Significance of Preprocedure Ultrasound Scan in Ultrasound-guided Regional Anaesthesia

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INTRODUCTION

We would like to report our experience that highlights the significance of preprocedure ultrasound scan before successfully performing an ultrasound-guided supraclavicular brachial plexus block in a patient with previous major neck, chest and arm injuries.

Our patient was a 30 year old male soldier who, 14 months prior to the scheduled surgery, suffered life-threatening penetrating neck and chest injuries following the explosion of an improvised explosive device. The neck injuries included 2/3rd disruption of the left common carotid artery 3 cm below its bifurcation, total transection of left internal and external jugular veins and a perforation in the hyoid cartilage. Other injuries included blast injury to the left arm (which was ultimately treated with a split skin graft), left pneumothorax, left occipital cerebral infarct (secondary to the carotid injury) and left corneal injury. The carotid injury had been repaired using a saphenous vein graft, while the transected internal and external jugular veins had been tied off. He subsequently underwent a redo surgery to his left carotid artery following surgical problems relating to the graft.

He was scheduled for serial excision of scar secondary to the split skin graft in the left arm (middle and lower 1/3) and removal of a fragment from the left index finger. It was felt that a brachial plexus block would provide excellent perioperative analgesia for the elective procedure in this young man who had already suffered from significant injuries in the past with ongoing pain issues. However, the nature of his previous injuries and repeated vascular procedures in the neck meant that a block could be technically difficult and risky due to altered anatomy or abnormal vascular proliferation.

A decision was made to proceed with ultrasound examination of the supraclavicular region to delineate the anatomy before proceeding with a block. This was to be followed with a general anaesthetic. If the anatomy was abnormal to an extent that the risks outweigh the benefits of brachial plexus block, the plan was to provide alternate forms of analgesia. The anaesthetic plan was discussed with the patient and consent obtained.

In the anaesthetic room, a thorough ultrasonographic assessment of the left supraclavicular area was done using Sonosite S-Nerve™. All the important structures relevant to performing a brachial plexus block were identified viz subclavian artery, subclavian vein, 1st rib, pleura and brachial plexus (Fig. 1). We could not identify any aberrant blood vessels in the area of interest. We repeated the scan with colour Doppler. Satisfied with the anatomy, we proceeded with real-time ultrasound-guided supraclavicular brachial plexus block using the in-plane technique. A 20G Locoplex insulated peripheral nerve block needle attached with nerve stimulator was used. Although no twitch was obtained at 0.3 mA, visual confirmation of correct position of the needle was confirmed. A total of 30 ml of 0.375% levobupivacaine was injected around the brachial plexus. Good local anaesthetic spread was confirmed by ultrasound. We then proceeded with a general anaesthetic as planned. The duration of surgery was 2 hours. Intraoperative course was uneventful with the patient requiring no supplemental analgesia. Postoperative assessment confirmed a good block that was effective for 24 hours. The postoperative course was uneventful and the patient was discharged from the hospital on the 3rd postoperative day.

Fig. 1: Preprocedure scan confirming the normal anatomy and absence of abnormal blood vessels. Subclavian artery is seen at the 7 o’clock position. Brachial plexus seen posterolateral to the artery
DISCUSSION

In recent years, the use of ultrasound guidance in regional anaesthesia has rapidly expanded. The surge in interest among regional anaesthetists has led to manufacturers designing better machines and probes specifically to facilitate peripheral nerve blocks. Better images and growing experience should lead to safer and more effective regional blocks.

Ultrasound-guided supraclavicular brachial plexus block is associated with a high rate of successful surgical anaesthesia and a low rate of complications. An ultrasound-guided approach for supraclavicular block combines the safety of axillary block with the larger extent of block achieved by the supraclavicular approach. We, therefore, felt that this would be the ideal block to perform for our patient. A blind approach relying on landmarks to stimulate nerves would have been significantly more risky in our patient. Possible altered vascular anatomy made inadvertent intravascular injection a real possibility. Further, scar tissue would have made tactile feedback from the needle difficult to interpret and may have impeded the spread of the local anaesthetic affecting the quality of the block. Thus, the use of ultrasound not only helped in confirming needle placement but also in ensuring good spread of local anaesthetic.

We believe, this report highlights the importance of a preprocedure scan as confirmed by previous studies. It also demonstrates that the use of ultrasound guidance for supraclavicular block considerably improves the safety even in complex situations while at the same time ensures better success by providing a visual confirmation of spread of local anaesthetic around the nerves.

REFERENCES


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