e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 1202-1205

Original Research Article

Efficacy and Safety of Trans-Arterial Axillary Brachial Plexus Block as Rescue Block - An Observational Study

Nivedha Arul[1], Nasir Shaikh[2], Jimitkumar Rathod[3], Kevin Pansuriya[4], Arun Pragadesh[5]

[1]MD Anesthesia, Senior Resident, Department of Anesthesiology, Indira Medical College and Hospitals, Pandur, Tamilnadu

[2] Associate Professor, Department of Anesthesiology, P.D.U. Medical College and Hospital, Rajkot

[3]3rd Year Resident, Department of Anesthesiology, P.D.U. Medical College and Hospital, Rajkot

[4]2nd Year Resident, Department of Anesthesiology, P.D.U. Medical College and Hospital, Rajkot

[5]2nd Year Resident, Department of Anesthesiology, P.D.U. Medical College and Hospital, Rajkot

Received: 01-11-2025 / Revised: 15-12-2025 / Accepted: 21-01-2026

Corresponding author: Dr. Nasir Shaikh

Conflict of interest: Nil

Abstract

Introduction: Brachial plexus blockade can be done by various approaches and techniques, supraclavicular approach is known as spinal arm of upper limb surgery, in some cases patchy effect can be occur, which can be overcome by Axillary blockade as rescue block resulting in avoidance of general anesthesia and minimal peri-operative complications.

Methodology: study at P.D.U. Medical College and hospital involves patient posted for upper arm surgery above 18 years without co-existing neurological disease**.**

Discussion: The study comprises of 70 patients in which 35 are control group and 35 are of rescue group. The rescue group has patients in which people have some nerve sparing effect of PNS guided Supraclavicular blockade, The study found no significant differences in age, sex distribution, body weight, ASA status.

Conclusion: Study indicates that ulnar/median nerve sparing effect by PNS guided blockade can be overcome by Tran's arterial axillary approach and avoids the risks of general anesthesia.

Keywords: Supraclavicular brachial block, Transarterial Axillary block, Rescue block.

DOI: 10.25258/ijcpr.18.2.198

Introduction

Brachial plexus anesthesia utilized generally for upper limb surgeries, Brachial plexus block can be performed by various approaches such as supraclavicular, infra clavicular, inter-scalane, Axillary ,depending upon the level of blockade. Among its Axillary approach is very popular in our institute. It can be performed via various methods like usg guided, PNS guided, blind, trans-arterial. Trans-arterial approach is a very effective method for lower arm surgery.

At our institute, it is standard practice to administer a paresthesia-guided or peripheral nerve stimulator-guided supraclavicular block to all patients scheduled for upper limb surgery. The occurrence of sparing and patchy impact is prevalent in some cases.in these cases we carried out transarterial axillary brachial blockade. The axillary artery is situated within the axillary region. The sheath and branches of the brachial plexus are organised near the artery It involves intentionally puncturing the axillary artery and administering local anaesthesia directly next to the artery. Due to the unambiguous indication of blood aspiration as an endpoint for injection, the success rate is significantly high. The axillary approach to the brachial plexus is a simple and efficient method for accessing the nerves in the lower arm surgical procedure, and it is safe.[5]The reported complications are modest, explicitly reandering the pulmonary system safe. Complications associated with alternative methods are thereby eliminated.

Aim and Objectives

Aim: To evaluate the efficacy and safety of transarterial axillary brachial plexus block as a rescue block.

Objectives: Primary objective: To determine the success rate of the transarterial axillary approach to brachial plexus block as a rescue block for supraclavicular block.

Secondary objective: To evaluate the incidence of adverse effects associated with transarterial brachial plexus anaesthesia.

Methodology: An observational study was conducted at P.D.U. Goverment medical College and Hospital after approval from hospital Scientific Committee.70 patients with aged 18 years and above scheduled for upper limb surgeries out of which 35 were required rescue block. All patients were subjected to pre anaesthetic check-up. Patients were explained about the procedure day before surgery.

Technique: After informed consent was taken and multipara monitors attached and pre-medicated patients with inj. dexmedetomedine (0.5mcg/kg) and midaz (0.03mg/kg), under aseptic precautions first PNS guided Supraclavicular block performed with The drug used was a 1:1 mixture of 0.5% bupivacaine and 2% lignocaine with 1:200000 adrenaline.(inj. bupivacaine 2 mg/kg, inj. lignocaine with adrenaline 7 mg/kg). and in patients with inadequate effect after 30 minutes we performed trans-arterial axillary block as a rescue block with A 23-gauge, one-and-a-half-inch block needle was inserted directly into the skin at a right angle and gradually pushed forward until it punctured the axillary artery in the middle. This was confirmed by blood flow from the needle hub and by successfully drawing blood into the syringe. The needle was then inserted further until the tip was positioned just behind thevessel wall, at which point no more blood could be drawn. The local anaesthetic solution Inj. Ropivacaine (0.375%). was injected into the axillary sheath, right behind the artery, local anesthetic, intense and continuous pressure was exerted directly on the artery for 5 minutes. Additionally, a tourniquet was placed below the level of the axillary sheath to assist in the upward movement of the local anaesthetic. And further the sensory score is reassessed. The sensory block was assessed using a 3-point scale, where 0 indicates no sensory loss, 1 indicates loss of unpleasant pinch, and 2 indicates loss of touch.

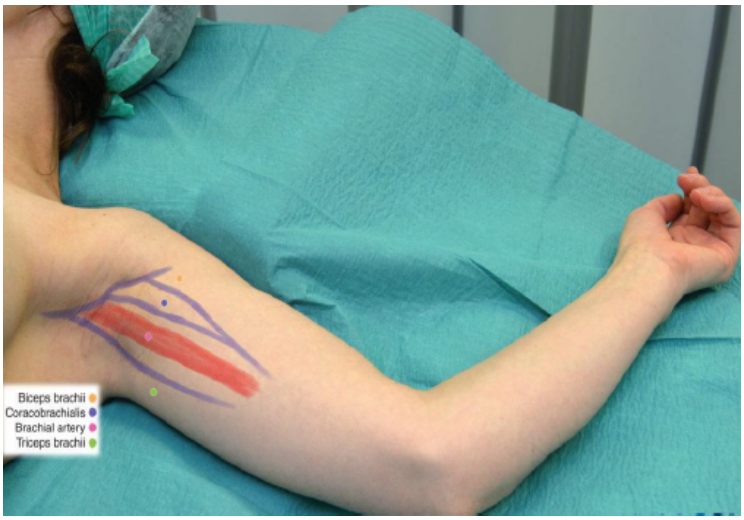

Figure 1:

Table 1:

	The score for sensory block Median(IQR)	Frequency (percentage)
Axillary nerve	1 (1-2)	6 (17%)
Musculocutaneous nerve	1 (1-2)	6 (17%)
Radial nerve	1 (0-1.5)	11(32%)
Median nerve	1 (0-1)	11(32%)
Ulnar nerve	1 (0.5-2)	12 (35%)

(Table 1 showing the median sensory block score for various nerves and proportion of sparing during the supraclavicular block under PNS guidance).

Table 2:

Post-operative	At0 hr	At2 hr	At6 hr	At12 hr	At24 hr	Krushkal-Wallice test
VAS score for pain	0 (0)	0 (0)	2 (0.25-3)	3 (3-3)	3 (3-3)	**P<0.0001**

(Table 2 showing Intra-group comparison of post-operative VAS score for pain at different times in rescue group)

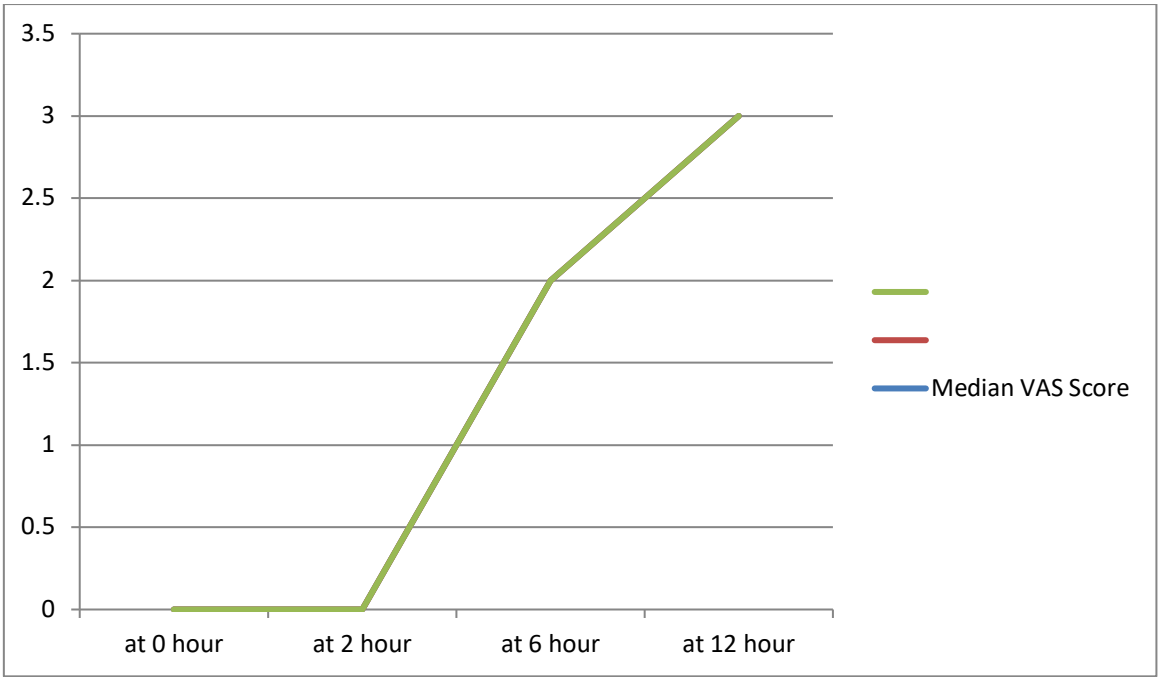

Figure 2:

Table 3:

	Sensory core after Rescue block Median(IQR)
At5min	1 (1-2)
At10min	2 (2-2)
At15min	2 (2-2)
At20min	2 (2-2)

The above table shows that the median score for sensory block after rescue block given was 1 (1-2) at 5 minutes of injection and 2 (2-2) at 10, 15 and 20 minutes.

There by the mean onset of time was (9.07±4.33 minutes) for the rescue TA block.

Discussion

Regional anaesthesia has become the cornerstone of upper limb surgery, offering superior recovery profiles compared to general anaesthesia (GA). While the supraclavicular brachial plexus block (SCB) is often referred to as the "spinal of the arm" due to its dense blockade, it is not without failure. In institutions where Ultrasound (USG) is unavailable and Peripheral Nerve Stimulation (PNS) remains the standard, "patchy" blocks or complete failures—particularly in the ulnar distribution—are a common clinical reality. This study evaluated the efficacy and safety of using a transarterial (TA) axillary brachial plexus block as a salvage technique for these failed SCBs. Our findings suggest that the TA approach is a highly effective, rapid, and safe rescue strategy that minimizes the need for conversion to GA.

The Clinical Need for Rescue: The necessity of a rescue technique was highlighted by our observation of the primary SCB's limitations. In our cohort, PNS-guided SCB frequently spared the ulnar nerve (35%), followed closely by the radial and median nerves (32% each). This aligns with anatomical realities where the lower trunk (C8-T1) is often harder to target blindly or with PNS at the supraclavicular level. Without a reliable rescue plan, these patients would typically undergo conversion to GA, negating the benefits of regional anaesthesia.

Efficacy of the Transarterial Rescue: Our study demonstrated a high success rate of 97.14% for the TA axillary rescue block, with only a single patient requiring conversion to GA. This success rate is comparable to, and in some cases higher than, previously reported primary axillary blocks. For instance, Pearce et al. reported a clinical success rate of 92.5%, which improved to 99% only with supplementary nerve blocks. Conversely, Tarekegn et al. reported a slightly lower success rate of 88.59% using a loss-of-resistance technique.

The efficiency of the technique was also notable. The mean time to perform the rescue block was approximately 5.26 minutes, with a mean onset time of roughly 9 minutes. This rapid onset is crucial in a rescue scenario where the operating room workflow is already delayed by the failed primary block. Our onset times were consistent with Pearce et al., who reported performance times of roughly 3.4 minutes. The efficiency we observed likely stems from the transarterial technique's reliance on the axillary

artery as a distinct, palpable landmark, which simplifies localization even when the anatomy has been distorted by previous injection attempts or patient positioning.

Safety Profile and the Trans arterial Controversy: Historically, the trans arterial approach has faced criticism due to the theoretical risks of intentional arterial puncture, specifically hematoma formation and Local Anaesthetic Systemic Toxicity (LAST) via intravascular injection. However, our study reinforces the safety of this technique when performed with meticulous care.

We observed zero incidents of axillary hematoma, neurological deficit, or LAST. This safety profile contrasts favourably with other studies, such as Koscielniak-Nielsen et al., which reported an 8% incidence of hematoma. We attribute our safety record to the use of small-gauge needles (23G), single-injection technique (depositing directly posterior to the artery), and firm digital pressure for 5 minutes post-procedure.

Interestingly, the only significant complication in our study occurred in the control group (primary SCB), where one patient developed a pneumothorax. This finding subtly underscores the potential safety advantage of attempting an axillary rescue—which carries no risk of pneumothorax—rather than re-attempting a supraclavicular block in a patient with difficult anatomy.

Intraoperative Quality and Postoperative Analgesia: Beyond successful surgical anaesthesia, the rescue block provided high-quality intraoperative conditions. We found that 80% of rescue group patients required no intraoperative opioids (fentanyl), with sedation reserved mostly for anxiety or positional discomfort. Postoperatively, the dense block provided by the rescue technique translated into prolonged analgesia. The mean duration before the first analgesic request was over 9 hours (555 minutes). This extended pain relief is likely due to the administration of a "top-up" volume of long-acting local anaesthetic (ropivacaine) during the rescue, effectively prolonging the sensory blockade well into the postoperative period.

Limitations: Our study was limited by its observational nature and the absence of an ultrasound-guided comparison group. In modern practice, ultrasound is the gold standard and likely would have reduced the failure rate of the primary SCB. However, our study was conducted in a resource-limited setting where USG was unavailable. In this context, our results are highly relevant, demonstrating that anatomical knowledge and landmark-based techniques remain vital skills for anaesthesiologists, serving as a reliable safety net when technology is unavailable.

Conclusion

While the supraclavicular block remains a popular choice for upper limb surgery, sometimes it is associated with a significant incidence of nerve sparing. This study confirms that the transarterial axillary brachial plexus block is a safe rescue technique. It provides excellent surgical anaesthesia and postoperative analgesia without increasing the risk of complications such as hematoma or LAST. For anaesthesiologists working in settings without ultrasound, or in scenarios where a primary block fails, the transarterial axillary approach remains an invaluable tool in the regional anaesthesia.

References:

1. PearceH, Lindsay DA, Leslie K. Axillary brachial plexus block in two hundred consecutive patients. Anaesth Intensive Care. 1996;24(4):453-8.
2. Cockings E, Moore PL, Lewis RC. Transarterial brachial plexus blockade using high doses of 1.5% mepivacaine. RegAnesth 1987; 12:159-64.
3. Sia S, Bartoli M, Lepri A, Marchini O, and Ponsecchi P. Multiple-injection Axillary brachial plexus block: A comparison of Two Methods of Nerve Localization – Nerve Stimulation Versus Paraesthesia. Anesth Analg 2000; 91:647-651.
4. Ay S, Akinci M, Sayin M, Bektas U, Tekdemir I. and Elhan A. The axillary sheath and single injection axillary block. Clin. Anat. 2007; 20: 57–63.