Arthroscopic Management of Bursal Sided Rotator Cuff Tears, In Situ Repair vs Conversion

A Systematic Review of Literature

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بسم الله الرحمن الرحيم
رب أوزعني أن أشكر نعمتك التي أنعمت علي وعلى والدي
وأن أعمل صالحا ترضاه وأدخلني برحمتك
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List of Abbreviations

Abb.	Full term

Abd..... *Abduction*
ACSA .....*Anatomical cross-sectional area*
AF .....*Attachment fibrocartilage*
ASES .....*American Shoulder & Elbow Surgeon Shoulder Score*
BT .....*Bursal tears*
CHL .....*Coraco-humeral ligament*
ER .....*External Rotation*
FF.....*Forward Flexion*
GT .....*Greater tuberosity*
IR .....*Internal Rotation*
IS.....*Infraspinatus*
MRA.....*Magnetic resonance angiography*
MRI.....*Magnetic resonance imaging*
PTRCTs .....*Partial thickness rotator cuff tears*
RCT.....*Rotator Cuff tears*
SC.....*Subscapularis*
SS.....*Supraspinatus*
TM.....*Teres minor*
TOE.....*Transosseus-Equivalent*
UCLA.....*University of California Los Angeles shoulder score*
US .....*Ultra sound*
VAS.....*Visual analogue scale*

Arthroscopic Management of Bursal Sided Rotator Cuff Tears, In Situ Repair vs Conversion (A Systematic Review of Literature)

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Abstract

Background and Rational: Rotator cuff tears are a common source of pain and dysfunction in various groups of age and occupation. The tear can either be complete or partial thickness rotator cuff tears (PTRCTs). PTRCTs involving <50% of the thickness have been managed arthroscopically by debridement alone without acromioplasty. While massive PTRCTs involving more than 50% were repaired either arthroscopically by convergence to full thickness tears then tendon repair or in situ repair. There is no widely accepted technique in repairing Bursal sided PTRCTs. This study is to conduct a systematic review to compare the results of two of the most commonly used surgeries for management of bursal side rotator cuff tears, repair in situ vs tear completion then repair, as the search for the optimal surgery is crucial to improve long term outcomes, decrease side effects and costs and enhance patient quality of life.

Methodology: The search was conducted using the databases Medline, PubMed, Medscape, Cochrane library, using the following keywords: "partial rotator cuff tears", "bursal sided tears", "in situ" "convergence" and "arthroscopic management" for published studies from 1990 to 2018.

Results: Our search included 11 studies, 5 tear completion, 4 repair in situ and 2 were comparative of both techniques. Studies showed insignificant difference in clinical outcomes between both surgical procedures, both repair in situ and tear completion techniques produce good results in rotator cuff tears techniques thus both remain in their places in management of bursal side rotator cuff tears.

Conclusion: Both in situ and tear completion techniques remain in their places in management of bursal side rotator cuff tears. We suggest that the final consensus should be postponed until further studies are the future, systematic reviews & comparative studies with longer term follow up period are needed to evaluate and guide for the best arthroscopic management of bursal side rotator cuff tears.

Keywords: Supraspinatus, partial, thickness, bursal, rotator, cuff, tears, management, in situ, completion, convergence, arthroscopic.

INTRODUCTION

The rotator cuff is made up by four muscles. These are; subscapularis (SC), supraspinatus (SS), infraspinatus (IS) and teres minor (TM) muscles. They end in short, flat, broad tendons which fuse intimately with the fibrous capsule to form the musculotendinous cuff.[1]

The largest one of them is SC muscle, it is inserted in a comma-shaped pattern on the lesser tuberosity.[1]

The IS is second in size, inserted on the greater tuberosity Superiorly, the IS is interdigitated and wrapped around the posterior aspect of the SS tendon.[1]

The SS tendon is the third in size. Its footprint fills the sulcus between the biceps groove and the bare area. The insertion is directly on the articular surface throughout the entire length of the tendon.[2]

The TM, is the smallest muscle–tendon unit. The insertion is tapered rapidly from a few tendinous fibers superiorly, to purely muscle and capsule along the inferior half.[2]

Rotator cuff tears are a common source of pain and dysfunction in various groups of age and occupation. The tear can either be complete or partial thickness rotator cuff tears (PTRCTs).[3]

Usually younger patients suffering from rotator cuff injuries give a history of repetitive overhead sports & activities involving the rotator cuff or, less commonly, there is a history of trauma.[3]

On the contrary, older patients usually present with a gradual onset of shoulder pain having no clear history of predisposing trauma or sports involvement.[3]

There are important factors to consider when planning to manage PTRCTs, the size of tear, its depth, the patient's age, his activity level, and what caused the tear initially. [4]

Initially PTRCTs are managed conservatively. When conservative management fails operative management is indicated.[5]

PTRCTs involving <50% of the thickness have been managed arthroscopically by debridement alone without acromioplasty. However, 25% of cases managed without acromioplasty needed to repeat surgery. While PTRCTs involving more than 50% were repaired either arthroscopically or open by conversion to full thickness tears before tendon repair or in situ repair.[4]

Evidence suggests that patients with high-grade partial tears benefit from formal repair rather than debridement and/or acromioplasty alone. Although the current practice is to debride partial-thickness tears comprising <50% of the tendon

thickness and to repair tears comprising >50% of the thickness, the data supporting any particular management approach are variable and limited.[6]

Studies claim that conversion to full thickness tear leads to damage in the remaining rotator cuff tissue changing the cuff footprint, resulting in tension-length mismatch of repaired tissue which will lead to failure and higher tear recurrence.[4] Other studies describe various techniques for repairing the remnant tissue in situ preserving intact tendon fibers. These techniques include, single /double row technique and suture-bridge technique.[7]

There is no widely accepted technique in repairing Bursal sided PTRCTs, but overall, surgical intervention is indicated for most PTRCTs involving >50% of its thickness.[8]

Aim of the Work

A systematic review to evaluate the different methods in Arthroscopic management of partial bursal rotator cuff tears - in situ repair techniques versus convergence to full thickness tears then repair. The goal is to guide better intervention strategies for these patients.

REVIEW OF LITERATURE

Anatomy of the Rotator Cuff:

The rotator cuff is made by four muscles. These are; subscapularis, supraspinatus, infraspinatus and teres minor muscles. They end in short, flat, broad tendons which fuse intimately with the fibrous capsule to form the musculotendinous cuff. [1]

The largest one of them is the Subscapularis (SC) muscle, It is inserted in a comma-shaped pattern from 7 to 11 o'clock around the greater tuberosity (with the right shoulder used as a point of reference). Its distance from the articular surface taper from 0 mm superiorly to 18 mm inferiorly.[9]

The infraspinatus is second in size, inserting from approximately 1 to 3 o'clock (with the right shoulder used as a point of reference). The bipennate muscle tapered into a trapezoidal footprint with an average maximum length of 29 mm and width of 19. The insertion tapers away from the articular surface. The gap between the articular surface and the inferior insertion formed the "bare area".[9]

The supraspinatus tendon is third in size. Its footprint fills the sulcus between the biceps groove and the bare area in a trapezoidal shape that is wider proximally along the articular surface compared with the more distal insertion around the

tuberosity. The insertion is located from 11 to 1 o'clock. It has an average maximum length of 23 mm and an average maximum width of 16 mm.[9]

It inserts on an average of 0.9 mm from the edge of the articular surface, directly on the articular surface throughout the entire length of the tendon. The lateral most attachment continue over the lip of the greater tuberosity. The posterior border of the insertion is overlapped by the anterior border of the IS tendon. the SS tends to insert closer to the articular surface.[2]

The TM, the smallest muscle–tendon unit, had a relatively large footprint, inserting from 3 to 5 o'clock (with the right shoulder used as a point of reference) in a triangular shape. Distance from the articular surface averaged 10 mm.[9] The SS tendon inserted immediately adjacent to the articular margin; the IS and TM tapered laterally away from the margin to create the bare area. This is critical in the restoration of torn tendons back to their proper locations, which is more difficult in chronic, neglected tears, where in anatomic relationships may not be as obvious as in acute tears with minimal retraction. [9] The coraco-humeral ligament lies in between supraspinatus and subscapularis muscles differentiating them.[9]

Functionally; Tendons of the rotator cuff muscles strengthen the loose fibrous capsule of the shoulder joint inferiorly where it is at its weakest.[9]