

for regional anaesthesia. Even though the incidence varies across studies and across different settings assuming a rate of 1–2 per 1000 blocks is considered reasonable. With the rise of regional anaesthesia it can be expected, that many anaesthesiologists will experience a case of LAST during their career especially when caring for populations at increased risk such as paediatric and geriatric patients.

LAST, however, is not a complication that only occurs in the operating theatre under the care of anaesthesiologists and many non-anaesthesiologists might often not even be aware of LAST, its recognition and treatment.¹

Traditionally, LAST has been expected to occur after unintentional intravascular injection, however toxic plasma concentrations can also occur secondary to systemic absorption after correct local anaesthetic injection in nerve and fascial plane blocks² and also intentional intravenous lidocaine infusion.³

Various preventative measures can potentially reduce the incidence of LAST events.

When LAST is suspected, early recognition with attention to central-nervous and cardiac symptoms remains paramount. Even though there is still debate about the exact mechanism of action, lipid emulsion therapy is now an established pillar in LAST therapy. Controversy exists in regards to adrenaline dosing in case of local anaesthetic induces cardiac arrest. While German Anaesthesia⁴ and European Resuscitation guidelines⁵ recommend standard dosing of 1mg recent ASRA guidelines⁶ recommend against this and suggest initial adrenaline doses of 1mcg/kg or lower.

SP30

STATISTICALLY SIGNIFICANT BUT CLINICALLY INSIGNIFICANT: NO USE FOR ESP BLOCK

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Since Erector Spinae Plane Block (ESP) was first described by Forero et al.¹ in 2016, more than 103 prospective, retrospective, animal and paediatric RCTs have been published.² There is great interest in ESP block that is seen on plethora of indications and different publications ranging from acute to chronic pain and surgery on upper limb through the trunk and spine to lower limb.^{3–6} Several meta-analyses have shown that ESP block can provide sufficient analgesic effects and reduce postoperative opioid consumption; however, the results are not convincing enough due to the small number of cases included and significant heterogeneity among studies.^{7,8}

There are blocks in the past that have been used in variety of indications like 3-in-1 block, transversus abdominis plane (TAP) block or ganglion sphenopalatine block (GSPB) before they have been put to the test in RCTs. Only a handful of complications associated with ESP have been published and same applies on negative results, therefore we can expect publication bias. On the other hand, there are randomized controlled trials (RCTs) documenting ESP block efficacy.⁹

We know that statistical significance is not the same as clinical significance, or it is? For example, an RCT from China analyzed efficacy of ESP block in relation to perioperative pain control and short-term outcomes in lumbar laminoplasty.¹⁰ Postoperative sufentanil consumption was 75.375 ± 9.349 in control group and 65.067 ± 13.421 in ESP group in 48 hours postoperatively ($p = 0.000$). Is it clinically

important if we have mean difference of 10 mcg of sufentanil in 48 hours? I would say no, it is not.

There is another thing about ESP that jumps out when analyzing data. Consistency of analgesia is low. The number of PCA Attempts after laminoplasty has a much wider range in the ESP group than in the control group (10). Also, a retrospective study from USA concluded that there was no difference in VAS score, but statistically significantly lower Morphine equivalent dose by 15 mg in 24 hours and faster discharge with 5-hour difference with high heterogeneity in ESP group.⁷

This field block brought new light to the world of spine surgery anaesthesia. These patients often fear postoperative pain, which can be a source of considerable preoperative distress. In spine surgery, postoperative pain can often be severe, especially in first 24 hours after surgery.¹¹ It is difficult to achieve pain control if a one-dimensional approach is used. There have been many studies that combined different modalities, like epidural catheters, spinal and epidural morphine, or local infiltration, in pain treatment after spine surgery.¹² There are often contraindications, severe pain that prevents positioning or technical difficulties to site catheter, that won't interfere with surgical field. Spine surgery is perhaps the only field where, when performing the ESP block, the relatively greater distance of the needle tip from nervous structures, which might be compromised by acute or chronic process that brought patient to the OR, is beneficial when compared to the gold standard techniques. But again, the benefits of ESP block in spine surgery according to data seems to be marginal.⁷ In modern era of perioperative medicine, ultrasound is ubiquitous, therefore performance of plane blocks like ESP block and other novel techniques are relatively easy and safe. These new blocks are common in clinical practice despite of limited proof of effectiveness^{6, 13}; therefore ESP block is not recommended for spine surgery by PROSPECT because of limited evidence.²⁰

Besides, the mechanism of ESPB is still indeterminate. In the cadaveric study, no spreading of the dye into the paravertebral space was observed to involve the origin of the ventral and dorsal branches of the thoracic vertebral nerves¹⁴ indicating the extent of blockage was not as wide as that observed in the initial clinical finding.¹ Besides, ESP block was performed in six male volunteers, and the authors found that cutaneous sensory loss varied greatly between individuals¹⁵ and didn't reach anterior thorax which suggests that only posterior rami of spinal nerves are involved in ESP block. Direct evidence is presently lacking and analgesia of ESP block is unpredictable and variable, that result from myriad factors at play.¹³

Meta-analysis of available RCTs by Oh on ESP block used in lumbar surgery brought the conclusion that higher-quality evidence is needed¹⁶ while meta-analysis of RCTs where single shot ESP block was used in various surgeries concluded that: ESP block reduced the accumulated opioid consumption during the first 24 h after surgery, but with considerable heterogeneity. This plane block also reduced time to first analgesia after surgery by 5 hours, but again with considerable heterogeneity.² Another meta-analysis from Kyeong et al. showed that ESP block provided effective analgesia after lumbar spine surgery. However, the low-grade quality of evidence compromised the findings, therefore further high-quality of evidence is required.²⁰

Many times, choice of ESP block over other techniques is influenced by contraindications to gold standard, lower complication risk, fewer medication side effect, missing personal with expertise to deliver gold standard RA technique. Many RCTs concluded that patients may benefit from ESP block when compared to systemic analgesia only.¹⁵ Only research in the future will show if there is more than statistical significance that makes ESP block attractive in clinical practice.

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SP30.1 ADJUVANTS OR DEXAMETHASONE AS MULTIMODAL ANALGESICS AT HIGH DOSES?

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Peripheral nerve blocks' effectiveness is limited by pain outlasting the analgesic duration of the nerve block. Different approaches have been used to counter this limitation, for example insertion of catheters for continuous infusion, increasing the total dose of the local anesthetic or administering adjuvants.

A well-functioning catheter is an effective method for increasing analgesic duration, but placing catheters are relatively more time-consuming, require more expertise, and may not be suitable in an outpatient setting. Furthermore, catheters are limited in their effect by catheter migration away from the nerve, dislodgement, and leakage. Consequently, attempts to increase the duration of single-injection peripheral nerve blocks are warranted.

Local anesthetic volume and concentration

It is a common perception that higher concentrations of local anesthetics will increase the duration of nerve blocks, but the relationship between concentration and duration is not straightforward. Earlier studies showed no connection between local anesthetic dose and duration.^{1–4} Then, in connection with the development of ultrasound-guided techniques, and dose-finding studies focusing on 'how low can you go', evidence started to emerge showing decreased duration with decreased doses.^{5–9} Although the evidence between the previous and more recent studies may seem contradictory, the explanation seems to be that the relationship between local anesthetic dose and duration is not linear. In two studies by Nader *et al*¹⁰ and Jaeger *et al*¹¹, duration of nerve block following a wide range of volumes and concentrations was studied in a non-clinical setting. These studies demonstrated that administration of very low volumes or concentrations of local anesthetics reduced the effectiveness of the nerve block by reducing success rate and duration. In contrast, as long as a minimal effective dose of local anesthetics was used, ensuring a high success rate, there was nothing gained in duration by a simple increase in concentration or volume.

Adjuvants

Dexamethasone, dexmedetomidine, clonidine and fentanyl have all been shown to prolong sensory and motor block duration, as well as increasing the time to first analgesia.¹² Among these adjuvants, dexamethasone seems to be the most effective.^{12–13}

α₂-adrenergic agonists

Clonidine prolongs sensory and motor block, and increases the time to first analgesia compared with placebo, but to a lesser degree than dexmedetomidine.^{12 14–15} Recent meta-analyses have shown that compared with placebo, dexmedetomidine prolonged a brachial plexus block by 292 minutes (95%