If chosen for analgesia purpose, we recommend the execution in the easiest approach where this block can be performed safely under ultrasound guidance.

Typically in our institution this block is performed transgluteal or subgluteal. For the transgluteal approach a convex probe is placed over the gluteus maximus in the interspace between the greater trochanter and the ischial tuberosity. Between these bony ultrasound marks lies the quadratus femoris muscle. The sciatic nerve is located over this muscle and under the gluteus maximus between these bony landmarks.

Subgluteal is another approach in case of elevated BMI. In this approach a convex or a linear probe is placed under the gluteal fold with the patient in lateral decubitus and the thigh flexed. In this region the sciatic nerve lies above the adductor magnus and between the biceps femoris and semitendinosus. The probe is firstly placed over the ischial tuberosity where biceps femoris and semitendinosus originate, then is moved caudally to identify the belly of these two muscles. The needle is inserted laterally to medial in an in-plane approach and 15 to 20 ml of local anaesthetic is injected.

In order to manage pain from the posterior compartment without compromising motore strength, Sinha proposed in 2012 an ultrasound (US)-guided local anaesthetic infiltration between the popliteal artery and the capsule of the knee (iPACK). Further investigations outlined that iPACK block reduced opioid consumption providing further effective analgesia if added to the FNB following TKA. Moreover, iPACK with ACB provided equivalent analgesia and improved physical therapy performance, allowing earlier hospital discharge.

The iPACK block is performed by placing a convex probe over the popliteal fossa. After the femoral condyles are identified the probe is moved cranially until the condyles disappear. The target lies between the bone landmark and the popliteal artery. The needle is inserted in-plane medial to lateral in order to avoid tibial or peroneal nerve damage and once the needle reaches the target 20 ml of local anaesthetic is injected.

Conclusion We are now living in a very bright era in regional anaesthesia. Our knowledge is more and more complete in the innervation of the knee and this, in conjunction with the evolution of ultrasound technology allows us to manage postoperative analgesia in an effective, accurate and tailor made strategy.

PNBs are now considered essential procedures to manage perioperative analgesia.

To date we can suggest to perform an ACB in every patient for the management of TKA. An iPACK block can be added in selected patients considering the clinical setting, the surgical approach and early discharge strategies.

We recommend anyway not to underestimate the learning of other approaches because being flexible increases the chances to fit into your case.

REFERENCES


SP27 PULSED RADIOFREQUENCY IN CHRONIC SHOULDER PAIN: A STATE OF THE ART REVIEW

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Shoulder pain is a worldwide high- incidence disease, with a reported European prevalence up to 26%1 and a similar reported USA prevalence of 24%.2 The disease became chronic in 20% of patients with consistent impairment in functional activity and painful limitation.3 The incidence of chronic shoulder pain increases with age, with a higher prevalence in patients older than 70 years old. [3]

Considering this high prevalence, the consistent functional limitation and the high chronicization, shoulder pain is a relevant disease not only in terms of patients quality of life but also in healthcare resource management.

There are a lot of different diagnostic options (e.g: rotator cuff disease, shoulder impingement syndrome, adhesive capsulitis, reumatologic disease and other), all leading to the same symptom: chronic shoulder pain. As a consequence, a multi-disciplinar and complete treatment, from conservative to surgical approach, is required.
Non invasive or minimally-invasive treatments as rest, FANS, nerve blocks and physical therapies often provide a short term analgesic benefit and, facing a rapid population aging, many patients may not be suitable candidates for surgery.4,5

In this scenario neuroablation and neuromodulation protocols are gaining traction as preferable options, providing an effective and minimally-invasive way to treat the symptoms in chronic shoulder pain, and a longer pain relief.7

As described in literature6,7 there are two types of radiofrequencies (RF) procedures: ablative and pulsed. Ablative RF (aRF) requires temperatures of 70–80°C and results in neuronal destruction.6 To avoid the motor disfunction from aRF applied to motor nerves, pulsed radiofrequency (pRF) technique has been used as an alternative to aRF for treating chronic pain.

Pulsed RF (pRF) is usually deployed at temperatures of 40–45°C thereby avoiding loss of neuronal function, but resulting in presumed neuromodulatory effects that contribute to analgesia.7

In a recent systematic review different RF protocols are analyzed, highlighting a lack of consensus regarding the parameters required to deliver an adequate ‘dose’ of pRF with reports of wide variation for voltage and duration of p RF. The most commonly used sequence for pRF is a pulse frequency of 2 Hz and a pulse width of 20 milliseconds with the treatment delivered over 2–10 min.8

An outstanding issue with current available literature remains the lack of proper evaluation of the effects of the two types of RF on innervation to the shoulder joint. It also necessary to account for the considerable variability in neural targets for RF procedures on the shoulder joint to properly evaluate effects.

The shoulder is a complex neuroanatomic zone. The suprascapular nerve (SN) supplies 70% of the sensory innervation of the shoulder joint, whereas the remaining 30% is supplied by the subscapular nerve (ScN), axillary nerve (AN), and lateral pectoral nerve (LPN).

Improving on the knowledge of the innervation of this area by cadaveric9 and anatomic studies, a recent narrative review proposed four distinct safe zones for ablation: Zone A, Suprascapular nerve principal non-motor branches (the lateral subacromial branch (LSAb) and posterior glenohumeral branch (PGHb) have been named). This zone is can be found in fluoroscopic guidance posterior, lateral, inferior aspect of the humerus (ascending humeral branches), This zone is can be found in fluoroscopic guidance posterior glenoid neck, upper 2/3 to 1/2, of the shoulder joint, whereas the remaining 30% is supplied by the subscapular nerve (ScN), axillary nerve (AN), and lateral pectoral nerve (LPN).

Summarizing, the current volume of analytical work with US-guided RF focusing on nerves other than AN and SN is still severely lacking.10

All the aforementioned zones can also be found with an ultrasound approach. The ultrasound technique is more recent than fluoroscopic approach and it is starting now to be explored in various studies. It has multiple advantages over a fluoroscopic approach, such as: real-time assessment and dynamic evaluation, limited trauma, easier application by trained and experienced physicians, reduced complications (pneumothorax and intravascular injection) and avoidance of patient’s exposure to radiation. Compared to the other available radiological imaging techniques, a higher success rate and a shorter treatment time were observed.11,12

Under US-guide as described in [2] (US scanning was performed with a high-frequency linear transducer (13–6 MHz)), to exactly locate the SN the transducer was moved to visualize the spine of the scapula and then cephalad to find the suprascapular fossa. The suprascapular notch was identified by moving the transducer laterally while maintaining a transverse orientation to identify the supraspinous muscle and the suprascapular fossa. The nerve was commonly seen as a round, hyperechoic image, below the transverse scapular ligament in the scapular notch. The needle was inserted along the longitudinal axis of the ultrasound beam (in plane) in a medial to lateral direction.

In a similar way, the UG scan as instead described in [2] finds the cross-section of the posterior circumflex humeral artery (PCHA) by doppler. The AN is located in close relation to the PCHA in the neurovascular space, whose boundaries are the teres minor (TM) muscle cranially, the deltoid muscle (DM) posteriorly, the triceps muscle caudally, and the shaft of the humerus anteriorly.

To the best of our knowledge, all ultra-sound guided studies performed targeted the SN and the AN, while the LPN US-guided technique is only described in the cadaveric study by Tran et al: The probe was placed in a coronal oblique direction on the anterosuperior aspect of the shoulder to identify the coracoid process medially, the anteromedial edge of the acromion laterally, and the coracoclavicular ligament coursing between these structures. The probe was then rotated medially approximately 90 degrees and translated anteromedially until the superior surfaces of the coracoid process and lateral third of the clavicle were visualized. At this site, a trilaminar arrangement of tissues was visualized. This included clavicular part of the deltoid muscle, superficially, neurovascular bundle consisting of the acromial branches of LPN and corresponding vessels surrounded by fatty connective tissue, located centrally and trapezoid part of the coracoclavicular ligament located deeply. A 25G ½-inch needle was inserted in-plane and advanced until the needle tip reached the superior surface of the coracoid process, just anterior to the neurovascular bundle.

Summarizing, the current volume of analytical work with US-guided RF focusing on nerves other than AN and SN is still severely lacking. All recent studies on pRF (less studies on aRF are performed due to possible motor impairment) reported nerve radiofrequency is a safe and effective technique for treating chronic shoulder pain, providing significant improvement in NPRS during at least 6 months, accompanied with improvement of motor function and higher levels of patient satisfaction.13–15

However, Pushparaj et al., in a recent meta-analysis of the seven RCTs evaluating pRF, found no analgesic benefit or functional improvement with this treatment over conventional medical management. Also, case series and reports on aRF indicate a potential for analgesic benefit but the quality of this evidence was low. Limits of the studies: most of the studies included in the systematic review targeted the SSN for various pathologies that cause chronic shoulder pain with a few publications on other possible targets including the AN, the LPN and lower subscapular nerves. Other possible limits of the studies are the extreme heterogeneity in scores to assess pain and functional capacity (VAS, NRS, SPADI, OSS), the absence of a punctual diagnosis and the absence in every RCTs.
included in the review of a prognostic block with local anaesthetics (LA).

In conclusion we can say that RF is a safe, minimal-invasive, technique to treat chronic shoulder pain in middle-long term, but large-scale studies, and controlled comparative-effectiveness trials, are required to better assess efficacy and effectiveness of RF treatments for shoulder pain.

REFERENCES


