28 Ultrasound-Guided Cervical Plexus Block

BLOCK AT A GLANCE

- Indications: carotid endarterectomy, superficial neck surgery
- Transducer position: transverse over the midpoint of the sternocleidomastoid muscle (posterior border)
- Goal: local anesthetic spread around the superficial cervical plexus *or* deep to the sternocleidomastoid muscle
- Local anesthetic: 10–15 mL

FIGURE 28-1. Needle and transducer position to block the superficial cervical plexus using a transverse view.

General Considerations

The goal of the ultrasound-guided technique of superficial cervical plexus block is to deposit local anesthetic in the vicinity of the sensory branches of the nerve roots C2, C3, and C4. Advantages over the landmark-based technique include the ability to ensure the spread of local anesthetic in the correct plane and therefore increase the success rate and avoid too deep needle insertion and/or inadvertent puncture of neighboring structures. Both in-plane and out-of-plane approaches can be used. The experience with ultrasound-guided deep cervical plexus is still in its infancy and not described here.

Ultrasound Anatomy

The sternocleidomastoid muscle (SCM) forms a "roof" over the nerves of the superficial cervical plexus (C2-4). The roots combine to form the four terminal branches (lesser occipital, greater auricular, transverse cervical, and supraclavicular nerves) and emerge from behind the posterior border of the SCM (Figure 28-2). The plexus can be visualized as a small collection of hypoechoic nodules (honeycomb appearance or hypo-echoic [dark] oval structures) immediately deep or lateral to the posterior border of the SCM (Figure 28-3), but this is not always apparent. Occasionally, the greater auricular nerve is visualized (Figure 28-4) on the superficial surface of the SCM muscle as a small, round hypoechoic structure. The SCM is separated from the brachial plexus and the scalene muscles by the prevertebral fascia, which can be seen as a hyperechoic linear structure. The superficial cervical plexus lies posterior to the SCM muscle, and immediately underneath the prevertebral fascia overlying the interscalene groove. (Figure 28-3).

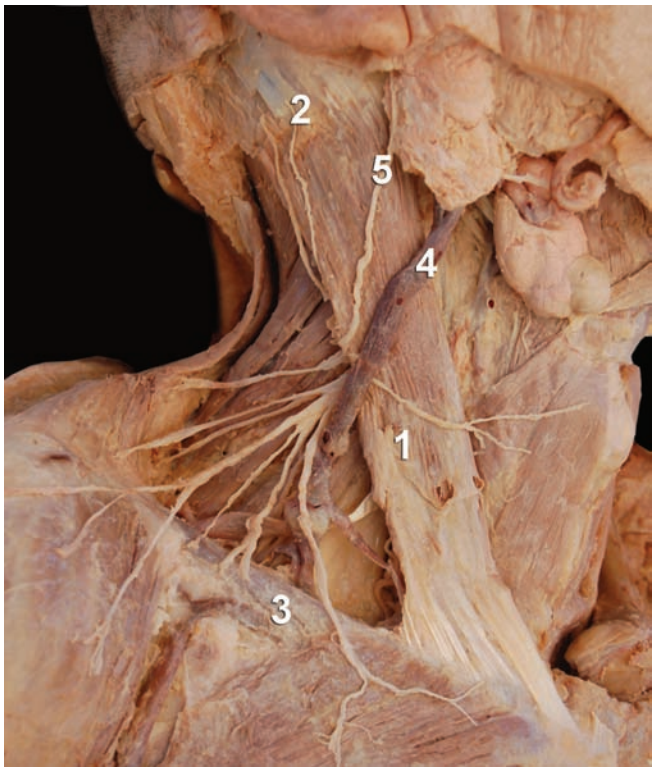


FIGURE 28-2. Anatomy of the superficial cervical plexus. ❶ sternocleidomastoid muscle. ❷ mastoid process. ❸ clavicle. ❹ external jugular vein. Superficial cervical plexus is seen emerging behind the posterior border of the sternocleidomastoid muscle at the intersection of the muscle with the external jugular vein. ❺ Greater auricular nerve.

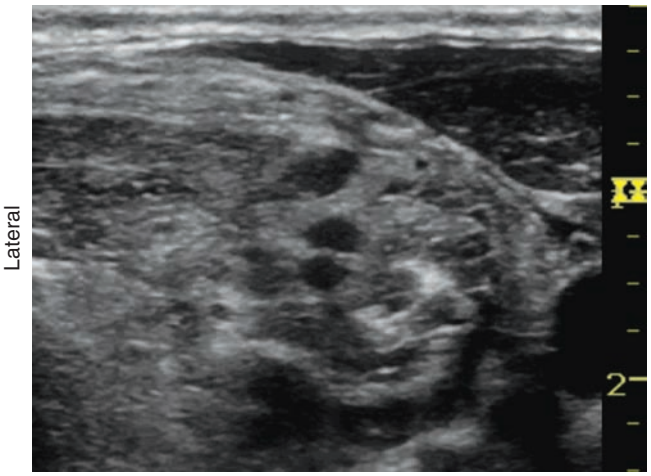
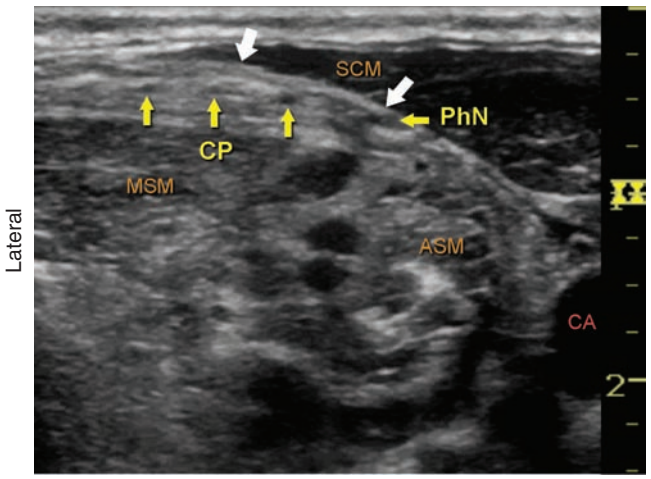


FIGURE 28-3. Superficial cervical plexus-transverse view.

Distribution of Blockade

The superficial cervical plexus block results in anesthesia of the skin of the anterolateral neck and the anteauricular and retroauricular areas, as well as the skin overlying and immediately inferior to the clavicle on the chest wall (Figure 28-5).



Superficial cervical plexus-transverse view

FIGURE 28-4. Branches of the superficial cervical plexus (CP) emerging behind the prevertebral fascia that covers the middle (MSM) and anterior (ASM) scalene muscles, and posterior to the sternocleidomastoid muscle (SCM). White arrows, Prevertebral Fascia; CA, carotid artery; PhN, phrenic nerve.

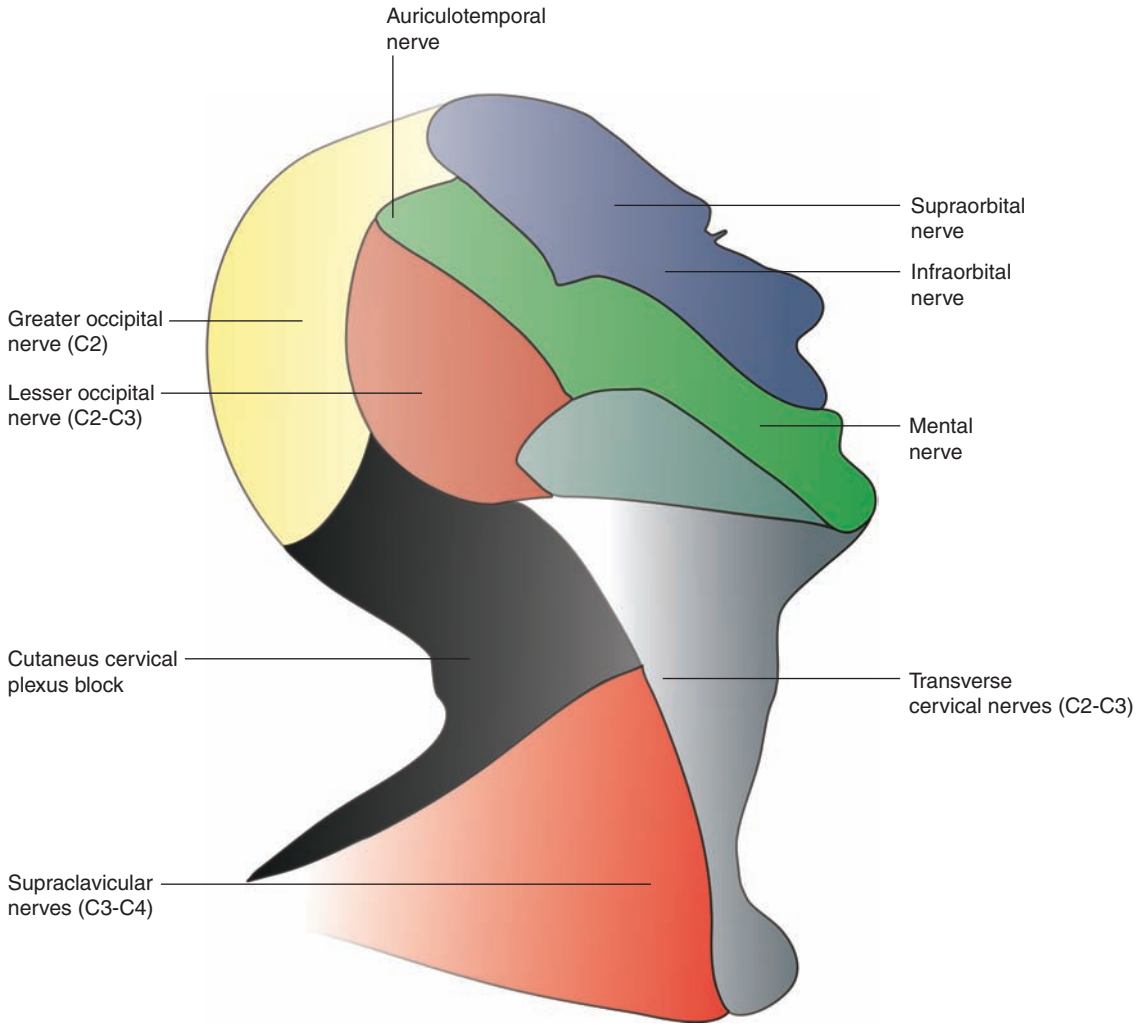


FIGURE 28-5. Sensory distribution of the cervical plexus and innervation of the lateral aspect of the face.

Equipment

Equipment needed includes the following:

- Ultrasound machine with linear transducer (8–18 MHz), sterile sleeve, and gel
- Standard nerve block tray (described in the equipment section)
- Two 10-mL syringes containing local anesthetic
- A 2.5-in, 23- to 25-gauge needle attached to low-volume extension tubing
- Sterile gloves

Landmarks and Patient Positioning

Any patient position that allows for comfortable placement of the ultrasound transducer and needle advancement is appropriate. This block is typically performed in the supine or semi-sitting position, with the head turned slightly away from the side to be blocked to facilitate operator access (Figure 28-6A and B). The patient's neck and upper chest should be exposed so that the relative length and position of the SCM can be assessed.

GOAL

The goal is to place the needle tip immediately adjacent to the superficial cervical plexus. If it is not easily visualized, the local anesthetic can be deposited in the plane immediately deep to the SCM and underneath the prevertebral fasica. A volume of 10 to 15 mL of local anesthetic usually suffices.

A

B

FIGURE 28-6. Superficial cervical plexus block. A) Transverse approach with an in-plane needle advancement. B) Longitudinal approach.

Technique

With the patient in the proper position, the skin is disinfected and the transducer is placed on the lateral neck, overlying the SCM at the level of its midpoint (approximately the level of the cricoid cartilage). Once the SCM is identified, the transducer is moved posteriorly until the tapering posterior edge is positioned in the middle of the screen. At this point, an attempt should be made to identify the brachial plexus and/or the interscalene groove between the anterior and middle scalene muscles. The plexus is visible as a small collection of hypoechoic nodules (honeycomb appearance) immediately underneath the prevertebral fascia that overlies the interscalene groove (Figures 28-3 and 28-4).

Once identified, the needle is passed through the skin, platysma and prevertebral fascia, and the tip placed adjacent to the plexus (Figure 28-7). Because of the relatively shallow position of the target, both in-plane (from medial or lateral sides) and out-of-plane approaches can be used. Following negative aspiration, 1 to 2 mL of local anesthetic is injected to confirm the proper injection site. Then the remainder of the local anesthetic (10–15 mL) is administered to envelop the plexus (Figure 28-8).

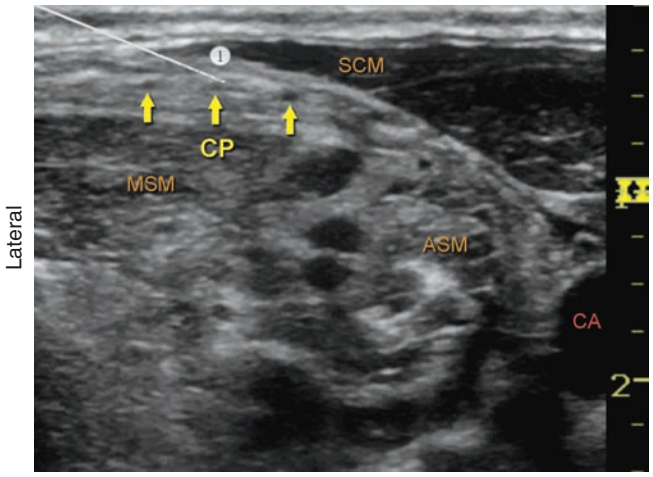


FIGURE 28-7. Needle path (1) and position to block the superficial cervical plexus (CP), transverse view. The needle is seen positioned underneath the lateral border of the sternocleidomastoid muscle (SCM) and underneath the prevertebral fascia with the transducer in a transverse position (Figure 28-1). ASM, anterior scalene muscle; CA, carotid artery; MSM, middle scalene muscle.

If the plexus is not visualized, an alternative substernocleidomastoid approach can be used. In this case, the needle is passed behind the SCM and the tip is directed to lie in the space between the SCM and the prevertebral fascia, close to the posterior border of the SCM (Figures 28-6B, 28-9, and 28-10). Local anesthetic (10–15 mL) is administered and

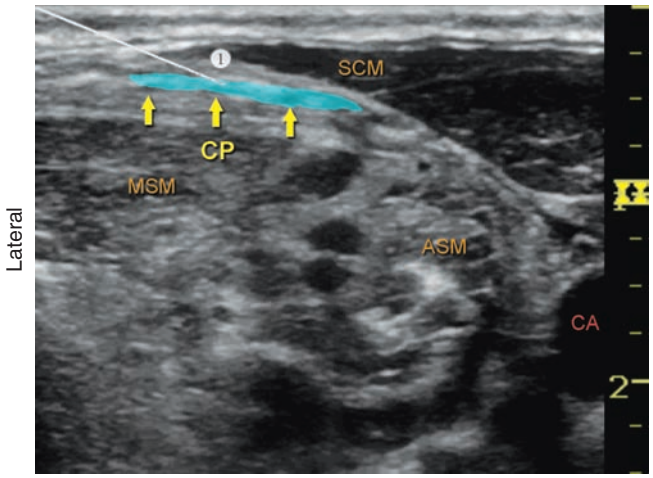


FIGURE 28-8. Desired distribution of the local anesthetic (area shaded in blue) to block the superficial cervical plexus. ASM, anterior scalene muscle; CA, carotid artery; CP, cervical plexus; MSM, middle scalene muscle; SCM, sternocleidomastoid muscle.

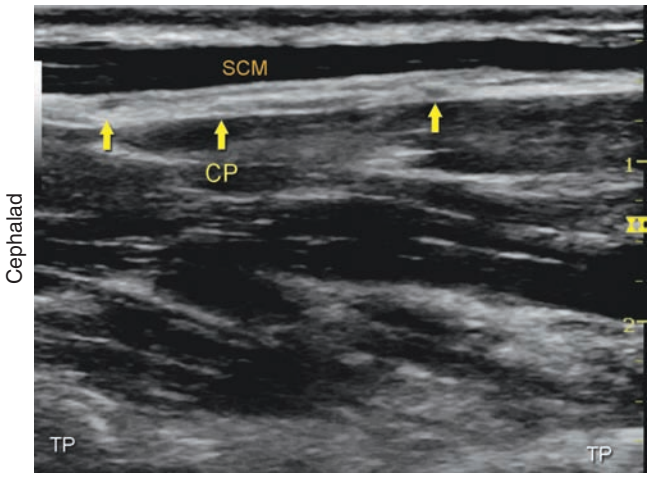


FIGURE 28-9. Longitudinal view of the superficial cervical plexus (CP) underneath the lateral border of the sternocleidomastoid muscle (SCM).

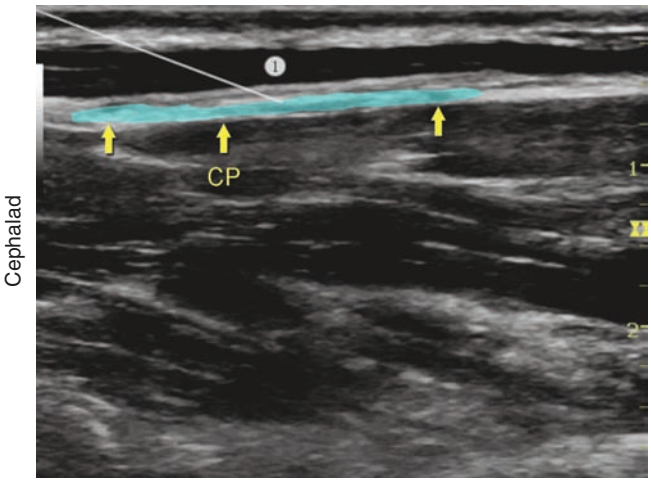


FIGURE 28-11. Desired spread of the local anesthetic under the cervical fascia to block the cervical plexus (CP).

should be visualized layering out between the SCM and the underlying prevertebral fascia (Figure 28-11). If injection of the local anesthetic does not appear to result in an appropriate spread, additional needle repositioning and injections may be necessary. Because the superficial cervical plexus is made up of purely sensory nerves, high concentrations of local anesthetic are usually not required; 0.25%-0.5% ropivacaine, bupivacaine 0.25%, or lidocaine 1% are examples of good choices.

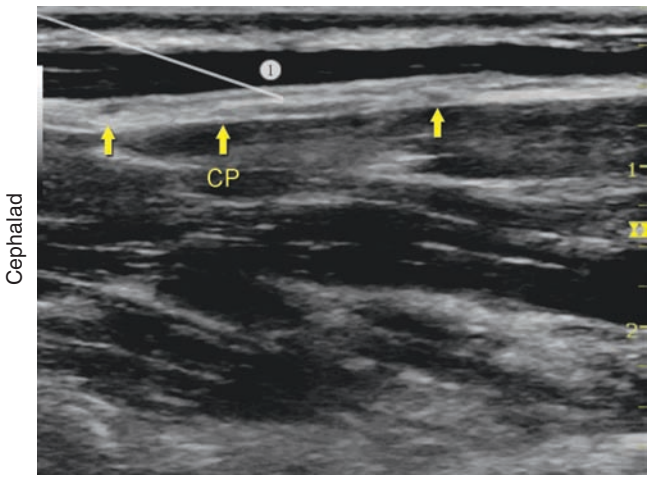
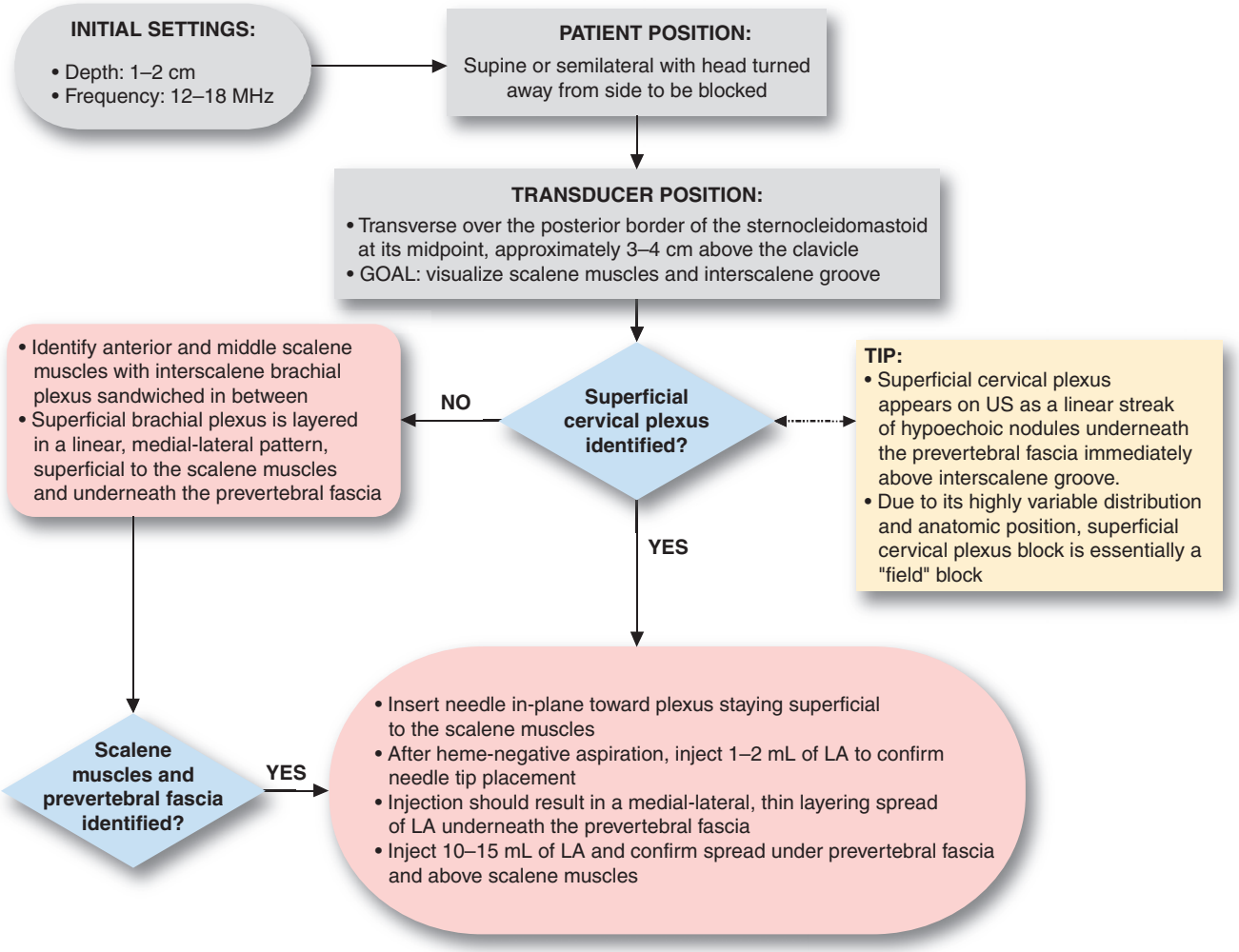


FIGURE 28-10. Needle position to block the cervical plexus (CP), longitudinal view.

TIP

- Visualization of the plexus is *not* necessary to perform this block because it may not be always readily apparent. Administration of 10 to 15 mL of local anesthetic deep to the SCM provides a reliable block without confirming the position of the plexus.
- The superficial cervical plexus overlies the brachial plexus (i.e., immediately superficial to the interscalene groove and underneath the prevertebral fascia). This can serve as a sonographic landmark by identifying the scalene muscles, the trunks of the brachial plexus, and/or the groove itself and the prevertebral fascia.

ULTRASOUND-GUIDED SUPERFICIAL CERVICAL PLEXUS BLOCK



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