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Review

Is the Erector Spinae Plane block useful for anti-nociception and analgesia in lumbar spine surgery? A narrative review of the literature and opinion paper

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Abstract

We aimed at determining whether the Erector Spinae Plane (ESP) block is useful for providing anti-nociception and analgesia to patients beneficiating from lumbar spine surgery. Using the keywords "Erector Spinae Plane block" and "lumbar" or "spinal surgery" in Pubmed, the Cochrane Library Database, and Google Scholar (end of search in March 2021), we identified 19 relevant papers involving 534 patients. Injection levels, and type, dilution, or volume of local anesthetic agent solution differed between studies. The main studied outcomes were postoperative pain control, and opioid consumption. Only one study compared the ESP block with another loco-regional technique. All published papers conclude that ESP block reduces postoperative pain scores and rescue medication use. As a corollary, ESP block appears promising in this indication for several reasons. First, it is easy to perform and does not have the same adverse effects or complications as neuraxial techniques. Second, even if the best site of injection as not been determined yet, skin puncture can be performed at distance from the surgical site, hence reducing the risk of surgical site infection by the loco-regional technique, and allowing its use as a rescue analgesic technique after surgery. Last, the incidence of ESP block complications seems low even if the number of studied patients is not wide enough to ascertain this fact for sure. Several unresolved questions are still pending. None of the published studies were randomized controlled trials with a group receiving a sham block, length of follow-up was limited to 48 hours, chronic pain was an exclusion criteria, and the pain scores were evaluated at rest. We conclude that the ESP block appears to be a safe and promising technique to be used as part of a multimodal analgesia protocol in lumbar spine surgery. Several studies are needed to precise its superiority and safety as compared to other techniques, its intraoperative opioid sparing effect, and its influence on longer term outcomes such as the development of chronic pain.

Keywords: **Erector Spinae Plane Block, lumbar spine surgery, analgesia.**

Introduction and background

The Erector Spinae Plane Block (ESP) block was first described in 2016 by Forero and colleagues[1]. It was initially used for thoracic analgesia in both neuropathic and postoperative pain. In this block, local anesthetics (LA) are injected between fascia, at the level of the tip of the transverse process of the vertebrae and beneath the deepest layer of the erector spinae muscle. These muscles are present from the neck to the sacral region, with some region-dependent anatomical singularities. During the months following the first ESP block description for thoracic pain management, it was increasingly proposed for improving analgesia after spine surgery. Indeed, in the setting of enhanced recovery protocols (ERAS), physicians are more and more interested in techniques that might improve pain relief and minimize opioid use. Accordingly, there has been an explosive growth in the use of peripheral regional analgesic procedures, especially fascial plane blocks, although the

relative merits of each are still unclear and debated. ESP block is one of those new "fashionable" block in spinal surgery.

The spread of local anesthetics to the paravertebral space was originally proposed as the primary mechanism of action of the ESP block. This assertion is now challenged by recent cadaveric studies[2,3] and observations of inconsistent cutaneous sensory loss in clinical studies. However, one could argue that, due to the imprecision of cutaneous sensory testing and its imperfect correlation with analgesia, the absence of cutaneous sensory loss does not mean that ESP block is ineffective. This relates to the concept of differential neural blockade. Insofar, the mechanisms of action of ESP block remain controversial.

Spinal surgery is probably a niche spared by this debate. Indeed, the analgesic effect of the ESP block is principally explained by the blockade of the posterior rami of the spinal nerves and inconsistently by the blockade of the anterior spinal nerve rami, both resulting in the interruption of sensory and nociceptive information transmission emerging from the para-spinal muscles, soft tissues and skin (Figure 1). At the time of injection in the paravertebral region, a cranial and caudal spread of local anesthetics occurs over several metameric levels, allowing large blocks with a single shot injection. Clinical and cadaveric studies have shown a spread over up to 6 spinal segments surrounding the injection site[2,4-7].

LA diffusion depends on the site of injection. This is explained by anatomical differences. Indeed, although the erector spinae muscle (ESM) extends from the cervical to sacral region, its anatomy differs as a function of the considered spinal level. The multifidus muscle thickens as it descends to the lumbosacral region, which can hinder the spreading in the fascial plane. The size of the vertebra and the spinal curves also vary. Finally, the anatomy of the nerves also differs between the thoracic and lumbar areas. Spinal nerves continue as the dorsal ramus and ventral

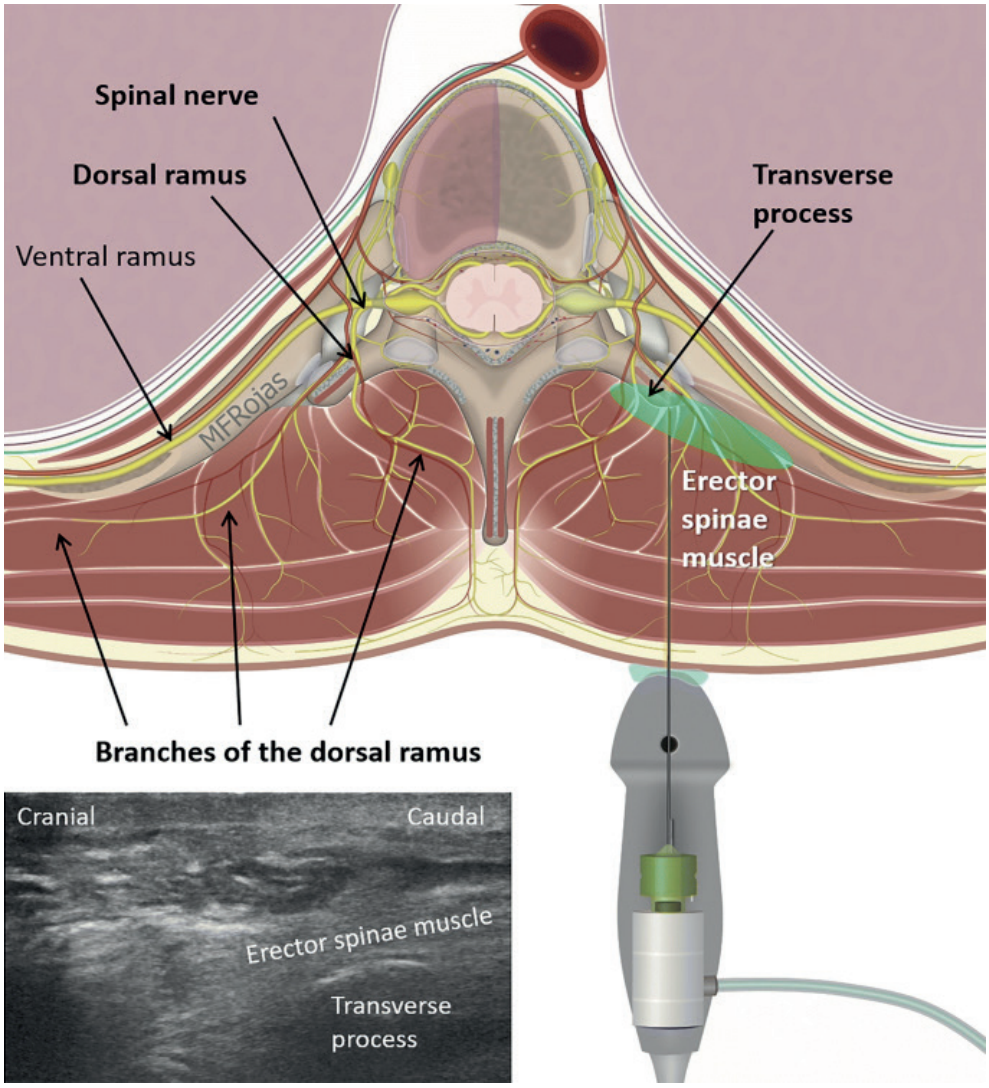

Fig. 1 — Anatomy of the Erector Spinae muscle. The green zone represent the zone of injection of local anaesthetics. Reproduced with permission from Dr. Maria Fernanda Rojas Gomez and Dr Ki Jinn Chin.

ramus after leaving the epidural foramen. While the dorsal ramus split into the lateral and medial branches in the thoracic area, in the lumbosacral area they separate into the medial, intermediate, and lateral branches. Consequently, craniocaudal spread of ESP block is more limited in the lumbar region when compared to the thoracic region.

In their review paper, De Cassai and colleagues[6] report that, in radiological investigations, the median volume of LA needed to cover one vertebral level is 2.5 mL in the thoracic region, and 5 mL in the lumbar region with a median of 3.5 mL when considering the whole vertebral column. In their anatomical study, Choi and colleagues[5] document that a minimal volume of 20 mL is needed to see a paravertebral spread over 2 to 3 levels in the thoracic region. Increasing the volume over 20 mL enlarges the spread predominantly to the back muscles and fascial layers rather than enhancing the paravertebral spread.

The position of the patient for performing the ESP block can be variable, the prone position or lateral decubitus being the most often used. The choice of the position mainly depends on the final position of the patient on the operating table. The sitting position has also been described but is less comfortable for both the physician and the patient. Lumbar ESP block can be performed using anatomical landmarks if ultrasonography is not available, but this scenario is rare nowadays. Several sonographic approaches have been described. The parasagittal approach was described first and allows an in-plane or out of plane technique. It is used the most by clinicians. The transverse subcostal approach, described later, improves visualization at the lumbar levels and is particularly useful when performing the block on an anesthetized patient in lateral decubitus. However, the spread of LA is less easy to see in that case[8].

The ESP block rapidly became popular, mainly because it is easy to perform with no postoperative constraint on neurological evaluation, and eliminates the specific risks inherent to perimedullar analgesia. Given its properties, the question of its utility for providing anti-nociception and analgesia in lumbar spine surgery naturally emerged. Lumbar diseases have become more and more frequent in the general population over the last decades, and surgery is frequently proposed to relieve patients from their symptoms. In the United States, for example, the volume of elective lumbar fusion has increased by 62.3% between 2004 and 2015[9]. Perioperative pain management for this type of surgery can be uneasy, because of the high prevalence of chronic pain before surgery in this patient population, on which surgical pain then adds. Indeed, following spinal surgeries, more than 50% of patients report severe or neuropathic pain, which can itself promote further chronic pain[10]. The use of intravenous opioid analgesia during the first postoperative hours is effective but not devoid of potentially harmful hazards such as, among others, hyperalgesia, nausea and vomiting, pruritus, drowsiness, delayed laxation, and urinary retention resulting in reduced patient satisfaction[11]. These unwanted events can also contribute to longer hospital lengths of stay. Finally, the introduction of opioids in the post-operative period can also lead to long-term dependence to those medications. A multimodal opioid-sparing analgesic approach is therefore now recommended for all types of surgeries, and loco-regional analgesia can be part of this approach.

Even though there is a rapidly growing interest for fascial plane blocks in the settings of multiple types of surgeries including the subject at hand, i.e. spinal surgery, there are also articles pointing out the lack of proper evidence regarding their use, as well as uncertainty with regard to their mechanisms of action[12,13]. Lonnqvist and colleague go as far as calling the ESP block a rest in peace (RIP) II block in analogy to the fate of the interpleural nerve blockade. Indeed, this block was once considered a very useful regional anesthetic nerve blockade and was widely practiced despite proper evidence-based support. However, as more robust studies appear, the interest for this type of nerve block dwindled, hence calling it the RIP I block. In the ESP block, the lack of a clear understanding of the underlying mechanism explaining their usefulness in surgeries performed on the front side of the trunk or in visceral surgeries is mainly questioned. However, spinal surgery may be a niche that this debate will spare.

Consequently, in this review, we aimed at finding the current evidence supporting the usefulness of the ESP block for providing anti-nociception and analgesia to patients beneficiating from lumbar spine surgery.

Literature review method

We searched for articles including letter to editor, case reports, case series, retrospective cohort studies and randomized controlled trials (RCTs), related with the use of ESP block in the context of lumbar spine surgery. The keywords "Erector Spinae Plane block" and "lumbar spine surgery" were used in Pubmed, the Cochrane Library Database, Google Scholar and articles identified through our lectures were screened from inception until March 2021 (Table I). After exclusion of the duplicates (n=10),

Table I. — Case reports, letters to the editor and randomised control trials concerning Erector Spinae Plane Block in the field of lumbar spine surgery.

Year of publication	Author	Study design and size	Type of surgery	Technique	Outcome	Time	Conclusion
2018	Brandao et al.	Case report (1 patient)	Lumbar spine surgery	Injection of 15 ml Ropivacaine 0.375% per side at L4 level	Pain score, analgesic consumption.	48h	Pre-operative ESP dismissed the need of intraoperative opioids and provide clear surgical field.
2018	Calandese et al.	Case report (1 patient)	Anterior thoracolumbar spine surgery	20 ml of Levobupivacaine 0.25% + 1 ml of dexamethasone per side at T10 level	NRAS pain score and analgesic consumption.	24h	ESP can provide effective postoperative pain management after anterior thoracolumbar spine surgery.
2018	Cesur et al.	Case series of 5 patients	Lumbar surgery	Preoperative ESP single shot block performed at T12 level with injection of 20 ml of a mixture of Bupivacaine 0.25% and Lidocaine 1% per side	NRS pain scores and analgesic consumption	24h	Reduction of pain scores and analgesic consumption by performing ESP block in patients undergoing single or multilevel lumbar spine surgeries.
2018	Kline et al.	Letter to the editor (1 patient)	Laminectomy L4/L5	15ml 1:1 mixture of Ropivacaine 0.5% and lidocaine 1% per side + 10ml superficial to the posterior investing fascia	Hemodynamic response during surgery, post-operative pain	48h	Quality of analgesia augmented by a dual-injection technique into the superficial fascial planes as well as the ESP block.
2018	Melvin et al.	Case series of 6 patients	Elective lumbo-sacral surgery	3 single shots and 3 catheter insertion performed at T10 (2) or T12 (3). All using 20 to 30 ml of bupivacaine 0.375% for the first injection (+/- dexamethasone or dexmetomidine)	Pain score (NRS) and use of analgesia	48h	Pre-incision ESP block reduce the use of opioids; those benefits are extended by the introduction of a catheter.

we identified a total of 32 articles. We excluded thirteen papers. Six articles in which the ESP block was used in another type of surgery[14–19], three because they were anatomical descriptions[20-22], and one was describing the technique for lumbar fracture without surgery[23]. Another paper reported preliminary results only[24]. We also excluded the retrospective study written by Ueshima et al. due to proven fraud (partial fabrication of research data in this case)[25]. Finally, we also excluded a systematic review published in 2020 by Qiu and colleagues[26] because reviews were not in our inclusion criteria, however all the articles cited in this review were identified through our search.

After exclusion of those articles, we identified a total of 19 papers related to the subject. Nine were case reports[27-35]; three were letters to the editor[36-38] and seven others were RCTs[39-45]. Of the seven RCTs, five were evaluating the analgesic efficacy of the ESP block in the studied context, one was focusing of the effect of ESP block during the perioperative period, and one was comparing the ESP block versus mid-transverse process block to pleura block. To our knowledge, the paper of Zhang et al.[43] was the only one to include a sham block in their study protocol.

Current evidence according to existing literature

Patient cohort

A total of 534 patients were involved in those 19 different studies. Among them, 450 were recruited in RCTs while the 84 remaining patients consisted in case report, case series or letter to editor (Table I). These numbers constitute a fair amount, but are still not large.

Technical considerations

When considering the methods employed in those studies and case reports, it appears that the level of injection of the ESP block is quite wide and ranged from T8 to L4. However, in the majority of the articles (133 patients over 534), the block was performed at the lower thoracic levels (from T8 to T12) at distance from the lumbar surgical site. All of the patients received either bupivacaine, levobupivacine or ropivacaine, with a mean concentration of 0.3125% for either of them. It was sometimes associated with lidocaine 1%, dexamethasone or dexmetomidine[28,45]. Finnerty and colleagues[46] will also use levobupivacine 0.25% in their upcoming RCT, for which the study protocol has recently been published. The volume of local anesthetic solution ranged between 15 and 30 mL for each side, with a mean of 21.5 mL.

The ESP block was performed before induction of general anesthesia in four of the seven RCTs; and after intubation and installation in the prone position in the other three. In total, the block was performed before induction of general anesthesia in 110 patients, and after induction in 110 patients. In the case reports and case series, the ESP block was used as a rescue analgesic technique in three patients during the first 24 hours following surgery[31,34].

Studied outcomes

The main studied outcomes were the postoperative pain scores recorded from early after tracheal tube removal to up to 48 hours later. Opioid consumption was also among the studied outcomes. All studies showed a benefit of receiving an ESP block as demonstrated by lower pain scores after surgery. The technique also provided intraoperative anti-nociception and opioid sparing. For example, in the study of Siam and colleagues[41], the mean intraoperative expired isoflurane concentration was lower in the ESP block group (1.44% as opposed to 1.64%; p=0.025), and fentanyl consumption was significantly lower (mean of 10 µg in the ESP block group as opposed to 46.67 µg in the control group; p=0.049). To our knowledge, Zhang and colleagues[43] were the only ones furnishing clear data regarding opioid sparing and pain score. They showed lower pain scores in the group where an ESP block was performed with an estimated mean difference of -1.6 at 4h, -1.3 at 8h and -0.7 at 12h. However, the pain scores were similar at 24h. Concerning the use of opioids, a significant smaller amount of patients needed fentanyl rescue in the ESP group during the first 12h (p=0.020); the total amount of consumed fentanyl was also significantly lower in this group (p=0.042).

Study design

The only study comparing the efficacy of the ESP block with another loco-regional technique was the one of Eskin and colleagues[39]. The compared technique was the mid transverse process to pleura block (MTP block) which consists in the injection of LA at the mid-point between the transverse process and the pleura resulting in the spread of LA to the paravertebral space. Pain relief was superior in the ESP block group as compared to the MTP block group, with lower pain scores up to 12h after surgery, as well as a lower number of patient-controlled analgesia bolus demands.

To our knowledge, the study of Zhang and colleagues[43] is the only one where the control group received a sham injection. This study was, however, not blinded because the sham procedure consisted in a subcutaneous injection of normal saline.

Discussion and comments

Based on their recent systematic review of the literature, the PROSPECT working Group develops recommendations for optimal pain management after complex spine surgery[47]. They recommend the use of a multimodal pain management, including the perioperative use of paracetamol and classical non-steroidal anti-inflammatory agents or anti-COX-2 specific ones, the intraoperative use of a low-dose ketamine infusion, and the postoperative infusion of a low concentration of local anesthetic agent alone or combined with opioids through an epidural catheter, placed under direct visualization by the surgeon. Part of the concerns about the use of epidural catheters in the postoperative period are loss of sensory function and motor weakness, and the possibility of delayed diagnosis of neurological complications. Insofar, they conclude that epidural analgesia is recommended, but its use should be individualized. In our center, the use of an epidural infusion was abandoned a few years ago, due to the above-cited concerns, but also because having implemented an enhanced recovery protocol in which even complex spine surgery patients are mobilized on the day of surgery. This early mobilization can potentially be hindered by the presence of an epidural infusion. Consequently, part of the reasons for our interest in ESP block and subsequent writing of this narrative and opinion paper emerged from the fact that, in our opinion, the use of loco-regional anesthesia may play an important role in the opioid sparing multimodal analgesia. Since we abandoned epidural infusion, going against recent published recommendations, we wanted to look for an alternative technique that would allow us the same benefits with fewer risks.

From the reading of existing literature, it appears that the ESP block has several theoretical advantages and is a promising technique for analgesia in the field of lumbar spine surgery. First, like we said, the ESP block is an alternative to neuraxial techniques without carrying the risk of the same possible complications, including a drop in blood pressure, urinary retention, or epidural hematoma. More specifically, it can advantageously be used when evoked potential recordings are needed during surgery, since neuraxial techniques are more prone to have an effect on the spinal cord. Absence of motor block is also an advantage of the ESP technique, facilitating postoperative neurologic monitoring and early mobilization. A bolus of intrathecal morphine is also effective to reduce pain and morphine requirements after complex spine surgeries without impairment of hemodynamic stability, neurological evaluation or motor function[48]. However, to our opinion, the dose of morphine necessary to reduce postoperative pain also requires close postoperative monitoring to prevent respiratory depression. Once again, this puts a brake to early mobilization. Moreover, there is always the theoretical risk of postoperative dural fistula at the puncture site.

Noteworthy, neither spinal morphine nor ESP block are recommended by the PROSPECT working group. Indeed, they conclude that, up until now, data are insufficient to recommend the use of a bilateral ESP block, although results from recent publications are promising.

Second, the ESP block may carry less risk of surgical site infection as compared to neuraxial techniques[34,43], insofar as puncture can be performed at distance from the site of skin incision, and it does not require the insertion of a catheter. However, up until now, puncture for ESP block performance at the target level or one level above the surgical site has not shown increased risk of infection, and the best site for injection has not been determined yet.

Last, parasagittal puncture at distance from the skin incision site allows using the ESP block as a rescue postoperative analgesic technique. These advantages remain theoretical at the present time, and would require specifically dedicated studies to be formally demonstrated. In addition, multimodal intravenous analgesic techniques share these advantages with the ESP block as well, but are less efficient in terms of analgesic efficacy.

All retrieved papers in this narrative review concluded to the superiority of the ESP block for postoperative pain relief after lumbar spine surgery. Indeed, they all showed lower postoperative pain scores in the group receiving the block as compared to the group who didn't. The use of rescue analgesic medications and their side effects were also less frequent in patients receiving the ESP block. The ESP block is probably not the only efficient non-neuraxial loco-regional technique in this indication, since the MTP block also shows efficacy, although lower[39]. There is also the thoracolumbar interfascial plane block (TLIP), which has been described as an alternative to the posterior lumbar block. However, few studies on this block have actually been published[49].

MTP block lower efficacy could be explained by the fact that the effectiveness of the ESP block in spinal surgery is not due to a potential extent of LA diffusion into the paravertebral space, but to the consistent block of the dorsal rami. In January 2021, Chin and al. published a narrative review on the mechanisms of the ESP block[50], concluding that the spread of LA to the neural structure in the fascial plane and adjacent structures mostly explains the observed effects. It seems that the involvement of the dorsal rami is consistent and widely accepted in the literature. The involvement of the ventral rami is variable and the epidural spread of LA is, at the most, not commonly observed. Another proposed explanation is the systemic action of the injected LA, but this seems a minor contributor to the analgesic efficacy of the ESP block[13,50]. Unfortunately, to the best of our knowledge, there is no study comparing the ESP block with a control group achieving similar IV concentration of LA through intravenous or subcutaneous infusion. Such a study would close the debate on LA systemic effects. Some authors also evoke a lymphatic spread or a fascia-mediated analgesia, but those theories remain speculative[50].

Among the studies included in this review, the complications were inexistent, and hence the ESP block appears to be a safe technique. When specifically looking to the literature in search for ESP block complications, we found two case reports of pneumothorax[51,52]. In 2019, Tsui and al. made a pooled review of 242 cases of ESP block practiced between 2016 and 2018 and including single shot, continuous infusion and intermittent boluses. Of those 242 performed blocks, the only noticed complication was also a pneumothorax (0.4%)[53]. A few months later, a systemic qualitative review published by De Cassai[54] stated that pneumothorax was the only real ESP block complication described in the literature. Some may think that pneumothorax is of no concern for ESP block in lumbar spine surgery, but this would be a dangerous shortcut. Indeed, ESP block is often performed at the lower thoracic level to cover upper lumbar surgeries. Some teams even perform all of their ESP blocks in the surrounding of T8 to T12, counting on the good diffusion of LA to remain safely away from

the lumbar surgical site.

From our own clinical experience, the development of a motor block due to the diffusion of LA towards the lumbar plexus can be observed on rare occasions. This could be a more specific complication of lumbar ESP block, but large series of observations would be necessary to determine the incidence of this complication. These motor blocks have also been previously described by De Cassai[54]. Even if this block appears safe according to our review, this assertion needs to be taken carefully since the number of studied patients identified in our narrative review is still low (n=534).

Of course, to keep the incidence of complications low, the general safety rules for loco-regional techniques must be respected. One should pay attention to keep the total dose of LA lower than the recommended limits, and adapt this dose when the patient suffers from renal insufficiency. A particular attention should be paid to the implications and risks of using combinations of local anesthetic interventions (referred to as MILANA for Multiple Interventions of Local ANAesthetics[55]), such as intravenous lidocaine infusion and surgical wound infiltration in addition to the loco-regional technique[43]. Indeed, determining the toxic cumulative dose of different LA, administered through various routes, in patients with different sensibilities to LA systemic toxicity is uneasy.

The recommendations for the performance of loco-regional techniques in case of coagulation problems also apply to the ESP block. To our opinion, insofar as ESP block does not concern the epidural space, the recommendations to use in this domain are those of peripheral loco-regional techniques[56].

Block duration depends on the type of LA used, its dose, and mode of administration, since the insertion of a catheter and a continuous LA infusion are theoretically possible. In the studies we looked at, only four patients received continuous infusion. They were case reports. None of the published RCTs used the insertion of a catheter. Therefore, more studies are necessary to precise the interest of a continuous infusion over a single shot injection.

No consensus exists regarding the type of LA, concentration, and volume to be used when performing an ESP block. Most of the authors used bupivacaine with concentrations ranging from 0.25% to 0.375%. The second most used LA was ropivacaine with concentrations ranging from 0.2% to 0.375%. Only two papers reported the use of levobupivacaine at concentrations ranging from 0.25% to 0.375% with one more upcoming[46]. Concerning the injected volume, most authors used 20 mL on each side. The highest injected volume was 30 mL on each side. The limiting factor here remains the necessity to keep the total dose of LA below the toxic dose. Additives to the LA solution are possible but, so far, the few scarce data did not show any benefits from it. Melvin and colleagues[30] and Calandese and colleagues[28] used dexmetomidine or dexamethasone, but there was no extended duration of the analgesic effect, or a better outcome for pain management.

From the above, one has to admit that several questions remain unanswered regarding the use of ESP block in lumbar spine surgery. They are summarized in Table II.

First, studies comparing the ESP block with a sham procedure are still scarce (only one, to our knowledge, not blinded, and comparing the ESP block with a subcutaneous normal saline injection). The extent of the placebo effect of injection has therefore not been sufficiently evaluated so far. Second, patients with chronic pain and/or chronic opioid use were excluded from recruitment in the vast majority of RCTs, and the preoperative pain scores were not recorded. There is therefore a need for investigating the interest of ESP block in this specific patient population. Third, the longest postoperative follow-up was 48h, precluding from obtaining any long term outcome information. In this regard, it would be interesting to assess the efficacy of the ESP block on chronic pain following surgery. Fourth, the pain scores after surgery were only rated at rest, and no information exists on the efficacy of ESP block on pain at mobilization. Fourth, few information currently exists on the intraoperative opioid sparing effect of the technique. Fifth, Tsui et al pointed out, in their 2019 review, that only 35% of case reports and studies presented data about sensory changes observed in the apparently 'blocked' area of the body. This only reinforces the debate about fascial plane block efficacy. However, Zhang et al.[57] recently evaluated the loss of cutaneous sensation following ESP blocks in healthy volunteers. They found that ESP block results in widespread cutaneous sensory block of the posterior part of the thorax, with no effect at all on the lateral-anterior part of the thoraco-abdominal wall. Their conclusion was that an ESP block does only block the dorsal ramus of the spinal nerve. This further confirms our believes that the ESP block for spinal surgery may be a spared niche with regard to the ongoing debate. Last, as mentioned above, future investigations should seek at better defining the incidence of complications and side effects, ideal LA solution and volume, ideal level of block performance, definition of patients at risk of complications, and interest of echo guidance as compared to anatomical landmarks. A recent systematic review by Qiu and colleagues gathered

Table II. — Unanswered questions regarding the use of ESP block in lumbar spine surgery.

Remaining questions
Optimal dose and volume
Single shot vs continuous infusion
Single shot at one level or more depending of the spread of the surgery
Best level of injection as compared to the surgical site
Efficacy in patient with chronic pain
Efficacy on acute postoperative pain-on-movement
Long term effect on outcome
Advantages of the ESP block over other techniques
Exact mechanism of action of ESP block

publications until July 2019[26]. Since then, several studies have been published including much more patients (534 patients for the moment as compared to 171 at that time). This is the witness of a growing interest for the technique, and may lead to obtaining responses to unresolved questions in the near future.

Conclusions

The ESP block promises to be a safe and effective technique to reduce postoperative pain and opioid consumption when used as part of a multimodal analgesia protocol in lumbar spine surgery. Even if the interest of ESP is questioned by some authors, we believe that this does not concern the niche of spinal surgery since a spread in the paravertebral space is not necessary to produce a good posterior cutaneous sensory block coverage. However, those theoretical advantages and promising results from the studies published so far need to be confirmed by future large randomized control trials. These future studies will confirm its interest in this indication, providing answers to unresolved questions including the advantages of the ESP block over other techniques, definition of best technical details for block performance, and definition of its benefits for different types of patients.

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