DOI: https://doi.org/10.2298/SARH230218083I
UDC: 617-089.5

CASE REPORT / ПРИКАЗ БОЛЕСНИКА

Cervical plexus block – safe anesthesia for the patients with massive mediastinal lymphadenopathy

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SUMMARY

Introduction General anesthesia is frequently employed in neck surgery procedures. However, in patients at high risk for general anesthesia, regional anesthesia options, such as the superficial cervical plexus block, warrant careful consideration. Patients with mediastinal lymph node enlargement face an elevated risk of airway obstruction and hemodynamic mediastinal instability during anesthesia induction. In selected neck surgeries, including thyroglossal cyst excision, thyroglossal fistula repair, bronchial cyst removal, thyroidectomy, and lymph node excision, the superficial cervical plexus block presents a viable and secure alternative to general anesthesia.

Case report This report details the case of a patient with mediastinal lymphadenopathy and multiple brain metastases who underwent cervical lymph node excision. Given the patient's severe comorbidities, pronounced risk of complete distal airway obstruction, hemodynamic instability, and the potential for compression effects from mediastinal mass, a superficial cervical block was administered. This block facilitated effective perioperative analgesia without inducing respiratory or cardiovascular instability.

Conclusion The superficial cervical plexus block emerges as a prudent alternative to general anesthesia in high-risk patients requiring cervical lymph node excision procedures. Its utilization should be considered in such cases to enhance patient safety and perioperative management.

Keywords: cervical plexus; excision lymph node; airway obstruction; anesthesia; analgesia

INTRODUCTION

General anesthesia is the prevailing choice for neck surgeries; however, in patients with elevated anesthesia-related risks, regional anesthesia options such as the superficial cervical plexus block (SCPB) emerge as a potentially safer alternative [1]. Notably, patients presenting with mediastinal lymph node enlargement face an increased susceptibility to airway obstruction, and hemodynamic instability during the induction of general anesthesia. This susceptibility arises from the potential compressive effect of mediastinal masses on structures distal to the tracheal tube tip, including the inferior and superior vena cava, ascending and descending aorta [2]. For specific neck and maxillofacial surgical procedures (e.g., thyroglossal cyst excision, thyroglossal fistula repair, branchial cyst removal, thyroidectomy, lymph node excision, lipoma removal, mandibular fracture repair), SCPB represents a viable and safe alternative to conventional general anesthesia [3]. The SCPB encompasses the sensory innervation of the anterolateral neck, originating from the anterior primary rami of the second to fourth cervical nerves [2, 3].

CASE REPORT

A 67-year-old male with bilateral neck lymphadenopathy was admitted to the Clinic for Ear, Nose, Throat, and Maxillofacial Surgery at the University Clinical Centre of Serbia for the excision of a left cervical lymph node. The patient had noticed a visible neck mass on the left side four months prior, and had been experiencing hoarseness. His medical history only revealed hypertension. Physical examination upon admission revealed normal ear, nose, and throat findings, along with the palpable, a 30 mm-sized neck tumor in the left IIa region. A computed tomography (CT) of the brain revealed multiple metastases of unknown primary origin. Neck and chest CT scans revealed a left-sided neck lymph node measuring 25 × 16 × 25 mm, a right-sided neck lymph node measuring 12 × 6 mm, and an 86 × 77 mm conglomerate of mediastinal lymph nodes situated in front of the trachea, among the ascending and descending aorta, and the inferior vena cava (Figure 1). Other routine investigations yielded normal results. The patient received midazolam as premedication. A landmark based SCPB was performed for the patient undergoing lymph node excision in the upper third of the left neck area. A 20 ml solution of local anesthetics (0.5% bupivacaine 10 ml + 2% lidocaine 6 ml + 0.9% NaCl 4 ml) was employed. The procedure involved placing a 22G needle subcutaneously at the mid-portion of the posterior border of the sternocleidomastoid muscle, while targeting the origin of all superficial branches of the cervical plexus.

Received • Примљено: February 18, 2023
Revised • Ревизија: September 3, 2023
Accepted • Прихваћено: September 6, 2023
Online first: September 8, 2023

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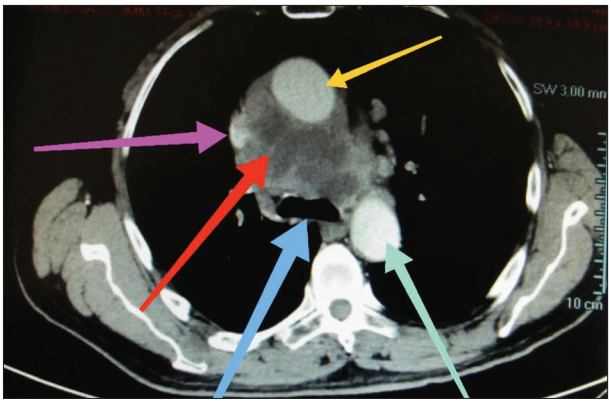

Figure 1. Computed tomography scan of mediastinal lymphadenopathy at the level of tracheal carina; pink arrow – inferior vena cava; red arrow – lymph node conglomerate; blue arrow – tracheal carina; green arrow – descending aorta; yellow arrow – ascending aorta

Subsequently, 10 ml of the local anesthetic solution was injected subcutaneously at this point, following aspiration. The needle's depth of insertion was maintained at 0.5 cm to minimize the risk of deeper block or inadvertent injection.

Given the lymph node's positioning between the innervation areas of the great auricular nerve and transverse cervical nerve, the needle was redirected towards these nerves, and each was blocked by the administration of 5 ml of local anesthetic solution. The block's efficacy was assessed after a 10/minute interval, with the patient receiving oxygen via a simple face mask. Throughout the intraoperative period, monitoring included blood pressure, heart rate, echocardiography, and pulse oximetry. The surgical procedure was finished after 25 minutes, with the perioperative period proceeding without complications such as pain, respiratory issues, or hemodynamic instability. The patient was discharged from the hospital on the second postoperative day.

This case report has received approval from the Ethics Committee of the University Clinical Centre of Serbia (Reference No: 1100/6).

DISCUSSION

Mediastinal lymph node enlargement can result from various etiologies, including neoplasms (e.g., Hodgkin's disease, non-Hodgkin lymphoma, leukemia, metastasis), granulomatous diseases (e.g., sarcoidosis, amyloidosis, Wegener's disease), or reactivity to infectious diseases (e.g., tuberculosis, fungal infections, viral and mycoplasma pneumonias) [4]. Depending on their location, mediastinal masses may lead to airway obstruction, producing symptoms such as dyspnea in cases of proximal obstruction or a non-productive cough with distal obstruction. In our patient's case, hoarseness likely resulted from the compressive effect of the mediastinal mass on the left recurrent laryngeal nerve, as part of the mass extended beneath the aortic arch, where the nerve typically courses. Severe airway obstruction can unexpectedly occur upon the induction of general anesthesia in patients, even in the absence of preoperative symptoms, emphasizing the need for a careful review of chest radiographs and CT scans for signs of asymptomatic airway obstruction. Typically, the point of obstruction is distal to the tracheal tube tip. Furthermore, the loss of spontaneous ventilation can lead to complete airway obstruction. [5]. Previous literature has documented severe respiratory complications during general anesthesia in children with mediastinal masses [6]. While our patient did not exhibit clinical signs of airway obstruction, the position of the mass posed a significant risk of distal airway obstruction during anesthesia induction and a loss of spontaneous breathing. Although an option would have been to opt for general anesthesia while maintaining spontaneous breathing, this approach could have led to coughing and increased intracranial pressure. Given the presence of diffuse brain metastases, such outcomes were strongly discouraged.

Cervical plexus block (CPB) is widely utilized in neck vascular surgery, but its application in non-vascular neck surgery has been increasing. Regional anesthesia techniques, such as CPB, offer numerous advantages over general anesthesia for surgeries involving the neck region. CPB does not compromise the airway, breathing, or hemodynamics. The contemporary popularity of CPB has surged as it offers opioid-free anesthesia, sparing patients from the various side effects associated with opioid usage. This concept aligns with the principles of opioid-free analgesia, rendering CPB a favored method of anesthesia, particularly in thyroid surgery [7, 8]. In case of surgery of posterior neck region, general anesthesia is the method of choice, because CPB encompasses the sensory innervation of the anterolateral neck. CPB can be performed at superficial, intermediate, or deep levels. Deep CPB, described as a paravertebral block targeting the C2–C4 spinal nerves, not only affects superficial branches but also deep branches of the cervical plexus, resulting in neck muscle relaxation. Local anesthetics are injected into the space between the paravertebral fascia and the cervical transverse process. Superficial CPB, on the other hand, is conventionally characterized as a subcutaneous injection technique administered at the mid-portion of the posterior border of the sternocleidomastoid muscle, targeting the superficial branches of the cervical plexus. Both ultrasound-guided and landmark-based techniques are available for performing CPB. In the case of SCPB, there is currently insufficient clinical data to definitively establish the superiority of ultrasound-guided techniques over landmark-based methods. Hence, we elected to employ a landmark-based approach, which is readily accessible and does not necessitate specialized equipment such as an ultrasound machine. Intermediate CPB, in which the needle pierces the investing fascia of the neck, deep to the subcutaneous layer but superficial to the prevertebral fascia, represents another variation [9].

The literature indicates that SCPB yields results comparable to combined cervical block but with fewer complications [10]. In a study conducted by Mukhopadhyay et al. [1], which involved bilateral SCPB, no major complications (e.g., central nervous system toxicity, spinal anesthesia) were observed, with only minor hematomas reported. Severe complications, such as phrenic nerve blockade, are uncommon following superficial block but are more frequently

encountered with deep CPB. SCPB serves as a valuable anesthesia method for patients with severe comorbidities or specific conditions, including asthma, chronic obstructive pulmonary disease, coronary artery disease, diabetes mellitus, difficult airway, urgent tracheostomy, active COVID-19 infection, hypertension, previous cerebral embolism, all of which are considered high-risk factors for general anesthesia. In such patients, SCPB offers a simple and secure alternative to general anesthesia, with established efficacy and safety, especially in high-risk scenarios [11–17]. Our patient experienced no pain during or after the procedure, aligning with data from the literature indicating effective perioperative analgesia in neck surgery achieved through SCPB [13, 18, 19]. A recent study by Patel et al. [20] found that SCPB, in conjunction with general anesthesia, resulted in reduced intraoperative fentanyl requirements and postoperative paracetamol use compared to general anesthesia alone in various head and neck surgeries. These findings corroborate the efficacy of SCPB in providing effective analgesia in head and neck surgery [20].

To conclude, we presented a case of SCPB that provided effective perioperative analgesia without inducing respiratory or cardiovascular instability in a patient with diffuse brain metastases and significant mediastinal lymphadenopathy undergoing neck lymph node excision. SCPB should be considered as a safe alternative to general anesthesia for high-risk patients requiring cervical lymph node excision.

Conflict of interest: None declared.

REFERENCES

1. Mukhopadhyay S, Niyogi M, Dutta M, Ray R, Gayen GC, Mukherjee M, et al. Bilateral superficial cervical plexus block with or without low-dose intravenous ketamine analgesia: effective, simple, safe, and cheap alternative to conventional general anesthesia for selected neck surgeries. Local Reg Anesth. 2012;5:1–7. [DOI: 10.2147/LRA.S28360] [PMID: 22915895]
2. Standing S, Borley NR, Collins P, et al, editors. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 40th ed. London, UK: Churchill Livingstone Elsevier; 2008.
3. Saripalli RRK, 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;14(1):e21371. [DOI: 10.7759/cureus.21371] [PMID: 35198283]
4. Ivošević T, Trivić A, Kalezić N. Perioperativno lečenje bolesnika u otorinolaringologiji i maksilofacijlanoj hirurgiji. U: Kalezić N. (ur): Perioperativna medicina 2. Prvo izdanje, udžbenik. Beograd: Akademija medicinskih nauka Srpskog lekarskog društva; 2021. str 891–927.
5. Morgan GE, Mikhail MS, Murray MJ. Anesthesia for thoracic surgery. In: Morgan GE, Mikhail MS, Murray MJ, editors. Clinical Anesthesiology. 4th edition. United States of America: McGraw-Hill Companies; 2006. p. 585–614.
6. Unceta-Barrenechea Orúe B, Garrán Sabando B, Reguera Fernández MA, Navajas Gutiérrez A, Pérez Delgado J. Tumores mediastínicos en niños: a propósito de 2 casos [Mediastinal tumors in children: apropos of 2 cases]. Rev Esp Anestesiol Reanim. 1990;37(3):168–71. [Article in Spanish] [PMID: 2389079]
7. Jain N, Rathee R, Jain K, Garg DK, Patodi V, Khare A. Post-operative analgesic efficacy of 0.25% ropivacaine with dexmedetomidine versus dexamethasone as an adjuvant in bilateral superficial cervical plexus block for thyroidectomy under general anaesthesia - A comparative randomized clinical study. Indian J Anaesth. 2023;67(3):269–76. [DOI: 10.4103/ija.ija_272_22] [PMID: 37250524]
8. Jain N, Mathur PR, Lakhina K, Patodi V, Jain K, Garg D. A comparison of efficacy of parenteral and perineural dexmedetomidine with 0.25% ropivacaine for post-thyroidectomy analgesia using bilateral superficial cervical plexus block. J Anaesthesiol Clin Pharmacol. 2023;39(1):98–105. [DOI: 10.4103/joacp.joacp_177_21] [PMID: 37250248]
9. Saranteas T, Kostroglou A, Efstathiou G, Giannoulis D, Moschovaki N, Mavrogenis AF, et al. Peripheral nerve blocks in the cervical region: from anatomy to ultrasound-guided techniques. Dentomaxillofac Radiol. 2020;49(8):20190400. [DOI: 10.1259/dmfr.20190400] [PMID: 32176537]
10. Ivanec Z, Mazul-Sunkol B, Lovricević I, Sonicki Z, Gvozdenović A, Klican K, et al. Superficial versus combined (deep and superficial) cervical plexus block for carotid endarterectomy. Acta Clin Croat. 2008;47(2):81–6. [PMID: 18949902]
11. Roy R, Patnaik S, Padhy R, Sarawgi G. Superficial and intermediate cervical plexus block for neck dissection in patients with high risk of general anaesthesia. J Anaesth Crit Care Open Access. 2015;3(2):00093. [DOI: 10.15406/jaccoa.2015.03.00093]
12. Koshy RC, Thankamony H. Superficial cervical plexus block for urgent tracheostomy. Indian J Anaesth. 2019;63(1):65–6. [DOI: 10.4103/ija.IJA_559_18] [PMID: 30745618]
13. Woldegerima YB, Hailekiros AG, Fitiwi GL. The analgesic efficacy of bilateral superficial cervical plexus block for thyroid surgery under general anesthesia: a prospective cohort study. BMC Res Notes. 2020;13(1):42. [DOI: 10.1186/s13104-020-4907-7] [PMID: 31992341]
14. Abi Lutfallah A, Jabbour K, Gergess A, Hayeck G, Matar N, Madi-Jebara S. Bloqueio do plexo cervical como técnica anestésica alternativa para tireoplastia tipo I: relato de caso [Cervical plexus block as an alternative anesthetic approach for type I thyroplasty: a case report]. Braz J Anesthesiol. 2020;70(5):556–60. [DOI: 10.1016/j.bjan.2020.08.002] [PMID: 33012560]
15. Majumdar U, Mitra A. A Prospective Observational Study of the Efficacy of Combined Interscalene Block and Superficial Cervical Plexus Block using Peripheral Nerve Stimulator and Landmark-Based Technique, as a Sole Anesthetic for Surgeries on the Clavicle in the COVID-19 Pandemic. Anesth Essays Res. 2022;16(1):149–53. [DOI: 10.4103/aer.aer_80_22] [PMID: 36249133]
16. Peksöz U, Öner F, Ahıskalıoğlu A. Superficial Cervical Plexus Block for Retroauricular Mass Excision in a Patient with High Risk of General Anaesthesia: A Case Report. Turk J Anaesthesiol Reanim. 2022;50(2):148–50. [DOI: 10.5152/TJAR.2021.21070] [PMID: 35544256]
17. 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;18(1):23–9. [DOI: 10.1007/s12663-017-1029-4] [PMID: 30728687]
18. Syal K, Chandel A, Goyal A, Sharma A. Comparison of ultrasound-guided intermediate vs subcutaneous cervical plexus block for postoperative analgesia in patients undergoing total thyroidectomy: A randomised double-blind trial. Indian J Anaesth. 2020;64(1):37–42. [DOI: 10.4103/ija.IJA_483_19] [PMID: 32001907]
19. Karakış A, Tapar H, Özsoy Z, Suren M, Dogru S, Karaman T, et al. Eficácia analgésica perioperatória do bloqueio bilateral do plexo cervical superficial em pacientes submetidos à tireoidectomia: estudo clínico randomizado [Perioperative analgesic efficacy of bilateral superficial cervical plexus block in patients undergoing thyroidectomy: a randomized controlled trial]. Braz J Anesthesiol. 2019;69(5):455–60. [DOI: 10.1016/j.bjan.2019.06.013] [PMID: 31627901]
20. Patel H, Shah N, Syed A, Shah P, Macwan S. Evaluating the Analgesic Efficacy of Superficial Cervical Plexus Block for Head and Neck Surgeries: A Comparative Randomized Control Study. Cureus. 2023;15(5):e39303. [DOI: 10.7759/cureus.39303] [PMID: 37346207]

Блок цервикалног плексуса – безбедна анестезија за болеснике са масивном медијастиналном лимфаденопатијом

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САЖЕТАК

Увод Општа анестезија се често користи у операцијама на врату. Међутим, код болесника са високим ризиком за општу анестезију, могућности регионалне анестезије, као што је блок површинског цервикалног плексуса, захтевају пажљиво разматрање. Болесници са увећањем медијастиналних лимфних чворова суочавају се са повећаним ризиком од опструкције дисајних путева и хемодинамске нестабилности током индукције у анестезију. У одабраним операцијама на врату, укључујући ексцизију тироглосалне цисте и фистуле, уклањање бронхијалне цисте, тироидектомију и ексцизију лимфних чворова, површински блок цервикалног плексуса представља одрживу и сигурну алтернативу општој анестезији.

Приказ болесника Овај приказ описује случај болесника са медијастиналном лимфаденопатијом и вишеструким метастазама на мозгу који је подвргнут ексцизији цервикалних лимфних чворова. С обзиром на тешке коморбидитете болесника, изражен ризик од потпуне опструкције дисталних дисајних путева, хемодинамску нестабилност и могућност компресивних ефеката медијастиналне масе, примењен је површински цервикални блок. Овај блок је омогућио ефикасну периоперативну аналгезију без изазивања респираторне или кардиоваскуларне нестабилности.

Закључак Блок површинског цервикалног плексуса намеће се као опрезна алтернатива општој анестезији код болесника са високим ризиком који захтевају ексцизију цервикалних лимфних чворова. У таквим случајевима треба размотрити његову употребу како би се побољшала безбедност болесника и периоперативног третмана.

Кључне речи: цервикални плексус; ексцизија лимфног чвора; опструкција дисајног пута; анестезија; аналгезија