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Ultrasound-guided rotator interval or subacromial corticosteroid injection in primary adhesive capsulitis of the shoulder: Does it make a difference?

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Abstract

Primary adhesive capsulitis occurs spontaneously without any predisposing factors. Diabetes, diseases of thyroid, cerebrovascular accident, coronary artery diseases, autoimmune disease and Dupuytren's contracture are some of the associated conditions. Various treatment methods for adhesive capsulitis of shoulder including physical therapy, intraarticular corticosteroid injections, manipulation under anaesthesia, and arthroscopic or open capsular release have been described. Intra-articular, subacromial, rotator interval and bicipital grove are the various sites for corticosteroid injection in adhesive capsulitis. Ultrasound has been used widely in shoulder joint injections to improve accuracy. There is limited data comparing these sites for their efficacy in adhesive capsulitis when injected under ultrasound guidance. In this study, we compared ultrasound-guided corticosteroid injection through rotator interval and subacromial route shoulder joint in adhesive capsulitis of shoulder.

Keywords: frozen Shoulder; Restricted Shoulder Abduction; Visual Analogue Scale; Adhesive Capsulitis

1. Introduction

Adhesive capsulitis is a common cause of painful stiffness of shoulder affecting activities of daily life(1). Adhesive capsulitis or frozen shoulder is a common condition that presents with pain and progressive limitation of both active and passive shoulder movements. It is estimated to affect 2%–5% of the general population, and up to 20% of patients with diabetes mellitus.(1) It can be either primary (idiopathic) or secondary; the latter includes causes such as rotator cuff tear, hemiparesis, cardiovascular diseases and diabetes mellitus.(1,2)

Primary adhesive capsulitis occurs spontaneously without any predisposing factors. Diabetes, diseases of thyroid, cerebrovascular accident, coronary artery diseases, autoimmune disease and Dupuytren's contracture are some of the associated conditions. Various treatment methods for adhesive capsulitis of shoulder including physical therapy, intraarticular corticosteroid injections, manipulation under anaesthesia, and arthroscopic or open capsular release have been described (3). Intra-articular, subacromial, rotator interval and bicipital grove are the various sites for corticosteroid injection in adhesive capsulitis. Ultrasound has been used widely in shoulder joint injections to improve accuracy.

The American Shoulder and Elbow Surgeons (ASES) defines adhesive capsulitis as "a condition of uncertain aetiology characterised by significant restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder".(1,3) However, there is no consensus on the exact range of motion (ROM) limitation of this condition, leading to confusion about its clinical diagnosis.(4)

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Adhesive capsulitis is commonly described as passing through three stages: Stage 1 (freezing stage) with increasing pain and stiffness lasting 2–9 months; Stage 2 (frozen stage) with persistent stiffness lasting 4–12 months; and Stage 3 (thawing stage) with spontaneous recovery lasting 12–42 months.(5) While commonly described as a self-limiting condition with spontaneous recovery within 2–3 years, up to 40% of patients may experience persistent symptoms, with 7%–15% having some degree of permanent functional loss.(4,6,7)

There is limited data comparing these sites for their efficacy in adhesive capsulitis when injected under ultrasound guidance. In this study, we compared ultrasound-guided corticosteroid injection through rotator interval and subacromial route shoulder joint in adhesive capsulitis of shoulder.

2. Material and methods

This was a prospective cross-sectional observational study conducted in the Department of Orthopaedics in Justice K.S. Hegde Charitable hospital, Mangalore, India between January 2020- June 2021. The study included a total of 30 study participants, 15 in rotator interval and 15 in subacromial group respectively.

The study included patients with symptoms lasting for at least 1 month, and didn't respond to treatment, aged between 25-80 years. Patient with previous injections to the shoulder, osteoarthritis, fractures involving shoulder joint and rotator cuff tear were excluded from the study.

The patients were randomly divided into two groups- Group 1 consisting of 15 patients is given sub acromial corticosteroid injection and group 2 consisting of 15 patients is given rotator interval corticosteroid injection. The VAS, SPADI score and Shoulder ROM will be assessed pre injection and post injection at 3 weeks, 6 weeks and 12 weeks.

The data collected was recorded in a semistructured pro forma, and analyzed using SPSS software v21.

3. Results

The comparison of Preinjection VAS between the three groups shows that 40-50 group has the highest value of 7.83 and >60 has the least value of 6.25. At 3 weeks, it was observed that 51-60 group has the highest value of 3.3 and >60 has the least value of 2.75. At 6 weeks, it was observed that 40-50 group has the highest value of 2.42 and 51-60 has the least value of 2.2. at 12 weeks also, the similar findings were noted.

The comparison of VAS at 3, 6 and 12 weeks between the three groups shows that 40-50 group has the highest value and >60 has the least value. However, this difference was not statistically significant.

The comparison of Preinjection SPADI between the three groups shows that 40-50 group has the highest value of 82.58 and >60 has the least value of 67.88. This difference is statistically Insignificant with a test value of 1.068 and p value of 0.358.

The comparison of 3 weeks SPADI between the three groups shows that 40-50 group has the highest value of 38.08 and >60 has the least value of 24.38. This difference is statistically Insignificant with a test value of 1.401* and p value of 0.274.

The comparison of 6 and 12 weeks SPADI between the three groups shows that 40-50 group has the highest value and >60 has the least value.

4. Discussion

Adhesive capsulitis is a painful condition of the shoulder which causes disability in the form of loss of range of movement (Niels). Corticosteroid injection is one of the common method of treatment for frozen shoulder. There are different methods of steroid injection into shoulder such as intra-articular, sub acromial or rotator interval with or without ultrasound guidance. There are conflicting reports in the literature regarding the advantages and disadvantages of these various methods of steroid injection. Hence in this study we compared the functional outcome of patients with adhesive capsulitis following corticosteroid injection into the subacromial space and rotator interval under ultrasound guidance.

4.1. Age distribution

Our study included 30 subjects with adhesive capsulitis of shoulder with a mean age group of 53.87 years; the mean age of 15 subjects in rotator interval group was 55.07 years and the mean age of 15 subjects in sub acromial group was 54.67 years. In a study conducted by Oh JH et al (8), the mean age of 37 subjects in the gleno-humeral group was 55.7 years and that of 34 subjects in the subacromial group was 58.3 years. Yoon JP et al (5) conducted a study in which 86 subjects were involved, the mean age group was 54 66 years. Hence the age group of patients included in our study was comparable with other similar studies.

4.2. Sex distribution

In our study, out of 30 subjects 19 are males and 11 are females. In comparison, Oh JH et al (8) reported 71 subjects with primary frozen shoulder of which 32 were males and 39 were females. In another study by Goyal T et al (7) out of 105 study subjects, 33 were males 72 were female subjects.

4.3. Vas score assessment

Mean VAS score of patients in rotator interval group improved from 707 prior to corticosteroid injection to 2.53, 1.8, and 1.73 at 3, 6 and 12 weeks follow up which was statistically significant. Mean VAS score of patients in subacromial group improved from 74 to 3.67.28 and 2.73 at 3, 6, and 12 weeks followup which was again statistically significant. But this improvement in VAS score when compared between the two groups was not statistically significant

In a study conducted by Yaying Sun et al (11) to compare the functional outcome in patients with frozen shoulder after subacromial, rotator interval and intra articular steroid injection, it was found that VAS score improved from 76 to 12 at 12 weeks post rotator interval injection whereas VAS score improved from 7.4 to 5.6 at 12 weeks post subacromial steroid injection which was statistically significant

4.4. Spadi score assessment

In our study, mean SPADI score in the rotator interval group was 68.13 prior to steroid injection improved to 28.33, 19.60 and 16.07 at 3, 6 and 12 weeks respectively. The mean SPADI score in the subacromial group improved from 80.27 prior to steroid injection to 39.27,30.67 and 27.47 at 3, 6 and 12 weeks respectively. Even though SPADI score improvement was noted at the follow ups, there was no significant difference in SPADI score between sub acromial and glenohumeral groups at the follow ups. This is in line with study conducted by Neils Gunnar et al (8) where mean SPADI score was noted to be 65 pre injection that improved to 39 at 4 weeks follow up and 23 at 12 weeks following steroid injection via rotator interval. In a study conducted by Goyal et al (7) SPADI score was assessed pre and post steroid injection at 3, 6 and 12 weeks and at 6 months. SPADI score improved from 44.5 pre injection to 18.2 post injection at 12 weeks follow up in subacromial group.

5. Conclusion

With ultrasound guided intra-articular corticosteroid injection, there was a significant improvement in ROM, reduction in pain and discomfort with an improved SPADI score in both groups. However, there was no difference between the two groups. Hence, the site of injection doesn't significantly improve the outcomes in such cases.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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