

Post-operative physiotherapy rehabilitation in rare combined full thickness tear of supraspinatus and subscapularis tendon managed by arthroscopy with mini open Supraspinatus tendon repair: A Case report

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Abstract: Background: Complete combined disruption of muscle fibres of Supraspinatus and subscapularis tendon are rare than any other tear of rotator cuff. Mini open arthroscopy supraspinatus tendon repair is used to repair a torn supraspinatus along with other tendon that forms rotator cuff. Prime aim of post-operative physiotherapy rehabilitation following arthroscopy mini open supraspinatus tendon repair (STT) is focus on healing of repaired tendon when reducing muscle atrophy and stiffness due to prolonged immobilization. In this case study Rehabilitation protocol has been modified into four phases from immediate protection phase to advance strengthening exercises on the basis of surgery procedure.

Case Presentation: A 41 year male who was diagnosed with combined full thickness tear of supraspinatus and subscapularis tendon which are rare than any other tear of rotator cuff. Patient underwent arthroscopy with mini open supraspinatus tendon repair (STT) after 20 days. Patient was referred to physiotherapy with complaints of pain, restricted range of motion (ROM), muscle weakness and difficulty in functional activities. Rehabilitation was given according four phases to accelerate early healing of repair tendon. Patient was treated 5 days per week for 22 weeks. In Phase I patient was explained maintain the arm in abduction sling for 5 week, removed only during exercises and no lifting of objects or taking body weight. Key exercises of rehabilitation were therapeutic modalities to reduce pain (cryotherapy, Interferential therapy) scapula isometrics, range of motion, strengthening exercises, muscle energy technique (MET) with open-chain proprioceptive activities.

Conclusion: In this case used rehabilitation protocol had significantly reduce the pain and tenderness, improved ROM , muscle strength and endurance which helped patient to restore his functional independence at home and work.

Keywords: Arthroscopy with mini open Supraspinatus tendon repair, physiotherapy rehabilitation.

Introduction:

Prime aim of post-operative physiotherapy rehabilitation following arthroscopy mini open supraspinatus tendon repair (STT) is focus on healing of repaired tendon when reducing muscle atrophy and stiffness due to prolonged immobilization. (1) Complete combined disruption of muscle fibres of Supraspinatus and subscapularis tendon are rare than any other tear of rotator cuff. (2) Supraspinatus tendon tear is a common reason for shoulder pain and restricted range of motion and muscle weakness in shoulder. Supraspinatus tendon tear is commonly accompanied with other rotator cuff muscles tear. Cause of full thickness Supraspinatus and subscapularis tendon tear result from direct trauma or repeated micro trauma such as lifting heavy weight, overhead activities or falling on shoulder and age related degeneration.(3) Postsurgical intervention depends upon partial or full thickness disruption of muscle fibres. Full thickness supraspinatus tendon tear is managed with open arthroscopy surgery.(4) In this case report patient was managed by Mini open arthroscopy supraspinatus tendon repair, this surgical procedure is used to repair a torn supraspinatus along with other tendon that forms rotator cuff, tendon is reattached to head of humerus. Rehabilitation protocol differs based on surgeon, physiotherapist and clinical experience rather than standard protocol. Rehabilitation protocol categorized into four phases from immediate protection phase to advance strengthening exercises.

This case study is discussed to provide a rehabilitation protocol on rare combined full thickness tear of supraspinatus and subscapularis tendon managed by arthroscopy with mini open STT tendon repair.

Patient and observation:

A 41 year male patient works as fabrication worker by occupation with right hand dominance. He suddenly met with accident on 02/01/20 where his bike got skid and felt on outstretched left hand. Patient was conscious, oriented to place and time and brought to AVBRH hospital sawangi Meghe with the complaints of pain and difficulty to hold movement of shoulder joint and weakness in the left arm. Patient was referred for the investigation of MRI and USG by orthopaedic surgeon and was diagnosed as a combined full thickness tear of supraspinatus and subscapularis tendons. Patient was operated with arthroscopy mini open Supraspinatus tendon repair and immobilized the arm in abduction sling for 5weeks. Patient was referred to physiotherapy with complaints of intense pain in left shoulder and difficulty to raise left upper extremity from shoulder and weakness in the arm. Pain was sharp shooting and referred to arm and neck, sudden in onset, intermittent in nature, aggravated by movement and relieved at rest and intensity of pain on numerical pain rating scale was 9. Patient was known case of hypothyroidism since 5 year, no history of diabetes mellitus, hypertension. Patient had no any previous

significant medical or surgical history. Patient was having 100 mg thyroxin and shelcal 500mg tablets .Patient had no significant personal or family history.

Clinical findings:

Written consent was taken from patient. Patient was explained about physical examination and intervention. On general examination, patient was moderate, conscious, oriented to time and place and cooperative. Patient was haemodynamically stable, afebrile with BP was 120/80 mmHg, pulse rate was 75 beats per minute, Respiratory rate was 18 breath per min. Patient had no findings of cynosis, icterus, clubbing, edema. On observation scar was present over lateral aspect of shoulder [figure 1] with no muscle wasting and edema. Attitude of left upper extremity in supine lying was shoulder extended, internally rotated with elbow and wrist extended. On palpation temperature of local area was normal. Patient had grade I tenderness on shoulder joint. Range of motion had been mentioned in [Table 1] .Muscle strength assessment was taken and compared on both upper limbs based on medical research council and positive findings were (1/5: shoulder flexors. 1/5: shoulder abductor, 1/5: external rotation).sensation was normal.

Therapeutic intervention:

Physiotherapy rehabilitation protocol was executed every week with different therapeutic exercises. Short term goal was patient education, to reduce pain and tenderness, improve range of motion and muscle strength of left upper limb. Long term goal was to improve endurance and restore functional activities of daily living. Patient was rehabilitated till 22 weeks for six days a week. In every week intervention was specified according to short and long term goal which was mentioned in detail in Table no .2

Table No. 1 Range of motion assessment Pre and Post intervention

Motion	Pre- interventional ROM		Post- interventional ROM	
	Active ROM	Passive ROM	Active ROM	Passive ROM
Shoulder flexion	25°	30°	160°	170°
Shoulder extension	50°	55°	60°	60°
Shoulder abduction	20°	20°	150°	160°
Shoulder adduction	45°	45°	45°	45°
Shoulder internal rotation	60°	70°	70°	70°
Shoulder external rotation	25°	25°	80°	85°

Table No.2 Detailed rehabilitation was given below

Phase (week wise) Goal	Therapeutic exercise
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Phase I: Immediate postsurgical phase (Week 1-4)	
Precaution	No active ROM of shoulder Maintain arm in abduction sling for 5 week No lifting of objects or body weight No shoulder motion behind back
To reduce pain and tenderness	Cryotherapy , application of ice pack on left shoulder for 8 – 10 minute Interferential therapy 4PV was applied on shoulder for 10 minute to reduce referred pain (Figure 2)
To improve range of motion	Begin scapula isometrics(5sec hold ,10 sec relax, 10 repetitions ,2 sets) Pendulum exercises (10×2) Passive ROM till patient tolerance level ,flexion ,abduction, external and internal rotation in scapular plane Active ROM to elbow, wrist ,finger(10×2) 1-5 rest interval in between the exercise
Phase II: Protection phase(week 4-10)	
To reduce pain	Cryotherapy , application of ice pack on left shoulder for 8 – 10 minute

To improve ROM	<p>Week 4-5 week: Initiate active assisted ROM exercises, Flexion in supine position (AAROM) with uninvolved extremity, external & internal rotation by cane (10×2) Progressive passive ROM until full ROM achieved but pain free Gentle Anterior and posterior glides of glenohumeral joint mobilization</p> <p>Week 6-8 : continue (AAROM) Rotator cuff isometric Active ROM to elbow, wrist ,finger(10×2)</p>
Phase III: Intermediate phase (10-14 week)	
To improve ROM and muscle strength	<p>Active range of motion (10×2) Started strengthening program to shoulder muscle with theraband (10×2) Avoided empty can abduction exercise Initiate light functional activities</p>
Phase IV : Advanced strengthening exercises (week 16-22)	
To improve endurance and functional activities	<p>ROM and self scapular stretching exercises Progressive strengthening exercises(10×2) open-chain proprioceptive activities</p>

Follow up:

Patient was followed after 22 weeks and examination was done. Patient reported normal functional activities without complaints of pain or restricted range of motion. On examination after 22 weeks of surgery patient had complete range of motion and 5 grade of muscle strength on left arm. Patient returned to his job without any functional limitation.

Discussion:

Arthroscopic mini open supraspinatus tendon repair is surgical procedure for irreversible full thickness combined tear of supraspinatus and subscapularis tendon. (4) Prime aim of post-operative physiotherapy rehabilitation following arthroscopy mini open STT is focus on healing of repaired tendon when reducing muscle atrophy and stiffness due to prolonged immobilization. (1) In this case report key aim of rehabilitation was to reduce pain and tenderness, improve ROM and muscle strength of left arm and restore patient functional activities at home and work. Histological studies suggest that rotator cuff has phases for healing after surgical arthroscopy repair.(5) These include an inflammatory phase, a proliferative or repair phase, and a remodelling phase. To design safe individualize rehabilitation protocol after supraspinatus tendon repair which is based of healing of repaired tendon. (6) Rehabilitation protocol was divided into four phases. Patient arm was immobilized in abduction sling for 5 weeks to minimize tension and maximize vascularisation of repair tendon. In immediate postsurgical phase (1-4 week) patient was instructed to take precaution of not doing active movement, weight on affected arm. Cryotherapy was applied on left shoulder for 8 -10 minute to decrease pain and minimize the inflammatory response. Interferential therapy 4PV was applied on shoulder for 10 minute to reduce referred pain. In protection phase passive ROM was given with pendulum exercise for 10 repetitions till patient tolerance level to minimize stress on repaired tendon and encourage early healing. Samuel found that early passive overhead motion decrease tendency of postsurgical adhesion later arthroscopic rotator cuff repair. Anterior and posterior glides of glenohumeral joint mobilization were applied gently with the 30 degrees abduction of arm in the scapular plane which don't not put stress on repaired supraspinatus tendon was demonstrated by T Muraki. (7) In home exercise program patient was taught to perform active ROM exercises of cervical, elbow, wrist and finger. Active assisted ROM was performed in supine position for flexion with assistance of uninjured extremity and external and internal rotation with a cane then continued with active ROM. In intermediate advance phase progressive strengthening exercises and Open chain proprioceptive exercises were performed by patient in supine lying with shoulder flexed at 90° and draw circles, alphabet in air. Samuel had confirmed that durable repair of tendon to bone achieved pain relief, regain of range and strength later rotator cuff repair.(8,9) Millett reported rehabilitation protocol widely depends on accessible scientific research, surgical procedure and clinical experience.(10) In this case study, above rehabilitation protocol had significant improvement in functional outcome of patient.

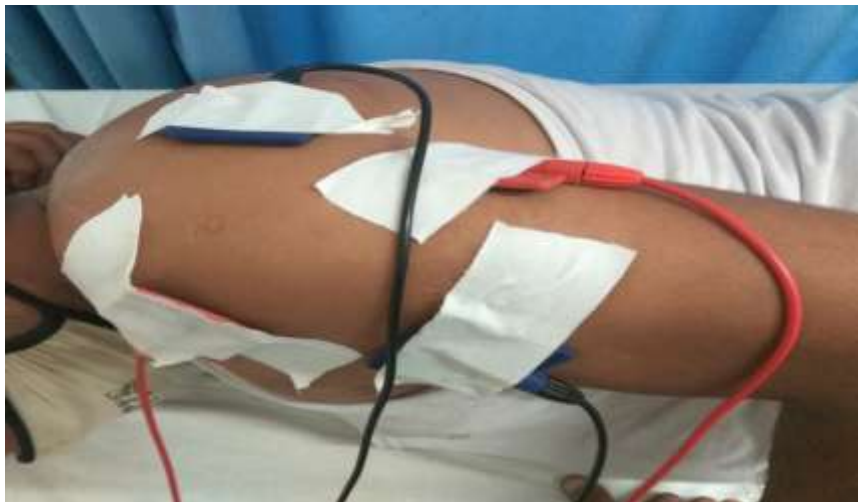
Conclusion:

Combined full thickness tear of Supraspinatus and subscapularis are rare than any other muscle of rotator cuff. In this case above rehabilitation protocol had significantly reduce the pain and tenderness, improved ROM , muscle strength and endurance which helped patient to restore his functional independence at home and work.

Figure 1: Scar present on lateral aspect of shoulder



Figure 2: Placement of interferential therapy



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