk of deadly errors. From the July 2, 2008 issue, 1-4.

Equipment

- place epidural or intrathecal infusions on the opposite side of the bed from IV
- label DO NOT FLUSH
- make medication labels visible
- trace tubing to point of origin
- ??flushing
- store enough supplies in the home

Administration

- independent double checks- initiation of infusion, pt transfer, change in pump settings, change in solution

Myers, J. et al. (2010). Intrathecal techniques for pain management in cancer patients: a systematic review. Supportive Cancer Care, 18, 137-148. Cancer Care Ontario, 2009
Institute for Safe Medication Practices. (2008). Epidural-IV route mix-ups: Reducing the risk of deadly errors. From the July 2, 2008 issue, 1-4.
Institute for Safe Medication Practices. (2005). Tunnelled Intrathecal Catheter Mistaken as Central Venous Line Access. Vol 5 Issue 8.

Monitoring - Assessment of patient receiving analgesia by catheter technique

- PQRST (RNAO BPG)
- Edmonton Symptom Assessment System (ESAS)
- VS
- sedation score (Pasero Opioid-induced Sedation Scale)
- motor & sensory block (Bromage, stairs, ice, dermatomes)
- side effects
- complications
- insertion site
- dsg
- catheter & tubing connections
- infusion device (independent double check, include the pt)
- protection from an infectious environment
- documentation

Myers, L. et al. (2010). Intraosseal techniques for pain management in cancer patients: a systematic review. *Supportive Cancer Care, 18*, 237-240.
 Pasero, C., Ekezerowicz, N., Pimeau, M., & Cowley, C. (2007). Registered Nurse management and monitoring of analgesia by catheter techniques. *Pain Management Nursing, 8*(2), 43-54.

Intrathecal Flow Sheet

S & Sx of LA toxicity PCA

Date	Time	Pain Rating (0-10)	Level of Sedation	Resp Rate	Resp Depth	SIDE EFFECTS			BLOCK ASSESSMENT								
						Pruritus	Itchiness	Secondary Adverse Effects	Motor Assessment	Six	Step	Ice	Stairs				

Legend of Sedation:
 0 - awake, easy to arouse
 1 - occasionally arousable, easy to arouse
 2 - frequently arousable, fully oriented and cooperative
 3 - spontaneously arousable to noisy
 4 - unarousable to noisy
 5 - unarousable to voice
 6 - unarousable to pain
 7 - unarousable to deep pain

Motor Assessment:
 0 - flexes hip/knee/ankle, able to raise leg (no block)
 1 - flexes hip/knee/ankle, unable to raise leg (partial block)
 2 - flexes ankle, unable to flex knee or raise leg (distal/complete)
 3 - unable to flex ankle/raise leg (total block)

Six Step:
 0 = none
 1 = mild
 2 = moderate
 3 = severe
 4 = very severe
 5 = no response

Pasero, C. & McCaffery, M. (2011). Pain Assessment and Pharmacologic Management. Elsevier, Mosby, St. Louis Missouri.

Professional Education

Nursing

- institutional P&P review
- related anatomy & physiology review
- comprehensive pt assessment
- use and interpretation of monitoring modalities
- use and troubleshooting of infusion devices
- side effect management
- complications and emergency situation recognition and management
- legal ramifications
- pt/family education

Pasero, C., Ekezerowicz, N., Pimeau, M., & Cowley, C. (2007). Registered Nurse management and monitoring of analgesia by catheter techniques. *Pain Management Nursing, 8*(2), 43-54.




TABLE 15-4 Overview of the Recommended Practice: Intraosseous and Intravenous Regional Anesthesia for Pain Management in Cancer Patients	
Agent	Recommendation
Anticoagulation	<ul style="list-style-type: none"> Intraosseous injection with intrathecal or intravenous opioids has no effect on general anesthesia and should be considered in patients who require anti-thrombotic therapy in the presence of anti-coagulation. Local anesthetic infiltration is safe with intrathecal or intravenous opioids. Of these, intrathecal opioid is preferred over intravenous opioids and are contraindicated within 4 weeks of surgery (due to overall general anesthesia) or in long-term therapy (depending on agent, avoid neuraxial technique until possible haemostatic recovery).
Local anesthetic	<ul style="list-style-type: none"> Neuraxial blockade is safe in the presence of anticoagulation. Consider adequate hydration and other blocks if technical difficulty or intolerance.
Local anesthetic/ opioid	<ul style="list-style-type: none"> Combining neuraxial techniques with intravenous anesthesia is acceptable. Reserve local anesthetic blocks for rescue therapy. Reserve catheter use a block after low-dose neuraxial. Reserve catheter use for rescue therapy. No mandatory delay of catheter.
Propofol	<ul style="list-style-type: none"> Propofol infusion is safe in the presence of neuraxial techniques. All tests to be used should follow standard doses and be hours after higher doses before neuraxial techniques is attempted.
Lidocaine, ropivacaine	<ul style="list-style-type: none"> The first dose of LIDOC should be administered no earlier than 6 hours after surgery and only if adequate hemostasis is present. Subsequent doses should be administered no earlier than 4 hours after surgery.
Lidocaine, single-dose infusion	<ul style="list-style-type: none"> The first dose of LIDOC should be administered no earlier than 6 hours after surgery. The second dose should be administered no earlier than 4 hours after the first dose. Neuraxial catheter may be safely maintained. Catheter should be removed a minimum of 4 to 6 hours after the last dose of LIDOC and 1 to 4 hours prior to the next dose. Propofol 100 mg IV bolus if indicated.
Neuraxial	<ul style="list-style-type: none"> Stop oral anticoagulation prior to neuraxial technique (ideally 4 to 5 days prior). Discontinue neuraxial after discontinuation of oral anticoagulation (per neuraxial technique). Reserve catheter when AHA is 1 to 2 days (injection of 0.5 mg). Neuraxial blockade of neuraxial and lower trunks should be reserved during optimal analgesia for patients requiring oral anticoagulation. Withdrawal or reduce dose of warfarin if risk higher than 1 to 2 patients with neuraxial catheters. AHA advice on recommendation for removal of catheters in patients with therapeutic levels of anticoagulation during neuraxial catheter utilization.
Pharmaceuticals	<ul style="list-style-type: none"> No data on safety interval for performance of neuraxial technique or catheter removal. Local anesthetic infusion in patients requiring it while they receive neuraxial and intrathecal drugs. Guidelines defining optimal concentrations for the neuraxial technique drugs suggest addition of these drugs to the following treatment of neuroanesthetic needs. Neuraxial techniques at high levels (T4 to T6) is recommended in patients who have received neuraxial block at or near the level of neuraxial and intrathecal therapy. Following 10-minute trial (one of the best clinical factors to record) may be helpful in determining optimal level for catheter removal. No evidence for mandatory blood/urine prior to neuraxial technique. No need of monitoring drug concentrations.
Peroral therapy	<ul style="list-style-type: none"> No evidence for mandatory blood/urine prior to neuraxial technique. No need of monitoring drug concentrations.

Pauro, C. & McCaffery, M. (2011). Pain Assessment and Pharmacologic Management. Elsevier, Mosby, St. Louis Missouri.


Patient & family education

Requires:

- discharge with an information package
- ongoing education
- pts & families who are motivated
- provision of contact information for support should complications arise (contact list)
- medical alert/wallet ID/procedure note

Myers, J. et al. (2010). Intraosseous techniques for pain management in cancer patients: a systematic review. Supportive Cancer Care, 28, 127-146. Cancer Care Ontario, 2009.

Thank you for your attention



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