Novel perivascular articular branch of the lateral pectoral nerve block for an extended shoulder block: A comprehensive case-based technical report

Dear Editor,

The main advantage of the 'shoulder block' compared to other techniques, such as the interscalene block, is the reduction of the motor and sensory blocks of the upper limb and, secondarily, the avoidance of complications such as the phrenic nerve block.[1-3] To promote analgesia during the early postoperative period, we propose a novel technique to broaden the analgesic coverage of the shoulder block – perivascular articular branch of the lateral pectoral nerve (AB-LPN) block.[3,4]

We report two patients for rotator cuff repair presenting with significant pre-surgical pain and limited shoulder motion. The perivascular AB-LPN block reduced preoperative pain and improved shoulder motion before other blocks were performed. The perivascular AB-LPN block can extend the shoulder block combined with suprascapular nerve block, subscapularis nerves, and axillary nerve anaesthesia while maintaining a supine position. After emergence from general anaesthesia and the concomitant perioperative administration of intravenous conventional analgesia, the patients were pain-free during the first 24 h.

AB-LPN and the acromial ramus of the thoracoacromial artery (ARTA) pass in the neurovascular bundle at the infraclavicular fossa within the fascia beneath the inferior surface of the deltoid muscle and above the coracoacromial ligaments (target of the perivascular AB-LPN).[3] ARTA arises commonly from the pectoral branch of the thoracoacromial artery. Anterior to the coracoacromial ligaments, AB-LPN ramifies into the glenohumeral and acromial branches, exiting from the neurovascular sheath involving ARTA and AB-LPN. A breach at the level of the coracoacromial ligament allows the posterior passage of the glenohumeral branch of AB-LPN. After leaving the neurovascular sheath, ARTA branches run in deeper planes to form an anastomosis with the acromial ramus of the suprascapular artery[3] [Figure 1]. For the AB-LPN block, the ultrasound linear probe is positioned obliquely between the coracoid process apex and the acromioclavicular joint: the coracoid process apex (caudally) and the acromion (cranially) are observed (the probe may be rotated to observe ARTA in cross-section). In the ultrasound image, from superficial to deeper planes, the subcutaneous tissue layer, the deltoid muscle, and the anterior (laterally) or the posterior (medially) coracoacromial ligaments are in their long axis. In its long axis, ARTA is visualised between the coracoacromial ligaments and the fascia beneath the deltoid muscle. Approximately 4 mL is injected at this point, above and beneath ARTA, being the vessels' important landmarks. The needle is inserted in a plane or out of a plane to the ultrasound probe. Colour Doppler real-time evaluation is essential for neurovascular bundle identification. AB-LPN, a small-calibre structure, may need to be identified. With the probe positioned obliquely, in the infraclavicular fossa, sliding it medially, the nerve is observed apart from ARTA at the coracoid process level. Ultrasonographically, AB-LPN is identified as running along the anterior surface of the coracoacromial ligaments between the coracoid process and the clavicle at the level of the glenohumeral nerve formation.

This technique is different from the approach of Eckmann *et al*.[5] in which a 'safe' plane is identified to avoid arterial

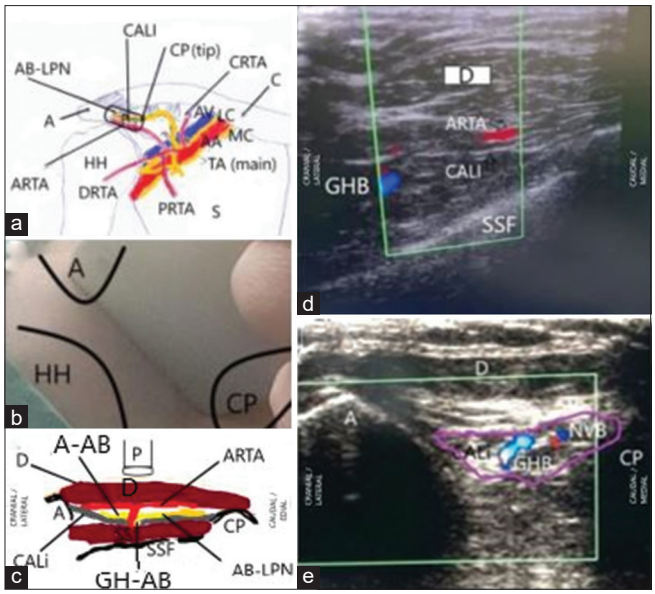

Figure 1: Describing the perivascular articular branch of the lateral pectoral nerve. (a) Essential anatomy (bones, ligaments, arteries and nerves) for identifying the neurovascular bundle containing ARTA superficially to the coracoacromial ligaments. (b) Topographical landmarks obtained from the author's own body. (c) Illustrative schematic image demonstrating the relevant sonoanatomy. (d) Illustrative sonoanatomical image from the author's body. The needle is inserted in the plane. (e) Image after the injection of local anaesthetic (surrounding the neurovascular bundle – limited by the purple line) over the coracoacromial ligaments. The bundle (located superficially to the coracoacromial ligaments) is constituted by the acromial ramus of the thoracoacromial artery and vein and the articular branch of the lateral pectoral nerve. Deep to CALI, some vessels may be observed representing a netlike meshwork formed together with the acromial ramus of the suprascapular artery. A = acromion, AA = axillary artery, A-AB = acromial division of articular branch of the lateral pectoral nerve, AB-LPN = articular branch of the lateral pectoral nerve, ARTA = acromial branch of the thoracoacromial artery, AV = axillary vein, C = clavicle, CALI = coracoacromial ligaments, CP = coracoid process, D = deltoid, DRTA = deltoid ramus of the thoracoacromial artery, GH-AB = glenohumeral division of the articular branch of the lateral pectoral nerve, GHB = glenohumeral branch of the acromial branch of the thoracoacromial artery, HH = humeral head, LC = lateral cord of the brachial plexus, MC = medial cord of the brachial plexus, NVB = neurovascular branch (involving acromial ramus of the thoracoacromial artery and the articular branch of the lateral pectoral nerve), PRTA = pectoral ramus of the thoracoacromial artery, SS = supraspinatus muscle, SSF = supraspinatus fossa, TA = thoracoacromial artery

puncture by fluoroscopic and ultrasonographic guidance in the superior surface of the coracoid process; at this level, AB-LPN and ARTA are distant from each other (AB-LPN travels over the coracoid process base, and ARTA over the coracoid process tip). At the coracoid process level, this different location is an opportunity for radiofrequency techniques but complicates AB-LPN identification.[5]

The perivascular AB-LPN block enables better shoulder motion before the suprascapular nerve block and subscapularis plane block performance. This is probably due to a more comfortable compensatory trapezius and deltoid muscle contraction elicitation.

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Conflicts of interest

There are no conflicts of interest.

Carlos Rodrigues Almeida

Tondela-Viseu Hospital Centre, Viseu, Portugal

Address for correspondence:
Dr. Carlos Rodrigues Almeida,
Rua Rei Dom Duarte, nº261 3ºdto, 3500-401 Viseu, Portugal.
E-mail: carlosralmeida@gmail.com

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