51-year-old male patient presented with multiple rib, tibial and scaphoid fractures due to fall from tractor and planned for external fixation. He was 180 cm tall, weighed 120 kg, had a history of obstructive sleep apnea (OSA) and 60 pack-year of smoking. He wasn’t operated before, not on any medications, not allergic to drug and didn’t use cpap or oral device for osas.

He was found conscious, pulse rate(PR) 88/min, blood pressure(BP) 160/80mmHg and Spo2 94. Airway investigation revealed mallampati score 3, mouth opening 4cm, thyromental distance 6cm and neck circumference 52cm. He had 6 score in El-Ganzouri airway difficulty score, 35 points in Ariscat score and 6 points in Stop-Bang score. His high scores implied he could suffer from pulmonary complications perioperatively and we might encounter difficulties with his airway protection. To avoid such problems, infraclavicular block with 20 ml of prilocain 2%+bupivacain 0.5% and spinal anesthesia performed for his tibial and scaphoid fractures while avoiding sedatives and opioids. Surgery lasted 130 minutes uneventfully and without any complaints from patient who was sent to orthopedics ward.

Patients with OSA are at increased risk of perioperative morbidity and mortality because of potential difficulty in maintaining a patent airway. Patients have increased perioperative risk from OSA and are prone to respiratory and airway problems if opioids, sedatives and inhaled anesthetics are used.1 RA for a difficult airway patient helps avoiding difficulty of awake fiberoptic intubation and bypasses the question of when and where to extubate the patient.2 RA is recommended in patients with OSA and/or potentially difficult airways who present for surgery.1,3

REFERENCES

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 al10 and Jaeger et al11, 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% CI: 245 to 329) and clonidine by 176 minutes (95% CI: 118 to 205). In the studies directly comparing the two α2-agonists, dexmedetomidine prolonged analgesia by approximately three hours.14 Of note, both α2-agonists were associated with a concurrent fourfold increase in the relative risk for hypotension, in addition, dexmedetomidine also increased the relative risk for bradycardia requiring medical intervention by a fourfold.14

Dexamethasone Dexamethasone increases time to first request of analgesics by 8.7 hours (95% CI: 6.6 to 10.8) compared with placebo.12 In comparison, the meta-analyses comparing the two α2-agonists to placebo have shown that dexmedetomidine prolongs analgesia by about five hours and clonidine by about three hours.12, 14 A recent systematic review by Albrecht et al13 only retrieved one study directly comparing dexamethasone to dexmedetomidine, reporting that dexamethasone prolongs analgesic duration by about 2 hours.16 Because of the scarcity of direct comparisons, Albrecht et al performed an indirect comparison between perineural dexamethasone and perineural dexmedetomidine, finding that dexamethasone significantly prolongs the duration of analgesia by a mean difference of 148 minutes (95% CI: 37 to 259 minutes).13 The result of the indirect comparison was thus similar to the results of the direct comparison.

Furthermore, dexamethasone was associated with a lower rate of intraoperative hypotension and postoperative sedation, compared to dexmedetomidine.13 The high effectiveness and low rate of side-effects suggests that dexamethasone may be the most favorable adjuvant.
Mechanism of action The mechanism by how the adjuvants increase block duration is unknown. Dexamethasone, clonidine dexmedetomidine and opioids all have analgesic properties, and their effect on block duration may be the result of systemic absorption rather than a block modulating effect. This assumption is supported by a study by Yilmaz-Rastoder et al., showing that neither dexamethasone, clonidine nor buprenorphine have any effect on isolated sensory Aδ and C pain fibers in rats, indicating an extrinsic effect of the adjuvants.

This assumption is supported by non-clinical studies in healthy volunteers. Using a bilateral setup, controlling for any potential systemic effect of the perineural adjuvant administered in on limb only, the studies found no clinically relevant difference in sensory block duration, between the limb receiving perineural adjuvant and the one without. The difference between perineural adjuvant and ‘systemic adjuvant’ (obtained by systemic absorption from the contralateral limb) was 1.5 h (95% CI: 3.5 to 0) for dexamethasone and 0.1 h (95% CI: 1.0 to 1.3) for clonidine. However, for dexmedetomidine, the mean difference was 2 h (95% CI: 1 to 3) when dexmedetomidine was used as an adjuvant for a saphenous block, and 5.2 hour (95% CI: 4.2 to 6.1) when used for an ulnar block.

Short and colleagues also investigated the local effect of dexamethasone in a non-clinical study, demonstrating that irrespective of dose (2, 4 or 8 mg), IV dexamethasone fails to prolong sensory anesthesia compared with no dexamethasone (0 mg). Thus, the nonclinical studies indicate no direct effect of dexamethasone or clonidine on the peripheral nerve block, while dexmedetomidine may have some local effect.

Perineural vs systemic administration In a clinical setting, two meta-analyses have shown that perineural dexamethasone prolongs block duration compared with systemic administration, but the difference is only about 3–4 h. In a third review, using a more conservative statistical method, Hussain et al. found no statistically significant difference between perineural and systemic dexamethasone. Considering its’ off-label use, the relatively modest difference questions whether perineural administration should be used routinely.

Liposomal bupivacaine Liposomal bupivacaine is an extended-release formulation of bupivacaine designed to increase block duration. Meta-analyses comparing liposomal bupivacaine to plain bupivacaine for peripheral nerve blocks, found a statistically significant but clinically questionable reduction in pain scores at 24–72 hours postoperatively associated with liposomal bupivacaine. However, exclusion of an industry-sponsored trial further reduced the difference between treatments and rendered it non-significant (0.7 cm · h, 95% CI: 0.1 to 1.5).

Previous trials have compared liposomal bupivacaine to plain bupivacaine without adjuvants. In a recent trial, Kim and colleagues, however, compared liposomal bupivacaine to plain bupivacaine mixed with perineural dexamethasone. The study showed that liposomal bupivacaine provides non-inferior analgesia to plain bupivacaine + dexamethasone (mean difference −1.1, 95% CI: −1.8 to −0.4; P < 0.001 for noninferiority). Most interesting, liposomal bupivacaine did not extend duration of analgesia (26 h vs. 27 h; P = 0.851, liposomal bupivacaine and plain bupivacaine + dexamethasone, respectively). Considering the large difference in cost, plain bupivacaine with dexamethasone may be preferable.

Conclusion For local anesthetic dose, concentration, and volume, as for most other aspects of life, moderation seems to be the key answer. Excessive volume or concentration do not increase duration but increase the risk of neurotoxicity and systemic toxicity. Conversely, very low volumes or concentrations of local anesthetics decrease the effectiveness of the block by reducing success rate and duration.

Adjuvants may help to increase analgesic coverage of single-injection peripheral nerve blocks, but the effect is moderate. Dexamethasone seems to be the most promising of the adjuvants, providing a 6–8-hour prolongation compared with placebo. Dexamethasone also seems to have the fewest side-effects, and may be administered systemically, avoiding off-label administrations. The combination of different adjuvants needs further investigation, especially regarding the safety of its use, both in terms of neurotoxicity and side-effects such as sedation. Finally, it should be noted that using the Grading of Recommendations Assessment, Development, and Evaluation system (GRADE), the quality of the evidence from most of the meta-analyses cited above are assessed as low.
Awake breast surgery combines the reduction of hospitalization, postoperative stress, and postoperative lymphoedema, furthermore local anaesthesia and peripheral nerve block provide better analgesia during glандular displacement techniques, as during oncoplastic and axillary surgery. COVID-19 outbreak determined a strong effect on clinical practice worldwide and novel approach as awake breast surgery could combine fast track surgery and cross-infection reduction with an optimization of resources and resource optimization in terms of spaces and economic savings with shorter hospital stays.

Fast track awake breast surgery provides a reduction of operative room time length of stay and potentially surgical treatment for a wider number of oncological patients.

Costa et al proposed, to perform regional anaesthesia for breast procedures, a combination of three techniques: Pecs II block to cover muscles, axilla and lateral cutaneous branches of intercostal nerves (reliably from T2 to T4), erector spinae block to cover lateral cutaneous branches from T4 to T7 and parasternal block or transversus thoracic muscle plane block to cover anterior cutaneous branches.

The introduction of erector spinae block in breast surgery, represents an alternative to general anaesthesia and locoregional conventional techniques, like epidural anaesthesia or paravertebral block in oncological breast surgery, especially in high-risk patients.

Santonastaso et al wonder if the secret to obtaining perfect anaesthesia/analgesia for radical mastectomy procedures associated with sentinel lymph node biopsy, when we need to avoid general anaesthesia, could be the association of multiple techniques between Pecs, Serratus Anterior Block and Erector Spinae Block. More randomized trials are required to provide a certain answer to this question.

REFERENCES