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Ultrasound in Emergency Medicine

USE OF ULTRASOUND-GUIDED SUPERFICIAL CERVICAL PLEXUS BLOCK FOR PAIN MANAGEMENT IN THE EMERGENCY DEPARTMENT

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☐ **Abstract—Background: Although use of the superficial cervical plexus block (SCPB) by anesthesia for perioperative indications is well described, there is a paucity of research on use of SCPB in the emergency department (ED). Objective: This prospective observational study aims to prospectively characterize the feasibility, potential for efficacy, and safety of ultrasound-guided SCPB in a convenience sample of ED patients presenting with painful conditions of the "cape" distribution of the neck and shoulder. Methods: Data were gathered prospectively on a convenience sample of 27 patients presenting to a community ED with painful conditions involving the distribution of the SCPB: para-cervical muscle spasm/pain (n = 8), clavicle fractures (n = 7), acromioclavicular joint injuries (n = 3), radicular pain (n = 3), and rotator cuff disorders (n = 6). Pre- and post-block 11-point verbal numeric pain scores (VNPS) were recorded, as was the incidence of any immediate complications. A retrospective chart review looked for delayed complications in the 14-day post-block period. Results: The mean 11-point VNPS reduction was 5.4 points (62%). There were no early serious complications and one case each of self-limiting vocal hoarseness and asymptomatic hemi-diaphragmatic paresis. No delayed block-related complications were found. Conclusions: While limited by the fact that this was a nonrandomized observational experience with no control group, our findings suggest that SCBP may be safe and have potential for efficacy, and warrants further evaluation in a randomized controlled trial.**

☐ **Keywords—cervical plexus; nerve block; ultrasound; analgesia**

INTRODUCTION

Use of ultrasound-guided superficial cervical plexus block (SCPB) is a novel approach to pain management in the emergency department (ED). Literature on the use of SCPB in the ED setting is scarce. The first published use of the SCPB in the ED setting is in the form of a case report by Herring et al. describing the successful use of SCPB in the management of acute pain from a fractured clavicle (1). A second case report by Flores et al. described self-limiting Horner's syndrome after a successful SCPB for analgesia in a case of a clavicular fracture (2). In contrast to the ED setting, anesthetic practice has included use of ultrasound-guided SCPB mainly in surgery involving neck structures, including thyroid, carotid, and clavicle. With the exception of the case report by Flores et al., no literature exists reporting complications associated with the SCPB in the ED setting. In anesthetic practice, one large systematic review was conducted to evaluate the complication rates of the SCPB as used for carotid endarterectomy (3). This study consists of 69 papers with a total of 2176 superficial blocks performed. There was a total of zero "serious" complications of

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intrathecal or intravascular injection of local anesthetic, local anesthetic toxicity, local trauma, or hematoma leading to airway obstruction, and respiratory distress due to diaphragmatic or vocal cord paresis after placement of the block.

In a study population of 27 ED patients, we aimed to evaluate the potential role of the ultrasound-guided superficial cervical plexus block within the ED. Prospectively gathered data included verbal numeric pain score (VNPS) reduction for differing ED diagnoses and the incidence of any immediate complications. A retrospective chart review looked for delayed (within 14-day post-block period) complications from the SCPB.

Regional Anatomy

The superficial cervical plexus supplies innervation to the skin and underlying structures of the anterolateral neck. It originates from the anterior rami of the C1–C4 spinal nerves and gives rise to four distinct branches, which emerge from the midpoint of the posterior border of the sternocleidomastoid muscle at the level of the thyroid cartilage (Figure 1) (4). These terminal branches include the greater auricular, lesser occipital, transverse cervical, and supraclavicular nerves (1). Clinically important areas innervated by the cervical plexus include commonly injured structures of the neck, auricle of the ear, acromioclavicular (A-C) joint, and clavicle (Figure 2) (1). Specifically, the supraclavicular nerve provides intrinsic bone innervation to the clavicle and its overlying skin (5).

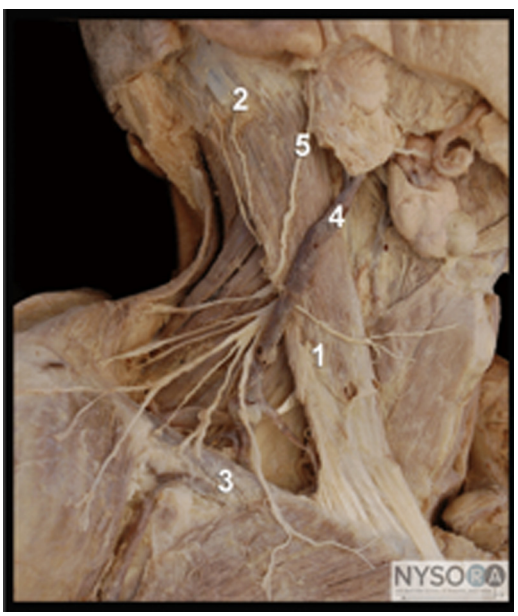

Figure 1. Cadaveric anatomy of the superficial cervical plexus. The plexus may be seen emerging from the posterior border of the sternocleidomastoid muscle (1) at the intersection of the muscle and external jugular vein (4). The mastoid muscle (2), clavicle (3), and greater auricular nerve (5) are also seen. Adapted from The New York School of Regional Anesthesia (*www.nysora.com*).

Block Technique

The patient is placed in either a sitting position (Figure 3A) or the lateral decubitus position with the block side up. The mid-point of the posterior border of the sternocleidomastoid is visualized in the transverse plane using a linear high-frequency transducer (Figure 3A and B). With the injection point starting just posterior to the posterior edge of the sternocleidomastoid (SCM) muscle half way between the clavicle and mastoid bone (Figure 2), a standard 1.5″ 25-gauge needle is used in an in-plane technique. The needle tip is inserted 1–2 cm directly under the SCM and the local anesthetic should be seen dissecting along the fascial plane, as shown in Figure 3B. Five to ten milliliters of local anesthetic is injected in the fascial plane deep to the SCM.

Block Contraindications and Complications

There are very few contraindications to performing the SCPB, but they include infection over the injection site and allergy to the local anesthetic (4).

Possible complications of SCPB include local anesthetic toxicity resulting from intravascular injection and inadvertent deep injection involving the phrenic nerve or recurrent laryngeal nerve causing diaphragmatic paresis or hoarse voice, respectively (1). Other complications include infection, hematoma, accidental

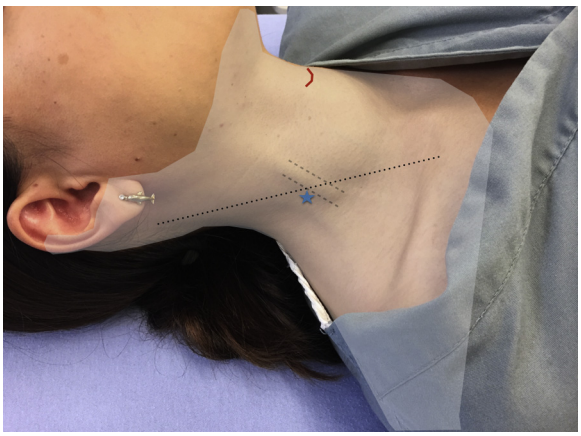

Figure 2. The distribution of the cutaneous innervation of the superficial cervical plexus outlined in shaded white area. The injection site for the superficial cervical plexus block is marked (blue star), which corresponds to the mid-point of the posterolateral border of the sternocleidomastoid muscle (dotted line). External landmarks that help to localize the injection site include the superior border of the thyroid cartilage (red curved line) and the point where the external jugular vein (dashed line) crosses over the sternocleidomastoid.