



SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK BY EMERGENCY PHYSICIANS IN THE EMERGENCY DEPARTMENT: A PROSPECTIVE STUDY

Emergency Medicine

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ABSTRACT

The supraclavicular brachial plexus block (SCBPB) is an effective regional anesthesia technique that can be utilized by emergency physicians (EP) in the emergency department (ED) for upper extremity injuries. With the increasing integration of ultrasound-guided regional anaesthesia (UGRA) into emergency medicine practice, EPs are well-positioned to perform SCBPBs safely and effectively. This prospective study evaluated the feasibility, safety, and outcomes of SCBPB performed by EPs in the ED. **Material & Methodology:** thirty patients in ED with upper limb injuries including hand injury, forearm fracture, distal humerus fracture were assigned for case study. SCBPB was achieved with linear probe, 22G 50-mm needle 20 ml of 0.25% bupivacaine. **Results:** This study demonstrated a high success rate, significant pain reduction, and without any complications, lesser need of NSAIDs and opioids. **Conclusion:** The findings support the integration of SCBPB into emergency medicine practice and highlight the importance of ultrasound training for EPs.

KEYWORDS

Supraclavicular Brachial Plexus Block (SCBPB), Emergency Physicians (EP), Emergency Department (ED), Ultrasound-guided Regional Anesthesia (UGRA)

INTRODUCTION

The supraclavicular brachial plexus block (SCBPB) provides dense anesthesia for the upper limb and is widely used in operative and perioperative settings.[2] Traditionally performed by anesthesiologists, this technique is increasingly adopted by emergency physicians (EPs) due to advancements in ultrasound-guided regional anesthesia (UGRA).[2]

Acute pain management for upper extremity fractures in the ED often relies heavily on opioids, which are associated with significant adverse effects and dependency risks. There is a growing need for alternative analgesic methods that provide effective pain control while minimizing opioid use.[3]

This study aims to assess the feasibility, efficacy, and safety of SCBPB when performed by EPs in the ED setting.

MATERIAL & METHODOLOGY

A prospective interventional study was conducted over six months in the ED of a tertiary care hospital. Thirty patients aged 18 years and above, presenting with upper extremity injuries (distal humerus fractures, forearm fractures, and hand injuries), were included after obtaining informed consent.

Inclusion Criteria: Adults ≥ 18 years with acute upper extremity injuries (fractures or severe soft tissue injuries), Hemodynamically stable patients, Patients with a baseline pain score ≥ 5 on the numeric rating scale (NRS), Consent to undergo ultrasound-guided SCBPB.

Exclusion Criteria: Patient refusal, Local infection at the injection site, Coagulopathy or anticoagulation therapy, Allergy to local anesthetics, Pre-existing brachial plexus neuropathy or neurologic deficit in the injured limb, Hemodynamic instability (SBP < 90 mmHg or HR < 50 bpm), Head injury and cervical spine injury, Inability to provide informed consent (e.g., altered mental status, severe cognitive impairment), Known pulmonary disease with high risk of diaphragmatic paralysis (e.g., severe COPD with limited reserve).

Pain scores were measured using the numeric rating scale (NRS) at the time of admission. A high-frequency linear probe (6–13 MHz) was placed in the supraclavicular fossa. The subclavian artery was identified, and the brachial plexus visualized as a cluster of hypoechoic nodules lateral and superior to the artery.

After skin asepsis and local infiltration, a 22G 50-mm insulated needle was advanced in-plane toward the plexus. After negative aspiration, 20 mL of 0.25% bupivacaine was injected. Procedural success was defined as effective analgesia without the need for supplemental opioids and NSAIDs within 30 mins. Complications were recorded, if any.

RESULTS

A total of 30 patients were enrolled, with a mean age of 42 years (range: 19–75 years). The most common injuries were forearm fractures (50%), followed by distal humerus fractures (30%) and hand injuries (20%).

Table 1: Demographic Data

Variable	Value	Percentage
Forearm fractures	15	50%
Distal humerus fractures	9	30%
Hand injuries	6	20%
Male	18	60%
Female	12	40%

Analgesia was achieved in all patients with SCBPB (30/30 patients). Mean pain scores reduced significantly from 8.5 pre-block to 2 post-block. No patients required supplemental opioids post-block. No major complications were observed. Emergency physicians reported high confidence post-training, with 90% expressing readiness to routinely perform SCBPB in the ED.

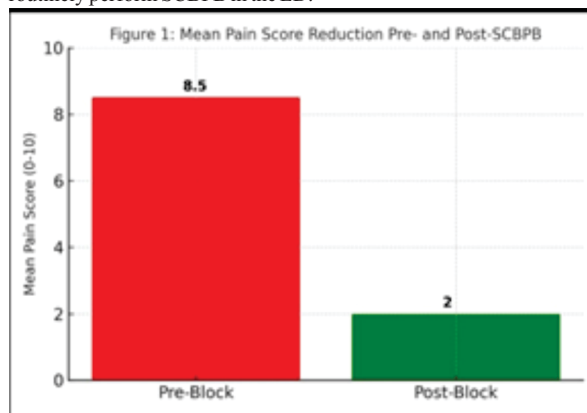


Figure 1. Mean Pain Scores Before And After Ultrasound-guided SCBPB Showing Significant Reduction.

Table 2: Various Parameters and Significance of SCBPB by EPs

Parameter	Data	Remark
Block success rate	100%	High success rate with ultrasound guidance
Time of onset of analgesia (min)	10 $\pm$ 3	Fast onset

Pain score at 30 mins (NRS /10) 1	2 ± 0.5	Significant analgesia
Pain score at 6 hours (NRS /10)	2 ± 1	Significant analgesia duration through out 6 hours
Need for rescue analgesia	nil	SCB reduces opioid/ NSAID requirement
Time taken to perform block	5 ± 2 (min)	Quick with experienced team
ED Length of Stay	5 ± 1 (hours)	Patient remain painless throughout stay
Rate of complication	nil	A procedure is USG guided so chances of complications are less

DISCUSSION

This study demonstrates that ultrasound-guided SCBPB can be safely and effectively performed by trained emergency physicians in the ED. The high success rate and significant reduction in pain scores align with previous literature supporting ultrasound-guided regional anesthesia UGRA for acute trauma care.[4]

Absence of major adverse events highlight the procedure's favorable safety profile in the hands of Emergency physicians. The opioid-sparing benefit is particularly relevant in the current era of opioid stewardship. Additionally, the use of ultrasound guidance likely contributed to the high success rate and minimized complications by improving anatomic visualization.[5]

In all cases SCBPB was achieved by emergency physician with help of ultrasound and mean pain score was 2 ± 0.5 at 30 mins. Shalaby M, Sahni R [1] in 2023 also achieved desirable pain score in all cases. Stone MB et al.[4] in 2007 found that with help of ultrasound guidance SCBPB was achieved in all cases and there was no need to supplement with NSAID or opioids.

To ensure patient safety, we excluded individuals at higher risk for adverse events, including those with local infection, coagulopathy, or pre-existing neurologic deficits. These exclusion criteria align with standard recommendations for peripheral nerve blocks and further reinforce the generalizability of our results to appropriately selected ED patients.

There was no complications related to SCBPB because it is performed by trained emergency physicians. Stickles SP et al[6]. in 2022 studied adverse events related to USGRA performed by EP and found that it is an integral part of painless ED concept without significant complications.

Goldsmith A et al. [7] in 2024 found that USGRA is important part of ED. With help of ultrasound complication rates are very less with higher rate of achievement of desirable pain score.

CONCLUSION

SCBPB is a feasible, effective, and safe regional anesthesia technique when performed by trained EPs in the ED. This block significantly reduces pain scores and opioid requirements in patients with upper extremity injuries. The study supports the broader adoption of UGRA in emergency medicine practice.

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