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ULTRASOUND GUIDED INTERSCALENE BRACHIAL PLEXSUS BLOCK ALONE, FOR MID SHAFT DISPLACED CLAVICLE FRACTURE: A CASE REPORT.

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Abstract:
Background: Fractures of the clavicle are common usually following trauma. Surgical fixation of clavicular fractures has been traditionally performed under General Anaesthesia (GA). Although GA has several benefits but also carries associated risks. Ultrasound-guided techniques have enabled the anaesthetists to reduce doses of local anaesthetic drugs and perform more successful blocks. In this case report we have explored use of only interscalene approach to brachial plexus block as surgical anaesthesia and analgesia in clavicle fracture.
Case description: A 39-year-old male patient, had a closed complete displaced fracture in the middle third shaft of the left clavicle due to a history of trauma. The interscalene block was performed under ultrasound guidance. A local anaesthetic drug was administered for interscalene block. Distribution of the local anaesthetic drug was visualized during the procedure. Motor blockade and sensory blockade was assessed. The patient underwent open reduction and internal fixation (ORIF) of the left clavicle. During intraoperative and postoperative period no intravenous analgesics were used. Patient was monitored for few hours in post-operative room and was sent home the day after the surgery, with oral medications (non-steroidal anti-inflammatory drug with an opioid).
CONCLUSION: Our limited experience suggests that the interscalene block is possible as a sole anaesthesia method in patients who undergo clavicular fracture surgery. In this case study, regional anaesthesia was successful.

INTRODUCTION:

Fractures of the clavicle are usually common following trauma. The clavicle is peculiar of being the sole horizontal long bone with a strut like disposition combined with its subcutaneous and superficial location makes it very prone to injury following direct violence. The annual incidence of clavicle fractures is estimated to be between 29 and 64 per 100,000 populations per annum. Males are affected twice as compared to females.

Fractures of the shaft account for 69% - 82% of all fractures, lateral-end injuries for 21% and medial-end injuries for 2% to 3% [1-4]. Surgical fixation of clavicular fractures has been traditionally performed under general anaesthesia (GA) due to difficulty in blocking all the nerves supplying the area of surgery concerned [5-7].Although GA has the rendering all the patients completely relaxed and unaware during the surgery, it carries risks of increased haemodynamic stress response, increased usage of medicines and increased post-operative nausea and vomiting (PONV) apart from the risks of airway complications [8, 9]. The danger is further increased in patients with co-morbid illness. Various regional blocks alone or together are hypothesised to achieve the desired anaesthesia for clavicle surgeries. These blocks are supraclavicular (SCB), interscalene block (ISB), superficial plexus cervical regional anaesthesia block (SCPB) or isolated C5 root block or suprascapular nerve block. Any one particular regional anaesthesia method for repair of a clavicular fracture has not been described and not commonly performed in current anaesthesia practice. Although peripheral nerve blocks are commonly used for variety of surgical procedures on the upper extremity, there are only a few regarding regional anaesthesia for surgery of the clavicle. Within the literature, proposed interventional strategies for clavicular fractures include superficial plexus cervical blocks combined superficial plexus cervical -deep cervical plexus blocks, and interscalene brachial plexus blocks. These techniques are usually used for analgesia of the clavicle [10].
Choosing the optimal nerve block to anesthetize the clavicle requires understanding of innervation, which remains controversial. The sensory innervation of the clavicle has been attributed to either the cervical or plexus brachialis[11, 12]. Ultrasound-guided techniques have enabled the anaesthetists to scale back doses of local anaesthetic drugs and perform more successful

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blocks [13, 14]. As local anaesthetic doses were reduced with the use of USG and lower doses were administered, combined or multiple blocks became possible.As per various publications there are reports of various regional anaesthetic methods being used as a single anaesthetic modality for surgery of the clavicle [15]. But there's neither a prospective study nor a well established regional anaesthesia method for clavicle surgery.
In this case report we have explored use of only interscalene-brachial plexus block as surgical anaesthesia and analgesia in clavicle fracture. We present a case report of clavicular fracture using interscalene-brachial plexus block.

CASE REPORT:
The patient signed an informed consent, which stated that the clinical images taken would be used for medical teaching and in a journal publication. The K S Hospital Scientific Research Committee has reviewed and approved this case report.

A 39-year-old male patient, had a closed complete displaced fracture in the middle third shaft of the left clavicle due to trauma. A proper pre anaesthetic assessment was done. Patient was thin built and there was no history of any significant co morbidities, no history of allergy, vitals were stable and all the investigations were within normal limits. Patient NBM status was confirmed, informed consent about the procedure and related complications was explained. Inside operation theatre patient was made to lie down in supine position, required monitors were attached before the procedure (ecg, pulse oximeter, NIBP).

With the head tilt on right side, painting and draping done on left side of the neck (Figure 1). The transducer was dressed with a sterile cover. A 12-megahertz linear transducer (Siemens Voluson S8 USG) was used for performing the blocks. (Left side neck of the patient was scanned by ultrasound in a transverse orientation across the neck with the probe marker facing lateral at the level of the interscalene groove (Figure 2). The interscalene block was performed using a 5-centimeter block needle (B Braun) under ultrasound guidance. Distribution of the local anaesthetic drug was visualized during the procedure (Figures 3). A 5ml of 2% lignocaine with adrenalin and 10ml of 0.5% bupivacaine local anaesthetic drug was administered for interscalene block. Motor blockade was determined by loss of shoulder abduction, and sensory blockade was assessed using the pinprick test at the surgery site. The patient was also checked for pain with mobilization of the arm and palpation of the clavicle by the surgeon.

The patient underwent open reduction and internal fixation of the left clavicle with plates and screws. During intraoperative and postoperative period intravenous analgesics were not used. Patient was monitored for four hours in post-operative room and patient was sent home the day after the surgery, with oral medications (non-steroidal anti-inflammatory drug with an opioid).

DISCUSSION:
In this case report we have demonstrated that only interscalene block under ultrasound guidance may be feasible in clavicular fracture surgery. Before ultrasound, local anaesthetic doses required for successful blocks were substantially high; therefore, the risk for systemic local anaesthetic toxicity was high. Advances in the field of ultrasound guided peripheral nerve blocks have allowed reduction of local anaesthetic doses in interscalene blocks [16].

There is limited data on regional anaesthesia for clavicle surgeries, probably due to the complex innervation of the clavicular region [17]. But there are reports of using regional anaesthesia previously for provision of postoperative analgesia following clavicle surgery.

However, this case demonstrated that interscalene block only can give good outlook for operative analgesia. At the same time, it attenuated the need of post-operative analgesia as opioids and NSAIDS. It can thus be a good alternative to the routinely practised general anaesthesia for clavicle fracture surgeries.

Similar methods have been reported in a patient with dilated cardiomyopathy scheduled for surgery of fracture mid shaft of clavicle where use of general anaesthesia was totally abandoned [18]. And in some other cases combination of blocks guided by ultrasound has been used solely in a patient undergoing ORIF for clavicle fracture as reported by Dillane et al [19]. Ultrasound guided superficial cervical plexus alone has been used in the management of pain following clavicle fracture using 8 ml 0.5% bupivacaine [20].

Various approaches have been described in different reports for pain management following clavicle fracture surgery. Choi SD et al reported a successful post-operative analgesia after open reduction and internal fixation for clavicle fracture using a cervical plexus block by classic approach using 0.5% bupivacaine which provided 14 hours pain free interval following surgery [21]. Ultrasound guided combined interscalene brachial plexus and superficial cervical plexus block provides an effective intraoperative as well as post-operative analgesia with patient comfort and reduction in other parenteral analgesics in patients undergoing clavicle surgery. With dexmedetomidine as an adjuvant to the local

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anaesthetic, adequate sedation is maintained throughout the procedure which is an additional advantage apart from prolonging the block duration.

Superficial cervical plexus block can also be used in the emergency care settings for pain management not only for clavicle fracture but in ear lobe and lateral neck injuries as well [22,23].
Interscalene and superficial cervical plexus block can be used as a potential technique for procedures on clavicle fracture especially in patients who will have better outcome with avoidance of general anaesthesia. Use of ultrasound helps in better localization and avoids injury to surrounding vascular structures along with reduction in the volume of local anaesthetic solution used for blockade.

Figure 1: Shows the marking and painted parts before block

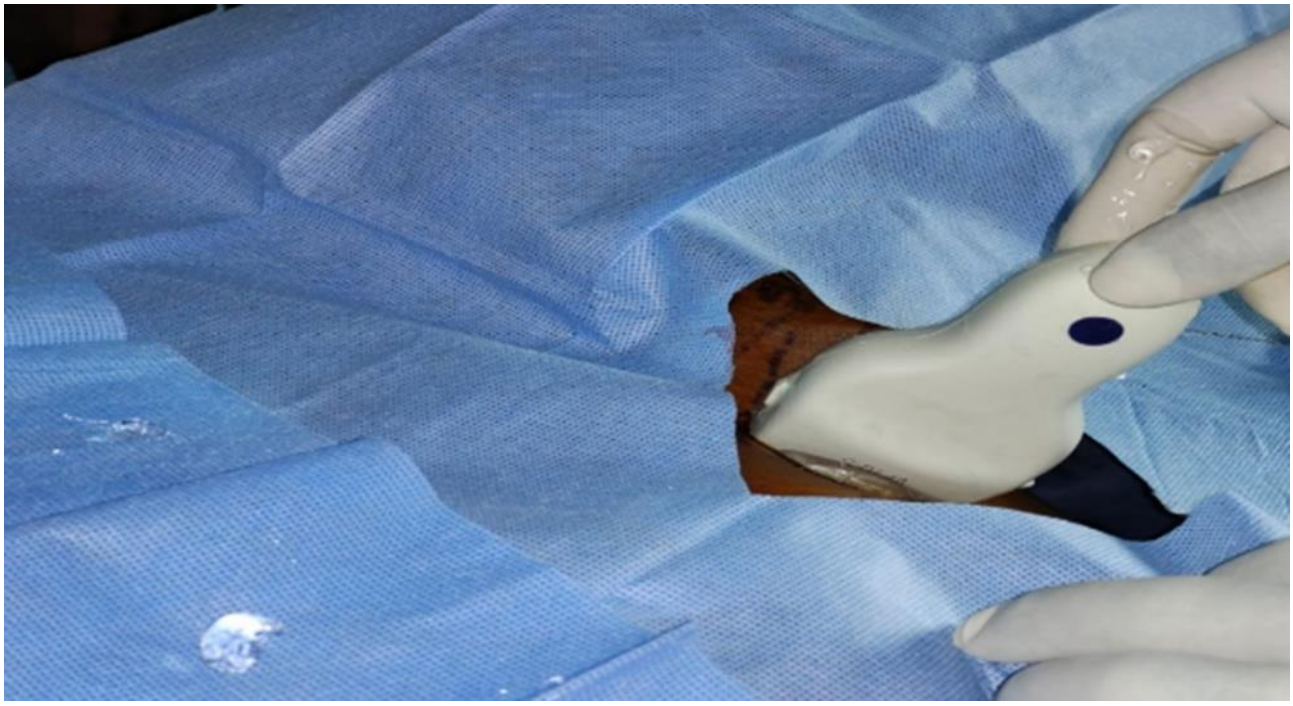

Figure 2: Shows Position of the ultrasound transducer and the needle during the performance of blocks.

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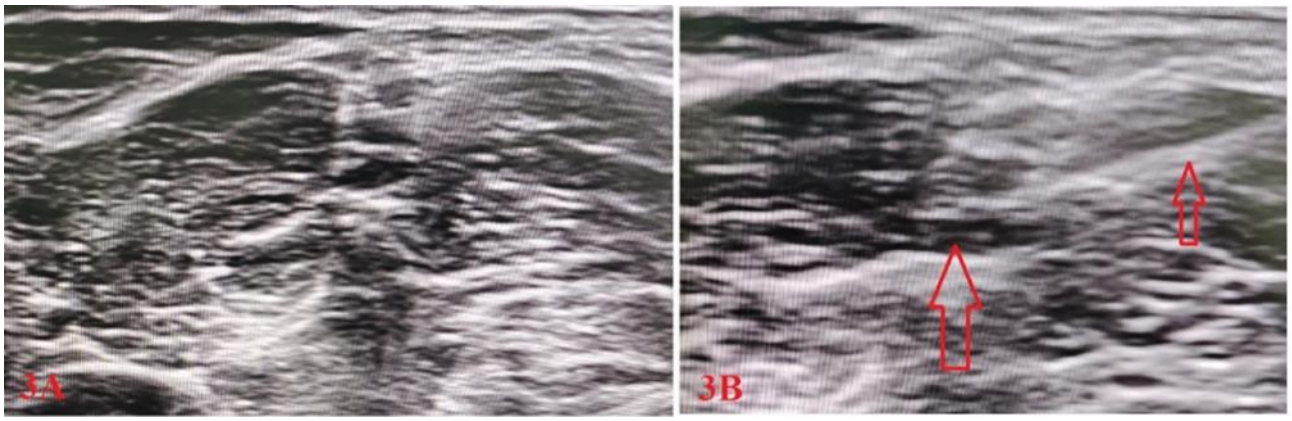

Figure3: 3A & 3B shows position of the needle and local anaesthesia distribution

LIMITATION OF THE STUDY

The conclusion of this case study is limited for it includes only single patient and patient was not followed up for postoperative analgesia requirement. Prospective
(randomized) trials are required to determine whether only interscalene block will help most of the patients or combination of blocks need to be considered as the best option for such operations. As clavicular repair is a rarely performed intervention, the low number of cases will also be a limitation. Several measurements were not evaluated such as the number of needle insertion attempts, needle redirections, block performing times, and onset times. Long-term complications were also not evaluated.

CONCLUSION:

Our limited experience suggests that the interscalene block is possible as a sole anaesthesia method in patients who undergo clavicular fracture surgery. In this case study, regional anaesthesia was successful, effective, and well tolerated by the patient. This method may be considered as an alternative to general anaesthesia.

Interscalene block can be used as a potential technique for procedures on clavicle fracture especially in patients who will have better outcome with avoidance of general anaesthesia. Use of ultrasound helps in better localization and avoids injury to surrounding vascular structures along with reduction in the volume of local anaesthetic solution used for blockade.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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