Use of a Paravertebral Anesthetic Infusion System for Post-Operative Pain Relief

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Patients who undergo lumbar spine surgery are often concerned about postoperative pain control. With adequate pain control, patients are able to more rapidly increase their level of activity after surgery and more likely to benefit from physical therapy. In addition, poor pain control has been cited as one of the most common reasons for an extended hospital stay after surgery.

Current pain control options include the use of narcotic (similar to morphine) medications in pill form, injection form, or intravenous patient controlled analgesia (PCA). Patients control the additional treatment modality in the form of a continuous paravertebral anesthetic infusion (On-Q® PainBuster®, I-Flow Corp., Lake Forest, CA) has recently been added to the arsenal of pain control. The plastic pump delivers local anesthetic into the surgical site at a controlled preset rate, effectively decreasing pain in the area surrounding the incision.

Currently, we use each of the available modalities in our patients to varying degrees based upon the type of surgery performed and the patient’s specific pain tolerance. Post-operatively, we commonly inject the incision site with a local anesthetic such as lidocaine or bupivicaine, then use a long-acting oral pain medication and the intravenous PCA as a very effective combination. Unfortunately, the local anesthetic injection is only effective for a brief period of time, generally between four and eight hours. With a continuous anesthetic infusion pump (On-Q® PainBuster®), a lower dose of the anesthetic may be delivered to the area around the incision on a continuous basis and can be used to up to 72 hours in the postoperative period. Using long-term local anesthetics significantly reduces the need for narcotic pain medications and also limits the morphine associated side-effects such as sedation, constipation and respiratory depression.

In our experience, the infusion of this continuous local anesthetic around the surgical incision site has significantly decreased the amount of postoperative narcotics required, taken either orally or with PCA delivery. It has increased the mobility of patients: patients have been able to sit up, walk and work with physical therapy sooner than the patients who did not receive the continuous infusion pump. With this increased activity and improved pain control, patient satisfaction has also greatly improved.

In addition to early mobilization, the benefits for the patients include increased pulmonary function, decreased fever and reduced risk of...
deep venous thrombosis (blood clot in the leg) and pulmonary embolism (blood clot to the lung). There are additional benefits associated with the continuous infusion of local anesthetics for postoperative pain. It has been shown that the use of bupivacaine interacts with various prostaglandins (inflammatory mediators) in the postoperative period. One such prostaglandin is called prostaglandin E₂ (PGE₂). Prostaglandin E₂ receptors, subtype EP₁ (PGE₂EP₁) have been linked to several physiologic responses, such as fever, inflammation, and mechanical hyperalgesia (increased sensitivity to pain). Local anesthetics seem to decrease the sensitivity of these receptors to the presence of prostaglandins, thereby speeding recovery of injured tissues.

The use of continuous wound catheters after surgery has been shown to improve pain control, reduce opioid use, increase patient satisfaction and shorten hospital stay across a wide range of surgical procedures such as cardiac surgery, abdominal hysterectomy, cesarean section, knee and shoulder surgery, and spinal fusion. The most recent study involving spinal fusion demonstrated that the On-Q® PainBuster® after spinal fusion surgery decreased postoperative pain and the need for narcotic medications. A group of 52 patients in Southern California underwent lumbar spinal fusion. An infusion pump was inserted into half of the patients. The recorded average daily pain level and use of narcotics was lower for patients with the local anesthetic pump than for patients without one.

Figure 4.


