

A cadaveric cervical erector spinae study: Are there any barriers?

Dear Editor,

The cervical erector spinae plane block (ESPB) has been utilized for chronic shoulder pain when performed at the levels of T2 and T3.^[1] Contrast studies revealed the spread of the dye up to the C3 neural foramina on dorsal aspect. Injections at T2/T3 levels provided adequate postoperative analgesia for carotid endarterectomies.^[2] A clinical study in five young patients demonstrated phrenic nerve-sparing analgesic efficacy cervical ESPB using 20 ml injected at the level of T1 costotransverse-junction (CTJ).^[3]

After institutional approval, we performed ultrasound (US)-guided ESPB in two well-preserved formalin-based cadavers (one male-84 years and one female-79 years) which were 3 months old in prone position. After identifying the first CTJ, a 23-G spinal needle was introduced in-plane with needle traversing cranio-caudally below ESM. The needle tip was positioned deep to

the anterior erector sheath (AES) and above the first CTJ. Ten ml of 0.1% methylene blue dye (MBD) diluted in 0.9% saline was injected in small boluses in real-time [Figure 1a].

After 6 h, cross-sections performed at the level of T1 and C5 were inspected with loupe magnification and further micro-dissection of cross-sections of T1 and C5 were performed to inspect the spread.

The MBD was observed spreading from dorsal aspect at the level of spinous process traveling laterally over ESM reaching posterior wall of carotid sheath and along the ASM. Coursing along the anterior wall of carotid sheath it spread into the anterior layer of pretracheal fascia. Far laterally spread was observed along the investing layer of deep cervical fascia, encircling the SCM on anterior and posterior aspects. Since the status of ventral root of T1 could not be commented as it lies under the roof of intervertebral foramen (IVF), the T1 vertebra was hemi-sectioned to reveal the course of T1 disappearing into paravertebral muscles which were stained with MBD [Figure 1c]. Two small neural twigs emerged from ventral root of T1, innervating the paravertebral muscles [Figure 1c]. The

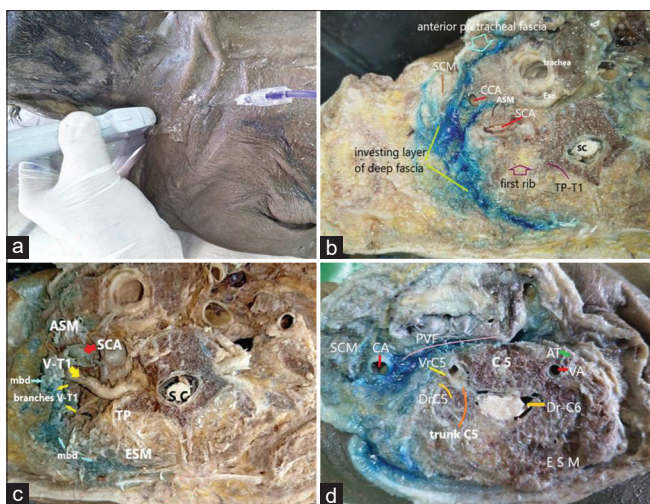


Figure 1: (a) Left C-ESP at T1. The probe-slided cephalad to visualize the extent of spread in real time. (b) Cross-section at the level of T1. SCM - sternocleidomastoid; CCA - common carotid artery; ASM - anterior scalene muscle; SCA - subclavian artery; TP-T1 - transverse process of T1; SC - spinal cord. (c) Excision of hemivertebra at level of T1 of specimen in Figure 1b. SCM - sternocleidomastoid; CCA - common carotid artery; ASM - anterior scalene muscle; SCA - subclavian artery; V-T1 - ventral nerve root of T1; ESM - erector spinae muscle; mbd - methylene blue dye; SC - spinal cord. (d) Cross-section at the level of C5: AT - anterior tubercle; VA - vertebral artery; V-C5 - ventral root of C5; Drc5 = dorsal root of C5; Drc6 - dorsal root of C6; CA - carotid artery; PVF - prevertebral fascia (spread in rose line); SCM - sternocleidomastoid; ESM - erector spinae muscle; C5 - fifth cervical vertebral body

MBD spread from posterior to lateral and dorsal to ESM. A partial stain of the anterolateral ASM could be visualized [Figure 1c].

The MBD was observed spreading from dorsal aspect at the level of spinous process laterally over ESM up to the posterior wall of carotid sheath. Along the prevertebral fascia, it reached the anterolateral aspect of C5. Deep to prevertebral fascia the dye spread was noticed above the paravertebral muscles: middle and anterior scalene. The ventral nerve of C5 was visualized emerging from the spinal cord entering into IVF, bounded by the anterior and posterior tubercles, and disappearing into paravertebral. Far laterally the dye spread was anterior and posterior to SCM.

In both cross-sections at the levels of T1 and C5, the MBD stained the thoracic and cervical nerve roots. In the axial sections of T1 and C5, the MBD spreads through the path taken by the dorsal rami between the medial and lateral cervical ESM [Figure 1b and d]. The dynamics are different in fresh frozen cadavers, wherein post defrosting the dye can take a different path.^[4]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Access this article online	
Quick Response Code:	Website: https://journals.lww.com/joacp
	DOI: 10.4103/joacp.JOACP_462_20

How to cite this article: Diwan S, Shivaprakash S, Nair A. A cadaveric cervical erector spinae study: Are there any barriers? *J Anaesthesiol Clin Pharmacol* 2022;38:501-2.

Submitted: 26-Jul-2020

Revised: 04-Jan-2021

Accepted: 10-Mar-2021

Published: 15-Sep-2022

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