

◁심포지움 III (Rotator Cuff) 17:20 ~ 17:30▷

Massive Rotator Cuff Tear

이 용 결

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Definition: Massive rotator cuff tear is not synonymous with irreparable tear

1. >5cm
2. 3 tendons
3. medial retraction
4. (?) unable to repair

Biomechanics

1. force coupling ; coronal force coupling - deltoid pull
inferior rotator cuff
axial/transverse force coupling - anterior : subscapularis
posterior : infraspinatus, teres minor
2. loss of equilibrium in force couples
 - abnormal kinematics
 - inability to establish a stable glenohumeral fulcrum
3. clinically
 - weakness
 - decreased active motion

Favors of massive tear

1. atrophy of supra/infraspinatus fossa
2. LHB rupture
3. weakness of RC (lag sign)
4. discrepancy btw active and passive ROM

Evaluation in special study

1. tear size
2. amount of retraction
3. muscle quality
4. trophicity/fatty degeneration

Management options

1. rehabilitation ; functional RCT-balanced force coupling and intact suspension bridge
2. debridement/decompression ; limited goals for irreparable tear
3. repair/partial repair ; re-establishment of force coupling
4. tendon graft/transfer ; substitute for muscle weakness

Standard outcome

1. good pain relief
2. accepted residual weakness
3. some limitation of endurance for work and sport activity

Four basic principles for torn rotator cuff

1. preserve the origin of the deltoid
2. eliminate subacromial impingement
3. close the cuff defect
4. adapted postoperative rehabilitation

Determining factors for achieving a secure repair

1. size
2. retraction
3. tissue quality
 - tendon : thickness, elasticity, friability,
 - bone : osteoporosis
4. surgeon's skills

Tear size/retraction

1. difficult to repair
2. nonfunctional tissue
3. likely to retear

Surgical Technique

1. identify the rotator cuff tear configuration and quality of the tendon tissue by placing several sutures and rotating the arm
2. mobilize the retracted rotator cuff
 - extraarticular release
 - divide coracohumeral ligament
 - release supra/infraspinatus fossa under deltoid
 - intra-articular release
 - divide the interval btw the superior labrum and rotator cuff
 - care should be taken not to injury LHB
 - not to advance the instruments more than 2 cm because of a risk of injury to suprascapular n.
3. repair the mobilized cuff
 - ideal repair
 - initial fixation strength
 - minimal gap formation
 - maintenance of mechanical stability
 - tendon repair
 - suture materials ; braided nonabsorbable #2
 - suture technique ; Matsen, Mason-Allen
 - suture anchor/transosseous suture

. tied over a bone bridge at least 1 cm in diameter and 2 to 3 cm from the tip of greater tuberosity (Caldwell & Warner,1995)

. strongly influenced repair strength is bone and tendon quality (France & Paulos,1991)

4. filling defect ; decrease repair tension

mobilization of torn rotator cuff ; 2cm anatomically at the risk margin convergence

medialization ; 5mm lead to 12% loss of abduction

15mm result in loss of 19% of abduction

(Rytel MJ et al.,1995)

10mm of medial advancement without negative biomechanical consequences (Liu J et al,1998)

lateral advancement ; allowed only one centimeter of lateral advancement of either tendon and limited to dissect safely beyond the neurovascular pedicle (Warner et al.,1992)

abduction of the arm ;

possible to retear with adduction and induce shoulder stiff (Matsen,1992)

in the other hand (Warner & Gerber,1997)

- reduce constant tension on the inelastic musculo-tendinous unit

- increase the likelihood of healing without disruption of the repair

- allow the musculotendinous unit to stretch gradually without failure at the repair site

Treatment modality

1. Debridement/repair and decompression

2. Local muscle repair or transfer

advancement of the supraspinatus (Debeyre, Patte)

transfer of infraspinatus (Paavolainen)

rotationplasty of subscapularis (Cofield)

subscapularis and teres minor transfer (Neviaser)

biceps (Nobuhara)

3. Distant muscle transfer

trapezius (Mikasa), middle deltoid (Augereau), latissimus dorsi (Gerber)

4. Free tissue graft

fascia lata (Nasca), freeze-dried rotator cuff (Neviaser), biceps (Neviaser)

5. Synthetic graft

Teflon mesh (Ozaki)

6. Arthrodesis and arthroplasty

Results :

. only acromioplasty in repairable tear : 50% satisfaction (Ellman,1993)

. only acromioplasty in irreparable tear : 83% satisfaction (Rockwood,1995)

. arth. debridement vs open repair in massive tear (Melillo & Savoie,1997)

- UCLA score : repair 32.5, debridement 19
- Pt's satisfaction : repair 87%, debridement 8%
- 23 required additional surgery in 25 patients of arthroscopic debridement
- . acromioplasty alone for FTRCT (Zvijac & Levy,1994)
 - satisfactory results : 68% of 45.8ms from 84% of 24.6ms
 - a trend of further deterioration of results with time
- . postoperative ultrasonography 5yrs after open repair (Harryman,1991)
 - 35% FTRCT : 12% in only SS, 50% in SS & IS
 - 96% satisfactory in intact
 - 87% satisfactory in recurrent defect
- . second look arthroscopy after arthroscopic repair (Wolf,1998)
 - 30 % incomplete repair
 - 85% good/excellent results in repair intact
 - 64% good/excellent results in repair incomplete

Summary

- . Although the surgical repair of massive tears of the rotator cuff is demanding procedure, the results are rewarding if technical principles are strictly followed
- . But structural healing does not parallel to technically successful repair of tears
- . Alternatives to direct repair might be considered for irreparable massive tears