



DOES SUPERFICIAL CERVICAL PLEXUS NERVE BLOCK HAVE A ROLE IN DAY CARE MAXILLOFACIAL SURGERY AS A SUBSTITUTE TO GENERAL ANESTHESIA?

Maxillofacial Surgery

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ABSTRACT

Routinely, mandibular nerve blocks and local infiltrations are used for achieving anesthesia in oral and perioral region. Certain procedures which require additional anesthesia for dissection in wide area and deeper planes (lymph node biopsy, mandibular angle fractures etc) would not be provided by regular nerve blocks. Regional nerve blocks in cervical region can be used as an addition to conventional nerve blocks when these procedures are being performed. The superficial cervical plexus nerve block (SCPNB) produces adequate regional anesthesia to the maxillofacial region and neck. It is easy and simple technique to perform, can be used in selective cases as a substitute to general anesthesia (GA). We performed an enbloc excision of osteoma from angle of mandible in a 13-year-old female patient under regional nerve block (SCPNB) and presented the same in this paper with literature back up.

KEYWORDS

Superficial cervical plexus anatomy, loco-regional anesthesia, peripheral osteoma, superficial cervical plexus nerve block, general anesthesia.

INTRODUCTION

Pain management is an essential and critical component in maxillofacial surgery. Routine local anesthetic (LA) nerve blocks provide adequate anesthesia in oral and perioral region for office-based surgeries. Certain procedures like submandibular and cervical lesions, peri mandibular space infections and fractures of the mandibular angle region require dissection in deeper planes¹. These procedures demand additional anesthesia and analgesia beyond the effects of regular nerve blocks. Regional nerve blocks in cervical region can be used as an addition to conventional nerve blocks when these procedures are being performed.

The superficial cervical plexus nerve block (SCPNB) is easy to perform, simple technique, and used as a substitute to general anesthesia (GA) in selective cases². Nevertheless, GA has its down sides like morbidity and mortality, a number of highly skilled personnel required and high-cost of the equipments which leads to increased economic cost. Whereas, regional anesthesia (RA) has a number of advantages like decreased blood loss due to local vasoconstrictors, lower catecholamine release (Stress free anesthesia) and minimal morbidity rates with proper technique and dosages of the LA solution^{2,3}. Cervical plexus (CP) block was first performed in 1884 by Halstead. Posterior route technique was reported in Germany by Kappis^{1,3}. The SCPNB technique is used on regular basis in head and neck surgeries like mastoid- tympanic surgeries, parathyroidectomy with minimal access, thyroid surgeries, dissection of lymph nodes and endarterectomy of carotid arteries etc⁴. With the literature backup on RA, we performed an enbloc excision of an osteoma from right mandibular angle region and this paper is aimed at presenting the same.

CASE PRESENTATION

A 13-year-old female patient reported to the unit of Oral & Maxillofacial Surgery with complaint of swelling and pain in the right lower jaw for 1 year. On examination, a circumscribed bony hard swelling measuring approximately 1cm x 1 cm was present in right angle of mandible which was tender on palpation (Figure 1a).

On orthopantomogram, a well circumscribed radiopacity was evident in right mandibular angle of mandible at inferior border (Figure 1b). A provisional diagnosis of osteoma was made and planned for enbloc excision. The patient was given option for surgery under GA or RA, however, the patient opted for RA. Enbloc excision was done under SPCNB and patient's experience post-surgery was uneventful. As the patient was hemodynamically stable, she was discharged on the same day.



Fig 1a: Bony hard swelling

Fig 1b: Circumscribed radiopacity

Clinical Anatomy of Superficial Cervical Plexus (SCP)

SCP is structured by the first four spinal nerves in cervical region (C1-4) situated on the upper cervical vertebra in the anterior region. It lies on scalenus medius muscle, the levator anguli scapulae muscle and sternocleidomastoid (SCM) covers it⁵. The CP is formed by ventral rami of C2 through C4. C1 root is not a part of SCP, hence it is not blocked in this technique. The deep structures of neck are supplied by deep branches of CP which also innervate the muscles of diaphragm (phrenic nerve) and anterior neck. The four branches of SCP arise from the posterior border of SCM and carry sensory innervations from superficial structures cervico-facial region including shoulders (Figure 2a).

Areas of neck supplied by four cutaneous branches of SCP

- 1) *Lesser occipital nerve (C2)*: Ascends from posterior border of SCM and supplies area behind the ear.
- 2) *Great auricular nerve (C2 – C3)*: Sensory innervation from skin over the parotid gland, angle of the mandible and posteriorly to the surface of the ear.
- 3) *Transverse cervical or anterior cutaneous nerve (C2-C3)*: Sensory innervation from lower border mandible to the sternum and posteriorly till angle of mandible.
- 4) *Supraclavicular nerve (C3-C4)*: Innervation from Clavicle to the second rib and laterally over the deltoid area. Branches of supraclavicular nerve also supply the surface of the trapezius and acromion.

All these cutaneous branches are blocked when a SCPNB is administered.

Technique of SCPNB

With the patient in supine position, head turned opposite to the side to

be operated landmarks points were marked on the neck under sterile conditions. Mastoid process (Points A) and SCM muscle (Point B) were marked and joined along the posterior border of SCM. Third point (Point C) was marked at midway between A & B (Figure 2b). SCPNB requisites all branches of the plexus to be soaked in LA solution. It thus depends on the quantity of LA to gain clinically productive anesthesia⁵. A 22-gauge, 4-5 cm, short beveled end needle was inserted along posterior border of SCM at point C and 5 - 10 ml of LA (2% lidocaine, 1:200,000 adrenaline) was injected cephalo-caudally (Around 1 - 2 cm) in a fan shaped motion. Objective symptoms were confirmed after 10 minutes and surgical procedure was carried out. If required, additional long buccal and inferior nerve block can be administered.



Fig 3a: Exposed tumour

Fig 3b: Closure. Inside figure showing excised tumour in toto

In the present case, right submandibular incision was made in the transverse neck crease, subplatysmal flap was raised, marginal mandibular nerve was identified and preserved. Further dissection was done, pterygo-masseteric sling was incised and inferior border of mandible was approached. Masseter muscle was reflected and tumour was exposed (Figure 3a). Enbloc excision, peripheral osteotomy were done, hemostasis was achieved and closure was done in layers (Figure 3b). Specimen was sent for histopathological examination and confirmed as osteoma of mandible. Throughout the procedure vitals were monitored and found to be stable.

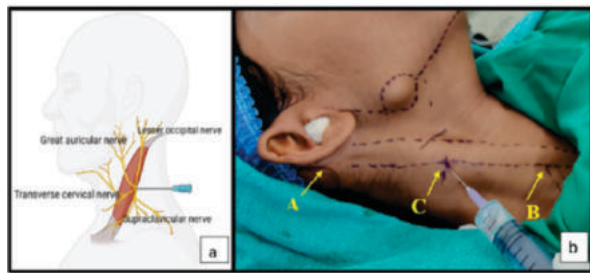


Fig 2: (a) Anatomical Location of SCP [2] (b) Technique of SCPNB

DISCUSSION

SCPNB is routinely performed for surgeries in the head and neck region with deep cervical nerve block if required. The SCPNB is described conventionally as subcutaneous injection targeting at origin of the four branches of CP along the posterior border of SCM at the midway. The SCPNB can be performed with or without an ultrasound guide². In the present study, conventional technique was used without ultrasound guide. Though the SCPNB seems technique friendly with benefits over GA, it carries its own set of risks like weakness of trapezius and SCM when spinal accessory nerve is blocked along with SCPNB. Deep cervical plexus may be blocked if improper landmarks and technique are used, which can lead to serious complications like transient Horner's syndrome, hoarseness from recurrent laryngeal nerve paralysis and phrenic nerve paralysis⁸. Systemic toxicity can also occur if LA solution is injected into internal or external jugular veins and vertebral artery.

A study by Gupta AK et al. on SCPNB in drainage of Ludwig's angina, concluded that SCPNB permitted the surgical decompression in their cases with limited infrastructure and resources in remote location hospital, so it could be a viable option where GA facilities are not available⁹. Kende P et al. also studied the role of SCPNB and concluded that the SCPNB is an alternative and safe technique for patients undergoing surgery for mandible fractures and peri-mandibular space infections, with clear advantages over local infiltration⁴. Saripalli RRR et al. operated a non-union of mandibular angle fracture successfully under SCPNB without any complications⁷. Reduced manpower, minimal infrastructure, shorter duration of the procedures, early recovery and reduced cost of surgery are the benefits of SCPNB³. With

the current literature support, office based locoregional anesthesia can be safely practiced in maxillofacial surgery.

CONCLUSION

The SCPNB can be routinely used in selective cases of maxillofacial and cervical region. A thorough knowledge of regional anatomy of cervical plexus and proper selection of cases is paramount. Since this technique has benefits over GA, it should be considered if feasible, when surgery is being planned in peri-mandibular region and anterior neck. Also, this technique requires minimal manpower and infrastructure, can be safely performed in day care set up with vitals monitoring.

REFERENCES

- Hakim TA, Shah AA, Teli Z, Farooq S, Kosar S, Younis M. The Safety and Effectiveness of Superficial Cervical Plexus Block in Oral and Maxillofacial Surgery as an Alternative to General Anesthesia in Selective Cases: A Clinical Study. *J Maxillofac Oral Surg*. 2019 Mar;18(1):23-29.
- Saripalli RRR, Kasaraneni S, Yadavilli SS, Alluri LSC. Superficial Cervical Plexus Block in Selective Cases of Oral and Maxillofacial Surgery as an Alternative to General Anesthesia: A Case Presentation. *Cureus*. 2022 Jan 18;14(1):e21371.
- Shtief M, Lesmes D, Hartman G, Ruffino S, Laster Z. The use of the superficial cervical plexus block in the drainage of submandibular and submental abscesses--an alternative for general anesthesia. *J Oral Maxillofac Surg*. 2008 Dec;66(12):2642-5.
- Kende P, Wadewale M, Mathai P, Landge J, Desai H, Nimma V. Role of Superficial Cervical Plexus Nerve Block as an Adjuvant to Local Anesthesia in the Maxillofacial Surgical Practice. *J Oral Maxillofac Surg*. 2021 Nov;79(11):2247-2256.
- Kanthan RK. The use of superficial cervical plexus block in oral and maxillofacial surgical practice as an alternative to general anesthesia in selective cases. *Ann Maxillofac Surg*. 2016 Jan-Jun;6(1):4-8.
- Pandit JJ, Bree S, Dillon P, Elcock D, McLaren ID, Crider B. A comparison of superficial versus combined (superficial and deep) cervical plexus block for carotid endarterectomy: a prospective, randomized study. *Anesth Analg*. 2000 Oct;91(4):781-6.
- Dieudonne N, Gomola A, Bonnichon P, Ozier YM. Prevention of postoperative pain after thyroid surgery: a double-blind randomized study of bilateral superficial cervical plexus blocks. *Anesth Analg*. 2001 Jun;92(6):1538-42.
- Suresh S, Templeton L. Superficial cervical plexus block for vocal cord surgery in an awake pediatric patient. *Anesth Analg*. 2004 Jun;98(6):1656-1657.
- Gupta AK, Dhulkhed VK, Rudagi BM, Gupta A. Drainage of Ludwig's Angina under superficial cervical plexus block in pediatric patient. *Anesthesia Pediatrica e Neonatale*. 2009 Dec 1;7(3).