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PROFESSIONAL ARTICLE

Evaluating the Outcome of Distal Sodium Channel Block by Chennai Cocktail Composition in Active Phase (Stage 1) of Adhesive Capsulitis (Frozen Shoulder)

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Abstract

Background/Aim: The average age range for people with adhesive capsulitis, also referred to as frozen shoulder, is 40–70 years old. Diffuse, severe shoulder pain gradually develops; it usually gets worse at night and causes a progressive loss of range of motion (ROM), particularly external rotation. In the treatment of adhesive capsulitis, distal sodium channel block by the Chennai cocktail method has become popular. It works by apparently activating α-2 receptors and blocking distal sodium channels, which reduces pain and promotes healing with a low risk of infections and immune reactions. Aim of this study was to evaluate efficacy of this method in patients with adhesive capsulitis.

Methods: Chennai cocktail regime consisted of 2 mL of 2 % lidocaine hydrochloride + 1 mL of 40 mg/mL triamcinolone injection + 30 µg clonidine injection. Xylocaine, clonidine and steroid test dose were given half an hour before the procedure. After the skin was marked, under aseptic precautions parts were painted and draped with a hole towel. Chennai cocktail regime was injected into 1st web space of the affected upper limb.

Results: Internal rotation showed the most improvement, while abduction and external rotation showed the fastest and most noticeable recovery. At six weeks and three months, there was a considerable recovery ($p < 0.05$) in abduction and external rotation. Flexion, abduction and external rotation did not significantly improve at two weeks. The group's Shoulder pain and disability index (SPADI) significantly improved at six weeks and three months ($p < 0.05$). Most of the patients were able to return to their normal daily activities and sleep on the affected side without any problems. The VAS showed a significant ($p < 0.05$) improvement in the group at three months. At three months, flexion, abduction and external rotation all showed a discernible improvement.

Conclusion: Injections using the Chennai cocktail method for adhesive capsulitis seem to be a safe and efficient treatment that improves ROM and discomfort in individuals with adhesive capsulitis of the shoulder at short-term follow-up.

Key words: Bursitis; Adhesive capsulitis; Coracohumeral ligament (CHL); Chennai cocktail method; Range of motion, articular (ROM); Receptors, alpha-2.

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Introduction

Shoulder pain and stiffness are frequently caused by adhesive capsulitis. It might be primary (idiopathic) or due to other disorders such diabetes mellitus, myocardial infarction, hyperthyroidism, autoimmune diseases, post-stroke, post-injury, post-surgery and extended immobilisation. Adhesive capsulitis, also referred to as frozen shoulder, is more common in women than in males and usually affects individuals between the ages of 40 and 70.[1] In the general population, frozen shoulder occurs 2–5 % of the time, but in diabetic individuals, it can occur as often as 30 %.[2] The distinguishing feature of adhesive capsulitis is glenohumeral capsule contracture. Adhesive capsulitis is characterised by the loss of the capsule's synovial layer, its attachment to the anatomical neck, a decrease in capsular volume and a thicker, fibrotic rotator interval—a structure vital to the integrity of the glenohumeral joint. The glenohumeral capsule, the biceps tendon and the coracohumeral ligament (CHL) are all located in the rotator interval. It is thought that the key finding in adhesive capsulitis is a contracted CHL. Freezing (painful), frozen (sticky) and thawing (healing) are often the three stages of frozen shoulder. Two to three months are spent in the freezing phase. Diffuse, severe shoulder discomfort gradually develops; it usually gets worse at night and causes a progressive loss of range of motion (ROM), particularly external rotation. Frozen stage is lasting three to twelve months. Over time, the discomfort lessens and the night discomfort goes away. The primary feature is stiffness, which first impacts the shoulder's external rotation and then its abduction.

During the thawing period, which typically lasts six to twelve months, the patient progressively regains ROM. There won't be any discomfort and of ROM, will recover gradually.[3] There are numerous ways to treat frozen shoulder, including open release of the contracture, arthroscopic surgery, oral corticosteroids, intraarticular injections of corticosteroids, PRP, intraarticular injections of hyaluronic acid, physical therapy exercises, deep heat modalities, hydro dilatation, manipulation under anaesthesia and more recent methods like distal sodium channel block by Chennai cocktail method.[4] Injections of local corticosteroids, which have a potent anti-inflammatory impact and are widely used to treat adhesive capsulitis, have been shown to help with pain management and enhance function. Distal sodium channel block by the Chennai cocktail method has become popular as a new treatment for adhesive capsulitis. It works by activating alpha-2 receptors and blocking distal sodium channels, which lessens pain and promotes healing with a low risk of infections and immune reactions.[5] Evaluating the function of distal sodium channel block by Chennai cocktail technique injection is necessary since evidence from many research points to varying degrees of efficacies in these treatments.[6]

Aim of this study was to evaluate efficacy of Chennai cocktail technique injection in patients with adhesive capsulitis.

Methods

This research was prospective, after the approval from the Sri Siddhartha Institute of Medical Sciences Hospital and Research Centre Ethics Committee approval. Patients between the ages of 30-63 who presented with pain and stiffness in their shoulder joint and who have been clinically diagnosed with frozen shoulder and who visit the Orthopaedics Emergency Room and Outpatient Department at "Sri Siddhartha Institute of Medical Sciences Hospital and Research Centre", T-Begur, between July 2022 and December 2022, were evaluated and potentially involved in the research on the basis of inclusion and exclusion criteria. Criteria for inclusion were patients range in age from thirty to seventy years, being given a clinical diagnosis and receive analgesic medication solely. A loss of passive shoulder flexion, extension, abduction, external rotation and internal rotation of greater than one-third is associated with shoulder discomfort, per a clinical diagnosis. Criteria for exclusion: individuals undergoing anticoagulant or antiplatelet treatment, or those with haematological problems, Sudeck's osteo dystrophy, rheumatoid arthritis, autoimmune or inflammatory arthropathies, surgical history for that specific shoulder, foci of infection surrounding the shoulder, rotator cuff damage, shoulder girdle complicated fracture, diabetes mellitus out of control and neuromuscular illness.

Patients undergo specialised examinations to rule out other illnesses presenting with comparable clinical characteristics after receiving a thorough history and clinical examination. Radiography of the glenohumeral joint was taken normally

and in neutral rotation from the front and behind. Individuals who meet the study's eligibility requirements and consent to take part had a single injection of the Chennai cocktail regimen in the first web area of their hands. Patients were asked to provide written consent for the treatment and research. Following an injection, patients were instructed to engage in vigorous shoulder motions and rehabilitation, which included shoulder wheel exercises. Following the treatment, there was follow-ups in two week, six week and three months. The "Visual analogue scale (VAS)" and the "Shoulder pain and disability index (SPADI)" score were utilised for evaluating the patient's level of pain. Additionally, at two-week, six week and three months, the patient's functional ROM was assessed. The data were recorded in the appropriate proforma.

Chennai cocktail regime consisted of two millilitres (mL) of 2 % lidocaine hydrochloride + 1 mL of 40 mg/mL triamcinolone injection + 30 µg clonidine injection. Prior consent to be taken from the patient before the procedure. Xylocaine, clonidine and steroid test dose were given half an hour before the procedure. After the skin was marked, under aseptic precautions parts were painted and draped.

Results

Presented study comprised 29 patients with idiopathic adhesive capsulitis of the shoulder. Each patient's dominant hand was the right one. The average age of the patients was 46.5 years. Table 1 demonstrates that there were 18 (62 %) females. Comparatively speaking, the left side was more frequently affected than the right 8 (28 %). None of these characteristics, meanwhile, attained statistical significance.

Table 1: Demographic details of patients

Variable	N (%)
Mean age, years	46.5
Gender	
Female	18 (62 %)
Male	11 (38 %)
Affected shoulder	
Right shoulder affected	8 (28 %)
Left shoulder affected	19 (65 %)
Bilateral	2 (7 %)

Internal rotation showed the most improvement, while abduction and external rotation showed the fastest and most noticeable recovery. At six weeks and three months, there was a considerable recovery ($p < 0.05$) in abduction and external rotation. Flexion, abduction and external rotation did not significantly improve at two weeks. The group's SPADI pain and disability scores significantly improved at six weeks and three months ($p < 0.05$). Most of the patients were able to return to their normal daily activities and sleep on the affected side without any problems. The VAS showed a significant ($p < 0.05$) improvement in the group at three months. At three months, flexion, abduction and external rotation all showed a discernible improvement. On day 0, the average pain reduction was 72.29 %; at two weeks,

Table 2: Analysis of pain score, disability score, VAS score and of range of motion (ROM)

Variable	N (%)	p value
Pain score, %		
At inclusion	72.29 (11.55)	0.609
2 weeks	56.90 (11.24)	0.051
6 weeks	41.51 (9.66)	0.021
3 months	24.04 (6.67)	0.000
Disability score, %		
At inclusion	66.21 (14.19)	0.655
2 weeks	52.54 (11.38)	0.679
6 weeks	34.43 (6.89)	0.014
3 months	21.26 (6.31)	0.010
VAS score		
At inclusion	8.95 (1.90)	0.437
2 weeks	6.67 (1.70)	0.349
6 weeks	4.25 (1.20)	0.012
3 months	2.85 (1.10)	0.007
External rotation		
At inclusion	40.87 (15.16)	0.666
2 weeks	52.21 (11.97)	0.024
6 weeks	63.36 (15.91)	0.016
3 months	70.33 (14.35)	0.003
Abduction		
At inclusion	86.83 (31.22)	0.208
2 weeks	96.24 (28.97)	0.145
6 weeks	113.75 (28.19)	0.025
3 months	138.22 (22.56)	0.001
SPADI, %		
At inclusion	68.55 (9.39)	0.850
2 weeks	54.22(6.70)	0.492
6 weeks	37.15 (5.61)	0.016
3 months	22.32 (4.63)	0.006

VAS: Visual analogue scale; SPADI: Shoulder pain and disability index;

it was 56.899 %; at six weeks, it was 41.511 % and at three months, it was 24.037 %. The mean improved disability score was 66.207 % on day 0, 52.539 % at two weeks, 34.429 % at six weeks and 21.257 % at three months. At day 0, the mean score was 68.55 %; at two weeks, it was 54.219 %; at six weeks, it was 37.15 %; and at three months, it was 22.323 %. At three months, the disability, pain and SPADI ratings showed a discernible improvement. Table 2 displays the ROM and functional outcome as determined by SPADI and VAS at inclusion, two weeks, six weeks and three months.

Discussion

An unidentified, frozen shoulder is a challenging ailment to treat. Little is known about the pathophysiology, natural history, aetiology and responsiveness to therapy, as evidenced by the range of treatment modalities used. Expanding the shoulder capsule, physiotherapy, deep heat therapy and strengthening exercises all help to reduce the symptoms of a frozen shoulder. Primary frozen shoulder symptoms develop without a clear cause.

Most patients associate some minor trauma with the start of their symptoms. Similar findings have been found in the literature. The age range of the idiopathic frozen shoulder patients in this study was 30 to 63 years old. According to Codman[3] and Lundberg,[7] females were affected by the illness at a relatively younger age than males. In their investigation, Codman and Lippman discovered that adhesive capsulitis was more prevalent in women. Compared to the right side, the left side was said to be affected more frequently.[8] Similar findings were seen in presented study: whereas every patient in presented series exhibited dominant use of their right hand, the left side was shown to be more frequently included than the right, but this difference did not approach statistical significance.

There was bilateral involvement in two cases. Nevertheless, Flannery et al reported that after three months of ineffective conservative therapy, 145 shoulders were treated with manipulation while under anaesthesia.[9,10] Patients who presented early in the disease course had a much superior range of abduction and an SPADI score. Presented series' mean abduction range was 86.83° at day 0, 96.24° at two weeks, 113.75° at six weeks and 138.22° at three months, with an average decline of 24.037 % at three months. Three months later, there was a discernible improvement. According to Mertens et al,[11] only 60 % of patients who underwent physical therapy in addition to other modalities were able to sleep pain-free after five months. In presented study after 3 months patients were pain free.

Although there hasn't been much research on the long-term benefits of cold therapy, mobilisations, intra-articular steroid injections, or no treatment at all, steroid injections have been proven to help with pain and ROM in the early stages. After intra-articular injections, there was a 50 % reduction in pain levels but only a 13 % gain in ROM. The range of external rotation showed a notable improvement after three months in presented study. Likewise, after 3 months, there was a notable improvement in the abduction range. Compared to exercise alone or placebo therapy, Carette et al[7] showed a statistically significant improvement following treatment with injections using the Chennai cocktail method. Injection using the Chennai cocktail method in the early stages of adhesive capsulitis facilitates a better and faster recovery, according to different research by Challoumas et al.[12] In presented research, there was an average of 24.037 % improvement in the group's pain score after three months.

Diercks and Stevens[4] demonstrated just 89 % of the participants had satisfactory shoulder function at two years. Strong evidence for the short-term and moderate evidence for the mid-term efficacy of steroid injection and laser treatment were discovered in a comprehensive analysis comparing the efficacy of conservative and surgical treatments for adhesive capsulitis. At both short- and long-term follow-ups, there was suggested to be modest evidence supporting active physiotherapy and mobilisation techniques.[13] Injections using the Chennai cocktail method were shown to significantly reduce shoulder ROM and discomfort early on, as demonstrated by several trials; however, after three months, no changes were observed between the therapies. They could work better in the early stages of inflammation without causing significant capsular contracture, although more thorough research is needed to confirm this.[14]

In presented investigation, it seems that Chennai cocktail injection was more beneficial for ROM

recovery. Similar results were observed in research by D'Orsi et al.[15] At short-term follow-up, injections utilising the Chennai cocktail method for adhesive capsulitis appear to be a safe and effective treatment that enhances ROM and pain in patients with adhesive capsulitis of the shoulder.[16] According to this research, most patients in the group experienced significant enhancements in their ROM and level of discomfort, suggesting that early intervention in the early stages of adhesive capsulitis may be beneficial. A longer follow-up period might have yielded even better findings.

Conclusion

Injections using the Chennai cocktail method for adhesive capsulitis seem to be a safe and efficient treatment that improves ROM and discomfort in individuals with adhesive capsulitis of the shoulder at short-term follow-up. Presented study found that most of the patients in the group experienced significant improvements in their ROM and discomfort, indicating that early intervention in the first stages of adhesive capsulitis may have positive results. While the outcomes we received were good, they may have been much better with a longer follow-up period.

Ethics

This study was approved by the Sri Siddartha Institute of Medical Sciences Ethics Committee, approval No 68/2022-23, dated 25 April 2022. The institutional Ethics Committee gave its approval to the project. All participants in this study provided informed consent or waived it.

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None.

Conflicts of interest

The authors declare that there is no conflict of interest.

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Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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