Perioperative Management of Complex Regional Pain Syndrome in a child with baseline anxiety and attention deficit hyperactivity disorder

Moderators: Meredith R. Brooks MD, MPH & Brenda Golianu MD

Goals

1. To identify key anesthetic issues for patients with complex regional pain syndrome.
2. To learn perioperative management of patients with complex regional pain syndrome.
3. To determine appropriate indications for single versus continuous peripheral nerve blockade.
4. To determine when chronic pain patients undergoing same day procedures should be admitted into the hospital.

Case Description

14-year-old male with a past medical history significant for complex regional pain syndrome type 1 of the right arm, anxiety, and ADHD presents for an open reduction internal fixation of the left wrist after falling off his skateboard. The patient states he had complex regional pain syndrome in his right arm after an injury three years ago. Preoperative assessment determines the patient's complex regional pain syndrome of the right arm has been resolved for two years. The patient and parents express concern the left arm pain may progress into complex regional pain syndrome. The patient takes anxiety and ADHD medications at baseline. You observe him and he is fidgeting, while rocking back and forth on the patient transport bed. Upon questioning, his parents tell you his anxiety has not been well managed and he refuses to take his ADHD medications. An IV is placed in the patient's right arm. The patient is sedated and a left infraclavicular nerve catheter is placed successfully under ultrasound guidance. During induction, the patient complains of increased pain at the IV site. The patient becomes upset and begins crying from the pain. Upon closer inspection, it is noticed the IV in the right arm has infiltrated. The IV is removed and another IV is attempted at a different location in the right arm. During placement the patient is crying and moaning from pain. After multiple unsuccessful attempts, the iv is abandoned and another is placed in the patient's right saphenous vein easily. The patient is induced successfully. The patient is managed during the case breathing spontaneously while on a propofol drip and a continuous infusion of 0.2% ropivacaine through the infraclavicular nerve catheter. He undergoes the anesthetic without a problem. After the case the patient awakes in the recovery room screaming in pain. The PACU nurse contacts you stating she believes the infraclavicular catheter isn't working and asks you to assess. The patient is incoherent and unable to tell you where he hurts. To calm him immediately, a bolus of propofol is given and he goes back to sleep. Upon assessment, you see the left arm is warm, pink, and immobile. While sleeping, the patient is given fentanyl and dilaudid. Once he awakes he begins to cry again and complains of burning pain shooting up his right arm from the old infiltrated IV site. On examination, his right arm appears mottled, blue, and cold. The patient is given multiple boluses of fentanyl and dilaudid without effect. He is given a bolus of IV ketamine and falls back to sleep. A pain consult is obtained and it is recommended the patient be placed on intravenous ketamine for the complex regional pain symptoms in his right arm. The patient is admitted into the hospital and during the admission undergoes physical therapy and occupational therapy targeting his right arm. He is discharged five days later with no pain in his left arm and persistent levels of pain in his right arm. He is admitted into a functional rehabilitation program where he undergoes daily psychotherapy, physical and occupational therapy for four hours each day. He is discharged from the program five weeks later with resolution of his pain complaints.

Model Discussion Outline

1) Are there any preoperative concerns you have given his history of complex regional syndrome?
2) What do you tell the patient's parents when they express concern?
3) Can the development of complex regional pain syndrome be prevented after surgery?
4) Are there any medications that can be given to prevent the development of complex regional pain syndrome?
5) Does the amount of time resolution of the patient's complex regional pain syndrome symptoms matter with regards to the risk of development of complex regional syndrome again?
6) Should you be concerned about the anxiety both the patients and parents express prior to surgery? If concerned, how would you mitigate the anxiety during the perioperative period?
7) Should the IV be placed in the right arm or a different location? What concerns do you have about the placement of the IV?
8) Should the patient have a regional anesthetic to prevent complex regional pain syndrome from occurring in the left arm? Should a single or continuous peripheral nerve block infusion be done? What are the pros and cons of doing each?
9) Once the IV infiltrates, are there any concerns you have? Should another IV be attempted in the same arm?
10) Are there any other medications you would consider giving intraoperatively that have been shown to be effective in the reduction of pain after surgery in chronic pain patients?
11) At what point in this process should you have considered admitting this patient (or similar chronic pain patients undergoing same day procedures) into the hospital? Is consideration when the patient is in the PACU too late?
12) Likewise, when do you think is the most appropriate time to obtain a pain consult?
13) Intravenous ketamine versus peripheral nerve blockade--discuss the pros and cons of each, which is more efficacious for the treatment of complex regional pain syndrome?

References

1. Gohil S, Balasubramanian S. Case report and literature review of chronic neuropathic pain associated with peripheral venous cannulation. Anaesthesia 2012; 67: 1395–7.

2. van Rijn MA, Marinus J, Putter H, Bosselaar SR, Moseley GL, van Hilten JJ. Spreading of complex regional pain syndrome: not a random process. J Neural Transm. 2011 Sep;118(9):1301-9.

3. Perez RS, Zollinger PE, Dijkstra PU, Thomassen-Hilgersom IL, Zuurmond WW, Rosenbrand KC, Geertzen JH; CRPS I task force. Evidence based guidelines for complex regional pain syndrome type 1. BMC Neurol. 2010 Mar 31;10:20.

4. Martin DP, Bhalla T, Rehman S, Tobias JD. Successive multisite peripheral nerve catheters for treatment of complex regional pain syndrome type I. Pediatrics. 2013 Jan;131(1):e323-6.

5. Marx C, Wiedersheim P, Michel BA, Stucki G. Preventing recurrence of reflex sympathetic dystrophy in patients requiring an operative intervention at the site of dystrophy after surgery. Clin Rheumatol. 2001;20(2):114-8.

6. Veldman PH, Goris RJ. Multiple reflex sympathetic dystrophy. Which patients are at risk for developing a recurrence of reflex sympathetic dystrophy in the same or another limb. Pain. 1996 Mar;64(3):463-6.

7.Wilson JG, Serpell MG. Complex regional pain syndrome. Continuing Education in Anaesthesia, Critical Care and Pain 2007; **7**: 51–4.

8. Welch MB, Brummett CM, Welch TD, et al. Perioperative peripheral nerve injuries. A retrospective study of 380,680 cases during a 10-yr period at a single institution. Anesthesiology 2009; **111**: 490–7.

9.Linnman C, Becerra L, Lebel A, Berde C, Grant PE, Borsook D Transient and persistent pain induced connectivity alterations in pediatric complex regional pain syndrome. PLoS One. 2013;8(3):e57205