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Results of arthroscopic rotator cuff repair

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Abstract

Background: Rotator cuff disease is one of the most common condition afflicting shoulder joint. It includes spectrum from minimal bursal/articular inflammation of tendons to severe degenerative cuff tear/arthropathy. With advent in arthroscopic techniques, most RC tears are nowadays treated arthroscopically than open, miniopen or nonoperative management. The purpose of this prospective study is to assess results of arthroscopic repair of rotator cuff tear using UCLA (University of California at Los Angeles) and ASES (American Shoulder and Elbow Surgeons) shoulder scoring systems.

Methods: 25 patients operated arthroscopically by single senior arthroscopic surgeon at Civil hospital, Ahmedabad, over a period of 30 months (Dec 2012 to June 2015) were followed for minimum of 12 months duration and included in study. Outcome measures used are preoperative and postoperative UCLA and ASES scores. A proforma was prepared to collect and analyse data using descriptive and inferential statistical methods.

Results: In our study, we have measured UCLA and ASES scores over 12 months period. Our study shows improved functional outcome from UCLA presentation-12.2 and ASES presentation-30.8 to UCLA 12 months-30.64 and ASES 12 months-77.43. Evident from our study, there is no significant gender difference in terms of incidence and postoperative functional outcome. Maximum incidence is seen in age group-41-50 years with etiologic inclination towards precedent trauma.

Conclusion: Arthroscopic repair of rotator cuff tear offers excellent functional outcome; with minimal morbidity. Improvement in pain, range of motion and strength of cuff tendons can be achieved only by meticulous repair techniques, adequate subacromial decompression, and strict rehabilitation programme.

Keywords: Shoulder, arthroscopy, rotator cuff repair, RC tear

Introduction

Rotator cuff disease is a painful condition with a multifactorial aetiology in which severe or chronic impingement of the rotator cuff tendons on the under-surface of the coracoacromial arch is often a significant factor [1]. Rotator cuff tears are often the cause of incapacitating shoulder pain, reduced shoulder function, and compromised joint mechanics with clinical manifestations of shoulder stiffness, weakness, instability and roughness.

With fast-growing population and higher life-expectancy, the prevalence of symptomatic and asymptomatic cuff tears in aging individuals is expected to increase [2]. A research study on natural history of RC tears demonstrated that even though large proportion of RC tears are asymptomatic to start with, over 50% individuals develop pain over 2.8 years [3]. RC tears may cause significant pain, weakness, and limitation of motion. It can increase functional dependency in the elderly due to difficulties in completing activities of daily living and in young it causes absenteeism from work, decreased productivity and consequential socioeconomic loss [4]. Only 4 percent of patients under 40 years show partial or complete tear as compared to 54 percent in patients over 60 years of age, in MRI studies. [5] For this reasons, current debate on management of Rotator cuff tears (RCT) has shifted to earlier operative treatment with maximum functional outcome possible.

Credits for describing rotator cuff tendon and its ruptures goes to J.G. Smith dating back to 1834 in London Medical Gazette [6]. In 1924, Meyer published his attrition theory for this ruptures. [7] Codman, in his classic monograph, discussed observations on supraspinatus ruptures and described its repair. This was the first successful repair to be reported [8]. In 1931, Burman was first to do shoulder arthroscopy, however this remains disputed [9].

Over the next three decades, open repair of rotator cuff became increasingly popular with introduction of various techniques. However, results remained variable and largely unsatisfactory. After the rise of shoulder arthroscopy, assisted miniopen rotator cuff repair was pursued by orthopaedic surgeons. In 1972, Neer gave understanding about Impingement syndrome ^[10] Fundamental principles about rotator cuff repair, described by Cordasco and Bigliani ^[11]; whether open or miniopen or arthroscopic have been largely remained the same:

1. Adequate subacromial decompression
2. Maintaining the integrity of the deltoid origin
3. Mobilizing torn tendons and performing an interval slide when indicated
4. Repairing tendons to bone
5. Carefully supervising and staging postoperative rehabilitation

The first arthroscopic cuff repairs were reported by Johnson using a staple technique in 1992 ^[12]. Since then, there has been tremendous evolution in understanding of biomechanics of shoulder joint, miniaturization and technological advances in arthroscopic equipments which has inclined more and more orthopaedic surgeons towards arthroscopic rotator cuff repair. Arthroscopic repair also supersedes over open and mini open approaches in having high clinical and operative accuracy, preservation of deltoid attachment, less morbidity, full visualization of glenohumeral joint, decreased postoperative adhesive capsulitis, less postoperative pain, early rehabilitation, and less infection rates ^[13].

In recent years, arthroscopy is gaining a steady popularity among Orthopaedic surgeons. While more complete arthroscopic or arthroscopic-assisted rotator cuff repairs are done day by day, the literature on this subject is relatively sparse. We undertook the present prospective study to evaluate functional outcome of total arthroscopic repair of rotator cuff tear using UCLA and ASES scores and evaluate influence of various parameters on rotator cuff repair such as age and sex of patient, cause of tear, and duration from surgery.

Materials and Methods

“Results of Arthroscopic Rotator Cuff Repair” is a prospective cohort study conducted for 30 months from December 2012 to June 2015, on 25 patients admitted and operated for rotator cuff tear at Civil Hospital Ahmedabad, Gujarat State.

Inclusion Criteria

1. Patient having tear in any of rotator cuff tendon on clinical examination confirmed on MRI
2. Repair of rotator cuff tear solely by arthroscopic techniques
3. Informed consent to participate in study and followup for postoperative rehabilitation.

Exclusion Criteria

1. Patients with associated shoulder pathology like SLAP, frozen shoulder, fracture etc.
2. Previously operated rotator cuff repair patients with failure.
3. Irreparable tears
4. Patients with associated AC joint arthritis, biceps pathology.
5. Patients with cuff tear arthropathy.
6. Patients not willing for strict adherence to postoperative rehabilitation protocol.

Methodology

The protocol included eliciting history regarding age, sex, functional loss, onset, duration and progress of symptoms. Clinical examination of patients to assess muscle strength, range of motion were done. Preoperative UCLA and ASES scores were determined. A proforma was designed which was to be filled by the patient himself/herself preoperatively and on subsequent visits postoperatively at 3,6,12 weeks, 6 months and 1 year. The patient would fill the subjective data by themselves which included muscle strength and range of motion as assessed by the surgeon and documented. The functional outcome was assessed by two scoring systems: UCLA (University of California at Los Angeles) and ASES(American Shoulder and Elbow Surgeon) scores. Postoperatively, Elbow, wrist movement, scapular retraction and finger grip was started at post op. day 1. Patient was given a shoulder immobilizer in 30 degree abduction for 6 weeks. Oral antibiotics and analgesics were started on next day after day 1 spirit dressing. Discharge was given on 3rd postop day. Pendulum exercises were begun from 10th postop day. Active assisted shoulder movements were started after 6 weeks as much as pain allowed. Scapular stabilization programme was initiated and milestones were marked for % of Preop Range of Motion.

Results

- Incidence of rotator cuff tears is maximum in age group 41-50 years (40%). In our study, we had only 1 patient above 70 year. Age group < 40 years comprises 8%. Age group 51-60 year comprises 32%, while age group 61-70 year comprises 16% of total patients.
- There exists almost equal incidence of rotator cuff tear amongst both genders. Male patients comprise 48% while Female patients comprise 52% of total patients. Our study shows no gender difference as regards to incidence of rotator cuff tears.
- Trauma as a major etiological factor comprises 76% for rotator cuff tears. While degenerative tears comprises 24% of total tears. Preceding trauma can also be an aggravating factor over pre-existing degenerated cuff. Most patients in our study have given a history of low velocity trivial trauma preceding onset of symptoms.
- Inability to lift arm is most predominant symptom amongst 60% of patients. Pain over arm remains predominant symptom in 40% patients. Difficulty in performing daily tasks due to decreased function of rotator cuff is more concerning in patients, while pain could be decreased with analgesics.
- Mean UCLA score among 25 patients at presentation is 12.2. Minimum UCLA score is 7 while maximum UCLA score is 18. At 3 weeks postoperatively, mean UCLA score is 17.4 with minimum score being 10 and maximum is 23. At 6 weeks postoperatively, mean UCLA score is 20.4 with minimum score being 15 and maximum is 26. At 12 weeks postoperatively, mean UCLA score is 24 with minimum score being 19 and maximum is 28. At 6 months postoperatively, mean UCLA score is 28.8 with minimum score being 23 and maximum is 34. At 1 year followup, mean UCLA score is 30.6 with minimum score 27 and maximum score being 34. Maximum improvement post-arthroscopic surgery is found in age group <40 years, i.e younger population.
- Our study shows maximum difference of UCLA score is in 1st 3 weeks postoperatively. With ‘functionally good’

UCLA score (>27) observed at about 6 months postoperatively. At 6 months patients show maximum improvement in function (UCLA difference 4.88 i.e 14%). At 1 year, functional outcome does not change significantly as compared to 6 months (UCLA difference 1.76 i.e 5.1%).

- There is statistically no significant difference in functional outcome amongst males and females undergoing arthroscopic rotator cuff repair.
- Improvement in functional outcome after arthroscopic repair is significantly better in patients with traumatic etiology than degenerative cuffs.

Evidently, most common complain after 12 months follow-up is 'Unable to use limb' in 20% patients as compared to Severe unbearable pain in 16% patients. Function is more concerning after repair than pain which is often relieved on medications. Fair strength and active forward flexion of range 120°-150° is achieved in most patients. Patient satisfaction of 88% strengthens support for early arthroscopic rotator cuff repair.

Discussion

Rotator cuff disease includes a wide spectrum of pathology from minimal bursal or articular side irritation and tendonitis to severe degenerative rotator cuff arthropathy. Our study shows that there is significant improvement in functional outcome as measured by UCLA scores and ASES scores after arthroscopic repair of rotator cuff tears.

Epidemiological studies conducted by Nho *et al* [14], Burks *et al* [15] shows increased age as a risk factor for rotator cuff disease. Our study shows incidence of rotator cuff rising from 8% in age group <40 years to 72% in age group 41-60 years. While 20% patients belonged to age group > 60 years. Mean age of patients was 51.44 years. Comparison to other studies is shown in table below.

TABLE I – Comparison of Studies for Mean age of incidence of Rotator Cuff Tears.

Our study shows highest incidence of rotator cuff disease in age group 41-50 years. This shares similarity with other such studies in Indian subcontinent. We found no statistical significance between age of patient and postoperative results. Similarly Bennett, Stollsteimer and Savoie reported no significant association between age and postoperative results.^{18,19} However Boileau reported increased age as a major predictor for poor postoperative outcomes [20] They concluded that increased age decreases chances of tendon healing by 43% in patients aged more than 65 years.

The description for outcome with Sex as a variable are limited in literature. Our study shows incidence of rotator cuff tear 48% in male and 52% in female. We found no significant difference in postoperative result. The almost equal sex distribution is also reported by other studies carried out by Boileau. However, Razmjou and Cho have reported decreased satisfaction and functional score in female patients based on gender specific analysis [21, 22]

In our study, 19 among 25 patients gave history of predecant trauma. Rest patients had no such history. Improvement in functional outcome after arthroscopic repair is significantly better in patients with traumatic etiology than degenerative cuffs. We didn't find any reference for comparison.

In our study, we have included only Arthroscopically operated rotator cuff tears. Comparison with open, miniopen approaches is thus not possible. We have found 100% success rates in terms of improvement in UCLA and ASES scores.

Mean preop UCLA scores (12.2) and ASES (30.08)

scores(were improved upto UCLA(30.64) and ASES(77.43) at end of 12 months follow-up. We have compared our results with Cochrane review article conducted by Paul Saridikas at Ohio state university which reviewed ten articles systemically [23].

Table II-Comparison of Results of Arthroscopic Rotator Cuff Repair with other studies.

Thus in accordance with other wide studies, our study shows significant improvement in functional outcome after arthroscopic rotator cuff repair

Conclusion

In current orthopaedics practice, arthroscopic repair of rotator cuff tear offers excellent results in terms of functional outcome with minimal morbidity. Added advantages of this approach is decreased postoperative pain, deltoid preservation, full joint visualization, cosmetic appeal, minimal hospital stay and early rehabilitation. This has evolved arthroscopy from mere diagnostic tool to surgical tool.

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