

Submitted:
03.10.2020
Accepted:
27.12.2020
Published:
08.03.2021

Ultrasound guided injection of the rotator interval – Gaurav-Botchu technique

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DOI: 10.15557/JoU.2021.0013

Keywords

rotator interval,
injection,
ultrasound

Abstract

Ultrasound-guided injection of the shoulder via the rotator interval can be challenging. The procedure is used for arthrograms, hydrodilataion and intra-articular glenohumeral joint injections. The conventional approach to the rotator interval is from lateral to medial. However, the placement of the needle in the target zone i.e. between the coracohumeral ligament and the long head of the biceps tendon can be difficult and challenging. Inadvertent injection performed with the needle in the long head of the biceps tendon can result in a biceps tendon rupture. We describe a new method (Gaurav-Botchu technique) to access the target zone (between the coracohumeral ligament and the long head of the biceps tendon) via a medial to lateral approach, which increases the target zone.

Introduction

Ultrasound-guided injection of the rotator interval is a well-established technique for arthrogram, intra-articular glenohumeral joint injection, and hydrodilataion⁽¹⁻³⁾. Successful placement of the needle in the target zone between the coracohumeral ligament (CHL) and the long head of the biceps tendon (LHB) can be challenging. This is performed via lateral to medial approach (Fig. 1, Fig. 2). We describe a new method to access the target zone (Gaurav-Botchu technique).

Anatomy

The rotator interval (RI) is a key anatomical structure for the stability of the shoulder. This complex triangular region includes the long head of the biceps tendon (LHB), which is stabilised by the coracohumeral ligament (CHL) and the superior glenohumeral ligament. (SGHL). The CHL forms the roof and medial part of the RI, with the SGHL contributing to the medial part and floor of the rotator interval (Fig. 3). There is marked thickening of the CHL in adhesive capsulitis with associated synovitis in the RI⁽⁴⁾.

Technique for accessing the RI

The patient is supine, with the ipsilateral arm in external rotation. A high-frequency (15 MHz) linear transducer is placed over the LHB in the axial position over the rotator

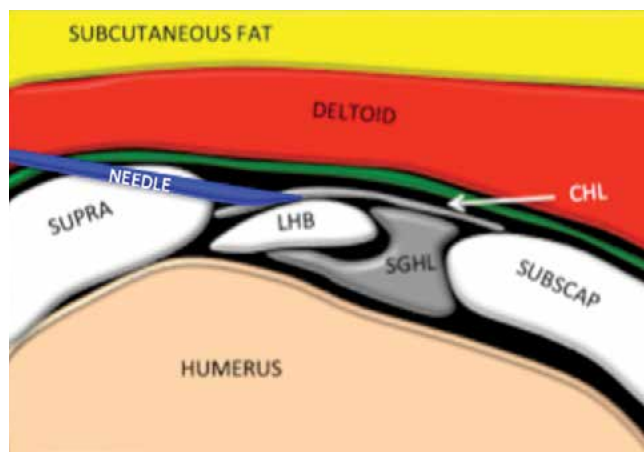


Fig. 1. Schematic diagram of rotator interval showing needle tip in target zone via lateral to medial approach

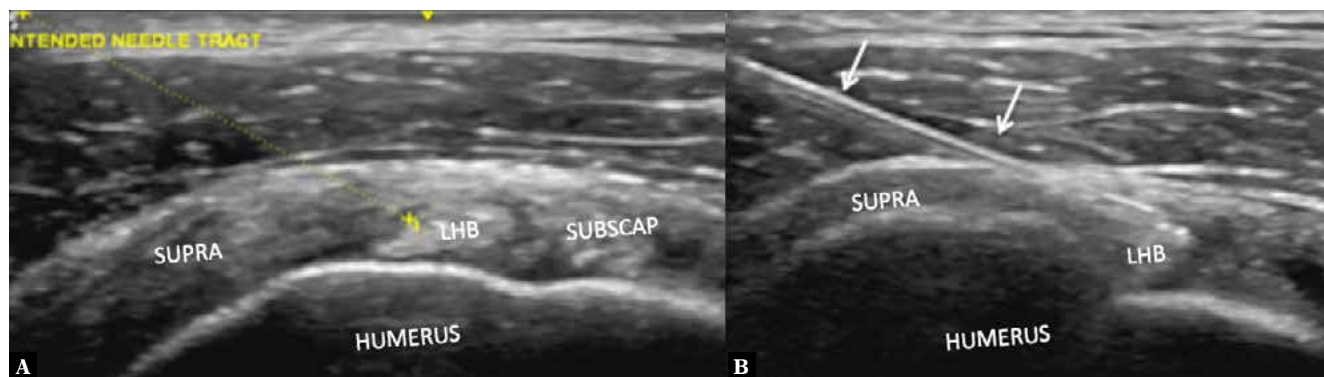


Fig. 2. Axial ultrasound showing the indented trajectory of the needle (A) with a needle tip in the target zone (B) via lateral to medial approach

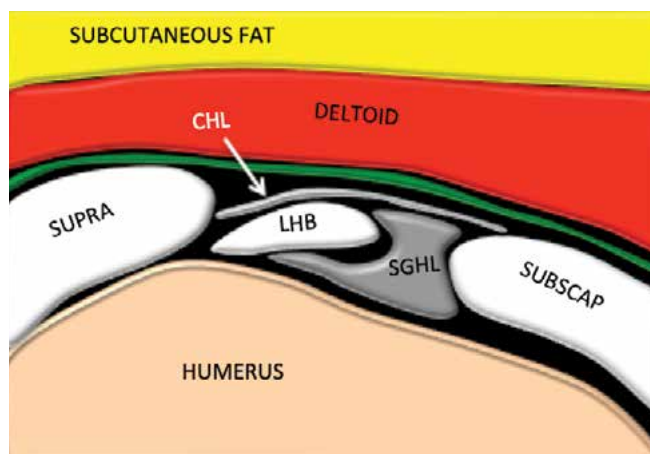


Fig. 3. Schematic anatomy of rotator interval. LHB (long head of biceps), SGHL (superior glenohumeral ligament), SUBSCAP (subscapularis), CHL (coracohumeral ligament), SUPRA (supraspinatus)

interval. The LHB is seen as a hyperechoic ellipsoid structure with a thin anterior hypoechoic CHL and a relatively thicker hypoechoic SGHL, medial and inferior to the LHB. Skin disinfection is required, but skin anaesthesia may or

may not be necessary. A needle (21G, 22G or 23G, depending on the operator) is inserted into the interval between the CHL and LHB, via a medial to lateral approach, traversing through the deltoid (Fig. 4, Fig. 5, Fig 6). The injectate is then injected into the target zone with a free flow indicating successful placement of the needle.

Discussion

Ultrasound-guided injection of the RI is an established technique for hydrodilataion, intra-articular injection, and arthrograms⁽¹⁻³⁾. The procedure is performed via a lateral to medial approach. The target for the approach is the interval between the long head of the biceps and the CHL. The orientation of the CHL is parallel to the superior configuration of the LHB. In the lateral to medial approach, the target zone is 0.5 mm (average). It can be challenging to precisely insert the needle tip in this narrow target zone, especially for beginners, and this could result in inadvertent injection into the LHB. Moreover, this approach involves traversing the supraspinatus tendon.

The target zone in the medial to lateral approach (Gaurav-Botchu technique) is significantly increased (2 mm). This

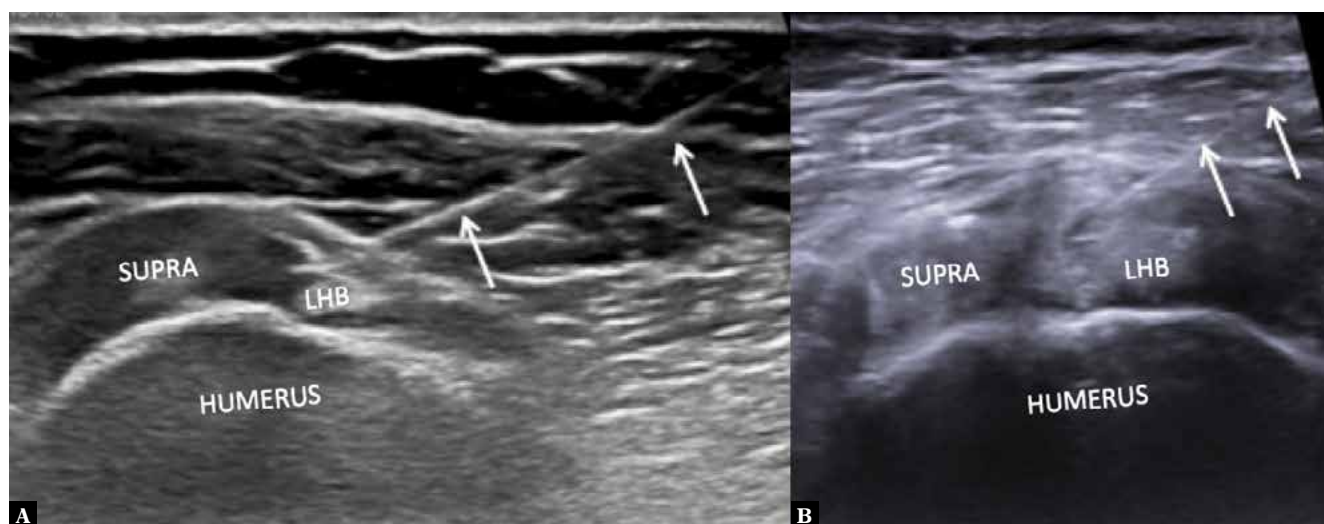


Fig. 4. Axial ultrasound images of two patients (A, B) with needle tip (arrow) in the target zone via medial to lateral approach

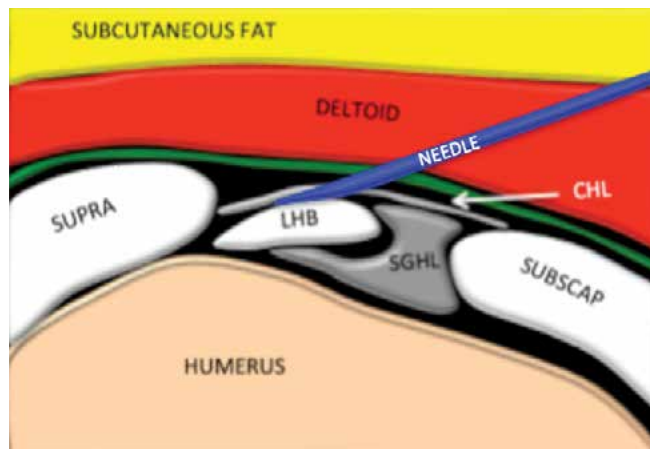


Fig. 5. Schematic diagram of rotator interval showing needle tip in target zone via medial to lateral approach



Fig. 6. Image showing the approach to rotator interval via the Gaurav-Botchu technique

enables a larger portion of the needle to be inserted into the target zone, thus theoretically increasing the success of the procedure. In addition, the trajectory of the needle avoids the supraspinatus, and the procedure is relatively well tolerated.

Conclusions

The Gaurav-Botchu technique is a relatively safer and easier method than the traditional lateral to medial approach for RI injection.

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Conflict of interest

Authors do not report any financial or personal connections with other persons or organisations which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

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