

Rotator Cuff Tear Arthroscopically Repair Study

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Abstract

Rotator cuff tear (RCT) is a common shoulder pathology. Majority of the patients, don't need surgical treatment, their evolution being favorable under conservative treatment. In another cases, symptomatology doesn't improve necessitating surgery. This can be done open, or less invasive, arthroscopically. **Material and Methods:** We evaluated 30 cases of rotator cuff (supraspinatus) tear, operated arthroscopically from 2015-2017. All surgeries were done arthroscopically, by the same surgeon. Dates were collected using Constant score and SST score, calculated preoperatively, and postoperatively at 12 months. Average age was 52.6 for female and 53.2 for male. **Results:** were improved after treatment: Constant score from 44 to 84 and SST from 25% to 83,3%. All patients were treated closing the defect, using one, ore more anchor's, with simple, or double-row technique. **Conclusions:** Evolution were good with significant improvement in terms of pain and strength.

Keywords: Rotator cuff tear; Arthroscopy; Shoulder

Introduction

Shoulder is the most mobile joint of the body. This mobility is the consequens of the asymmetry between glenoid and proximal humerus. To stabilise the gleno-humeral joint, a series of structures are involved: capsula, ligaments and muscles. Rotator cuff is an assembly of four muscle who rotates the shoulder (figure 1).

The subscapularis is situated in front of the joint, helping us to rotate posteriorly the arm. Infraspinatus and teres minor rotate the arm externally and supraspinatus, which is situated superiorly, allow us to lift arm above the head.

The high mobility of this joint expose it to different trauma, producing a variety of lesions (from simple irritation of tendon to complete rupture). In majority of cases the cause of the tear is direct

fall on the shoulder, or repetitive liftings of arm above the head, as we see in sportive (swimming, tennis, basketball, volley, etc.), or domestic activities (painting, plastering, etc.). In the last cases, repetitive movements produce an overuse of the tendon with rupture of tissue in different grades. The most expose muscle is by far supraspinatus, because is situated between two bone structure: acromion above and humeral head beyond.

Material and Methods

Some studies show that dominant hand and age are two factors involved in RCT. Dominant hand is utilized more and because of that, more stress is put on it. With age, vascularization at the level of tendon decreases, this being another factor who increases the risk for tear.

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Another factors as diabetes mellitus, hypertension, smoking, could be associated with RCT, but studies are not very conclusive. In literature, there is no difference between male and female about presence of RCT.

In our study were included 30 patients: M and F. Average: with rotator cuff tear. The tears were classified using DeOrio and Cofield system (5): 1cm, 1-3cm, 3-5cm and greater than 5 cm gap in mass of tendon means small, medium. Large and massive tear. In our cases, patients selected, had small, medium and large tear. Massive tear could not be repaired. All of them were operated arthroscopically by the same senior surgeon. None of them performed a performance sportive activity. Some of them were smokers, another had diabetes mellitus, or hypertension.

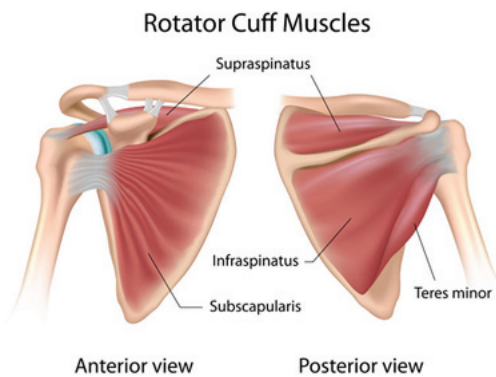


Figure 1: Rotator cuff muscles.

Symptomatology in these patents consists in pain which was mild, or severe, predominately during the night, or in time of movement with progressively loosing of the capacity to lift the arm. A series of test were suggestive for this pathology. Neer test, Hawkins test, Jobe test, abduction arch test are all positive. Patient notes the onset of symptoms during a traumatic event, a symptomatology who become worse with daily activities.

Imagistic investigation confirms the diagnostic. On X-ray can be find an acromion Bigliani type III, superior ascension of humeral head in total rupture of the rotator cuff. The most sensitive investigations are IRM and ultrasound both showing defect in muscular mass of rotator cuff (Figure 2).

Before surgery, a form was filled out (SST and Constant score). The same forms were completed a year after surgery.

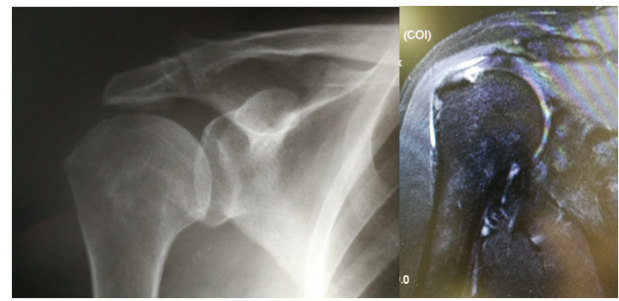


Figure 2: a) Radiologic aspect of Bigliani III acromion; b) IRM showing cuff tear (personal archive).

Surgery was done under general anesthesia, in beach-chair position (figure 3) under general, or loco-regional anesthesia. We used three-four portals: posterior, anterior and two lateral (2-3).

At the beginning, a diagnostic gleno-humeral visualization was performed, followed by subacromial decompression: bursectomy, acromioplasty (when was necessary), resection of coraco-acromial ligament. Subsequently, the torn tendon was debrided, and the footprint prepared with burr.

The repair was done using single-row, or double-row technique (one, two, or more anchors: cork-screw and PushLock) (1). For single-row technique, anchors were placed in the cuff footprint. With suture passed through tendon, a knot was done.

For double-row technique, the first anchor (or anchors) was placed in the medial side of footprint. Sutures were passed through tendon tissue at 5-10 mm away of the edge of the tear and tied in horizontal mattress fashion. The suture arms, were then introduced in the second anchor (anchors) who was placed laterally, perpendicular on the cortical surface of the humerus, 5-10 mm distal to the lateral edge of the greater tuberosity.

Postoperatively, the suture was protected with a special device, an abduction-pillow (with forearm in neutral position and affected arm at 30 degrees of abduction). Routine follow-up visits were at 3 days, 2 weeks, 6 weeks, 3, 6 and 12 months postoperatively. Suture were removed after 2 weeks. During first 4-6 weeks, shoulder was immobilized in abduction-pillow.

Wrist and elbow active range of motion was allowed, but only passive shoulder range of motion was permitted. At 6 weeks postop, active range of motion started and at 3 months, active resistance

muscle-strengthening exercises were begun. At 6 months, normally full activities were allowed. Shoulder function were measured before surgery and 1 year postoperatively. We used two international scales to evaluate the clinical outcomes: simple shoulder test (SST) and Constant test.



Figure 3: Beach-chair position in arthroscopic surgery.

Results

From total of 30 patient operated arthroscopically for RCT, 24 were male and 8 were female with age between 42 and 72; average was 52.6 for female and 53.2 for male. Majority of the patients were male. 17 cases were repaired using single-row technique and 13 using double-row technique. All surgeries were done arthroscopically by the same doctor, in beach-chair position. Repair of the torn tendon was done using one, two, or more anchors.

Postoperatively, every patient protected the suture with an abduction -pillow for 4-6 weeks. The healing process lasts several months until one year. Active range of motion was allowed at 6 weeks postoperatively. Clinical data were evaluated using Constant score and SST score preoperatively and one year after surgery by the current doctor. Active range of motion was calculated with a goniometer to the point of pain. The follow-up was done at 2 weeks, 6 weeks, 3, 6 and 12 months. We found an improvement of Constant score from 44 to 84 and for SST from 25% to 83.3%.

No intraoperative or postoperative complication were observed. None of the patients had nerve or vessel damage, suture anchor problems or wound-site infection. Our operative goal was to release the pain. All patients experimented improving in terms of pain and mobility.

Discussion

Gleno-humeral joint is the most mobile joint of the body, grace to incongruency between bone segments. Stability of the joint is maintained by the capsulo-ligamentous structures and muscles who surrounded the humeral head. All these four muscles are attached to the bone in a specific area, created so called footprint of the muscle (around 1cm in diameter). The main stabiliser of the joint are four muscles, who create the rotator cuff. These are: subscapularis, supraspinatus, infraspinatus and teres minor. Overhead activities can produce damage at the level of these muscles.

Rotator cuff tear is a common pathology of the shoulder. It is known that dominant hand and age, are both involved in appearance of tear at this level. In many cases conservative treatment proved to be helpful with decreases of pain and regaining of range of motion. It consists of physiotherapy and AINS. When symptomatology is resistant surgical treatment must be done. It is known that half of all tears enlarge over time and become more painful.

One option is open surgery, but now, with development of technology, arthroscopic intervention proved to have similar results. It demands a skillful person, but also a well-informed patient. This kind of surgery has less morbidity than open surgery.

We treated 30 patients, majority of them male. In our practice, male developed more RTC, probably because they are more involved in physical activities than female. The procedure was performed by the same surgeon arthroscopically, closing the defect with help of anchors. The goal was to restore the footprint of torn tendon, specially the supraspinatus muscle.

The intent of RTC surgery is first to relieve the pain and second to improve the motion and shoulder function. The healing time was long (months) and ask collaboration of patient during the process. An intensive physiotherapy program followed for each patient, to restore range of motion and regain the strength of rotator muscles.

Preoperatively and postoperatively (one year after surgery), specific scores were measured to evaluate the results of the treatment. Constant score increased from 44 to 84 and SST score increased from 25% to 83.3%. The results proved the efficiency of arthroscopic surgery in treatment of RCT (4,6) with low complications and maximum of benefits in term of pain relief and regaining motion and strength (7-8). Because of the benefits, this kind of surgery will be the future treatment in shoulder muscle pathology.

Conclusion

Rotator cuff muscles are very important in mobility and stability of the joint. With age, specially for dominant hand, appears damages at this level. Rotator cuff tear is a pathology often meet in adult population, specially at male. It is the result of repetitive trauma at the level of shoulder. The diagnostic is sustained by clinical examination, history of the patient and imagistic investigation (IRM, Rx, shoulder scanner).

Sometimes RTC is symptomatic and in majority of cases, treatment is conservative. For patients who don't respond at this form of treatment, surgery is the best option. Surgery can be done open, or arthroscopically, both having almost similar results in term of pain relief and range of motion. Arthroscopic surgery provided satisfactory clinical results in the patients with rotator cuff tear, resistant at conservative treatment.

It allows improvement in terms of pain and mobility with low morbidities. Even requires a skillful surgeon, trained in this type of surgery, the cosmetic and functional results make from arthroscopy the first choice in treatment of this pathology.

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