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بالرسالة صفحات لم ترد بالأصل

Injection of Sodium Hyalournate versus Steroid Guided by Ultrasound in Management of Rotator Cuff Tendinopathy

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ABSTRACT

Background: Rotator cuff (RC) tendinopathy is a common source of pain and shoulder dysfunction that affects both the young and older population. The available research findings emphasize the multifactorial origin of RC tendinopathy that begins as a failure in the tendon fibers due to the overuse and cyclic loading on their internal side

Aim of the Work: To compare effect of injection of sodium hyaluronate versus steroid guided by ultrasound in treatment of rotator cuff tendinopathy.

Patient and Methods: This study was conducted at the Department of Physical Medicine, Rheumatology and Rehabilitation at Ain Shams University Hospitals on 30 patients with shoulder pain. All patients were subjected to history taking, clinical examination and laboratory investigations together with diagnostic musculoskeletal ultrasound. We assessed by Pain and function scores using the visual analog scale (VAS), Oxford shoulder score (OSS), and Constant shoulder score (CSS). All patients were randomly assigned into one of two groups: Group I who received single steroid injection, Group II who received single hyaluronic acid injection. Patients were followed up after 2 months of injections.

Results: Group I there were highly statistically significance differences between pre and post injection in Constant shoulder score, Oxford shoulder and VAS (i.e. improvement) ($p < 0.01$), Group II there were highly statistically significance differences between pre and post injection in Contestant shoulder score, Oxford shoulder and VAS (i.e. improvement) ($p <0.01$). On comparison between group I and group II post 2month injection. There were highly statistically significant differences (improvement) in group II versus group I as regarded Constant shoulder score and VAS ($P <0.01$). There were no statistically significant differences between two groups as regarded oxford shoulder score ($p >0.05$)

Conclusion: Hyaluronic acid injection offers better therapeutic advantages over a corticosteroid injection in the treatment of rotator cuff tendinopathy especially in the intermediate-term follow up.

Keywords: Sodium Hyalournate, Steroid Guided, Ultrasound, Rotator Cuff Tendinopathy

INTRODUCTION

Rotator cuff (RC) tendinopathy is a common source of pain and shoulder dysfunction that affects both the young and older population. The available research findings emphasize the multifactorial origin of RC tendinopathy that begins as a failure in the tendon fibers due to the overuse and cyclic loading on their internal side ***(Lewis, 2009).***

RC tendinopathy occurs for a multitude of reasons. Intrinsic mechanisms are associated with the tendon itself and can be from aging, altered biology, microvascular blood supply, degeneration, tendon overload, overuse, or trauma. Intrinsic factors that contribute to RC tendon degradation with tensile/shear overload include alterations in biology, mechanical properties, morphology, and vascularity ***(Factor and Dale, 2014).***

Extrinsic mechanisms for RC tendinopathy include anatomic variables that set up conditions for impingement ***(Yamamoto et al., 2009)***. Shoulder impingement is the main extrinsic cause of RC tendinopathy. It occurs with mechanical compression of the external portion (bursal side) of the tendon, which leads to inflammation and degeneration. Upon repeated occurrence, the coracoacromial ligament may thicken, decreasing the subacromial space ***(Umer et al., 2012).***

Decreased microvascular blood supply has been discussed as a possible cause of intrinsic pathology but it can also be from an extrinsic cause ***(Maffulli et al., 2011)***. A tight posterior capsule may cause changes in GH movement which could set up the patient for the development of impingement ***(Umer et al., 2012).***

Ultrasound is an established and well-accepted modality for the evaluation of structures around the shoulder, being accurate, low cost and radiation free ***(Corazza et al., 2015).*** As the shoulder has a superficial anatomical position, it represents an excellent target to perform interventional procedures under ultrasound guidance. Thus, a number of pathological conditions can be treated using ultrasound as guidance for needles ***(Sconfienza et al., 2012).***

Hyaluronic acid (or "hyaluronan", or "sodium hyaluronate preparation") is a high molecular weight glycosaminiglycan consists of the repetition of a disaccharide unit of an N-acetyl-glucosamine and a β-glucuronic acid. Its most important physicochemical properties are its capacity to retain water, having a very high hydration ratio, and its visco-elasticity. Changes in HA concentrations within the extracellular matrix modulate a variety of cellular functions, such as cell migration, adhesion, and proliferation. Several important medical applications of HA have been discovered for joints degeneration. Additionally, high local concentration of HA causes release of endogenous growth factors and stimulates

cell–cell interaction, resulting in faster cell proliferation during early stages of in vitro culture ***(Osti et al., 2015).***

The mechanisms of action of glucocorticoids are multiple, highly complex and incompletely understood; one important pathway involves the activation of specific cytoplasmic glucocorticoid receptors which then migrate to the cell nucleus to affect gene transcription ***(Barnes, 2006).*** Several studies have shown that glucocorticoid is antiproliferative, reduces type I collagen formation and has cytotoxic effects on tendon cells ***(Dean et al., 2014).***

Unlike steroids, shown to be effective for reducing acute pain, improvement due to injections of HA was more gradual but more prolonged over time. These results are consistent with the widely accepted idea that corticosteroids could be more effective in reducing inflammation and ameliorating pain in its earliest form, while the regeneration of the viscoelasticity of the synovial fluid achieved by HA could improve the homeostasis of the joint, contributing to more long-lasting improvement of both function and pain ***(Monfort et al., 2015).***

AIM OF THE WORK

To compare effect of injection of sodium hyaluronate versus steroid guided by ultrasound in treatment of rotator cuff tendinopathy.

Chapter 1

ANATOMY

The Shoulder consists of 3 bony structures: the scapula, including the coracoid process and acromion; the clavicle; and the humerus. Motion of the upper arm is the result of simultaneous motions in the glenohumeral joint, the acromioclavicular joint, the sternoclavicular joint, and the scapulothoracic junction (Fig. 1) ***(Forriol et al., 2012).***

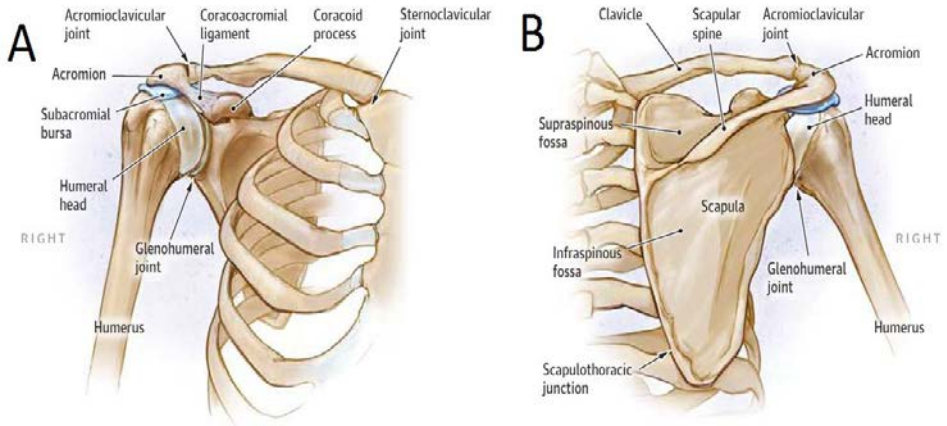

Figure 1: Musculoskeletal anatomy of the shoulder; A) anterior view, B) posterior view ***(Hermans et al., 2013).***

The Glenohumeral joint is nearly a spherical Ball and Socket joint characterized by its mobility and large range of motion. The bony discrepancy between the glenoid and the humeral head allows this wide range of motion making it susceptible to instability and dislocation ***(Tischer et al., 2011).***

Thus the stability of the glenohumeral joint is complex in nature and is determined by several structures interacting with

each other including the labrum, shoulder capsule, and the superior, middle, and inferior glenohumeral ligaments as well as the dynamic muscular stabilizers; rotator cuff and other muscles surrounding the shoulder ***(Apostolakos et al., 2015).***

Rotator cuff Muscles

These muscles both move the shoulder and stabilize it – 'movers' and 'shakers'. The rotator cuff muscles predominantly stabilize the glenohumeral joint, but also contribute significantly to movement.

The rotator cuff muscles are:

1. Supraspinatus
2. Infraspinatus
3. Teres Minor
4. Subscapularis

The tendons of these muscles coalesce to form the rotator cuff (Fig. 2) the muscles are inseparable at this level, except for subscapularis which is separate and joined to the rest of the cuff via the rotator interval ***(Funk, 2005).***

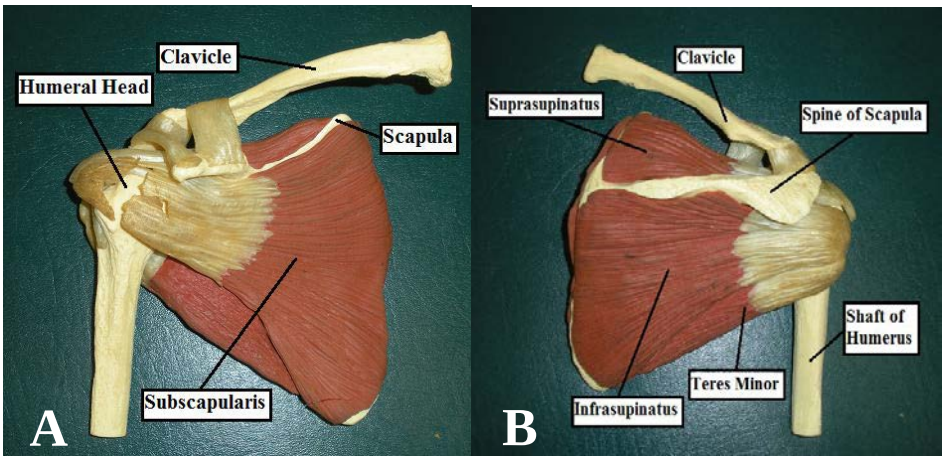

Figure 2: a: anterior view of shoulder, b: posterior view of shoulder ***(Ujino, 2012).***

1. Supraspinatus:

The supraspinatus muscle takes fleshy origin in the supraspinatus fossa to have a tendinous insertion onto the greater tuberosity. This muscle is categorized as a circumpennate muscle. The superficial tendon fibers run longitudinally whereas the deep ones run obliquely. The supraspinatus is part of the force couple to stabilize the glenohumeral joint by compression and initiate elevation. Supraspinatus muscle is supplied by suprascapular nerve (C5-6) ***(Halder et al., 2000).***

2. Infraspinatus:

The infraspinatus originates from the infraspinous fossa and extends laterally to its tendinous insertion on the middle facet of the greater tuberosity. The infraspinatus, along with the teres minor, provides the primary external rotation force and also stabilizes the glenohumeral joint against posterior

subluxation. It is innervated by the suprascapular nerve ***(Terry and Chopp, 2000).***

3. Teres minor:

Origin of the teres minor muscle is the lateral border of the scapula and the infraspinatus fascia, and its insertion is located inferior to the infraspinatus muscle on the inferior facet of the greater tuberosity. The teres minor muscle acts as stabilizer of the glenohumeral joint by resisting posterior and superior translation and generates 45% of the total external rotation force. It is supplies by the posterior branch of the axillary nerve (C5-6) ***(Halder et al., 2000).***

3. The subscapularis:

It originates from the subscapular fossa to extend laterally to its insertion on the lesser tuberosity of the humerus. The tendon of the subscapularis is intimately associated with the anterior capsule. The subscapularis functions as an internal rotator, especially in maximum internal rotation. Innervation is from the upper and lower subscapular nerves ***(Terry and Chopp, 2000).***

The Rotator cable

This cable is a semilunar arch within the rotator cuff ***(Burkhart et al., 1993).*** It's a 1-cm thickening within the supraspinatus and infraspinatus tendons that originates

anteriorly near the rotator/biceps tendon interval and terminates between the infraspinatus and teres minor insertions (Fig. 3). The cable's collagen fibers run transversely to the longitudinal fibres of the supraspinatus and infraspinatus, until it inserts at the lateral edge of the bicipital groove where it merges with the coracohumeral ligament and transverse humeral ligament, covering the long head of the biceps ***(De Vita et al., 2008).***

The cable's ability to transfer load may explain why the rotator cuff continues to function despite a tear. As long as the cable remains attached, the humeral head can maintain its center of rotation even in the presence of a large to massive tear ***(Burkhart, 1992; Oh et al., 2011).*** A tear in the anterior cable, as opposed to a crescent, creates a larger gap, increases cuff strain, and loses its stress shielding capabilities ***(Mesiha et al., 2013).***

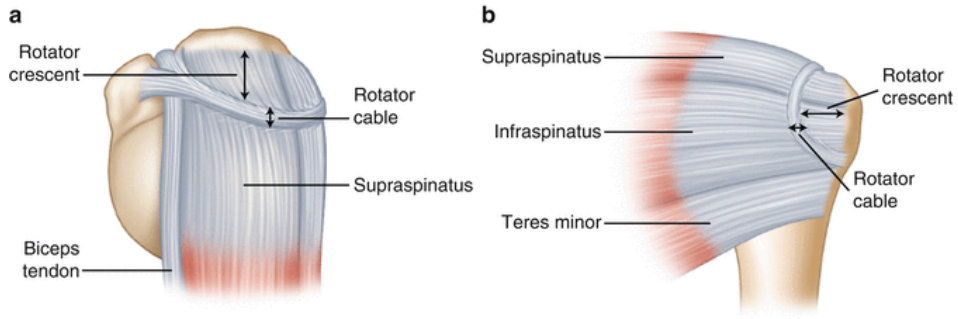

Figure 3: a) Superior and **b)** posterior view illustrating the position of the rotator cable and rotator crescent ***(Warth and Millett, 2015).***

The Rotator Crescent

It is the terminal part of the rotator cuff and capsule as they insert into the greater tuberosity. The rotator crescent is