Strengthening Exercises In Management Of Shoulder Pain In Diabetic Population

Dr. Rashmi Walke¹, Abhishek A. Telang¹

¹Associated Professor, Department Of Cardio-Respiratory Physiotherapy, Ravi Nair Physiotherapy College, Datta Meghe Institute Of Medical Sciences, Sawangi Meghe, Wardha, Maharashtra, India.

Abstract

Shoulder pain is a common complaint of diabetic patients that causes motion limitations and functional disability. Adhesive capsulitis (AC) is the most common disabling shoulder disorder. There is no optimal non-surgical treatment for managing AC in patients with diabetes. We are not sure what is the best treatment to manage Frozen Shoulder in patients with diabetes. We do not know how diabetes can affect recovery after shoulder replacement surgery. Also, we are not sure what factors can affect function after shoulder replacement surgery. Weakness of the shoulder rotator muscles is associated with shoulder pain.

Purpose: The aim of this study was to describe and evaluate a physiotherapy program targeted to reduce pain intensity and improve the daily functioning of diabetics with shoulder problems. It was hypothesized that patients receiving specific physiotherapy treatment improved more frequently and rapidly than diabetic patients followed up without specific physiotherapeutic intervention. Method: A pre-post treatment design was completed for a group of 10 subjects. The treatment protocol, also applied during the daily activities of the subjects, was aiming at reducing pain intensity and shoulder stiffness and improving impaired functioning in daily activities by muscle relaxation, light-load exercise and enhancing the co-ordination.

Keywords: adhesive capsulitis; frozen shoulder; physical therapy; self-management.

INTRODUCTION

Frozen Shoulder is a common problem that occurs five times more frequently in patients with diabetes. Frozen Shoulder causes pain and disability. The usual treatments reduce shoulder pain and disability, but these treatments often fail for people with diabetes. Currently, we are not sure what is the best treatment to manage Frozen Shoulder in patients with diabetes. We do not know how diabetes can affect recovery after shoulder replacement surgery. Also, we are not sure what factors can affect function after shoulder replacement surgery. Diabetic patients have been known to have a higher incidence of frozen shoulder. Arthroscopic capsular release has been described for diabetic frozen shoulder refractory to non-surgical treatment. We describe our single-surgeon experience of this procedure done in Asian patients presenting with diabetic frozen shoulder. While the exact mechanism of primary adhesive capsulitis is unknown, we know that it has strong associations with diabetes mellitus (DM). Arthroscopic capsular release for adhesive capsulitis of the shoulder is a treatment option. The present study aimed to investigate the clinical outcomes following arthroscopic capsular release among idiopathic, diabetic and secondary adhesive capsulitis. To determine if arthroscopic capsular release (ACR) shortens duration of illness in frozen shoulder (FS) in comparison to the depicted natural course of 30.1 months and to identify risk factors for persisting complaints [1-15].

ASSOCIATION BETWEEN DIABETES & SHOULDER DISORDER

Diabetes is a metabolic condition that is characterized by persistent hyperglycemia due to insulin deficiency, impaired effectiveness of insulin action, or both. Diabetes is considered one
of the most challenging health problems in the 21st century. Based on the etiology, diabetes can be classified into two main types: type 1 diabetes, which results from cell-mediated autoimmune destruction of pancreatic islet beta cells causing the loss of insulin production; and type 2 diabetes, which occurs due to insulin deficiency and/or insulin resistance. However, other types of diabetes do exist such as gestational diabetes (occurs during pregnancy), type 3 diabetes (resistance to insulin in the brain). Diabetes has many well-described complications including neuropathy, cardiovascular diseases, retinopathy, stroke, peripheral vascular disease (amputation), and renal failure that result in disability, reduced life span, and increased health cost. Complications involving the musculoskeletal system are generally less well-described. Shoulder pain is one of the most common complaints of patients with diabetes that causes motion limitation, functional disability, and decreased quality of life. There is higher prevalence of shoulder disorders in patients with diabetes, with AC and RC tendinopathy being the most common disabling shoulder disorders [16-18].

The association between diabetes and AC was first recognized by Bridgman (1972) who found that 10.8% of patients with diabetes had AC as compared to 2.3% patients without diabetes. Subsequent studies have supported this association and reported a prevalence of AC in 10-76% type 1 and 30-70% type 2 diabetes as compared to 0-10% in the general population. Adhesive capsulitis was also reported to be associated with age in both types of diabetes and with the duration in type 1 diabetes. Patients with diabetes, with or without the use of insulin, have a high risk for developing RC tendinopathy, with a hazard ratio (HR) as compared with those without diabetes. In addition, chronic RC tendinopathy and shoulder pain have been associated with diabetes. Further, patients with diabetes have been reported to have a concurrent diagnosis of AC and RC tendinopathy, leading to shoulder pain and contracture. Furthermore, diabetes has been associated with postoperative stiffness after rotator cuff repair. The pathophysiology that predisposes patients with diabetes for the development of AC or RC disease is not well-understood. However, the two diseases might share similar diabetes-related mechanism [19-20].

**METHOD**

A pre-post treatment design was applied for a study group of ten patients with type 1 diabetes and shoulder problems. Adhesive capsulitis (also termed frozen shoulder) is commonly treated by manual therapy and exercise, usually delivered together as components of a physical therapy intervention. The physiotherapy treatment consisted of exercises promoting enhanced micro-circulation in the shoulder tissues, optimal shoulder co-ordination, and muscle relaxation. The Shoulder Rating Scale - Swedish version, and pain intensity measures were used. The results regarding SF-36 were compared with the results of a control group of patients having either type 1 or type 2 diabetes and shoulder problems that did not receive any specific physiotherapy treatment. The impact of diabetes on functional outcomes after shoulder arthroplasty, with the following objectives: 1) To systematically review clinical research evaluating nonsurgical interventions for managing AC in diabetic patients; 2) To pilot test study procedures and estimating the effects of incorporating a progressive walking program as an adjunct to a regular physiotherapy program for managing AC in diabetic patients; 3) To examine the effect of diabetes on shoulder function and physical health status; Adhesive capsulitis is a common, yet poorly understood, condition causing pain and loss of range of motion in the shoulder. It can occur in isolation or concomitantly with other shoulder conditions (e.g., rotator cuff tendinopathy, bursitis). It is a condition of chronic inflammation and proliferative fibrosis resulting in painful limitation of shoulder movements with classical clinical signs. Diabetic patients are more likely to develop the disease and more likely to require operative management. The pathology of the disease, and its classification, relates to inflammation and formation of extensive scar tissue. Risk factors include diabetes, hyperthyroidism, and previous cervical spine surgery. The condition progresses in three stages: freezing (painful), frozen (adhesive) and thawing, and is often self-limiting. Common conservative treatments include nonsteroidal anti-inflammatory drugs, oral glucocorticoids, intra-articular glucocorticoid injections and/or physical therapy. However, many physicians may find themselves limited to prescribing medications for treatment. Stretching and strengthening exercises focused on improving rotator cuff strength and restoring balance between the muscles that stabilize and rotate scapula are used in prevention and treatment of shoulder pain. This article elaborates on physical therapy exercises targeted at adhesive capsulitis, which can be used in combination with common analgesics Regardless of management ultimately chosen. Physiotherapy of the RCT, rotator cuff muscles and surrounding shoulder girdle plays an essential role in proper treatment. Length of treatment, types of therapy and timing. Treatment modalities for FS include medication, local steroid injection, physiotherapy, hydrodistension, manipulation under anesthesia, arthroscopic capsular release, and open capsular release. Conservative management leads to improvement in most cases.

Clinical scenario: It has been suggested that posterior shoulder tightness is a common contributor to shoulder impingement in overhead-throwing athletes. The incidence of shoulder pain in the general population has been reported to be as high as 27%, and as many as 74% of the patients who were seen for shoulder issues had signs of impingement. Particularly regarding
physically active adults, shoulder impingement is frequent among overhead-throwing athletes and may lead to lost participation in sport, as well as other injuries including labral pathologies. Therefore, finding an effective mechanism to reduce posterior shoulder tightness in overhead athletes is important and may help prevent impingement-type injuries. Typically, posterior shoulder tightness is identified by measuring horizontal humeral adduction; although another clinical measure that is commonly used is the bilateral measurement of glenohumeral internal-rotation (IR) range of motion (ROM). It is important to note, however, that the measurement of glenohumeral IR ROM specifically aims to identify glenohumeral IR ROM deficits (GIRD). Although GIRD is believed to be a leading contributor to posterior shoulder tightness, this measure alone may not capture the full spectrum of posterior shoulder tightness. While treatment interventions to correct any ROM deficits typically include a stretching protocol to help increase IR, joint mobilizations have been found to produce greater mobility of soft tissue and capsular joints. However, it is unclear whether the combination of both joint mobilizations and a stretching protocol will produce even larger gains of ROM that will have greater longevity for the patient suffering from posterior shoulder tightness.

REVIEW

This article elaborates on physical therapy exercises targeted at adhesive capsulitis, which can be used in combination with common analgesicsRegardless of management ultimately chosen, physiotherapy of the RCT, rotator cuff muscles and surrounding shoulder girdle plays an essential role in proper treatment. The shoulder complex is composed of three bony structures: the clavicle, scapula, and humerus, which are connected to form three synovial (glenohumeral, acromioclavicular, and sternoclavicular) and two functional (scapulothoracic and subacromial) joints. These articulations link the upper extremity to the thorax and allow for great mobility of the arm. Asa result, the hand can be placed and moved through a large volume of space. Frozen shoulder (FS) is a common shoulder disorder characterized by a gradual increase of pain of spontaneous onset and limitation in range of motion of the glenohumeral joint. During arm elevation, the dynamic stability of the glenohumeral joint is provided mainly by the muscular forces of the rotator cuff and the deltoid. The rotator cuff consists of the subscapularis, supraspinatus, infraspinatus and teres minor muscles. This group of muscles inserts onto the facets of the greater and lesser tuberosities and provides a continual ring shaped insertion from posterior-inferior to anterior-inferior on the proximal humerus. The contraction of the supraspinatus, along with the deltoid, causes arm elevation. The contraction of the infraspinatus and the teres minor muscles provides an external rotation force while the internal rotation force results from the contraction of the subscapularis muscle. The co-contraction of the rotator cuff produces a concavity-compression effect directed toward the glenohumeral center to promote glenohumeral joint stability, while asymmetric contraction causes humeral head rotation (steering mechanism) and depression during shoulder abduction motion. However, due to the small size of the rotator cuff and its proximity to the joint center of rotation, they generate lower muscle forces when compared to the larger and more superficial muscles (deltoid, latissimus dorsi, trapezius, and pectoralis major). The long head of the biceps muscle plays a role in stabilizing the head of the humerus. Along with the rotator cuff, it functions to depress the humeral head during shoulder abduction. The pathophysiology of FS is relatively well understood as a pathologic process of synovial inflammation followed by capsular fibrosis. Treatment modalities for FS include medication, local steroid injection, physiotherapy, hydrodistension, manipulation under anesthesia, arthroscopic capsular release, and open capsular release. Conservative management leads to improvement in most cases. Failure to obtain symptomatic improvement and continued functional disability after 3 to 6 months of conservative treatment are general indications for surgical management. Shoulder pain due to rotator cuff tendinopathy is a common problem. Exercise is one intervention used to address this problem but conclusions from previous reviews have been mixed. the effects of a 7-week shoulder exercise program on shoulder ROM, strength, and perceived shoulder function and disability between diabetics/pre-diabetics and non-diabetics. We observed that the exercise program resulted in improved shoulder external rotation ROM, shoulder rotation strength, and shoulder function in participants with and without diabetes alike. Intervention used in our study resulted in improved shoulder rotation strength, but no change in shoulder elevation or scapular retraction strength. Lack of increase in shoulder elevation strength may be explained by the fact that only 1 of the 7 strengthening exercises targeted the shoulder elevator muscles (elevation). On the other hand, lack of improvement in scapular retraction was unexpected, since scapular retraction was emphasized in most of the strengthening exercises. The exercise program used in this study was designed to fit into the health education course (45 min x2/week for 10 weeks), and included 7 strengthening exercises for scapular and rotator cuff muscles with 3 stretching exercises for pectoral, posterior shoulder, and upper trapezius muscles [21-25].

Description of the condition

Adhesive capsulitis (AC), also known as frozen shoulder, is a common shoulder disorder that is characterized by a progressive and painful restriction of range of motion (ROM), that results in functional disability. The condition is more common in people with diabetes with an estimated prevalence of 10-76% in type 1 and 7-30% in type 2 diabetes as compared to 0-10% in the
Adhesive capsulitis is more frequent in women and is associated with age in both types of diabetes and with the duration in type 1 diabetes. Further, poor glycemic control has been shown to worsen shoulder pain and function in people with type 1 diabetes. Primary or idiopathic AC has no clear underlying cause and secondary AC is associated with a known systematic cause such as diabetes. The pathophysiology of primary AC is poorly understood but could occur as a result of inflammatory or fibrosing processes. However, the glycosylation of collagen fibers of the joint capsule and the impaired circulation of the joint small capillaries have been proposed as potential mechanisms that might explain the pathological process in patients with diabetes. For many years, AC has been described as a self-limited condition that progresses through a natural history of painful, frozen and thawing phases, leading to full recovery without treatment. However, a recent systematic review assessed the quality of the evidence that characterizes AC into three phases and that supports the concept that full recovery occurs without treatment. The authors reported a lack of evidence to support the theoretical phases of AC. In addition, this review found that moderate-quality evidence supported an early improvement in shoulder ROM and function that slows over time and leads to long-term limitations which questions the common perception that AC is a self-limited condition. Further, they reported that low-quality evidence suggested incomplete improvement in ROM after one to four years of follow-up. The authors recommended that the theory of natural progression of AC should be removed from professional and public information sites since it is not supported and potentially misleading. They also noted the need for future research towards diagnostic processes to identify the underlying causes of stiffness and disability of the patient [26].

INDICATIONS

Radicular pain, trigeminal neuralgia (TN), occipital neuralgia, shoulder and knee pain. Rotator cuff related shoulder pain (RCRSP) is an over-arching term that encompasses a spectrum of shoulder conditions including subacromial pain (impingement) syndrome, rotator cuff tendinopathy, and symptomatic partial and full thickness rotator cuff tears. Frozen shoulder (FS) is a common shoulder disorder characterized by a gradual increase of pain of spontaneous onset and limitation in range of motion of the glenohumeral joint. Failure to obtain symptomatic improvement and continued functional disability after 3 to 6 months of conservative treatment are general indications for surgical management [27].

RESULTS

We observed that the exercise program resulted in improved shoulder external rotation ROM, shoulder rotation strength, and shoulder function. The largest effect size was reported for joint mobilization plus exercises. The pilot RCT found that regular physiotherapy (PT) group and regular physiotherapy program plus progressive walking group (PT+) may improve functional performance and other outcomes. Consensus was achieved on a clinical reasoning algorithm to guide the assessment and treatment for patients presenting with local shoulder pain, without significant passive range of motion deficits and no symptoms or signs of instability. The algorithm emphasizes that physiotherapy treatment decisions should be based on physical assessment findings and not structural pathology, that active exercises should be the primary treatment approach, and that regular reassessment is performed to ensure that all clinical features contributing to the presenting shoulder pain are addressed. Consensus was also achieved on a set of guiding principles for implementing exercise therapy for shoulder pain, namely, a limited number of exercises, performed with appropriate scapulo-humeral coordination and humeral head alignment, in a graduated manner without provoking the presenting shoulder pain [28].

CONCLUSION

We found that low-quality evidence suggested large effects of joint mobilization plus exercises on AC in with people with diabetes.

Patients with and without diabetes may get equal surgical benefits, and residual pain may cause limitations in shoulder function one year after arthroplasty.
REFERENCES


