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Changes in the Neurovascular Anatomy of the Shoulder Following an Open Latarjet Procedure: Defining a Surgical Safe Zone

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Summary:

The purpose of this study was to define the neurovascular anatomy of the native shoulder and to define the anatomy following a Latarjet procedure to determine minimal safe zone distances to these neurovascular structures with and without a musculocutaneous nerve neurolysis.

Abstract:

Aim

The purpose of this study was to define the neurovascular anatomy of the native shoulder and to define the anatomy following a Latarjet procedure to determine minimal safe zone distances to these neurovascular structures with and without a musculocutaneous nerve neurolysis.

Background

Although previous literature has described the relevant anatomy to an open anterior Bankart approach of the shoulder, there is little known about neurovascular structure anatomic changes after an open Latarjet procedure.

Methods

Fourteen fresh-frozen male cadaveric shoulders (seven matched pairs) were utilized. The distances of 7 neurovascular structures (the main trunk of the musculocutaneous (MC) nerve at its conjoint tendon insertion, the MC nerve when closest to the coracoid process, lateral cord of plexus, split of the lateral cord and MC nerve, posterior cord of plexus, axillary nerve and axillary artery) to pertinent landmarks were first measured in the native state in relation to the coracoid, and again after a Latarjet procedure in relation to the glenoid. Additionally, the measurements were performed both with and without neurolysis of the MC nerve from the conjoint tendon. All measurements were performed using digital calipers and reported as the median with ranges (lowest, highest).

Results

The MC nerve entry into the conjoint tendon was 56.5 [43, 82.2] mm from the tip of the coracoid in the neurolysis group and 57.1 [23.5, 92.9] mm in the non-neurolysis group ($p=0.32$). The MC nerve entry into the conjoint tendon was 43.8 [20.2, 58.3] mm from the 3 o'clock position of the glenoid in the neurolysis group and 35.6 [27.3, 84.5] mm

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in the non-neurolysis group ($p=0.83$). The MC nerve entry into the conjoint tendon was 35.6 [25.1, 58] mm from the 6 o'clock position in the neurolysis group and 36.3 [24.4, 77.9] mm in the non-neurolysis group ($p=0.99$). The closest neurovascular structure in relation to both the 3 o'clock and the 6 o'clock positions to the coracoid was the axillary nerve at 27.4 [19.8, 40] mm and 27.7 [23.2, 36.1] mm, respectively. The posterior cord was also located at 30.7 [23.6, 49.3] mm at the 3 o'clock position and 35.4 [27.5, 51.6] mm from the 6 o'clock position.

Conclusions

This study identified a minimum surgical safe zone medial to the glenoid after a Latarjet procedure to be approximately 19.8 mm for the axillary nerve, 23.6 mm for the posterior cord, and 24.4 mm and 20.2 mm for the MC nerve, prior to and after a neurolysis, respectively. Knowledge of these minimal safe zone distances will help avoid iatrogenic damage.