

controversial topics in surgery

Management of frozen shoulder – conservative vs surgical?

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Management of frozen shoulder remains controversial. Codman, when he coined the term ‘frozen shoulder’, claimed that this disorder is ‘difficult to define, difficult to treat, and difficult to explain from the point of view of pathology’;¹ almost 80 years later, we are still not much farther.

Both conservative and surgical treatment may result in equal outcome two to three years from the onset. However, this is at the expense of pain, stiffness and disability for this length of time. Surgical treatment with manipulation under anaesthetic or arthroscopic release shortens this to several weeks.

The authors of these two excellent papers acknowledge the differences in approach in different stages of the disorder. In early stage there is a place for conservative treatment and one may try intra-articular steroid injections.

One should bear in mind that manipulation should be performed in a particular way using a short lever arm, stabilising the scapula and utilising ‘Codman’s paradox’ to avoid torque on the arm bone and avoid complications. Physiotherapy is a crucial part of success.

Reference

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The case for surgical treatment of the frozen shoulder

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Frozen shoulder is a painful and debilitating condition with an incidence of 3% to 5% in the general population and up to 20% in those with diabetes.^{1,2} The term ‘frozen shoulder’ was first introduced by Codman in 1934 to describe a condition that has been of interest to clinicians since the late 1800s.³ Clinically it is characterised by considerable pain and insidious shoulder stiffness, which results in loss of passive and active forward flexion and external rotation.

Some studies have described frozen shoulder as a self-limiting condition that resolves in 1 to 3 years.^{4,5} Yet others report that between 20% and 50% of patients can be symptomatic for up to 10 years.⁵ A number of treatments have been advocated. These include rest, analgesia, active and passive mobilisation, acupuncture, physiotherapy, oral and injected corticosteroids, capsular distension, manipulation under anaesthesia and surgical capsular release. It is sur-

prising that for such a common condition there is no consensus on the most effective treatment.

Frozen shoulder involves 3 phases. These include the ‘freezing phase’ or the ‘painful phase’ lasting 3 to 8 months, the ‘frozen phase’ or the ‘adhesive phase’ lasting 4 to 12 months and the ‘thawing phase’ or ‘resolution phase’, which lasts anywhere from 12 months to 42 months and is characterised by a steady return of shoulder mobility and function.⁶

Surgical treatment for frozen shoulder is usually considered after a concerted effort at conservative management has failed. There is no discrete timeline to proceed to surgery. As a general rule patients should have participated in some form of physiotherapy for a minimum of 4 to 6 months and shown little or no progress. A more conservative approach is largely recommended for patients in the ‘freezing phase’, which is the painful phase of the disease process.

Patients have to feel that they are not making progress and have limitations of occupation, recreation or sleep, for them to proceed with surgical intervention.

In a recent survey of healthcare professionals only 3% of the respondents recommended surgical treatment for the 'freezing phase' of the disease process. In comparison, 47% of respondents recommended surgical treatment for the second and third phases of frozen shoulder.⁷ The surgical treatment options in this survey were manipulation under anaesthesia, arthroscopic capsular release and open capsular release.

As operative techniques continue to shift from open to arthroscopic procedures, the open surgical release is less common, although still effective.⁸ Manipulation under anaesthesia is another technique commonly used to improve the range of shoulder movement. However, manipulation under anaesthesia is not without its disadvantages. There is a small risk of humeral fracture, dislocation, rotator cuff injuries, labral tears and brachial plexus injury. Arthroscopic arthrolysis has become well accepted in treating this process.

A tightened coracohumeral ligament and rotator interval with the contracted capsule are the 'essential lesions' noted in frozen shoulder. These contracted structures can be treated by release with arthroscopic instruments. The arthroscope is inserted through the posterior portal and the rotator interval is released with an electrocautery wand inserted through the anterior portal. All rotator interval tissue between the upper subscapularis and the superior glenohumeral ligament is released. Care is taken to preserve the medial sling of the biceps. The middle glenohumeral ligament is then released followed by an anterior capsular release and inferior capsular release. The arthroscope is then placed in the anterior portal and a posterior capsular release performed with the electrocautery wand inserted through the posterior portal. The arthroscope is then placed in the subacromial space. Subacromial adhesions, if present, are released through the lateral portal. This provides a more controlled release than manipulation alone.^{9,10}

Operative treatment of frozen shoulder has been shown to decrease the disease duration and return shoulder motion with success.^{11,12} Total recovery of pain-free range of movement averages 2.8 months (range 1 month to 6 months). As a result of the added diagnostic ability of arthroscopy and the favourable return of range of movement, this is my preferred method of operative treatment. Immediate postoperative physiotherapy is initiated after surgical treatment.

Exercises are progressed in accordance with the conservative protocol. In general 1 week to 2 weeks post surgery light sub-maximal isometrics for the glenohumeral joint, rotator cuff and scapular muscles can begin, with isotonic exercises starting around the 2-week to 3-week time frame. Full unrestricted use of the shoulder should be attained by the 12-week to 16-week time frame in most cases.

Although I have made a case for surgical treatment for frozen shoulder, demonstrating superiority of surgical treatment intervention over non-operative treatment requires an adequate sample size with a controlled study population and random allocation of treatment. Systematic reviews to date have been largely inconclusive as a result of insufficient numbers in small trials. One would anticipate that the limitations of previously published studies on frozen shoulder could be overcome by conducting a large multicentre randomised trial in the future.

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Frozen shoulder – the case for conservative management

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Introduction

The management of this idiopathic condition that is unique to the glenohumeral joint of the shoulder remains controversial. It was first described by Duplay in 1872 as ‘*périarthrite scapulo-humérale*’.¹ Rowe and Leffert described three stages of this shoulder pathology as ‘freezing, frozen and thawing’, with a suggestion that this was a process that resolved of its own accord, with full recovery within 18–24 months.² No definite aetiology has been defined as yet though a number of mechanisms have been postulated.^{1,5}

Management is aimed primarily at the resolution of the severe pain, especially in the early stages of the disease, which frequently results in severe sleep deprivation due to nocturnal pain that is poorly controlled by analgesics. The secondary aim of treatment is improvement in the range of movement of the affected shoulder, which will usually follow after alleviation of the severe shoulder pain. The traditional (‘gold standard’) method of treatment of this condition is a manipulation under anaesthetic. The aim of this article is to discuss the conservative or non-surgical management of this debilitating pathology of the shoulder joint.

Before deciding on the management of a patient whose shoulder is affected by this condition, it is important to distinguish between primary (idiopathic) frozen shoulder and secondary conditions that require treatment where the management should be aimed at the aetiological agent, of which there are numerous.^{5,6} Diabetes (especially type I, insulin-dependent diabetes) needs to be identified as this disease causes the response of this condition to treatment to be variable and unpredictable, usually affecting the prognosis negatively.

Management

The conservative management of frozen shoulder has included combinations of regimens that include physiotherapy using a number of modalities, hydraulic distension of the glenohumeral joint and intra-articular steroid injections.

Physiotherapy

Physiotherapy is usually the first line of treatment in primary care and can help in the early stages of the disease if it is recognised. Evidence of its effectiveness in respect of pain relief and alleviation of restriction of shoulder movement is variable from positive⁴ to negative.⁵ Manske and Prohaska⁴ describe in great detail their recommendations for physiotherapy treatment in relation to the three stages of frozen shoulder. They quote evidence in their paper of the efficacy of this treatment from the literature. Their paper glosses over the use of steroids with or without distension in the

treatment of frozen shoulder and seems to concentrate on physiotherapy as a primary treatment for all phases of this condition. However, there are no randomised controlled studies of physiotherapy as there are many differing methods of it, which are difficult to control for in order to draw valid scientific conclusions from the evidence.

Distension

The treatment using hydraulic distension of the shoulder was popularised after it was found that arthrography of the shoulder in this condition produced alleviation of the pain and improved range of movement in a number of patients.⁵ This procedure, called *brisement*, was commonly undertaken by radiologists.^{7,8} Randomised controlled studies are few and suffer from small numbers, with poorly defined entry criteria.⁹

Steroids

There has been much variation in the way in which steroid preparations have been administered over the years. Oral prednisone was initially used. The use of steroid injections initially in the form of hydrocortisone acetate and later as an insoluble preparation, methylprednisolone, has been studied since the early 1950s. The dosage has also varied as has the method and anatomical sites of the administered injections.^{1,5,4} In a three-way randomised controlled study, which this writer co-authored, the value of adding steroid to intra-articular distension of the shoulder with local anaesthetic was first intimated.¹ However, the study methodology suffered from low numbers and could not be described as definitive.

The author’s management rationale

Having extensively reviewed the evidence from the literature available by the late 1990s, we noted the lack of any evidence-based outcomes in the management of frozen shoulder. Therefore we embarked on a randomised controlled study in order to compare the clinical outcomes of two groups of patients: the first treated by the gold standard of surgical intervention (as a day case) for primary frozen shoulder, namely a manipulation under anaesthetic followed by a standard regimen of physiotherapy; the second treated with up to three intra-articular steroid-with-distension (SWD) injections at six-weekly intervals as an outpatient, without a physiotherapy referral. It was not possible to obtain ethical committee approval for a ‘no treatment’ group despite making such a proposal initially.

This study confirmed that patients treated by the SWD injections had the same outcome as patients treated with

a manipulation under anaesthetic and physiotherapy when followed up over a two-year period.⁵ No patients in either group required any additional surgical interventions in the form of open or arthroscopic surgical release of the shoulder or any other shoulder surgical interventions. The cost implications are thus obvious, with the avoidance of day-case admission, a general anaesthetic and physiotherapy. These patients were probably mostly in the first phase of the disease in view of these overall satisfactory results.

Thus it remains this author's practice when treating primary frozen shoulder that patients are treated with steroid-and-distension injection, using 40mg methylprednisolone, 5ml 2% lignocaine and 10ml of 0.25% bupivacaine in a 20ml syringe. Room air is added in order to act as a marker and confirm intra-articular administration of the injection by an audibly and palpably positive 'squelch sign' after the injection. The injection is inserted by the posterior approach with the patient seated.¹ It is the author's experience that apart from a handful of patients who felt faint after the first injection, this treatment had an estimated 99% patient acceptability rate. He therefore does not agree with the sentiments expressed by Manske and Prohaska that the injection 'typically is a painful process and often is poorly tolerated' by patients.⁴

Counselling and a full explanation of what the patient can expect with sympathetic outpatient staff support will result in a relaxed patient who readily accepts what can on occasion be a very painful procedure. Full knowledge of the anatomical landmarks whereby one can insert the needle expertly into the glenohumeral joint without a struggle, is invaluable. In practice the second (and third) SWD injection is only administered six weeks later if the patient has not regained external rotation of at least 50% compared with the normal shoulder. Again it is important to stress when embarking on this course of treatment that the first injection is always far more painful than any subsequent intra-articular

injections. The author believes that more than three SWD injections into any shoulder joint is inappropriate and then usually in the minority of patients has to proceed to surgical methods of treatment.

The author therefore believes that intra-articular SWD injections are an effective evidence-based treatment regimen that can be used as the primary treatment of this enigmatic disease process. His experience has shown that these injections give reliable pain relief (especially of the debilitating nocturnal sleep disturbance due to shoulder pain) and improvement in the range of movement of the shoulder.

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