



HOARSENESS: RARE CASE REPORT OF A COMPLICATION OF ULTRASOUND GUIDED LEFT SUPRA CLAVICULAR BRACHIAL PLEXUS BLOCK FOR DISTAL UPPER LIMB PROCEDURE

Anaesthesiology

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ABSTRACT

Supra clavicular brachial plexus block is an ideal choice for surgical procedures of the upper limbs. Orthopaedic upper limb surgeries at or distal to elbow are usually performed under brachial plexus nerve block. Ultrasound guided blocks have become popular nowadays due to additional advantages than the blind approach such as real time visualisation of the plexus, adjacent structures, vessels or aberrant anatomy and the needle penetration thus leading to better efficacy of the block and preventing inadvertent injuries. Although use of ultrasound cannot fully eliminate the complications of the procedure. Hoarseness of voice following a supra clavicular block under ultrasound guidance is a very rare complication while pneumothorax, vessel injury or local anaesthetic toxicity are commonly observed. Here, we present the case report of hoarseness of voice after ultrasound guided left supra clavicular block for an orthopaedic surgery of left forearm.

KEYWORDS

Supra clavicular block, Brachial plexus, Ultrasound guided nerve blocks, Recurrent laryngeal nerve palsy (RLN).

INTRODUCTION

Supra clavicular brachial plexus block is a method of regional anaesthesia (Nerve block technique) commonly performed for orthopaedic upper limb procedures. Some common complications of this method are intravascular injection of drugs, injury to vessels, pneumothorax, hemi- diaphragmatic paresis, nerve damage¹ etc. Recurrent laryngeal nerve block is a rare complication associated with this approach with incidence² reported to be around 1.3 %. Most of the reported cases of such palsy are seen in the right sided supra clavicular block or with use of inter scalene block. Use of ultrasound (USG) guidance for the nerve plexus blocks have improved the efficacy of the blocks and reduced the incidence of common complications to a great extent but not completely eliminated. Hoarseness of voice is a rare complication and in this case report, it has been observed after a left sided supra clavicular brachial plexus block performed under ultrasound guidance for an orthopaedic surgery of left forearm.

CASE REPORT

A 25 year old male, of American society of Anaesthesiologists (ASA) grade I was planned for corrective osteotomy with plating of an old malunited fracture of left distal radius, under ultrasound guided supra clavicular brachial plexus block. Pre-operative evaluation of the patient was non-significant with no abnormalities or any comorbidities and all routine investigations were found to be within normal range. The procedure was undertaken after proper informed consent of the patient and the attendants. In the operating room, standard ASA monitoring was done. Vitals were stable i.e heart rate (HR)- 85/min, non-invasive blood pressure (NIBP)- 110/65 mmHg and oxygen saturation (SpO₂) - 100% on room air. Intravenous (i/v) access was secured with a 20 G cannula in the opposite arm (right arm). Under strict aseptic precautions, left supra clavicular brachial plexus nerve block was given using USG guidance and 22G, 5mm Stimuplex ultra needle with in-plane technique, using 20 ml of 0.25% ropivacaine and 10 ml of 2% lignocaine with adrenaline (1:200000) after repeated negative aspirations. Effective block was achieved with proper motor and sensory blockade of the left arm. Hemodynamic parameters were within normal limits.

After few minutes, patient complained of hoarseness of voice along with mild dry cough. There was no difficulty in breathing and SpO₂ was maintained at 100%, NIBP and HR were unchanged. Respiratory system was examined immediately, chest rise, bilateral air entry was normal/equal and there were no added sounds, no signs of bronchospasm or reduced air entry, pneumothorax was ruled out. There were no signs of local anaesthetic systemic toxicity (LAST) such as peri-oral numbness, light headedness or dizziness etc. and vitals were stable. But as patient got anxious and restless so, 1 mg midazolam and 30 micrograms of fentanyl was given i/v and oxygen

was started via simple O₂ mask @ 4-6 litre/min. After patient was sedated, surgery was allowed to start and intra-operatively, 100 mg of hydrocortisone along with 8 mg dexamethasone i/v was given. The surgery was completed within 2.5 hours and was uneventful, the patient had stable vitals, although cough had subsided but the hoarseness of voice still persisted. Communication with the patient throughout and vigilant monitoring helped us to detect this complication early which lead to timely management.

Post-operative chest Xray was done to rule out possibility of pneumothorax by inadvertent pleura puncture by the needle. USG was used to check the view of supra clavicular fossa again for spread of the local anaesthetic drug. Deposition of drug was seen laterally along the subclavian artery which explains the proper effect of the local anaesthetic for performing surgery while slight deposition of drug was also observed above & medial to artery too which suggests the possibility of partial blockade of RLN fibres of left vagus nerve or left RLN itself. Such erroneous spread of the drug might have lead to mild effects of RLN palsy as in our case leading to hoarseness of voice and cough. Injection dexamethasone 8 mg B.D was continued for 3 consecutive days and patient was followed up in the orthopaedic ward. Patient was pain free for around 12 hours post-operatively and hoarseness gradually subsided over the next 24 hours.

DISCUSSION

Ultrasound continues to grow in popularity as a method of choice for performing upper limb blocks in orthopaedic surgeries. USG provides multiple benefits such as real- time visualisation³ of the anatomy (normal and abnormal), plexus, vessels, adjacent structures and needle penetration, spread of the drug throughout procedure can be appreciated easily with its use which is not possible with the conventional blind approaches^{4,5}. Although all the advantages of USG are well known but it still can add to a false sense of security, thus proper learning and long term experience is needed for its use with adequate orientation of the USG probe, the needle and monitor. Errors and complications can still occur by inadvertent needle placement and puncture due to inadequate needle tip visualisation^{6,7} or due to aberrant structures or abnormal anatomy. Complications due to erroneous or excessive spread of the local anaesthetics due to large volume of drug, allergy to drugs or intravascular damage by needle, puncture of pleura leading to cough & pneumothorax etc can be observed with blind approach but also with the use of USG, although chances in USG approach are lesser.

Hoarseness of voice along with cough as a complication after supra clavicular block suggests the possibility of allergic reaction to the drug, pneumothorax, pleural irritation, bronchospasm or rare condition of RLN blockade. In this case, as the vitals were found to be

stable throughout, with no signs of local anaesthetic toxicity or pneumothorax or bronchospasm while maintaining saturation and no breathing difficulty. All those factors point towards blockade of ipsilateral RLN fibres of left vagus nerve or ipsilateral incomplete left RLN palsy probably due to erroneous spread of the local anaesthetics medial to subclavian artery.

According to Neal et al, RLN block incidence due to supra clavicular brachial plexus block is seen in only 1.3% patients⁷. Gupta et al reported a case of RLN block after right supra clavicular block⁸. Another similar case of RLN fibres blockade was observed by Sahu et al⁹. Bala ji et al presented a case report of hoarseness of voice along with features of Horner's syndrome following a right sided supra clavicular block and suggested the reason being application of tourniquet¹⁰. Hickey et al explained two incidents of right RLN block in 152 patients who received supra clavicular brachial plexus block for upper limb surgeries¹¹. Ward et al observed 1 case of right sided RLN palsy in 34 patients who underwent inter scalene block for proximal upper limb procedure¹². Naaz et al also observed a case of unilateral left RLN palsy after supra clavicular block with similar presentation of hoarseness and cough¹³. Shrestha Et al reported similar case report of hoarseness in left USG guided supra clavicular block¹⁴.

The right and left recurrent laryngeal nerves (RLN) run different course on each side¹⁵. The right RLN is found in close proximity to right subclavian artery while the left RLN is found in more medial relation to left subclavian artery and closer to trachea and oesophagus. Left vagus nerve is more close to left subclavian artery than on the right side. Studies suggests that spread of the local anaesthetic drug is longitudinal i.e up and down the nerves while the circumferential spread of the drug is limited by fascial sheath¹⁶ enveloping the brachial plexus, which also prevents excessive spread of the drugs. Several methods have been proposed in researches to influence the distribution of the injected drug or limits its spread in the brachial plexus such as use of tourniquet¹⁷, positioning of the arm¹⁸, local massage or digital pressure on the blocked area¹⁹, using lower volume of the local anaesthetics etc. According to radiological evidence in studies, digital pressure has been listed as an effective approach to limit the excessive spread of the local anaesthetic in places other than the brachial plexus²⁰.

The blockade of the RLN fibres of left vagus nerve or left RLN itself might have occurred in our case due to excessive and erroneous spread of the local anaesthetic towards medial side along with the desired lateral deposition for an effective block. As any of the above mentioned mechanisms to limit the drug spread were not instituted in our case, it might have lead to inadequate spread of the drug and thus leading to hoarseness and cough due to possible ipsilateral left RLN block. Volume of the drugs used might have been another contributing factor for the complication. A different view point by some researchers also suggest that there is no fascial sheath protecting the brachial plexus at all and it lies in the tissue planes between various anatomical structures²¹. Unilateral RLN palsy is more clinically significant when contralateral RLN is damaged, apart from that it presents with mild symptoms and signs of patient discomfort with cough, hoarseness, slight difficulty in breathing due to improper movement of the cords²². Bilateral RLN palsy is considered more dangerous and presents with respiratory obstruction. In our case, unilateral left RLN block or blockade of RLN fibres of left vagus nerve is suggested as the complication leading to hoarseness of voice after left USG guided supra clavicular brachial plexus block.

CONCLUSION

Blockade of Ipsilateral RLN fibres of vagus nerve or RLN blockade itself can be observed in supra clavicular block even with the ultrasound guided approach, although as a very rare complication in the left sided block for upper limb procedures. Proper pre-operative evaluation, intra-operative vigilant monitoring with good communication with the awake patient throughout the procedure for early detection of any complication and experienced use of USG is advised. Use of lower volumes of local anaesthetics and vigorous measures to limit the spread of the drug is another good measure to improve the efficacy of the procedure and reduce the complications.

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