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Case Report

Ultrasound-guided supraclavicular nerve and interscalene block for clavicle surgery in pregnancy: A case report and case-based literature review

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ABSTRACT

A 34-year-old woman at 32 weeks of gestation sustained a displaced clavicle fracture following a motor vehicle accident. To avoid the risks of general anesthesia during late pregnancy, ultrasound-guided interscalene and selective supraclavicular nerve blocks were performed with a single skin entry point. Surgery was completed uneventfully, and there was no need for additional analgesics. No maternal or fetal complications observed. This case illustrates the safety and efficacy of regional anesthesia in pregnant trauma patients and highlights the potential of targeted peripheral nerve blocks as a viable alternative to general anesthesia for upper extremity surgeries during pregnancy.

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1. Introduction

Trauma is one of the leading non-obstetric causes of maternal mortality, and the third trimester presents increased risks for both mother and fetus [1]. Although orthopedic trauma requiring surgical intervention is rare during pregnancy, clavicle fractures present a unique anesthetic challenge due to their complex innervation and the high risk associated with general anesthesia in pregnant patients.

Regional anesthesia has emerged as a safer alternative for clavicle surgery in such patients. Selective supraclavicular nerve blocks, when combined with interscalene blocks, allow for targeted analgesia while minimizing local anesthetic volume and systemic exposure [2]. An interscalene block is a regional anesthetic technique that targets the roots of the brachial plexus, typically used for shoulder and upper arm surgeries [3]. The supraclavicular nerve block, on the other hand, targets the superficial sensory branches that supply the skin overlying the clavicle and upper chest [4]. However, their use in pregnant trauma patients remains sparsely documented.

Here, we describe the successful use of a single-entry-point, ultrasound-guided interscalene and selective supraclavicular nerve block technique in a woman at 32 weeks' gestation undergoing clavicle fracture repair.

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This case was conducted with written informed patient consent for the publication of this case report and in accordance with institutional ethical guidelines.

2. Case Presentation

A 34-year-old woman at 32 weeks of gestation presented to the emergency department following a motor vehicle collision. Evaluation revealed a left distal clavicle fracture, for which surgical repair was planned by the orthopedics department (Fig. 1).

Obstetric consultation confirmed stable vital signs, a soft abdomen without guarding or rebound tenderness, and positive fetal heart tones with a reactive non-stress test. Ultrasonography showed a normal amniotic fluid index, normal placental location with no signs of abruption, and normal umbilical artery Doppler flow. No uterine contractions were observed. It was concluded that there were no obstetric contraindications for surgery. To minimize fetal exposure during surgery, the use of a lead apron was recommended. The patient had no known systemic illnesses, laboratory values were within normal limits, and her ASA physical status was evaluated as class II.

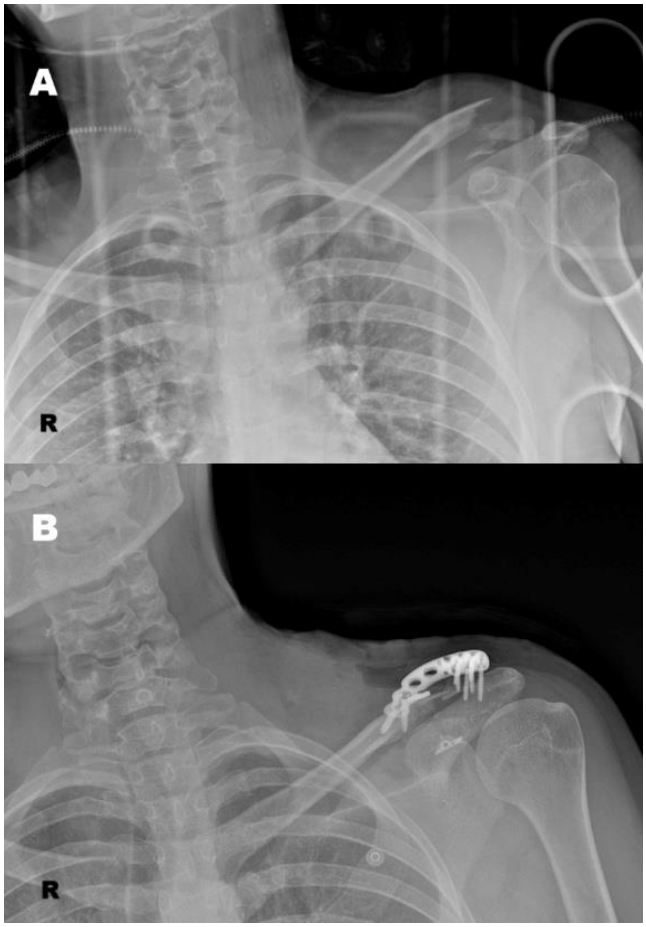

Fig. 1. (a) Preoperative anteroposterior chest X-ray demonstrating a displaced fracture of the left distal clavicle; (b) Postoperative radiograph showing internal fixation of the clavicle fracture using a precontoured locking plate.

Upon admission to the operating room, light sedation was achieved with 1 mg of intravenous midazolam. Preoperative vital signs were as follows: SpO_2 97%, blood pressure 137/88 mmHg, and heart rate 87 bpm. We decided to perform a single-entry interscalene and selective supraclavicular nerve block for our patient.

The interscalene block was performed first. With the patient in the supine position and the head turned to the contralateral side, the skin was prepared under sterile conditions. A 5–12 MHz linear ultrasound probe (L50) was placed in the transverse-oblique plane at the level of the cricoid cartilage (C6) to obtain a cross-sectional view of the brachial plexus. Ultrasound imaging revealed the hypoechoic C5, C6, and C7 nerve roots located between the anterior scalene muscle and middle scalene muscle, lateral to the carotid artery and deep to the sternocleidomastoid muscle. Prior to needle insertion, 2 mL of 2% lidocaine was infiltrated subcutaneously at the puncture site to minimize discomfort. A 22 G, 80 mm insulated nerve block needle (Stimuplex® Ultra 360®, Braun, United States) was inserted using an in-plane technique from lateral to medial, advancing through the middle scalene muscle toward the lateral-posterior aspect of the C7 root. Hydrodissection was not routinely performed; needle position was confirmed via direct sonographic visualization of perineural spread. Once the needle tip was positioned adjacent to the nerve roots, 15 mL of a local anesthetic mixture (prepared by combining 10 mL of 0.5% bupivacaine and 10 mL of 2% lidocaine in a 1:1 ratio, resulting in final concentrations of 0.25% bupivacaine and 1% lidocaine) was injected slowly with intermittent aspiration. The spread of the anesthetic was visualized in real time, confirming correct perineural deposition (Fig. 2a).

Without withdrawing the needle from the skin after the interscalene block, a selective supraclavicular nerve block was subsequently performed. To achieve this, the ultrasound probe was moved cranially to visualize the superficial fascial plane immediately beneath the posterior border of the sternocleidomastoid muscle. The supraclavicular nerve was visualized as a thin hypoechoic structure located within the superficial fascial plane between the platysma and the middle scalene muscle. Using an in-plane technique, the same needle was redirected into this plane. After confirming the correct position, 5 mL of the previously described local anesthetic solution was slowly injected. The spread of the anesthetic and its perineural distribution were observed in real time under ultrasound guidance (Fig. 2b).

Following the block, sensory blockade was assessed approximately 15 minutes after the block, using pinprick testing over C4 – T1 dermatomes, yielding a score of 1 (no pain perception). Motor block was evaluated with a Modified Bromage score of ≥1. Surgery commenced approximately 30 minutes after the block application. The surgical procedure lasted 78 minutes in total, with no intraoperative complications. No additional sedatives or analgesics were required. Vital signs were monitored every five minutes, and hemodynamic stability was maintained throughout. No complications such as Horner's syndrome, phrenic nerve paralysis, respira-

tory depression, or total spinal anesthesia were observed. After surgery, the patient was transferred to the post-anesthesia care unit, where vital signs were monitored every 10 minutes for 30 minutes. At the time of transfer to the ward, her vital signs were: VAS 0/10, SpO_2 98%, BP 124/77 mmHg, and pulse 92 bpm.

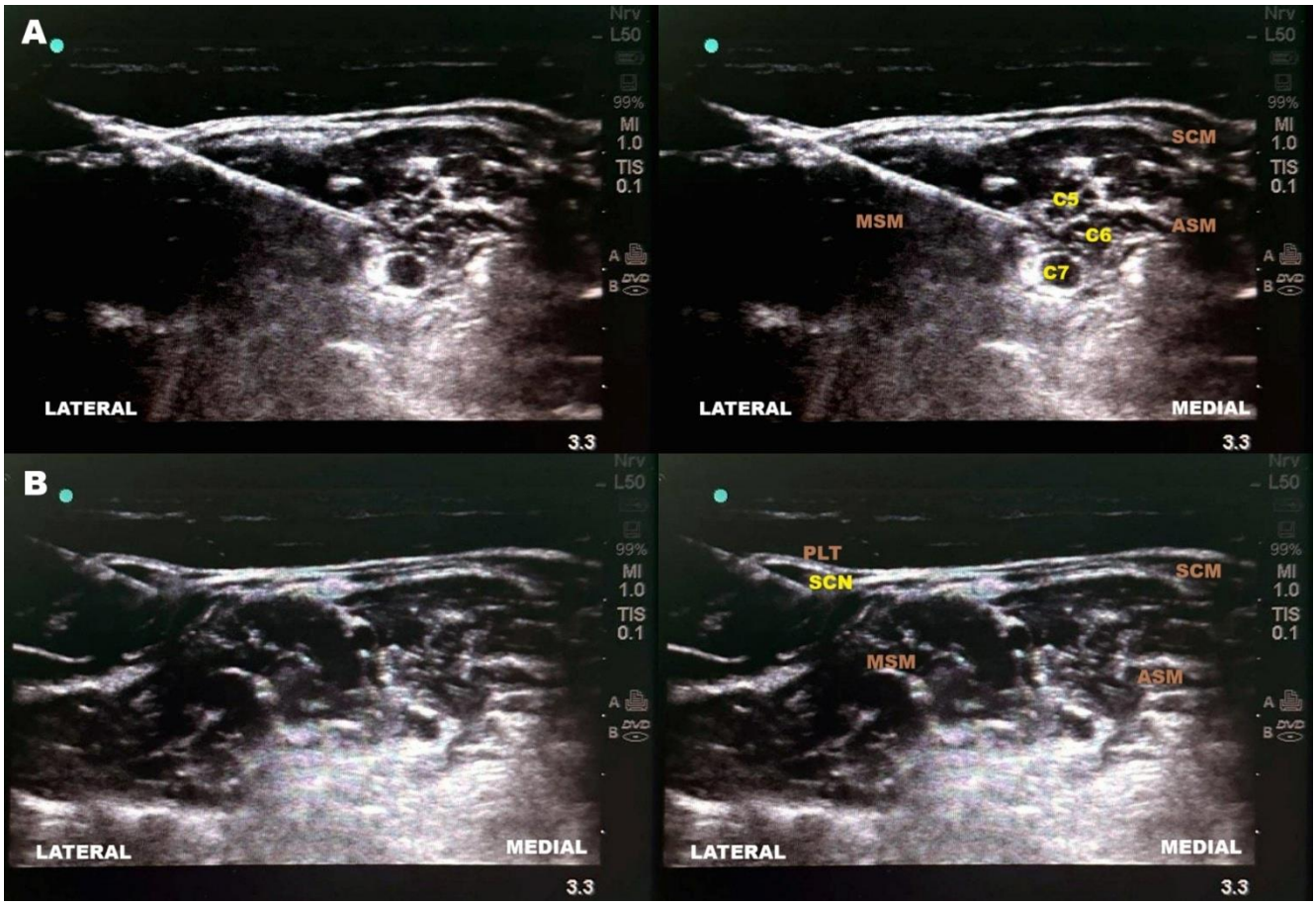

Fig. 2. (a) Ultrasound image obtained during interscalene block. The brachial plexus roots (C5, C6, C7) are visualized between the anterior scalene muscle (ASM) and middle scalene muscle (MSM). The in-plane needle is seen approaching from lateral to medial through the MSM.
(b) Ultrasound image during selective supraclavicular nerve block. The supraclavicular nerve (SCN) is seen within the fascial layer between the platysma (PLT) and the middle scalene muscle (MSM), targeted using an in-plane approach.

Approximately eight hours after the block, the patient experienced pain and mild paresthesia. Her pain was assessed as VAS 5. No preemptive or scheduled analgesics were administered as part of a multimodal analgesia regimen. Instead, 1 g of intravenous paracetamol was given only when the VAS score reached 5, resulting in a reduction to VAS 2. Pain control was successfully achieved, and no complications were observed during follow-up. Reassessment of fetal vital signs and ultrasonography results remained within normal limits. As the patient remained clinically stable, she was discharged with outpatient follow-up instructions.

3. Discussion

In this case, we describe the use of a combined interscalene and selective supraclavicular nerve block under ultrasound guidance in a patient at 32 weeks' gestation with clavicle fracture. The technique provided effective surgical anesthesia without the need for general anesthesia or intraoperative sedatives, and postoperative pain was managed with a single dose of paracetamol.

Trauma during pregnancy is a leading cause of maternal and fetal morbidity and mortality, with an incidence reported in approximately 6–7% of all pregnancies [1]. Trauma occurring in the third trimester is particularly concerning due to its association with severe perinatal outcomes, such as preterm labor, placental abruption, fetal distress, and fetal loss [5]. Therefore, a multidisciplinary approach that accounts for the physiological changes of pregnancy is essential in managing such high-risk cases.

In these scenarios, not only the effects of trauma but also the surgical and anesthetic management require close collaboration across specialties. In pregnant patients, general anesthesia must be approached with caution due to the increased risk of aspiration, decreased uteroplacental perfusion, and the potential teratogenic effects of pharmacologic agents crossing the placenta [6]. Physiological changes in the third trimester, such as airway edema, increased oxygen consumption, and de-

creased functional residual capacity, further increase the risks associated with general anesthesia [6]. Accordingly, regional anesthesia is often preferred when appropriate. Brachial plexus blocks, in particular, offer safe and effective analgesia while preserving consciousness [7].

In upper extremity surgeries, regional anesthesia not only provides adequate analgesia but also reduces the need for airway manipulation, thereby maintaining hemodynamic stability [8]. It has been shown that regional blocks can eliminate the need for conversion to general anesthesia while ensuring adequate surgical anesthesia throughout the procedure [9].

The sensory innervation of the clavicle is a complex network involving contributions from the supraclavicular, subclavian, long thoracic, and suprascapular nerves, making it one of the rare anatomical structures innervated by both the cervical and brachial plexuses [10]. Due to the complex neural innervation of the clavicular region, a single block technique is often insufficient, necessitating various combinations. Several regional techniques have been proposed for clavicle surgery, including supraclavicular plexus, interscalene, intermediate cervical plexus, costoclavicular, clavipectoral fascial plane, and PECS-Zero blocks [3,7,8,11,12]. The interscalene block acts by anesthetizing the roots of the brachial plexus (C5–C7) located between the anterior and middle scalene muscles. While effective for shoulder and clavicle surgery, this technique carries a risk of phrenic nerve blockade, which can result in ipsilateral hemidiaphragmatic paresis. Other possible complications include Horner's syndrome, vocal cord paralysis, spinal cord injury, and pneumothorax [3].

More recently, selective supraclavicular nerve blocks—targeting the more superficial supraclavicular nerve instead of the plexus—have gained importance. These blocks effectively anesthetize superficial tissues involved in clavicle surgeries using low volumes of local anesthetic, while reducing the risk of complications [4,13,14]. Moreover, they have been reported to reduce the incidence of complications such as hemidiaphragmatic paralysis [4]. Alternatively, a superficial cervical plexus block may also be used to anesthetize the supraclavicular nerves, offering a technically simpler and broader sensory coverage of the C3–C4 dermatomes [3]. However, the selective supraclavicular nerve block provides more focused anesthesia with potentially reduced risk of phrenic nerve involvement due to the smaller volume and limited spread, which may be particularly advantageous in pregnant or respiratory-compromised patients.

When combined with other brachial plexus blocks such as the interscalene block, selective supraclavicular nerve blocks administered with low volumes of local anesthetic can provide sufficient intraoperative analgesia and reduce postoperative analgesic requirements [14–16]. In the presented case, the combination of interscalene and selective supraclavicular nerve blocks resulted in effective surgical anesthesia. Motor blockade regressed within eight hours, and postoperative pain was controlled with paracetamol alone. These outcomes are consistent with findings from previous literature highlighting the effectiveness of regional techniques in pregnancy [16–18].

In pregnant patients, regional anesthesia avoids airway instrumentation, minimizes fetal drug exposure, and maintains hemodynamic stability. Lidocaine is classified as an FDA Pregnancy Category B drug, while bupivacaine is Category C due to animal studies indicating possible fetal risks [19]. However, both are commonly used in obstetric anesthesia at clinically appropriate doses. Regional techniques thus offer a safer alternative to general anesthesia in trauma-related surgeries during pregnancy. Numerous case reports have demonstrated the safety of regional blocks in pregnancy. For example, axillary brachial plexus blocks have been safely used in pregnant patients undergoing tendon repair during the second trimester, and popliteal sciatic nerve blocks have been successfully performed in the third trimester without complications [16,17]. Upper extremity surgeries under superior trunk blocks have also been completed without sedation [15]. Even when applied at anatomical sites distant from the uterus, regional anesthesia techniques have been reported to reduce fetal exposure and improve maternal-fetal safety outcomes [18].

This report has several limitations. As a single-patient experience, these findings may not be generalizable. Long-term follow-up data on maternal or fetal outcomes were not collected. In addition, the lack of comparative or objective outcome measures limits the strength of the conclusions.

4. Conclusions

This case highlights that the combination of an interscalene and selective supraclavicular nerve block can be a safe and effective anesthetic strategy for clavicle surgery in pregnancy. Especially in high-risk patients where general anesthesia poses significant concerns, ultrasound-guided regional anesthesia offers a viable alternative that minimizes fetal exposure, avoids airway manipulation, and ensures maternal hemodynamic stability. Increased awareness and dissemination of such targeted approaches may contribute to broader adoption of regional anesthesia in similar clinical scenarios and improve maternal-fetal outcomes in obstetric trauma care.

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Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this manuscript.

Data Availability

The datasets created and/or analyzed during the current study are not publicly available, but are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

Not applicable.

Author Contributions

Oguzhan Okumus: *conceptualization, methodology, investigation, writing – original draft, visualization.*
Ahmet Ridvan Dogan: *supervision, validation, writing – review & editing.*
Burcu Can: *data curation, literature review, writing – review & editing.*

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