REVIEW OF MANAGEMENT OF ADHESIVE CAPSULITIS OF THE SHOULDER.

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Introduction:

Adhesive capsulitis (frozen shoulder) is a common condition, producing pain and restriction of motion of the glenohumeral joint. This condition was first described by Duplay in 1896, where he named the condition “peri-arthritis scapulohumerale” [1]. Codman in 1834, in his seminal book, coined the term “frozen shoulder”; he characterised this condition by pain and reduced range of motion in the affected shoulder and went on to describe it as follows: “This entity is difficult to define, difficult to treat and difficult to explain from the point of view of pathology”[2]. Nevasier in 1943, looked at 10 patients, and found chronic inflammation, thickening and fibrosis of the joint capsule, and used the term “adhesive capsulitis” to describe his findings [3].

The current definition of this condition by the American Shoulder and Elbow surgeons is as follows: A condition of uncertain aetiology characterized by significant restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder [4].

Adhesive capsulitis is relatively common, affecting between 2 to 5% of the general population [5, 6]. This condition is more common in diabetics, affecting up to 40% [7]. Peak incidence is between 40 and 60 years of age, with females more commonly affected than males [8, 9].

Adhesive capsulitis is divided into two types, namely idiopathic and acquired. As implied, the idiopathic type has no specific identifiable cause. Acquired type is associated with surgery, trauma, immobilisation and other local or systemic conditions. Local conditions include injury to the rotator cuff and calcific tendinitis. Systemic conditions include diabetes mellitus, thyroid disorders, Parkinson’s disease and stroke [10-12].

The natural history of adhesive capsulitis generally extends over 1 to 3 years. Usually there is an insidious onset of pain and gradual restriction of motion. The pain is usually most pronounced and progressive in the first three months. The pain often begins to settle around this time with ongoing, often increasing, restriction of motion which continues for another 3 to 12 months. Thereafter, there is a slow regaining of range of motion and function. In some instances, the loss of range of motion may be the first symptom [13]. Not all patients recover completely, with some left with varying degrees of restriction of motion [14]. Patients are also at risk of developing adhesive capsulitis on the contralateral shoulder in the order of 5 to 34% [15].

In adhesive capsulitis, the decrease of capsular distension resulting in reduced range of motion is the predominant problem. Consequently, the management of patients with adhesive capsulitis is centred on various methods of restoring this range of motion by re stretching the capsule.
**Diagnosis:**

**Clinical:**
Adhesive capsulitis is predominantly a clinical diagnosis. Usually there is a gradual onset with slowly developing pain and slowly developing reduced range of motion. Therefore, the majority of patients usually present weeks to months after the onset of their symptoms. In most studies evaluating adhesive capsulitis, inclusion criteria include the following: Insidious onset, night pain, painful restriction with isolated passive motion of the glenohumeral joint, restriction of scapulohumeral elevation to less than 100 degrees and external rotation limited to less than half of normal range.

On examination, in addition to the restriction of motion, there is often tenderness to pressure over the anterior and posterior capsule with deep palpation.

**Imaging:**
Plain x-rays can be used to exclude other causes of shoulder pain such as calcific tendinosis and neoplasms.

MRI is a valuable tool demonstrating multiple findings which support the diagnosis of adhesive capsulitis. These include: thickening of the coracohumeral ligament, capsular thickening, enhancement of the axillary recess post contrast administration, enhancing tissue within the rotator interval post contrast administration, thickening and increased signal of the inferior glenohumeral ligament and obliteration of the fat triangle under the coracoid process [16-19].

Ultrasound can also be valuable in diagnosis of frozen shoulder. Predominant finding is thickening of the coracohumeral ligament with increased vascularity within the rotator interval [20].

**Management:**

Management of adhesive capsulitis can be difficult, with the level of evidence for any particular treatment being limited.

Various treatment options include physical therapy (mobilisation techniques), oral non-steroidal anti-inflammatory drugs or oral corticosteroids, corticosteroid injections- subacromial or intra-articular, hydrodilatation, manipulation under anaesthesia, arthroscopic and open surgical release.

Usually, conservative means of therapy is initially instituted, with more invasive procedures utilised for those patients with sub optimal response. Surgery usually only considered if required after about 6 months.

**Conservative treatment:**
Often in the early stages of this condition, oral non-steroidal anti-inflammatory drugs are utilised, however, no study has shown this to improve the range of motion or reduce pain. Oral corticosteroids can improve pain and range of motion in the short term but this does not appear to be maintained after six weeks [24, 25].
Physical therapy (Mobilisation techniques)

There are many techniques available in the management of adhesive capsulitis, including the following: Angular mobilisation, translational mobilisation, spine mobilisation combined with gleno humeral stretching and both angular and translational mobilisation, high intensity techniques beyond pain threshold, Criax approach, Mulligan technique and Maitland technique.

A recent review of these techniques [21] concluded that the Maitland technique and Buchbinder’s technique of spine mobilisation combined with glenohumeral stretching and both angular and translational mobilisations appear to have the best outcomes.

Maitland technique [22] consists of passive oscillatory movements of the shoulder, over time increasing the range of motion.

Buchbinder’s technique [23] includes cervicothoracic spine mobilisation, stretching of the muscles around the glenohumeral joint, gliding and angular mobilisation. Increasing strength of the rotator cuff and scapular stabilisers.

Injection therapy:

If physical therapy proves unhelpful, usually injection therapy is usually the next treatment option. These methods include intra-articular injection, subacromial injection or hydrodilatation.

Some clinicians opt for injection therapy as the first line of treatment.

Oh JH et al [27] performed a prospective randomised control trial comparing glenohumeral and subacromial steroid injection in primary frozen shoulder. In separate patients, at each site, 1 mL triamcinolone (40 mg), 4 mL of 2% lidocaine, and 4 mL of normal saline was injected. They followed patients up to 6 months, demonstrating that both groups of patients benefited from these injections, with reduced pain and increased range of motion. Interestingly there was no statistical difference in outcome between the two groups.

Similarly, Rizk et al [28], performed a randomized trial comparing 4 groups: intra-articular methylprednisolone and lidocaine injection, intrabursal methylprednisolone and lidocaine injection, intra-articular lidocaine injection, and intrabursal lidocaine injection. In their study, 40 mg of methylprednisolone was injected weekly for 3 weeks. There was no significant difference in outcomes between intrabursal injections and intra-articular injections. In addition, the injection of steroids with lidocaine had no advantage over lidocaine alone in restoring shoulder motion; however, partial, transient pain relief occurred in two-thirds of the steroid-treated patients.

Hydrodilatation, first described by Andren, B.J. Lundberg, [26] in 1965, aims to distend the joint with injection of large amounts of fluid utilising predominantly normal saline. Usually a combination of normal saline, corticosteroid and anaesthetic such as lignocaine or Marcaine is injected. There is no consensus as to the volume of fluid required or what combination of product to be injected is best.

Some practitioners believe distending the joint is preferable to rupturing, and others believing that rupturing achieve better outcomes.

Yoon et al [29] performed a randomised clinical trial comparing intra-articular injection, subacromial injection and hydrodilatation. They found similar outcomes to Oh and Rizk with respect the subacromial and intra-articular injections. In the early stages, hydrodilatation by comparison, produced increased range of motion and reduced pain. At the six month mark, however, the difference in outcome was not statistically significant, with similar outcomes for the three groups.
Yoong P et al [36] performed ultrasound guided hydrodilatation via the rotator interval in 22 patients. At four month follow-up, 91% had statistical improvement in range of motion and reduction in pain.

Park KD et al [35] in the study comprising 20 patients performed three consecutive ultrasound guided hydrodilatations. 78% of patients having improvement in their range of motion and reduction of their pain at six weeks.

**Close manipulation and surgical intervention**

Usually these methods of management are only entertained after approximately 6 months of refractory pain and stiffness.

Closed manipulation, performed under anaesthetic involves rotation of the glenohumeral joint through its range of motion.

A number complications can be seen with this method of treatment, including glenohumeral joint dislocation, humeral fracture as well as rotator cuff and labral tears.

Although some studies have shown excellent outcomes such as Dodenhoff RM etal [30], who in a group of 37 patients demonstrated 94% patient satisfaction at three month follow-up.

Other studies, however, have shown equivocal benefit when compared to hydrodilatation [31] or home exercise therapy [32].

**Arthroscopic release**

This was first described by Pollock RG etal in 1994[33]. Techniques have been well described and over the years is becoming a more reliable treatment for recalcitrant frozen shoulder.

Barnes CP etal,[34] in a recent study (2016) involving 140 shoulders in 130 patients demonstrated improvements in pain and function which continued to improve up to 24 weeks post operatively.

**Open release**

With current arthroscopic techniques, this is now rarely performed, and is currently considered a historical treatment option only.

**Conclusion:**

Adhesive capsulitis or frozen shoulder is a common clinical condition, usually affecting middle-aged persons.

It usually has no obvious precipitating cause, with an insidious onset with increasing pain and limitation of range of motion of the shoulder.

This is a predominantly clinical diagnosis, however imaging can provide supportive evidence in its diagnosis.

Although it is an essentially self-limiting condition, it can has a protracted course, ranging between one to three years.

This means that patients often warrant and opt for some form of management / intervention.

In the initial stages, treatment often includes the use of oral anti-inflammatories or occasionally oral steroid therapy, despite there being limited evidence that this is of any significant benefit.

Physical therapy is the usually the next treatment option, with various methods being utilised by different practitioners. Current research suggests that spine mobilisation combined with gleno
humeral stretching and both angular and translational mobilisation and the Maitland technique have the best outcomes. If the physical therapy does not appear to be achieving the desired outcome, injection therapy is often the next form of intervention, with hydrodilatation, currently being the most popular. Although hydrodilatation appears to in the short term provide increased range of motion and decreased pain, studies comparing subacromial or intra-articular corticosteroid and anaesthetic injections appear to have similar long-term outcomes.

In those recalcitrant patients who have ongoing pain and restriction of motion, usually only performed after more than six months of conservative measures, manipulation under anaesthetic or arthroscopic surgical release can be considered.

**Information sources and search strategy:**

The databases of PubMed, Google Scholar, Web of Science, Cochrane Library, University of Queensland library and Monash Health library were searched without any date limits. The main search terms were: frozen shoulder, adhesive capsulitis, manual therapy and physiotherapy shoulder, mobilisation shoulder, intra-articular injection, subacromial injection, corticosteroid joint injection, lignocaine and marcaine joint injection, manipulation under anaesthetic, periarthritis, capsulitis, subacromial bursitis, arthroscopic shoulder surgery, surgical treatment shoulder, image guided injection shoulder.

**References:**


