Arthroscopic Decompresson of Subacromial Impingement Syndrome

Sung-Jae Kim,M.D.,Ph.D

Associate professor of Orthopaedic Department, Yonsei University College of Medicine ; Director of Arthroscopic Surgery Unit and Severance Arthroscopy Trainning Laboratory, SEOUL, KOREA

Impingement syndrome is a common cause of shoulder pain due to repetitive overhead artivlties in the young athleties. Degenerative change within the rotator cuff tendon and the coracoacromial arch is commomly followed by the rotator cuff tears in the old athletes.

In 1972, Neer defined the shoulder Impingement Syndrome. It is a spectrum of disease that result from Impingement of the rotator cuff and the overlying subacromial bursa and occasionally the tendon of the biceps tendon against the anterior edge of the acromion and the associated coracoacromial arch.

Neer described 3 stages of these, Stage 1 : Less than age 25
Edema and Hemorrhage
Stage 2 : Age 25-40
Fibrosis and Tendonitis
Stage 3 : Over than age 40
Bone Spur and Tendo Rupture

Neer presented three stages of Impingement syndrome which if left untreated, may progress from stage 1 through stage 2 to stage 3 with eventual rotator cuff tear.

Acording to Nirschi, the impingement syndrome is related to Intrinsic overload of the rotator cuff tendon causing muscle weakness and proximal migration of the humeral head. Impingement occurs as a secondary phenomenon rather than a primary phenomenon.

Tendons that can be injured are the supraspinatus, the Infraspinatus and the biceps. With adduction,the greater tuberosity can Impinge agaist the coracoid process. The coracoid Impingement is less than five percent of the Impingement syndrome. Impingement may cause tendonitis and rupture of the long head of the biceps muscle.

Differential diagnosis include glenohumeral instability, cromioclavicular arthritis,adhesive capsulitis,cervical radicueitis and neoplasm on the apex of the lung.

In the conservative treatment of impingement syndrome, strengthening of cuff muscles is very important to prevent proximal migration of humeral head.

Subacromial decompression is a part of surgical treatment. Arthroscopic debridement is alone done in incomplete tear without impingement and calcific rotator cuff tendinltis without impingement, Arthroscopic acromioplasty incomplete rotator cuff tear with impingement and complete rotator cuff tear with impingement.

Operative Technique

Under the general endotracheal anesthesia, The patient is placed in the lateral decubitus position on the operating table After tilting the patient 3 posteriory, the position is stabilized by the use of a bean bag under the chest and full width adhesive tape on the iliac crest. Preparation and draping is done as usual manner. The arm is placed in an traction device in a position of 40 degrees of abduction and 20 degrees of fiexion.
The arm is distracted with 10 lbs weight.
The skin is pierced with a No.11 blade on the posterior portal, 1 cm below and medial to the posterolateral tip of the acromion. The blunt trochar with a sheath is inserted through the posterior portal into the glenohumeral Joint after touching the posterior rim of the glenoid. The joint is thoroughly Inspected and any lesions are treated appropriately.
Associated pathology on arthroscopic examination of the glenohumeral joint are partial rotator cuff tear on the articular side, labral tear, glenohumeral arthritis, biceps tendon pathology, glenohumeral instability and loose bodies.
The arthroscope is removed from the glenohumeral joint and redirected superiorly under the deltoid muscle. The tip of the blunt trochar palpates the under surface of the acromion. Three liter of irrigation fluid with 1 ml of 1:1,000 epinephrine is used for inflow thourgh the anterior portal, 1 cm lateral and superior to the coracoid process. A spinal needle is inserted into the bursa from the lateral portal, 3 cm lateral to the anterolateral tip of the acromion. Debridement is done with a motorized shaver. Spinal needles are inserted through the anterior aspect of the shoulder on the anterior acromioclavicular joint and the anterolateral margin of the acromion. The needles help define the coracoacromal ligament and the acromioclavicular joint viewed arthroscopically. Abrasion on the acromion, spurs on the undersurface of the distal clavicle and rotator cuff tears are identified. The soft tissue is removed from the anterior acromion. The acromioplasty is done 2 cm posterior to the anterior edge of the acromion and sloped foreward and superiorly. Resection of the anterior acromion, including osteophytes anterior to the leading edge of the distal clavicle is done with a Acromionizer.
After interchage the arthroscope to the lateral portal and the acromionizer to the posterior portal,the acromion is then thinned to be flat,type I, undersurface.

Finally, the free superior portion of the coracoacromial ligament is removed with a punch forcep to prevent reattachment to the acromion. Bleeders from the bone and the ligament are cauterized. Following acromioplasty, the rotator cuff is again examined. Partial tears are trimmed,and some complete tears may also be resolved by trimming, rather than requiring open surgery. At the end of the procedure, the traction should be released and the shoulder is put through range of motion to invetigate that adquate decompression has been done.

Postoperatively, pain is relieved by application of ice, compression and the use of analgesics. Circumduction exercises are initiated on the day of surgery including passive and active range of motion exercises as tolerated. Active exercies can be started one to six days after surgery. Advadntges of arthroscopic subacromial decompression include, out patient procedure, minimal detoid morbidity, minimal, complication, cosmetic incision, glenohumeral joint evaluation and early rehabilitation.

In out department, arthroscopic acromioplasty was performed on 47 cases in 45 consecutive patients with either stage 2 or stage 3 impingement syndrome :19 with no actual tear of the cuff (group2):13 with a partial-thickness tear (group IIIa);10 with complete tear less than 3cm long (group IIIb); and 5 with complete tear longer than 3cm (group IIIc).

Patients were seen in follow-up at a minimum of 6 months.

Outlet radiographic views of the shoulder were used to evaluate both preoperative subacromial pathology and to document removal of adequate bone postoperatively in 17 patients. Patients were evaluated pre-and postoper-atively using both the UCLA Shoulder Rating Scale and Neer's criteria.

Mean motion improved postoperatively for all stages of impingement.

For all patients, preoperative UCLA and Neer ratings improved in 18 patients to a 95% satisfactory result rate. In group IIIa, 11 patients had major improvement in UCLA and Neer ratings to a 90% satisfactory result rate. In group IIIc,there were 3 satisfactory and 2 unsatisfactory results for a 60% satisfactory result rate.

Arthroscopic subacromial decompression and rotator cuff debridement is effective in the treatment of stage 2 impingement, and stage 3 impingement including partial-thickness tears, as well as in the complete tear less than 3 cm.