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Management Of Degenerative Rotator Cuff Tears By Mini-Open Method.

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ABSTRACT

Most of the guiding principles used for decision making in treating rotator cuff disease are based on limited evidence and minimal science. Present study was conducted in our department with series of 15 patients operated for it. Degenerative rotator cuff tears tend to occur in older patients (>50 years old). Patients often have no history of trauma but present with progressive shoulder pain and/or dysfunction. A number of patients will develop an irreparable rotator cuff tear due to progression of the tear and tendon retraction, and some patients will go on to develop secondary degenerative changes of the glenohumeral joint termed rotator cuff arthropathy. Factors that seem to be important include duration of symptoms, weakness, size of the tear, and muscle atrophy. If surgery is performed, either by a mini-open or arthroscopic technique, a double-row bridging repair seems to be biomechanically stronger, provided this can be performed in a tension-free environment.

Keywords: degenerative rotator cuff tears, mini-open method

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INTRODUCTION

The earliest published description of a rotator cuff tear was by Alexander Munro some 220 years ago in 1788, describing a “hole with ragged edges in the capsular ligament of the humerus” [1]. Since this description, there has been little agreement amongst orthopaedic surgeons regarding the exact indications for surgical repair of a torn degenerative rotator cuff [2]. The purpose of this article is to present an overview of degenerative rotator cuff tears and a suggested management protocol based upon current evidence. The prevalence of rotator cuff disease increases with age, with 4% of asymptomatic patients aged less than 40 years and 54% of patients aged 60 years or over, having partial or complete tears of the rotator cuff on magnetic resonance scanning [3]. Ultrasound scanning has demonstrated that 13% of the population in the fifth decade, 20% in the sixth decade, and 31% in the seventh decade of life have a rotator cuff tear [4]. Yamaguchi et al [5] demonstrated that more than half of asymptomatic rotator cuff tears become symptomatic within 3 years and progressed in size during this time period.

METHODOLOGY

Present study was conducted in our department with series of 15 patients operated for it. Degenerative rotator cuff tears tend to occur in older patients (>50 years old). Patients often have no history of trauma but present with progressive shoulder pain and/or dysfunction [6].

Examination may reveal atrophy around the shoulder girdle secondary to chronic disuse, typically in the supraspinatus and infraspinatus fosse [6]. Range of movement should be assessed, where active movement may be limited but generally passive is full [6].

Multiple imaging modalities are available to assess the status of the rotator cuff. Plain radiographs enable assessment of the acromiohumeral space (normally 7 to 14 mm), acromial morphology, and the glenohumeral joint, which can be used to grade the rotator cuff arthropathy. Ultrasound allows dynamic assessment of the rotator cuff with no radiation exposure; however, magnetic resonance imaging (MRI) remains the gold standard in the radiographic assessment of the rotator cuff.

The Natural History of a Rotator Cuff Tear

Neer originally described three stages of rotator cuff disease.

- Stage I occurring in patients younger than 25 years with edema and hemorrhage of the tendon and bursa.
- Stage II involves tendinitis and fibrosis of the rotator cuff in patients 25 to 40 years of age.
- Stage III involves tearing of the rotator cuff, either partial or full-thickness, and occurs in patients older than 40 years of age.

Whether the pathological changes observed in the rotator cuff is secondary to intrinsic tendon degeneration and/or extrinsic mechanical impingement is a matter of debate.

Basic research has demonstrated that the number of procollagen alpha 1-positive tendon cells in the edge of the tear decrease markedly 4 months after the tear, which may explain the failure to heal and progression in some patients. This is thought to be due to poor vascularization within the degenerate rotator cuff, as well as the intra-articular environment which can inhibit healing.

RESULTS

A number of patients will develop an irreparable rotator cuff tear due to progression of the tear and tendon retraction, and some patients will go on to develop secondary degenerative changes of the glenohumeral joint termed rotator cuff arthropathy (Figure 1).

Early repair of the rotator cuff tear may prevent progression of the tear and avoid cuff arthropathy, which is difficult to manage [20]. Even when the rotator cuff tear has progressed to a massive tear, repair has been shown to avert radiographic deterioration and resultant cuff tear arthropathy.



Figure 1. Rotator cuff arthropathy secondary to rotator cuff disease, demonstrating acetabulisation, with a concave deformity of the acromion, and narrowing of the acromiohumeral distance to less than 6mm (Hamada's grade 3 [III]).

DISCUSSION

The management of a rotator cuff tear is multifaceted. Conservative management includes analgesia and anti-inflammatory medications, physical therapy, activity modification and subacromial injections of local anaesthetic and/or steroid.

Injection of hyaluronate is advocated by some authors for complete rotator cuff tears, but a randomized control trial found it to be no more effective than a steroid injection [2]. More recently, however, Chou et al demonstrated a significant improvement in shoulder function at 6 weeks following injection with hyaluronate compared with placebo for partial tears [3].

Operative interventions include arthroscopic debridement of the tear or repair of the torn rotator cuff, with or without subacromial decompression. Most reports in the literature are procedure oriented, consisting of retrospective single-surgeon series with limited numbers of patients. A Cochrane review performed in 2004 analyzed interventions for rotator cuff tears and concluded that there is little evidence to support or refute the efficacy of commonly used treatment methods [4].

Suggested Approach to Management of a Rotator Cuff Tear

The aim in managing a rotator cuff tear is to reduce pain and improve function. The evidence for conservative management of a rotator cuff tear dictates an initial period, of at least 6 weeks to 3 months, of non-operative treatment unless there is evidence of an acute tear in a younger patient [5, 2].

Prolonged conservative management in symptomatic patients can have negative consequences. These include increase in tear size, tear retraction, increased difficulty of repair, [2] and muscle atrophy with fatty infiltration, all of which can result in a diminished outcome [3].

Despite limited evidence, physiotherapy is the mainstay of conservative management of rotator cuff tears. An ultrasound or MRI scan may be obtained for patients with persistent symptoms that have not improved after 2 to 3 months of conservative management.

There is no good evidence for or against steroid injection in the management of rotator cuff tears, although empirically these do seem to have a positive effect in some patients. Multiple injections should be avoided however, especially if there is a diagnosed rotator cuff tear that is potentially repairable.

Initial radiographic assessment includes anteroposterior, scapulolateral, and axillary views. If a rotator cuff tear is suspected based on clinical assessment, an ultrasound or MRI scan can be obtained. An ultrasound scan offers dynamic assessment of the rotator cuff with less expense, relative to a MRI scan, but it is operator dependent.

A MRI scan can also evaluate tear size and retraction; in addition, the rotator cuff muscles can be assessed for fatty atrophy which predicts outcome after repair.

Conservative Management

Symptomatic rotator cuff tears treated conservatively can give a baseline with which to compare the outcome after surgical intervention. In a study of 136 conservatively managed patients with symptomatic rotator cuff disease, Bartolozzi et al [25] found that full-thickness tears greater than 1cm², symptoms persisting more than 1 year, and functional impairment and weakness were associated with a worse outcome. They recommended that surgery be considered in this type of patient with these risk factors. In contrast, however, they found no association between age and functional outcome.

Hawkins and Dunlop [3] reported a smaller series of 33 patients managed conservatively. No patients were excluded and unsatisfactory results occurred in 14 of 33 (42%), with 12 patients eventually undergoing surgery. Patients with an insurance claim were less likely to be satisfied.

Operative Management

Repair of a torn rotator cuff has been shown to give predictable pain relief and functional improvement, with good overall patient satisfaction. The results of open, mini-open, and arthroscopic rotator cuff repair have all generally been favorable, but approximately 38% of patients suffer a post-operative complication.

CONCLUSION

Most of the guiding principles used for decision making in treating rotator cuff disease are based on limited evidence and minimal science. Factors that seem to be important include duration of symptoms, weakness, size of the tear, and muscle atrophy. If surgery is performed, either by a mini-open or arthroscopic technique, a double-row bridging repair seems to be biomechanically stronger, provided this can be performed in a tension-free environment.

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