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Case Report

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USG GUIDENCE TO RESCUE IN A CASE OF RESECTION ARTHOPLASTY OF HUMERAL HEAD WITH DISPLACED BRACHIAL PLEXUS

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INTRODUCTION

Peripheral nerve blocks can be customized and used for anaesthesia, post-operative analgesia and diagnosis and treatment of chronic pain disorders. It can be used both for elective as well as emergency surgeries. Brachial plexus block was first done by William Steward Halsted. Later different approaches have been designed in order to block Brachial plexus at various levels. Various techniques used to locate the peripheral nerves include paresthesia techniques, peripheral nerve stimulation and ultrasound guidance. Visualization of the target structures as well as the visualization of the needle and the spread of local anesthetic after injection in ultrasound guided technique has increased the success rate of the procedure and reduced risk of complications, block performance time, number of needle insertions and volume of local anesthetic agents. Ultrasound for supraclavicular brachial plexus block has improved the success rate of block with excellent localization as well as improved safety margin.

Blockade of the brachial plexus is an effective method for providing anesthesia to the upper limb from the shoulder to the fingertips. Multiple approaches to blocking the brachial plexus depend on the block indication, surgery or procedure being performed, patient-specific body habitus, medical comorbidities, and individual anatomy variations.

While brachial plexus blocks as the sole anesthetic may have some cost-saving aspects compared to the use of general anesthesia, this is only in the case of no need to utilize general anesthesia as a rescue technique emphasizing the supreme importance of successful block placement and management in maintaining cost-efficient practice.

Anatomy

The brachial plexus is formed from the C5 to T1 nerve roots. These roots join to form the superior (C5, C6), middle (C7), and inferior trunks (C8, T1) above the clavicle. As the trunks pass under the clavicle, they are found in proximity to each other and can be blocked easily at this level. Distal to the clavicle, the plexus splits into the lateral (C5-C7), posterior (C5-T1), and medial (C8, T1) cords, which are found situated adjacent to the axillary artery. Finally, the terminal nerve branches are formed from the cords in the axilla. The median nerve is formed from the medial and lateral cords and usually is located superficial to the axillary artery.The ulnar nerve is formed from the medial cord and usually is located lateral to the axillary artery. The radial nerve is located deep and lateral to the axillary artery. The last terminal branch, the musculocutaneous nerve, branches off from the lateral cord and pierces through the coracobrachialis in the proximal axilla.

The brachial plexus can be blocked at multiple sites for varying effects. Familiarizing oneself with multiple approaches given variant patient anatomy and indications is beneficial.

- Interscalene
- Superior trunk, a potentially phrenic nerve-sparing alternative to Interscalene
- Supraclavicular
- Infraclavicular
  - Traditional
  - Retrograde approach (RAPTIR)
- Axillary

CASE REPORT

Female 59year old Diagnosis with 8 days old left forearm both bone fracture Surgery planes ORIF + Plating of Radius and Ulna. Patient was bought to casualty with complaint of pain in left forearm. Alleged history of RTA one week back where patient was hit and dragged by carrier vehicle following which she sustained injury to her left forearm. Patient got admitted to Govt hospital and surgery was planned. Patient was taken up for surgery at govt hospital Axillary block was performed without ultrasound Block was inadequate, hence Supraclavicular Block was performed without ultrasound which also proved to be inadequate. Converted to General Anaesthesia – After induction patient went into severe Bronchospasm due to which

surgery was abandoned, then patient was discharged and referred to higher center for further management.

Past History
History of Excision of left head of humerus 10 years back following RTA Limited ROM at Left shoulder joint.

Not a K/C/O- DM, HTN TB, IHD ASTHMA EPILEPSY

On examination, PR- 62/min, BP- 130/80mmHg, SpO2- 99% at room air, Temperature- 99.1F, CNS – Higher mental function- normal, Cranial nerve examination normal. ECG- WNL.

USG of left shoulder was performed one day prior to surgery which showed lateral displacement of brachial plexus compared to normal anatomical location probably due to previous surgery of left shoulder joint.

Investigations: Complete blood count- normal, RFT- WNL. LFT-WNL, Serum Electrolyte -WNL.

Block Technique
Case reviewed on day of surgery shifted to operating room .All standard monitor were connected (NIBP, Pulse oximetry, ECG) 18G IV secured o2 inhalation at 4ml/min started .Under aseptic precautions parts painted and drapped. Left Supraclavicular brachial plexus demarcated were difficult to identify even under USG so traced slightly cephalad to trace Interscelene plexus ,identified through TRAFFIC LIGHT SIGNAL sign and block was performed using USG. Inj Lignocaine (2%) ,2ml was infiltereted into skin and subcutaneous tissue .Inj Bupivacaine (0.5%) 16ml + Inj Lignocaine with Adrenaline 10ml + Inj Dexamethasone 4mg (standard adjuvant for prolongation of block)was injected after negative aspiration for blood.BLOCK ATTAINED ADEQUATELY ,All VITAL PARAMETERS WERE STABLE.

DISCUSSION AND CONCLUSION
Brachial plexus blockade is a timer tested technique for the upper limb surgeries. Brachial plexus approaches have usually been considered in terms of their reliability in blocking various nerves supplying the upper extremity. In brachial plexus block, in order to improve efficacy, not only a variety of agents and volumes of local anaesthetic but also different methods for injection have been described. In the present study, we chose axillary, supraclavicular, and interscalene approaches to perform brachial plexus block.

When brachial plexus block is performed for a planned surgery, onset, quality, and extent of the sensory and motor blocks of brachial plexus nerve depend on the approach adopted. In order to obtain adequate sensory and motor block with analgesic and anesthetic requirement, the innervation regions of all the nerves belonging to brachial plexus, and to what extent these regions can be affected through the approaches we apply should be well known. In this way, the choice of the most suitable approach for the site of surgery and the patient might be helpful in preventing time loss and decreasing possible complications due to the procedure.

The application of ultrasound technique for exact localization of nerves/plexus has revolutionized the regional anaesthesia field where in ultrasound probes with suitable frequencies have been successfully tried. Ultrasound-guided brachial plexus. blocks supplement or replace general anaesthesia for most procedures performed on the upper limb.

The choice of technique should be based on the type of surgery, experience of the operator, perceived complications of the individual block, and the patient's health status. Ultrasound-guided brachial plexus blocks should ultimately improve the quality of these blocks and have the potential to reduce both acute and long-term complications.

Hence we conclude in case of distorted anatomy of shoulder, brachial plexus landmark technique can be difficult to perform adequate and effective block.Hence USG is an extra add to locate brachila plexus properly and perform block precisely with minimal complication and failure

Current study showed with ultrasound guidance, brachial plexus blockade through a variety of approaches can provide quality anaesthesia and analgesia with minimal complications.

Advantages of USG Guided
1. Direct visualization of nerves
2. Direct visualization of anatomical structures (blood vessels) to facilitate nerve identification
3. Accuracy of needle placement
4. Visualization of local anaesthetic spread in real time
5. Avoidance of intraneural/intravascular injection
6. Reduced complications (e.g. pleural puncture)
7. Rapid block onset
8. Reduced local anaesthetic dosage
9. Improved patient satisfaction

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