

Bilateral Infraclavicular Catheter Placement for Postoperative Pain Control with Epidermolysis Bullosa Patient: A Case Report

Aaron A Berg*, Immen D, Fridman R and Hutchins J

Department of Anaesthesiology, Medical Director of West Bank Adult Anesthesia and Research, Director of the Regional Anesthesia and Ambulatory Medicine Fellowship, University of Minnesota, Minneapolis, USA

Abstract

Epidermolysis Bullosa (EB) poses challenges to anesthesiologists due to difficulty maintaining skin integrity with interventions contacting the skin. Complications during all types of anesthesia are created by needs for monitoring and securing access, potentially creating blisters and bullae from friction and shearing forces. Also, due to EB patients having a higher opioid tolerance from prolonged use and being in a hypermetabolic state, adequate pain control is more difficult to achieve. This case report details the decision process and management of a pediatric patient who received bilateral infraclavicular catheters for bilateral syndactyly procedure. Epidermolysis Bullosa poses unique challenges for anesthesia care due to interventions that test skin integrity and management of chronic pain commonly controlled by opioids. Catheter placement for perioperative pain has been infrequently documented as a solution to pain control due to concerns of causing blister and bullae formation. Bilateral infraclavicular catheters used for postoperative pain management were successfully utilized in a pediatric patient with Epidermolysis Bullosa.

Keywords: Epidermolysis Bullosa • Post-operative pain • Infraclavicular catheter • Multimodal pain management

Introduction

Epidermolysis Bullosa (EB) is a combination of inherited connective tissue disorders affecting the structural components of keratinocytes and the dermoepidermal junction [1]. The infrequent incidence of this disease can lead to unfamiliarity in how to best care for each patient's specific anesthesia-related needs. This includes maintaining skin integrity with interventions contacting skin and difficulty with intubation due to limited mouth opening from oral scarring. Common procedures for EB patients include dressing changes, esophageal dilation, and syndactyly procedure for correction of pseudosyndactyly. We present a case report of bilateral infraclavicular catheters for postoperative pain management in a pediatric patient with EB.

Case Presentation

This medically challenging case details placement of bilateral infraclavicular catheters for pain control in an 11-year-old patient with recessive dystrophic EB undergoing bilateral syndactyly hand repair with closed reduction and cutaneous pinning. Preoperative planning for the patient focused on the best method to control surgical and postsurgical pain for bilateral syndactyly release. Preoperatively the patient was managing pain with gabapentin 500 mg three times daily, acetaminophen 150 mg daily, and hydroxyzine 30 mg nightly. After discussion with the surgical team and parents,

a decision was made to perform bilateral infraclavicular catheter placement in the operating room after induction of anesthesia for better tolerance of the patient. Supraclavicular approach was avoided due to risk of bilateral phrenic nerve paralysis and bullae present in the supraclavicular area on the day of surgery. Infraclavicular catheters were to be secured in place without suturing and use of IV Clear™ (Covalon Technologies Ltd. Mississauga, ON, Canada), an antimicrobial clear silicone adhesive dressing. This decision was based on past success with this product protecting skin integrity with this specific patient. Daily dressing changes by only the anesthesia team and parents were planned for the catheters.

Procedurally, both catheters were placed deep to the axillary artery from an inferior approach under ultrasound guidance. A pediatric catheter kit with 21-gauge four-inch needle and 23-gauge catheter were selected. Initially the posterior, medial, and lateral cords were identified and subsequently blocked with 2.5 mL bilateral boluses of 0.25% bupivacaine to provide surgical analgesia. Following the satisfactory spread of local anesthetic, the posterior cord was targeted for catheter placement. Confirmation of placement was observed with the spread of local anesthetic to the medial and lateral cord under ultrasound observation. Securing of the catheters was performed with IV Clear™ previously selected and final ultrasound confirmation of the correct catheter position was observed. During the procedure, special care was taken to not excessively cause pressure or rubbing forces on the skin with the ultrasound to avoid creating more blistering.

Post-operative course required continued care for pain control due to complex pain needs for the patient. While recovering from the syndactyly procedure, the patient's pain was controlled through continuous infusion of 0.2% ropivacaine at three mL/hr and 3 mL boluses of 0.2% ropivacaine every eight hours. Assessment of catheter sites was performed daily by the pediatric regional anesthesia team to minimize opportunities for dislodgement of catheters and exposure of the catheter site. Pain management during the recovery period cycled with patient mood and child life psychology assisted in pain management techniques from post-operative day two until discharge. Pain was controlled with hydrocodone-acetaminophen 15 mL of 7.5-325 mg/15 mL every four hours as needed, diazepam 3 mg every six hours as needed, gabapentin 600 mg three times daily, and celecoxib 50 mg every 12 hours. His hydroxyzine home dose of 30 mg nightly was also utilized. Patient continued to receive relief with boluses and continued infusion for three days in the hospital. Parents were instructed for catheter removal and signs of local toxicity for

***Address for Correspondence:** Aaron A Berg, Department of Anaesthesiology, Medical Director of West Bank Adult Anesthesia and Research, Director of the Regional Anesthesia and Ambulatory Medicine Fellowship, University of Minnesota, Minneapolis, USA; Tel: 612-702-5465, E-mail: bergx831@umn.edu

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giving boluses at home. Uneventful recovery was completed at home with removal of the catheter on postoperative day six by the parents.

Discussion

On average, our academic center provides care for roughly 75 EB cases in the operating room each year. A major goal of our anesthetic management for these patients is to minimize blister formation with contact of dermis and to identify the best medical supplies for patient use during the perioperative period. Previous catheter placements on EB patients had been rarely performed at our institution due to concerns for development of additional lesions. Planning for catheter placement was based on the best chance to provide coverage for pain postoperatively while minimizing potential complications due to the patient's success with their own dressing and difficulty with pain medication in the past. As it is commonplace for EB patients to have difficulty achieving adequate pain control due to higher tolerance to opioids from chronic opioid use, we were encouraged to attempt catheter placement for this patient [1].

Infraclavicular catheter placement with inferior approach was selected due to the need to avoid skin lesions on supraclavicular sites and desire to avoid potential bilateral phrenic nerve block with supraclavicular catheters. Important consideration for the placement of the infraclavicular catheters was minimizing trauma on already blistering skin in the supraclavicular and axillary regions. A disadvantage of infraclavicular site placement was incomplete blockade of bilateral upper extremities. Placing a single catheter covering the posterior, lateral and medial cords proved difficult as evidenced by the incomplete coverage of the medial cord leading to mild ulnar sparing bilaterally in the patient. During the recovery period the patient's pain required boluses *via* catheters to complete the coverage.

Prior literature detailed subcutaneous tunnelling of catheters for EB patients, but the technique described was not conducive for nerve catheter placement in this patient [2,3]. Overfeeding into the pectoralis muscle to avoid catheter dislodgement and use of IV Clear™ provided adequate securement of the catheters while avoiding additional blister formation around catheter sites.

Further analysis of potentially securing catheters in place with suture as compared to IV Clear™ may be beneficial for future EB patients but literature is limited to case reports. Additional research may be limited due to the low number of patients with the specific subgroup of EB undergoing catheter placement.

Conclusion

In summary, this case supports the use of bilateral infraclavicular catheters for a multimodal and opioid reducing technique for postoperative analgesia in EB patients undergoing syndactyly release.

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