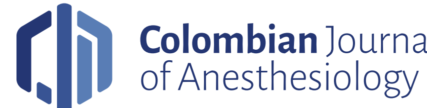

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CASE REPORT
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Use of clavipectoral fascia plane block for clavicle fracture repair - Case series

Uso del bloqueo del plano de la fascia clavipectoral en el tratamiento de fracturas de clavícula - Serie de casos

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Abstract

The clavipectoral fascia block is a novel regional technique used for the surgical repair of the midshaft clavicle fracture. The effectiveness of this approach is thought to be based on the spreading the local anaesthetic through the clavipectoral fascia. This case series report discusses 8 patients with midshaft or distal clavicular fractures who underwent a clavipectoral fascia block combined with a superficial cervical plexus block. Only one patient reported pain in the recovery room, three patients presented mild pain during the first 24 hours and only one required rescue analgesia with a weak opioid. No incidents or adverse events were documented during the first 24 hours and no motor blockage of the arm was reported. The clavipectoral fascia block is a safe, effective, and straightforward regional technique for analgesic management in clavicle repair. However, further research is needed to assess its efficacy.

Key words: Regional anaesthesia; Local anaesthetics; Clavicle; Bone fractures; Postoperative pain.

Resumen

El bloqueo del plano de la fascia clavipectoral es una novedosa técnica utilizada para la reparación quirúrgica de la fractura del tercio medio de la clavícula. Se cree que la efectividad de este abordaje se basa en la propagación del anestésico local a través de la fascia clavipectoral. El pre-sente reporte de serie de casos hace referencia a 8 pacientes con fracturas de la clavícula medial o distal, a quienes se les realizó un bloqueo de la fascia clavipectoral combinado con un bloqueo del plexo cervical superficial. Solamente un paciente reportó dolor en la sala de recuperación, tres pacientes presentaron dolor leve durante las primeras 24 horas y solo uno requirió analgesia de rescate con un opioide débil. No se documenta-ron incidentes ni eventos adversos durante las primeras 24 horas y no se reportó bloqueo motor del brazo. El bloqueo de la fascia clavipectoral es una técnica regional segura, efectiva y sencilla para el manejo analgésico durante la reparación de la clavícula. Sin embargo, se necesita más investigación para evaluar su eficacia.

Palabras clave: Anestesia regional; Anestésicos locales; Clavícula; Fracturas óseas; Dolor postoperatorio.

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INTRODUCTION

Currently, a surgical approach is often preferred for the treatment of clavicle fractures. The primary indications are fracture displacement, a third component, or neurovascular involvement for surgical treatment.(1) Traditionally, anaesthetic management has favoured the use of general anaesthesia. Nevertheless, over the last few years, new regional techniques have been developed to improve postoperative pain control, opioid consumption, patient satisfaction and decrease hospital stay.

The innervation of the clavicle is complex and remains a controversial topic. Multiple nerves are involved in the sensory innervation of the clavicle, making it difficult to find an ideal option for postsurgical pain management. Although the interscalene brachial plexus block (IBPB) alone or in conjunction with a cervical superficial plexus block (CSPB) is the preferred technique, it is far from ideal due to the frequently associated phrenic nerve block.(2)

Recently, Valdez-Vichez(3) described a new anaesthetic and analgesic approach for the management of the midshaft clavicle fractures: the clavipectoral fascia block (CPB). This technique involves spreading the local anaesthetic through the clavipectoral fascia (CPF) blocking the nerves that penetrate that structure. Some authors recommend complementing the CPB with a CSPB as the supraclavicular nerve from the superficial cervical plexus is responsible for the sensory innervation of the skin covering the shoulder, upper portion of the chest and clavicle.(4) Although it is a safe and relatively easy regional approach, there are few publications in the literature about its effectiveness in distal clavicular fractures. This paper presents a case series of patients who received CPB with CSPB for midshaft and distal clavicle fracture repair with a discussion about the surgical and anaesthetic outcomes.

CASE SERIES REPORT

This is a case series of 8 patients who underwent surgical fixation for midshaft and lateral clavicle fractures. Informed consent for publication was obtained from all patients included in the study.

Both regional techniques were performed in the preanaesthesia room with the patient in supine position and the head turned to the contralateral side. A low-frequency linear probe (2 – 5 MHz; SonoSite SII; SonoSite INC., Madrid, Spain) and a 22-gauge 50 mm echogenic needle (Echoplex+; Vygon; Paterna; Spain) were used.

For the CPB, the probe was positioned perpendicular to the surface of the clavicle in the parasagittal plane. Initially, a sweep of the entire clavicle was performed to locate the fracture site. The clavicle is visualized as an hyperechogenic line with posterior shadowing. The pectoralis major can be seen caudally. After identifying the healthy periosteum adjacent to the fracture, the needle was advanced in-plane in a caudal to cephalic direction into the space between the CPF and the periosteum until contact was made (Figure 1A). Afterwards, the CSPB was performed positioning the probe transversely on the neck of the patient at the level of the cricoid cartilage. A transverse approach was used to identify the posterior border of the sternocleidomastoid muscle (SCM). In this position, the superficial cervical plexus is visualized anterior and medial to the paravertebral fascia. The needle was

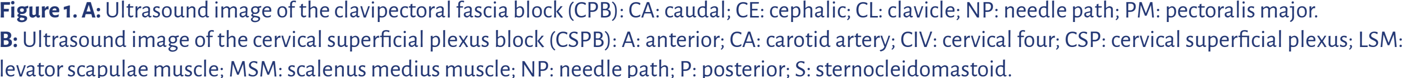
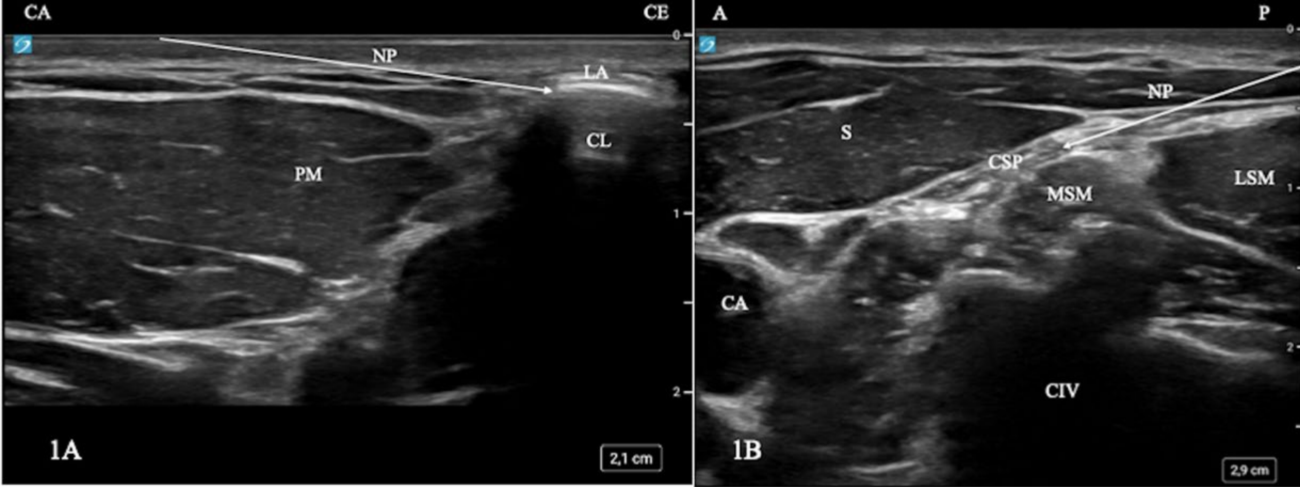


Figure 1. A: Ultrasound image of the clavipectoral fascia block (CPB): CA: caudal; CE: cephalic; CL: clavicle; NP: needle path; PM: pectoralis major.
B: Ultrasound image of the cervical superficial plexus block (CSPB): A: anterior; CA: carotid artery; CIV: cervical four; CSP: cervical superficial plexus; LSM: levator scapulae muscle; MSM: scalenus medius muscle; NP: needle path; P: posterior; S: sternocleidomastoid.



Source: Authors.

advanced in-plane in a lateral to medial direction through the fascia posterior to SCM (Figure 1B). A local anaesthetic solution of 0.2% ropivacaine and 1% mepivacaine was used. With a previous negative aspiration, a total of 15 mL of the anaesthetic were injected medial and lateral to the fracture focus for the CPB and 5 mL for the CPSB. If the fracture site was distal, a single puncture was performed medial to the site.

After admitting the patient to the theatre, patient monitoring was started under non-invasive blood pressure, pulse oximetry and a 5-leads electrocardiogram. Afterwards, all patients underwent balanced general anaesthesia with laryngeal mask. Maintenance of anaesthesia was achieved with an oxygen/air mixture and sevoflorane at 0.8 - 1 MAC.

During surgery, the patients received conventional intravenous (iv) analgesia (1 g of paracetamol and 50 mg of dexketoprofen). If during recovery the patients experienced pain >3 on the Numerical Pain Rating Scale (NRS), a rescue dose of tramadol was administered. If the pain persisted, a second rescue dose of 2 mg of morphine was used. Pain scores using the Numerical Rate Scale (NRS) during their stay in the recovery room and for the first 12 h and 24 h after surgery were recorded. The need for first analgesic rescue with iv tramadol or second rescue with morphine was also recorded. All of the demographic data, the characteristics of the surgery and the clinical results of the patients are shown in Table 1. No upper limb motor or sensory block was observed in any of the cases. No incidents or adverse events were documented during the first 24 hours that could be associated with the technique. Only one patient experienced pain according to the NRS pain scale in the recovery room. Moreover, most of the patients experienced only mild pain and only 3 patients reported mild pain according to the NRS scale at 12 h and 24 h respectively. It is even more significant that only one patient required a single dose of tramadol as rescue analgesia during the first 24 hours.

DISCUSSION

These results support the idea that CBP with CSPB are ideal regional techniques in the analgesic management of surgical clavicle midshaft and distal fractures. A review of the literature identified several publications demonstrating the potential efficacy of this nerve block. Most are small case series, similar to the one herein discussed and report comparable results.(5-6) However, the large majority of these publications focus on the effect of this technique on midshaft clavicle surgical repair. In our case, most patients had a distal clavicle fracture, demonstrating its efficacy in this subtype as well.

Currently there are some randomized control trials comparing the efficacy of CPB and IBPB in combination with CPSB.(7-8) Although only one of these trials showed

Table 1. Demographics, surgical characteristics and clinical results of the patients.

Variables	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
Age	25	21	50	28	19	28	34	28
Gender	F	M	M	M	F	M	M	M
ASA	II	I	II	II	I	I	I	I
Surgery	Midshaft	Distal	Distal	Midshaft	Distal	Distal	Distal	Midshaft
NRS Scores								
In PACU	0	0	0	0	0	0	4	0
12 h after surgery	2	1	2	0	1	0	3	2
24 h after surgery	1	0	0	0	0	0	2	1
Analgesia rescue	No	No	No	No	No	No	Once	No

ASA: American Society of Anesthesiologists; **F:** female; **M:** Male.
Source: Authors.

an analgesic improvement together with a longer duration of the block in the CPB group, both concluded that this technique prevented motor and hemidiaphragmatic paresis of the IBPB blockade. Furthermore, there were no incidents or adverse events reported during the administration of the clavipectoral fascia block, concluding that it is a safe and straightforward regional approach.

The clavicle innervation is complex and controversial and we are gradually learning more and more about it. For this reason, there is some controversy about the analgesic mechanism of this regional technique. It is believed that the CPF, which supports the vascular and nervous components of the axillary space, encases the clavicle. This anatomical distribution facilitates the spread of the local anaesthetic around the periosteum. However, this theory contradicts classical published anatomical studies. Those studies describe the fascia as a supporting structure anchored to the periosteum of bones rather than embracing them. This anatomical distribution would limit rather than facilitate the spread of local anaesthetic. Two recently published studies in cadaveric models showed that the distribution of local anaesthetic in the CPB is different from what was originally imagined.(9-10) Methylene blue was injected into cadavers on intact and fractured clavicles in the middle third. Both studies identified staining of the superficial muscle planes, the supraclavicular branches of the CSP and the anterosuperior portion of the clavicular periosteum. However, no detectable marking was observed in the deep muscle planes or in the posteroinferior portion of the clavicle.

In conclusion, we can assure that this novel technique is a safe and straightforward regional block that effectively controls pain during midshaft and distal clavicle surgery. Moreover, this approach avoids the side effects associated with other techniques, such as interscalene brachial plexus blocks that may lead to motor deficits or hemidiaphragmatic paralysis — which are poorly tolerated by patients with pulmonary conditions. However, further research is needed to assess the efficacy of the clavipectoral fascia block.

ETHICAL DISCLOSURES

Confidentiality of data

The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent

The authors declare that no patient data are disclosed in this article.

The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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Authors' contributions

CER: collected the data, contributed data or analysis tools, wrote the paper.
NGM and PGE: collected the data, contributed data or analysis tools.

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Conflicts of interest

None declared by the authors.

Presentations

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REFERENCES

1. Kihlström C, Möller M, Lönn K, Wolf O. Clavicle fractures: Epidemiology, classification and treatment of 2422 fractures in the Swedish Fracture Register; an observational study. BMC Musculoskelet Disord. 2017;18:82. http://.www.doi.org/10.1186/s12891-017-1444-1.
2. Olofsson M, Taffé P, Kirkham KR, Vauclair F, Morin B, Albrecht E. Interscalene brachial plexus block for surgical repair of Clavicle fracture: a matched case-controlled study. BMC Anesthesiol 2020;20:91. http://.www.doi.org/10.1186/s12871-020-01005-x.
3. Valdés-Vilches L. Abstracts and highlight papers of the 36th annual European Society of regional anaesthesia & pain therapy (ESRA) Congress 2017. http://.www.doi.org/10.1097/AAP.0000000000000748
4. Moriggl B. ESRA19-0712 Clavicle innervation and implications for regional anaesthesia. Reg Anesth Pain Med. 2019(44):A63–4. http://.www.doi.org/10.1136/rapm-2019-ESRAABS2019.56
5. Labandeyra H, Furno JL, Campos JL, Roqués Escolar V, Valdés Vilches LF. Ultrasound-guided clavipectoral fascia plane block for middle third clavicular fracture: A case series. Rev Esp Anestesiol Reanim (Engl Ed). 2022;69:683–8. http://.www.doi.org/10.1016/j.redare.2021.12.002.
6. Gonçalves D, Sousa CP, Graça R, Miguelez MP, Sampaio C. Clavipectoral Fascia Plane Block Combined With Superficial Cervical Plexus Block for the Removal of Osteosynthesis Material From Clavicle Fracture. Cureus. 2023;8:15. http://.www.doi.org/10.7759/cureus.43146.
7. Natrajan P, Vaidiyanathan B, Dhanger S, Rajesh IJ. Awake clavipectoral facial plane block for clavicle surgeries: A case series. Indian J Anaesth. 2023;67:1135–7. http://.www.doi.org/10.4103/ija.ija_202_23.
8. Xu G, Su P, Cai B, Liu Y, Jiang D, He Y, et al. Ultrasound-guided superficial cervical plexus

block combined with clavipectoral fascial plane block or interscalene brachial plexus block in clavicle surgery: a single-centre, double-blind, randomized controlled trial. J Clin Monit Comput. 2023;37:985–92. http://.www.doi.org/10.1007/s10877-022-00968-1.

9. Zhuo Q, Zheng Y, Hu Z, Xiong J, Wu Y, Zheng Y, et al. Ultrasound-Guided Clavipectoral Fascial Plane Block With Intermediate Cervical Plexus Block for Midshaft Clavicular Surgery: A Prospective Randomized Controlled Trial. Anesth Analg. 2022;135:633–40. http://.www.doi.org/10.1213/ANE.0000000000005911.

10. Labandeyra H, Heredia-Carques C, Campoy JC, Váldes-Vilches LF, Prats-Galino A, Sala-Blanch X. Clavipectoral fascia plane block spread: an anatomical study. Reg Anesth Pain Med. 2024;49:368–72. http://.www.doi.org/10.1136/rapm-2023-104785.