SP57 RA TECHNIQUES IN SPINE SURGERY: TARGETING A DECREASE IN THE USE OF MORPHINE DERIVATES

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The number of spine surgeries being performed has exponentially increased in the last two decades. This rapid growth is mainly attributed to the epidemic of chronic low back pain in developed countries, as well as the introduction of minimally invasive surgical technique that allows more complex spine procedures to be performed safely. Many institutes have protocolized their perioperative management of patients undergoing spine surgery.

However, a widely accepted enhanced recovery after surgery (ERAS) pathway for spine surgery has yet to be developed. Early studies suggested ERAS spine protocol enables faster recovery, increase patient satisfaction, reduction of hospital length of stay and healthcare expenditure. There are three major anesthetic considerations for adult patients undergoing complex spine surgery, namely: blood loss, pain management, and position-related complications

Complex spine surgery was ranked among the top six most painful procedures. Poor pain control has been shown to be associated with increased risks of wound healing, hospital-acquired infections, length of stay, and delayed mobilization. Pain following spine surgery can result from mechanical irritation, nerve compression, or postoperative inflammatory processes. It can be generated from different structures such as vertebrae, discs, ligaments, muscles, dural sleeves, and capsules of the facet joint. Innervation of these pain generators is from the dorsal rami of spinal nerves. Opioids are commonly used as effective analgesics for the management of severe pain disorders. However, their widespread use is restricted because of their side effects such as nausea, vomiting, and respiratory distress, and acquired tolerance.

Preemptive multimodal analgesic regimens that rely on the synergistic action of nonopioid agents given in lower doses have been used to improve postoperative pain management and reduce opioid consumption. Protocols for reducing pain after lumbar surgery recommend the use of regional anesthesia techniques to reduce opioid analgesic use to the minimum. Interfascial plane blocks have the potential to provide extended postoperative analgesia and to reduce opioid consumption and neuraxial-related motor block to a minimum.

In order to reduce opioid use, loco-regional and local anesthesia were introduced. In spine surgery, loco-regional techniques were limited to epidural catheters and spinal and epidural morphine. Neuraxial analgesia through spinal opioids or continuous epidural infusion can provide excellent pain control, but these techniques have drawbacks. They can lead to rare but serious complications, such as infection, hematoma, or nerve injury, often cause severe pruritus, nausea, vomiting, and urinary retention, and may cause hypotension in the postoperative period. In addition, the use of central blocks could interfere with neurophysiological monitoring and delay postoperative evaluation of possible neurological complications.

Local anesthetic wound infiltration is often performed with unfortunately short-lived effect. With the intention of prolonging the analgesic effect of wound infiltration, the possibility of infiltrating a mixture of local anesthetic, opioid, NSAIDs, and epinephrine in the lumbar region has been postulated. Although the evidence for this practice is limited.

In 2020, Jeff L. Xu described a novel regional anesthetic technique in which local anesthetic is deposited around the thoracolumbar dorsal ramus nerve (TDRN) via 4 multiorifice pain catheters placed intraoperatively under direct visualization by the surgeon, Patients who received TDRN block catheters required minimal opiates in the postoperative period and avoided affecting the blockage distribution of ventral ramus nerve and sympathetic chain. This allowed patients to participate in physical therapy as early as on postoperative day 0. This bypassed the potential untoward side effects of epidural analgesia (hypotension, lower extremity weakness, respiratory depression, and urinary retention). In addition, the TDRN block catheters can be used in the upper thoracic spine without fear of respiratory depression and may be used in cases of wide laminectomy or large vertebrectomy. Given the results, the authors believe that a larger study comparing TDRN block catheters with the standard thoracic or lumbar epidural or other regional approaches should be performed in the setting of a multimodal analgesic regimen.

The loco-regional technique used in this type of surgery should aim to anaesthetize the dorsal root of the spinal nerves at the appropriate operative level. Dorsal ramus blocks have been shown to be feasible in the treatment of chronic pain. In a recent series of case reports, a bilateral block of the lumbar dorsal ramus nerve showed improved pain scores and reduced morphine consumption after spine surgery A loco-regional technique suitable for back surgery should cover the innervation of the relevant vertebrae and paravertebral muscles and include the dorsal roots of the spinal nerves at this level.

The Toracolumbar interfascia plane (TLIP) block was first described by Hand et al. In the TLIP block, local anesthetic agents are injected into the fascial plane lying between the multifidus and longissimus muscles at the level of the third lumbar vertebra, targeting the posterior rami of the thoracolumbar spinal nerves, thus achieving a reproducible area of anesthesia with a predictable spread. The TLIP block can provide effective postoperative analgesia for lumbar spine surgery, decrease postoperative VAS scores, and reduce opioid consumption after lumbar spine surgery. In addition, the TLIP block significantly reduces the side effects of nausea. However, further studies are needed to testify these benefits, and more high-quality RCTs are still necessary and urgently required for further research.

Ultrasound-guided erector spinae plane blockade (ESP) was first developed by Forero in 2016 as an easy, safe way of managing thoracic neuropathic pain.Since that time, this block has gained in popularity and has been used to effectively provide analgesia for a variety of surgeries, including spine surgery. Theoretically, an infiltration between the erector spinae muscle and the transverse process provides anesthesia of the dorsal ramus at the same vertebral level. Since the local anesthetic is injected into a plane, the solution can spread both caudally and cranially via the toracolumbar fascia, resulting in anesthesia of the dorsal ramus of the spinal nerves above and below the injected level. Potential benefits of the lumbar ESP include the ease of performance with clear landmarks for ultrasound anatomy. The technique is inherently safe, as the target site for injection is a muscular plane and there is practically no risk for mechanical nerve contact. Other benefits include the possible reduction in perioperative opioid consumption. The ESP is performed in patients under anticoagulant therapy or with coagulopathies. Furthermore, hemodynamic instability due to sympathetic blockade, as with epidural and spinal anesthesia, occurs rarely. Possible risks

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consist primarily of local anesthetic systemic toxicity. Since substantial doses are considered necessary, there is a clinically significant risk for local anesthetic systemic toxicity, as with any high-volume fascial block. For this reason, patients need to be monitored according to American Society of Regional Anesthesia guidelines with Intralipid available at all times.

Some meta-analysis demonstrates that ESP is effective in reducing postoperative pain intensity and postoperative opioid consumption in spine surgery. Furthermore, ESP is easy to perform and has few complications. Therefore, for the management of postoperative pain following spine surgery, preoperative ESP is a good choice. More studies are still needed in order to explore doce.

Both the ESPB and TLIP blocks have shown to provide adequate analgesia after lumbar spinal surgery. Clinicians can choose either the TLIP block or the ESPB for pain control after lumbar spinal surgery based on their clinical experience and choice. Currently there is no consensus as to the superiority of one over the other.

Retrolaminar block (RLB) was first reported in 2006 as an alternative approach to PVB. RLB is performed with US imaging or the landmark technique. The needle is inserted at a puncture site 1–1.5 cm lateral to the target spinous process and advanced caudally or cranially until it contacts the lamina. Local anesthetics are injected on the lamina at doses of 20–30 ml. RLB can be performed with the US-guided, in-plane insertion technique. The sagital plane with a linear US probe allows for visualization of the laminae or transversus process, and the needleis advanced using the in-plane technique.

The retrolaminar block has been successfully used in spinal surgery, although the large number of publications that we have on the ESP block have left this approach relegated.

Although everything indicates that regional techniques will be a fundamental pillar in ERAS protocols for spinal surgery, there is no consensus regarding which is the best technique to control postoperative pain in these patients. More studies are needed to reach definitive conclusions in this regard.

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SP58 BLOCKS FOR HIP SURGERY: CURRENT EVIDENCE & FUTURE PERSPECTIVES

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Hip surgery involves different interventions, such as total hip replacement, hemiarthroplasty, or hip fracture surgery with metal plates or screws. Several of these procedures are associated with severe postoperative pain. Adequate pain therapy facilitates functional recovery and early mobilisation. For total hip arthroplasty a multimodal therapy including non-opioid analgesics, alpha-2 agonists, and regional anaesthesia techniques is recommended to improve postoperative analgesia.[1] Peripheral nerve blocks have been shown to improve pain levels and reduce morphine consumption after hip surgery.[2]

Innervation to the hip joint comes from the lumbar plexus, formed by the divisions of the first four lumbar nerves (L1 – L4), and the sacral plexus arising from the lumbosacral trunk (L4- L5) and the sacral spinal nerves (S1 – S4). The hip capsule is innervated by proximal branches of the femoral nerve, obturator nerve, the accessory obturator nerve (all three from lumbar plexus), the nerve to quadratus femoris, and the sciatic nerve (both from sacral plexus).[3]

Centro-axial techniques provide anaesthesia and analgesia for all types of hip surgery. For elderly patients, spinal or epidural are often considered a safe alternative to general anaesthesia. However, in a recent multi-centre study, spinal anaesthesia was not superior to general anaesthesia with respect to survival and recovery of ambulation at 60 days in older adults undergoing hip-fracture surgery.[4] For postoperative pain treatment epidural analgesia is no longer recommended for hip surgery since the adverse effects, like urinary retention and motor block, outweigh the benefits.[1] The same reservations apply for the proximal block techniques of the lumbar plexus and the sacral plexus. A lumbar plexus block might still be considered in hip revision surgery and in patients where high postoperative pain level is anticipated.[5]

Femoral nerve blocks and fascia iliaca compartment blocks are frequently used for pain treatment after hip-fracture surgery and arthroplasty.[6 7] Compared with a lumbar plexus block, analgesia or anaesthesia will be less complete with these distal block techniques. Yet, distal and superficial block techniques are associated with a lower risk for complications and adverse events. Inserting the needle in a remote distance to the femoral nerve, as done with the fascia iliaca compartment block, might further reduce the risk for nerve damage. Impaired motor function after femoral nerve blocks and fascia iliaca compartment blocks can delay mobilisation and increase the risk of falling after surgery.[8]

As an alternative to the conventional infra-inguinal fascia iliaca compartment block, supra-inguinal techniques have been described.[9] By aiming for a proximal local anaesthetic spread below the fascia iliaca, the lateral cutaneous femoral nerve and the obturator nerve might be anaesthetised in addition to the femoral nerve. High injection volumes are needed to obtain a spread to all target nerves.[10] Figure 1 illustrates

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