A Novel Approach to Post-Operative Pain Control after Scoliosis Surgery through Continuous Local Anesthetic Infusion Targeting the Thoracolumbar Dorsal Rami Nerves, a Case Report

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Scoliosis is the most common deformity of the spine. Surgical correction is usually indicated for angles greater than 45 degrees in patients with immature skeletons and if the severity of the curvature is allowed to progress without intervention there is risk for permanent disfigurement and potential long-term pulmonary issues. Post-operative pain management after posterior spinal fusion can be very challenging due to the large incision, surgical trauma to superficial and deep muscles of the back and the insertion of hardware directly into the vertebral column. Therefore, a multi modal pain management regimen including IV and oral opioids, intrathecal morphine, continuous epidural infusions and even subcutaneous local anesthetic infusions are all mainstay therapies after PSIF surgery. Common side effects of these various modalities include respiratory depression, drowsiness, hypotension, nausea/vomiting and sensorimotor dysfunction, all of which can be potentially avoided by strategically placing local anesthetic infusion catheters that specifically target the dorsal rami nerves. In this case report we demonstrate a novel approach to post-operative pain management via placement of multi-orifice infusion catheters lateral to the surgically placed metal rods that lie directly in the vicinity of the thoracic and lumbar dorsal rami nerves. We demonstrate that continuous infusion of local anesthetic to this region significantly improved this patient’s pain and improved post op comfort, all the while bypassing the potential untoward side effects of epidural analgesia. The benefits of placing these catheters intraoperatively directly into the surgical site helps avoid potential pitfalls like epidural hematomas, post dural puncture headaches and high spinals, while providing analgesia to the vertebral column and posterior thoracic musculature.

Our case report involves an otherwise healthy 14-year-old girl with adolescent idiopathic scoliosis (AIS) undergoing posterior spinal fusion under total intravenous anesthesia using continuous infusions of propofol, remifentanil, and ketamine. Intraoperative neurological monitoring of somatosensory and motor evoked potentials were continuously monitored throughout the procedure. The posterior spinal fusion was uneventful and the patient was hemodynamically stable for the entirety of the case. Typically, the surgeon places an epidural catheter prior to closing the incision but it was decided that placement of multi-orifice ON-Q pump catheters adjacent to the implanted metal rods would provide adequate post op analgesia by targeting the dorsal rami nerves which supply sensory and motor function to the back muscles and skin. Two catheters were placed on each side and a continuous infusion 0.1 % ropivacaine plus fentanyl 1mcg/ml was started immediately post op as well as the standard multimodal approach, including IV Tylenol, and hydromorphone PCA. The patient did very well and reported very low pain scores through out her
hospitalization. When she did have increased episodes of pain, a bolus dose of ropivacaine quickly abolished any discomfort.

The placement of local anesthetic infusion catheters directly into the facial plane through which the dorsal rami nerves travel has not been reported in either anesthesiology or spine surgery journals to date. This regional approach is unique because the catheters are placed with certainty under direct visualization without the need for ultrasound. There are a few case reports that describe local anesthetic injection into the thoracolumbar interfacial plane or into the erector spinae muscle plane but these were single shot injections and were not used for spinal surgery. Our goal was to deposit local anesthetic around the dorsal rami nerves at their point of exit from the intervertebral foramen and into the erector spinae muscles. Further investigation into the efficacy of this new technique is required but could drastically improve post-operative pain after scoliosis surgery.