International Journal of Regional Anaesthesia

Short Communication

Dual Guidance in the Era of Ultrasound: An Overlooked Necessity or a Luxury!

Vedhika Shanker[1], Tuhin Mistry[1], Gurumoorthi Palanichamy[1], Jagannathan Balavenkatasubramanian[1]

[1]Department of Anaesthesiology, Ganga Medical Centre & Hospitals Pvt Ltd, Coimbatore, India.

Real-time ultrasonography (USG) guidance has revolutionized the practice of regional anaesthesia (RA). As an adjunct to USG, nerve stimulation has been advocated for accurate and safe delivery of local anaesthetic (LA) while performing peripheral nerve blocks [1]. This letter highlights the importance of dual guidance infraclavicular brachial plexus block (BPB) in a polytrauma patient for forearm surgery.

A 54-year-old male was brought to the emergency with an alleged history of a road traffic accident and multiple injuries, including left middle third clavicle fracture, bilateral multiple rib fractures (3rd, 4th,5th, 6th ribs on left side and 4th, 5th ribs on right side), closed distal third both bones fracture of right forearm, scalp hematoma of the left parietal area, and left-sided pneumothorax. On arrival at the resuscitation bay, the overall pain score was 9/10 on a numeric rating scale (NRS). An intercostal drain was inserted, and he had been placed on noninvasive ventilation (NIV). On arrival a multimodal analgesia regimen was started, including continuous thoracic epidural, intravenous (IV) paracetamol 15 mg/kg, tramadol 2 mg/kg, and transdermal 10 mg buprenorphine patch. The patient has been on regular treatment for type 2 diabetes mellitus and hypertension for 15 years. He had suffered two episodes of myocardial infarction eight years ago, for which he had undergone percutaneous transluminal coronary angioplasty and was on dual antiplatelet therapy [stopped by patient one month back]. The transthoracic echocardiography revealed mild left ventricular hypertrophy, hypokinetic posterior, lateral, and inferior walls with a left ventricular ejection fraction of 40%. He also suffered an ischemic cerebrovascular accident involving the left middle cerebral artery six years ago. The patient had residual weakness of the right-sided hemiparesis, dysphagia, and slurring of speech. He was scheduled for open reduction and internal fixation with plating both right forearm bones three days after admission. The plan was to provide surgical anaesthesia with a right-sided diaphragm sparing BPB. The anaesthesia plan was explained to the patient and relatives, and informed written consent was obtained.

The patient was positioned supine with head-end elevation at 30 degrees in the operation theater, and the ipsilateral arm was abducted. Standard monitors were attached, and a scout scan was performed with a high-frequency linear array transducer (Sonosite HFL 38xp/13–6 MHz; Fujifilm SonoSite Inc., Bothell, WA, USA) to assess the viability of the anaesthetic plan (Figure 1a). The right infraclavicular BPB was performed under dual guidance (USG and electrostimulatilation) with a 100 mm nerve block needle and 15 ml 0.75% ropivacaine and 4 mg dexamethasone was administered (Figure 1b). Each cord of the brachial plexus was simulated separately, and 5 ml of LA was deposited after obtaining desired responses at <0.5 mA current, 0.1 ms impulse duration, and a frequency of 2 Hz. The lateral, posterior, and medial cords were identified by elbow flexion, wrist extension, and wrist flexion, respectively. The block was successful, and the procedure went off without any complications.

BPB above the clavicle is widely practiced for various upper limb surgeries. We ruled out this option to avoid inadvertent phrenic nerve palsy. Our patient was on intermittent NIV, and the procedure was undertaken once the patient could tolerate NIV-free periods without any respiratory distress. However, the challenge of the patient's inability to lie supine remained. The costoclavicular approach could not be instituted as the patient had a right-sided subclavian central venous catheter. Hence correct transducer placement and proper visualization of the brachial plexus were not possible (Figure 1c). We also excluded the possibility of axillary BPB due to the presence of fungal

Address of Correspondence: Dr. Tuhin Mistry, Department of Anaesthesiology, Ganga Medical Centre & Hospitals Pvt Ltd, Coimbatore, India.
E-mail: tm.tuhin87@gmail.com

Submitted: 20/09/2021; Reviewed: 15/10/2021; Accepted: 17/11/2021; Published: 10/01/2022

DOI: 10.13107/ijra.2022.v03i01.053 | www.ijrajournal.com |

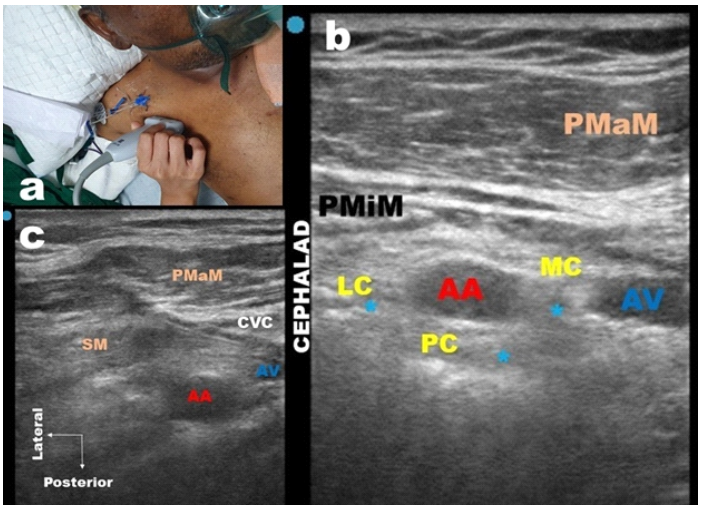

Figure 1: Dual guidance infraclavicular brachial plexus block (BPB) in a polytrauma patient with multiple comorbidities;
(a) Scout scanning and probe position for an optimal view of infraclavicular BPB;
(b) Post block ultrasound image showing drug spread around cords;
© Scanning of the costoclavicular area;
PMaM: Pectoralis major muscle,
Pmim: Pectoralis minor muscle,
SM: Subclavius muscle,
AA: Axillary artery,
AV: Axillary vein,
LC: Lateral cord,
MC: Medial cord,
PC: Posterior cord,
CVC: Central venous catheter,
Blue Asterix (*): Local anaesthetic.

skin infection. We opted for USG guided infraclavicular BPB, but discrimination of individual cords was not feasible. Hence, we used a combination of ultrasound and nerve stimulation for a sure-fire successful RA technique.

A successful infraclavicular BPB can be achieved either with electrostimulation or ultrasound guidance in experienced hands. However, USG shortens performance time compared to the dual-motor endpoint stimulation [2]. Although the LA deposition at a single point, cranioposterior to the axillary artery, could result in successful infraclavicular BPB, the success rate was reported to be higher with multiple-injection (53-100%) [4]. Gurkan et al. reported a similar success rate between dual guidance (95%) and single motor endpoint stimulation (93%) [5]. Hence, the use of ultrasound without neurostimulation may be sufficient to achieve a successful infraclavicular BPB. However, in particular cases, electrostimulation as an adjunct may help in the identification of individual cords based on the motor response as well as act as a safety monitor to prevent intraneural injection [1].

Conclusion

Dual guidance was necessary for our patient to perform the infraclavicular BPB. Ultrasound helped in real-time visualization of spread and reduced the LA volume, while peripheral nerve stimulation aided in accurate localization of cords with evoked motor responses.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Gadsden JC. The role of peripheral nerve stimulation in the era of ultrasound-guided regional anaesthesia. Anaesthesia 2021;76 Suppl 1:65-73.

2. Brull R, Lupu M, Perlas A, Chan VW, McCartney CJ. Compared with dual nerve stimulation, ultrasound guidance shortens the time for infraclavicular block performance. Can J Anaesth 2009;56:812-8.

3. Dingemans E, Williams SR, Arcand G, Chouinard P, Harris P, Ruel M, et al. Neurostimulation in ultrasound-guided infraclavicular block: A prospective randomized trial. Anesth Analg 2007;104:1275-80.

4. Sauter AR, Dodgson MS, Stubhaug A, Halstensen AM, Klaastad Ø. Electrical nerve stimulation or ultrasound guidance for lateral sagittal infraclavicular blocks: A randomized, controlled, observer-blinded, comparative study. Anesth Analg 2008;106:1910-5.

5. Gurkan Y, Acar S, Solak M, Toker K. Comparison of nerve stimulation vs. ultrasound-guided lateral sagittal infraclavicular block. Acta Anaesthesiol Scand 2008;52:851-5.

How to cite this article: Shanker V, Mistry M, Palanichamy G, Balavenkatasubramanian J | Dual Guidance in the Era of Ultrasound: An Overlooked Necessity or a Luxury! | International Journal of Regional Anaesthesia | January-June 2022; 3(1): 35-36.