

# A request for a clarification about classification and nomenclature of cervical plexus blocks

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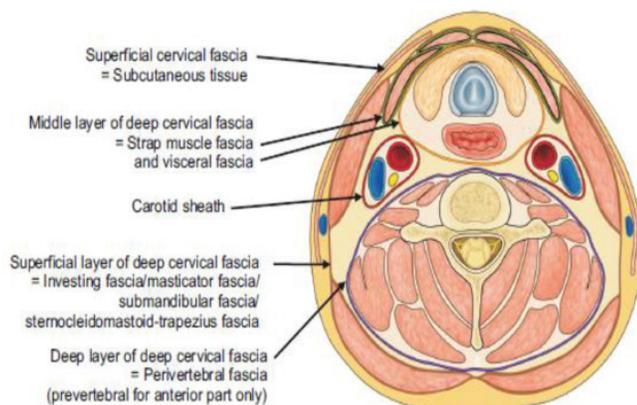
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## Dear Editor,

While we are planning a clinical trial, we are confused about naming of cervical blocks. So, we kindly ask for a clarification for that issue.

Before Pandit et al (in 2003) and Telford and Stoneham (in 2004) defined intermediate cervical plexus block (ICPB), CPBs were traditionally classified as deep or superficial block. In 2010, Choquet et al redefined ICPB by using ultrasonography (USG) (1,2).

By USG guidance, CPBs can be performed more thoroughly and safely (1). Because USG make seen the nerves and vessels, spreading of local anesthetic (LA) during injection. Also it reduces volume of LA (prevent swelling of the tissue and toxic dose of LA injection) and provides safely application of blocks (2). Cervical fascia classified as superficial and deep according to the Guidea et al (8). Deep cervical fascia has 3 layers (Figure 1 (1)).



**Figure 1.** The layers of cervical fascia (C6 transverse section)

- Superficial layer (Investing fascia/masticator fascia/submandibular fascia/sternocleidomastoid-trapezius fascia, paratidomasseteric fascia)
- Middle layer (strap muscle fascia and visceral fascia, pretracheal fascia, buccopharyngeal fascia)
- Deep layer (Perivertebral fascia (prevertebral for anterior part only))

They preferred to use more specific term "subcutaneous tissue" instead of "superficial cervical fascia" to avoid the confusion with the superficial layer of deep cervical fascia (3).

**Superficial cervical plexus block:** The SCPB is a subcutaneous infiltration of LA (1,4) under the skin, superficial to the investing fascia (4). By this technique, LA is injected at the mid portion of the posterior border of the sternocleidomastoid muscle. It can be performed by using landmarks or USG (1).

**Intermediate cervical plexus block:** Injecting LA between the superficial and deep (prevertebral) fascia is named as ICPB. In other words superficial to the prevertebral fascia and deep to the investing cervical fascia (2,4). Prevertebral fascia is only the anterior part of deep layer of deep cervical fascia (perivertebral fascia) so the term prevertebral fascia in ICPB should be recalled as deep layer of deep cervical fascia (perivertebral fascia) (1).

When cervical epidural anesthesia or deep CPB compared with ICPB; ICPB has lower frequency of anesthesia-related complications (2).

Barone et al (5) and other authors described a blind technique for ICPB for carotis endarterectomy. When a blind technique is used, there is a difficulty in the classification of cervical blocks. Because exact location of the needle cannot be seen (2). By this technique, the needle

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is inserted in a perpendicular plane at the midpoint of the posterior border of the sternocleidomastoid muscle until a 'loss of resistance' or 'pop' is felt for ICPB. This 'pop' felt after the needle passed the investing layer of the cervical fascia (at 1–2 cm depth) (1,6). This 'loss of resistance' or 'pop' is felt by all providers during the intermediate block placement, but not during subcutaneous injection. This is unlikely because if the practitioner is not experienced the "pop" cannot be felt. By using USG guided techniques, this can be eliminated (6).

It is a simple (4), easy (1,4), reliable, efficient and safe (1,2,5) technique; however, its use blindly has controversial efficacy (12). Anterior or posterior approach can be used for USG-ICPB (1,2).

Choquet et al described ultrasound-guided ICPB (US-ICPB) as performing LA injection to the posterior cervical space (which is located deep to the sternocleidomastoid and trapezius muscles and superficial to the prevertebral fascia) (7). This space was also the space which was described as superficial cervical space by Pandit et al (4,7,8). The needle is then inserted between the posterior border of the SCM muscle and the inferior border of the scapula elevator muscle by in plane technique. At midway between posterior border of sternocleidomastoid muscle and the internal jugular vein, the needle is advanced laterally under the investing layer of the cervical fascia (2).

Deep cervical plexus block: The targeted space was cervical paravertebral space (under the investing layer of the cervical fascia), where LA was injected by a single injection or by three separate injections, after identification of C2-C4 spinal nerves (1,9). But it is technically more difficult (9), can be associated with more severe complications (intravascular, epidural, or subarachnoid injections of local anesthetics and respiratory complications associated with phrenic nerve palsy) (1,9). The phrenic nerve can be blocked with bilateral deep cervical block. If so, it requires emergency mechanical ventilation support (4). By putting the US into use in clinical practice, the deep CPB can be done easily and securely (1).

In a study on histological examinations of neck tissues, Nash et al stated that the investing layer of fascia was either lacking or incomplete (10). If it is true, we expect that subcutaneous cervical plexus block is effective like an ICPB (6).

On the other hand Pandit et al (8) in a cadaver study showed that the deep cervical fascia (investing fascia) is complete and deep layer of deep cervical fascia is permeable (2,9). The investigators injected methylene blue above and below the superficial layer of deep cervical fascia. The solution spread to the deep cervical space across the deep cervical fascia, which suggested permeability of deep

layer of deep cervical fascia. Conversely, the solution that was injected above the superficial layer of deep cervical fascia, did not travel to the deeper tissues (5).

In a vivo study, the permeability of deep cervical fascia for local anesthetics after ICPB was demonstrated by Casutt et al (9). Calderon et al (2) observed the diffusion of local anesthetics in the posterior cervical space after ICPB. If Pandit et al is true, subcutaneous injection of LA do not pass the investing fascia and do not clinically acts like an ICPB (6).

LA can either be injected above or below the deep cervical fascia for superficial cervical block. If needle perforates the investing fascia of the neck, this block should be termed as "intermediate block" instead of "superficial block" (9). We contend that there is some confusion and misunderstanding in the literature regarding cervical plexus block.

*Competing interests: The authors declare that they have no competing interest.*

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