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RESEARCH ARTICLE

ROLE OF ULTRASOUND AS A GUIDING MODALITY FOR SUPRASCAPULAR NERVE BLOCK IN A STROKE PATIENT WITH EVALUATION OF PAIN ALLEVIATION IN SUB-ACUTE AND CHRONIC SHOULDER PAIN

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ABSTRACT

Hemiplegic shoulder is one of the most common forms of presentation in individuals suffering from stroke. They present with severe pain as well limited range of movements in the affected shoulder. This case report demonstrates the use of high-resolution ultrasound guidance to facilitate blockade of the suprascapular nerve which supplies sensation to the shoulder joint. Upon targeted administration of a small dose of medication (local anaesthetic mixed with a corticosteroid) in real time under ultrasound guidance, the patient reported significant reduction in pain as well as improvement in his shoulder movements and function immediate post-procedure and on follow-up at 12-weeks.

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INTRODUCTION

Hemiplegic shoulder is one of the most common forms of presentation in individuals suffering from acute stroke. The most common form of presentation is severe pain as well limited range of movements in the affected shoulder. The etiology of hemiplegic shoulder pain is multifactorial (Jones, 2013 and Coskun Benlidayi, 2014) and contributions have been described from includes soft tissue lesions (rotator cuff and biceps tendon disorders, adhesive capsulitis), impaired motor function (muscle tone changes), and altered peripheral or central nervous system (CNS) activity (complex regional pain syndrome, peripheral nerve entrapment, sensory impairment, central pain, central sensitization). Hemiplegic shoulder pain is often associated with decreased functional ability (Fernandes, 2012) resulting in a higher incidence of depression (Fernandes, 2012), followed by interference with rehabilitation, eventually leading to increased time of restoration to normalcy. The suprascapular nerve (SSN) block was first described by Wertheim and Rovenstein in 1941, (Wertheim, 1941) and has long been performed by pain specialists, anaesthesiologists and rheumatologists for the management of acute and chronic pain. Recent studies have demonstrated the use of ultrasound guidance to be emerging as

a very safe and effective modality (Harmon, 2007 and Vorster, 2008). As mentioned above, the use of Nerve blocks using local anesthetics has long been in practice. High volumes were usually injected with a blind approach, which may predispose patients to associated adverse events. Introduction of ultrasound guidance facilitates a more targeted approach to assess the suprascapular nerve hence reducing the volume of medication used. In this study, we demonstrate the role of using real-time, high-resolution ultrasound guidance to facilitate blockade of the suprascapular nerve. Suprascapular nerve block has been shown to be a safe and efficacious treatment for shoulder pain in a wide variety of other conditions as well, including adhesive capsulitis, rheumatoid arthritis and degenerative shoulder conditions. The primary aim of our case report is to demonstrate the use of ultrasound guidance for accurate interpretation of the structures in the scanning of the SSN as well as targeted administration of corticosteroid with local anaesthetic to facilitate blockade of suprascapular nerve in a stroke survivor, who showed significant improvement in terms of alleviation of pain as well as range of movements in the affected shoulder.

Case History

A 70 year old male patient who had suffered left sided stroke two months ago was referred for pain management for the same complaint of severe pain in the left shoulder. The pain

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was provoked on all passive movements of the shoulder which prevented physiotherapy which is an extremely useful component in rehabilitation of stroke patients to restore strength. Limited shoulder motion and pain may profoundly affect many aspects of daily living, cause psychological distress, sleep problems and impact the quality of life. The imaging investigations revealed no gross anatomical abnormality for the restricted range of movements and diagnosis of shoulder hand syndrome was made. The pain is similar to adhesive capsulitis or frozen shoulder. The patient had failed conservative management with topical modalities, oral medications and inability to do physiotherapy worsened his condition progressively resulting in excruciating pain. At our hospital, the Pain Specialist advised to subject him to a minimally invasive specialised procedure called suprascapular nerve block under Ultrasound guidance with the help of Consultant Sonologist. The procedure was carried out under local anaesthesia in the Department of Ultrasound on outpatient basis.

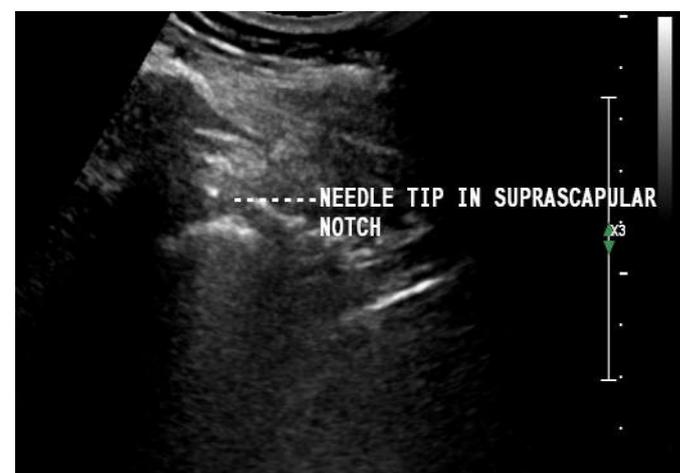
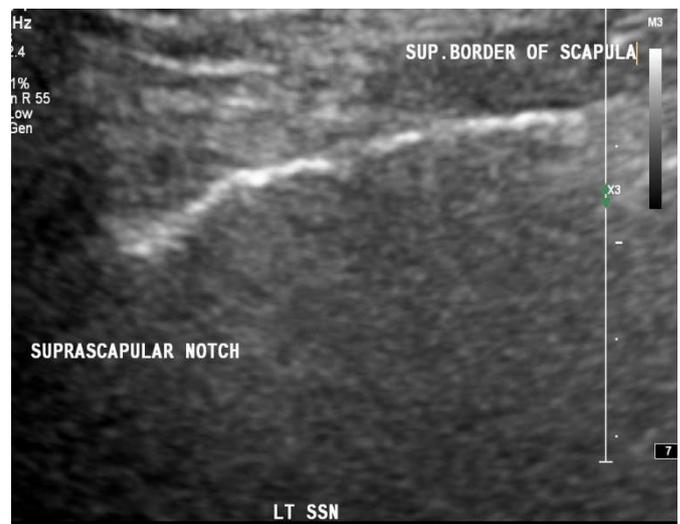
Technique: The patient is in a comfortable sitting position with hand resting on contralateral shoulder and a linear array transducer is used. In some cases, curvilinear transducer may be used for visualisation if the field of view of linear transducer is limited by the patient's body habitus. The ultrasound transducer in a transverse orientation is placed over the scapular spine. By moving the transducer cephalad, the suprascapular fossa is identified. While imaging the supraspinatus muscle and the bony fossa underneath, by moving the ultrasound transducer laterally (maintaining a transverse transducer orientation), the suprascapular notch will be located. This notch is converted into a foramen by the superior transverse scapular ligament which allows the passage of the suprascapular nerve with the suprascapular artery traversing superior to the superior transverse ligament. The supra-scapular nerve is seen as a round hyperechoic structure at 4 cm depth beneath the transverse scapular ligament in the scapular notch. A 22-gauge spinal needle is inserted along the longitudinal axis of the ultrasound beam. After aspiration to ensure that the needle was not in the suprascapular artery or vein, Bupivacaine 0.25% (4 ml) and triamcinalone (40 mgs) are injected with spread of the drug noted in real-time.

RESULTS

He got excellent pain relief almost immediately and remained pain free to cooperate for the physical therapy. This procedure helped in breaking the vicious cycle of pain, stiffness resulting into more pain. At the two week follow-up, the patient's pain had significantly reduced and his shoulder movements and function had improved as well. The patient was evaluated on a Numeric Rating Scale (NRS) on a scale of 0-10 (0 representing No pain to 10 representative of worst pain ever). At the time of presentation the patient indicated his pain to be at 9 on NRS scale. Immediate post procedure the patient indicated the pain to be 3 (Hurts little bit) while at 12 weeks follow-up he indicated the pain to be at 1 (No hurt).

DISCUSSION

Suprascapular nerve arises from the upper trunk of the brachial plexus which is formed by the union of the ventral rami of the fifth and sixth cervical nerves (C5,6).



It then traverses the suprascapular notch and descends deep to the supraspinatus and infraspinatus. The SSN provides 70% of sensory innervation to the shoulder joint.⁷ Etiologies that contribute to chronic shoulder pain, the afferent fibers of SSN may become entrapped by injured tissues or sensitized due to chronic pain. The result of our case study showed that suprascapular nerve block (SSNB) using a local anaesthetic with a corticosteroid was more effective, safe and with good compliance, especially for reducing pain and improving range of movement in hemiplegic shoulder. Compared to blind intra-articular corticosteroid injection, ultrasound guided SSNB with a combination of medication as described above was significantly better for reducing pain immediate after the procedure as well as at a 12-week follow-up. SSNB is shown to be an effective and safe method for pain relief and improving the range of motion (ROM) in many other groups of patients who had shoulder pain from a variety of other causes such as non-specific shoulder pain, chronic shoulder pain (Shanahan, 2003), rotator cuff tendonitis, rheumatoid arthritis, frozen shoulder (Jones, 1999), and pain after arthroscopic shoulder surgery.

Few of the major complications of targeting the SSN at the notch are the potential risk of pneumothorax, intravascular injection, injury or misplacement (Moore, 1979). The precision of the needle tip location is significantly improved by using imaging techniques, such as ultrasound guidance. These potential complications can hence be avoided as the pleura lies anterior to the scapula and using a sagittal transducer orientation, the pleura can be identified deep to the superior border of the scapula at its medial aspect.

Conclusion

Shoulder pain following stroke is a common ailment with limited treatment options. Suprascapular nerve block is a promising treatment and our result suggests that its effects are not confined to one stroke subtype. Furthermore, this technique has proven to be a cost effective alternative to surgery.

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