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Suprascapular nerve block versus intraarticular corticosteroid in the treatment of periarthritis shoulder

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ABSTRACT

Background: Periarthritis shoulder, Frozen shoulder or adhesive capsulitis, presents as a significant clinical challenge with various therapeutic strategies being explored. This study aimed to compare the efficacy of suprascapular nerve block (SSNB) and intraarticular steroids, both adjunctive to physical therapy, in managing periarthritis shoulder.

Materials and Methods: We conducted a comparative study involving 50 patients diagnosed with frozen shoulder. Patients were segregated into two groups: one received SSNB (n=25), and the other received intraarticular steroids, followed by physical therapy in both groups.

Results: Patients undergoing SSNB showed a significant reduction in SPADI scores over a 12-week follow-up period, with a mean reduction of 64%. This group also recorded patient satisfaction scores of 8.5 ± 1.2 on a VAS (0-10) and a quality of life score of 85 ± 10 on the SF-36 scale. In contrast, the intraarticular steroids group, while also showing improvement, lagged behind the SSNB group in these metrics.

Conclusion: SSNB, when combined with physical therapy, emerges as a promising therapeutic strategy for periarthritis shoulder, demonstrating superior efficacy compared to intraarticular steroids in terms of pain reduction, function enhancement, and patient satisfaction. Further extensive studies are warranted to affirm these findings.

1. Introduction

Periarthritis shoulder, also known as adhesive capsulitis, is a condition marked by pain and stiffness in the shoulder joint, limiting range of motion and daily activities.[1] With a complex etiology and multifactorial origins, including post-surgical conditions, trauma, or even prolonged immobilization, the treatment for frozen shoulder remains a matter of debate among clinicians and researchers.[2] Among the numerous interventions available, two approaches have gained prominence for their efficacy in managing pain and improving function: suprascapular nerve block and intraarticular corticosteroid injection.[3] This article delves into the comparative therapeutic potential of these two interventions in treating frozen shoulder.

The pathophysiology of frozen shoulder remains incompletely understood. Although the hallmark of the disease is fibrosis and contracture of the glenohumeral joint capsule, there's a growing belief that inflammation plays a pivotal role in its onset and progression.[4] This inflammation, which often presents without a detectable trigger, leads to pain and functional limitation, thereby underscoring the rationale for anti-inflammatory interventions such as corticosteroid injections.[5]

Intraarticular corticosteroid injections have been utilized in orthopaedic practice for decades as a mainstream treatment for various painful joint conditions, including frozen shoulder.[6] These injections work by reducing inflammation, thereby alleviating pain and enhancing joint function.[7] Several studies have documented the immediate

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and medium-term benefits of corticosteroid injections in improving pain scores and range of motion in patients with adhesive capsulitis.[8] However, some critics argue that while the symptom relief is undeniable, the impact on long-term functional outcomes and disease resolution is less clear.[9]

On the other hand, suprascapular nerve block has emerged as a valuable therapeutic option. The suprascapular nerve, originating from the upper trunk of the brachial plexus, provides sensory innervation to the majority of the shoulder joint.[10] By blocking this nerve, pain signals from the shoulder can be significantly reduced. Clinical trials have demonstrated not only immediate pain relief following the block but also an improvement in the range of motion, making it a viable alternative to corticosteroid injections.[11] Moreover, considering its relatively minimal systemic side effects and the potential to offer sustained relief, many clinicians are now advocating for its broader use in clinical practice.[12]

However, a direct comparison of these two treatments has its challenges. While both interventions primarily aim at pain reduction, their modes of action, potential side effects, and long-term benefits vary significantly.[13] Additionally, individual patient factors, such as the stage of adhesive capsulitis, comorbid conditions, and previous treatments, can influence the efficacy of each approach.[14] As a result, there's a pressing need for high-quality, comparative studies to provide evidence-based guidance to clinicians seeking the best treatment modality for their patients.

In conclusion, both suprascapular nerve block and intraarticular corticosteroid injections offer viable therapeutic options for patients suffering from frozen shoulder. While the former provides a localized, nerve-specific approach, the latter leverages the anti-inflammatory properties of corticosteroids to alleviate symptoms. Determining which approach is superior or more appropriate for individual patients requires a nuanced understanding of their clinical presentation and a critical appraisal of the existing literature.[15,16] This article aims to provide this much-needed comparison, shedding light on the optimal treatment strategy for adhesive capsulitis.

2. Aim

To compare the effectiveness of suprascapular nerve block with intraarticular steroids as an adjuvant prior to physical therapy in managing pain and shoulder disability in patients diagnosed with frozen shoulder.

3. Materials and Methods

3.1. Setting

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3.2. Study design

This study employed a comparative design to investigate the effects of two different interventions on patients diagnosed with frozen shoulder.

3.3. Inclusion criteria

1. Consecutive patients clinically diagnosed with frozen shoulder.
2. Age between 40 to 60 years.
3. Duration of symptom onset more than 4 weeks but less than 6 months.

3.4. Exclusion criteria

1. Symptom duration less than 4 weeks due to potential for spontaneous improvement.
2. Symptom duration more than 6 months as such patients might necessitate an alternate therapeutic approach.
3. Radiological evidence of glenohumeral arthritis or pronounced cervical degenerative changes.
4. Secondary frozen shoulder attributed to rotator cuff tears (managed by arthroscopic interventions).
5. Presence of upper limb monoplegia following a cerebrovascular accident.
6. Prior physiotherapy to the shoulder or previous intraarticular injections within the last 6 months.
7. Known allergy to any of the injectables employed.
8. Cases of bilateral frozen shoulder.

3.5. Intervention protocol

A total of 50 patients satisfying the inclusion criteria were randomized into:

1. Group A: Intraarticular Steroid group (IAS group)
   (a) Received an intraarticular mix of 40 mg Triamcinolone and 5ml 0.5% Ropivacaine.
   (b) Also underwent a sham Suprascapular nerve block without drug administration.
2. Group B: Suprascapular Nerve Block group (SSNB group)
   (a) Were administered a Suprascapular nerve block using 10 ml 0.5% Ropivacaine and 40 mg Triamcinolone.
   (b) Experienced a mock needle prick at the shoulder's posterior joint line without drug injection.

Both groups initiated home-based physical therapy following their respective interventions. Exercise routines were explained through charts and a video demonstration provided to aid their home sessions.

3.6. Evaluation method

SPADI: Patients self-administered the SPADI questionnaire (Shoulder Pain and Disability Index) at the onset (Week 0) and during subsequent intervals of 2, 4, 8, and 12 weeks. The SPADI score comprises 5 questions related to pain and 8 addressing disability.

3.7. Patient satisfaction

Patient satisfaction with the treatment was assessed using a Visual Analog Scale (VAS) for satisfaction. The scale ranged from 0 (completely dissatisfied) to 10 (completely satisfied). This scale is a straight line with the endpoints defining extreme limits such as 'no pain at all' and 'pain as bad as it could be'. The patient marked on the line the point they felt represented their perception of their current state.

3.8. Quality of life (QoL)

Quality of life was assessed using the Short Form (SF)-36 health survey. The SF-36 consists of eight scaled scores, which are the weighted sums of the questions in each section. The eight sections are:

1. Vitality
2. Physical functioning
3. Bodily pain
4. General health perceptions
5. Physical role functioning
6. Emotional role functioning
7. Social role functioning
8. Mental health

Each scale is transformed into a 0-100 scale on the assumption that each question carries equal weight. The lower the score, the more disability or poorer health the patient perceives. The higher the score indicates lesser disability and better perceived health.

3.9. Procedure technique

Intraarticular injection is given by posterior approach in the glenohumeral joint. The needle is inserted 2-3 cm inferior and medial to the posterolateral border of acromion process of scapula directed anteriorly towards coracoid process and advanced till there is loss of resistance after aspiration the mixture of anaesthetic and steroid is injected.

Suprascapular nerve block is done using anatomical landmarks with patient sitting marking is done 2 cm cephaloid and medial to mid scapular spine of scapula and injection is inserted at an angle of 45 degrees into the scapular notch after aspiration.

Figure 1: Administration of intraarticularCorticosteroid injection for Periarthritis shoulder

Figure 2: Technique of supra scapular nerve block

3.10. Post-injection protocol

Following the intervention, patients were provided with a set of recommendations to aid in their recovery and optimize the treatment's benefits. They were instructed to take analgesics for the subsequent 2 days to manage any post-procedural pain. To further alleviate discomfort and inflammation, patients were encouraged to apply ice packs to the shoulder area every night. Moreover, they were advised to initiate a regimen of home exercises. This regimen encompassed the Codman pendulum exercises and capsular stretching physiotherapy, which are integral to enhancing mobility and facilitating faster rehabilitation of the shoulder.

4. Results

4.1. Patient characteristics and baseline measurements

A total of 50 patients, clinically diagnosed with frozen shoulder, were enrolled in the study, evenly divided into two distinct treatment groups: the suprascapular nerve block

(SSNB) group and the intraarticular steroid injection (IAS) group. Both groups were matched well demographically and clinically, ensuring the validity of direct comparisons. The mean age of the SSNB group was 52 ± 6 years, while it was 53 ± 5 years for the IAS group. The gender distribution in both groups was nearly identical with 12 males and 13 females in the SSNB group, and 11 males and 14 females in the IAS group. At baseline, the mean duration of symptoms was 10 ± 2 weeks for the SSNB group and 11 ± 2 weeks for the IAS group. The initial SPADI score, reflecting pain and disability due to frozen shoulder, was 70 ± 10 in the SSNB group and marginally higher in the IAS group at 72 ± 12, though this difference was not statistically significant.

4.2. Intervention and adverse events

All patients in both groups received the designated intervention as per protocol. The SSNB group underwent a suprascapular nerve block using a solution of 0.5% ropivacaine combined with 40 mg triamcinolone. The IAS group received an intraarticular injection of the same solution. Adverse events were monitored and reported. In the SSNB group, 2 patients (8%) experienced pain at the injection site, and 1 patient (4%) reported mild systemic effects post-procedure. The IAS group exhibited a slightly higher adverse event profile, with 4 patients (16%) reporting injection site pain and 3 patients (12%) experiencing mild systemic effects.

4.3. Efficacy outcomes

When comparing the efficacy of the two interventions, the SPADI scores served as the primary outcome. Both treatments showcased a significant reduction in SPADI scores over the 12-week follow-up. However, the SSNB group demonstrated a faster and more pronounced decline. By the 12-week mark, the SSNB group recorded a SPADI score of 25 ± 4, reflecting a substantial 64% reduction from baseline. In contrast, the IAS group displayed a SPADI score of 38 ± 7, indicating a 47% decline.

4.4. Patient satisfaction and quality of life

In terms of patient satisfaction, gauged on a 0-10 VAS, the SSNB group scored an average of 8.5 ± 1.2, while the IAS group was slightly lower at 7.0 ± 1.5 (p=0.02), suggesting a statistically significant difference favouring the SSNB treatment. Quality of life, assessed using the SF-36 scale, further bolstered the SSNB group's superiority. The SSNB group reported a score of 85 ± 10, while the IAS group averaged at 78 ± 12 (p=0.03).

4.5. Physical therapy compliance

Compliance with the prescribed home-based physical therapy regimen was commendable across both groups. In the SSNB group, 23 patients (92%) were fully compliant, adhering to over 90% of the sessions. In contrast, the IAS group had 20 patients (80%) achieving full compliance. Only one patient in the IAS group showed non-compliance, attending less than 50% of the sessions.

The results of our study affirm the clinical benefits of the suprascapular nerve block over intraarticular steroids as a prior adjuvant to home-based physical therapy in patients with frozen shoulder. Not only does SSNB promise faster symptom alleviation and functional recovery, but it also presents a more favourable safety profile. Further studies with larger cohorts and extended timelines will substantiate these findings and could steer future clinical guidelines in managing frozen shoulder.

5. Discussion

The management of frozen shoulder remains an area of clinical exploration, and our findings have further highlighted the promising role of the suprascapular nerve block (SSNB) as an effective intervention. These results align well with some previous studies while contrasting with others, thus necessitating a comprehensive discussion.

A significant reduction in SPADI scores over the 12-week follow-up period in our SSNB group underscores its efficacy. This rapid decline in pain and disability echoes the findings of Kumar et al., who reported a marked improvement in shoulder function with SSNB.[17] Similarly, Lee et al. found that patients treated with SSNB had a more significant pain reduction compared to those who received intraarticular steroid injections.[18] The mean reduction in our study was 64%, a figure that sits comfortably within the range of outcomes reported in the literature.[19]

However, it's essential to acknowledge contrasting findings. Jones and colleagues found intraarticular steroids to be slightly superior to SSNB, especially in the short-term relief, which sharply contrasts with our results where SSNB outperformed intraarticular steroids.[20] The differences in outcome might be attributable to variations in patient selection, the severity of the condition, or even differences in the physiotherapy regimen post-intervention.

Adverse events in our study were minimal and mostly benign, a safety profile that aligns with larger meta-analyses on the topic. Murphy et al. reviewed various interventions for frozen shoulder and found SSNB to have one of the best safety profiles with transient, mild side effects.[21] Our study reported 8% injection site pain for the SSNB group, a figure that resonates with the 7-10% reported by Smith and associates in their comprehensive review.[22]

Patient satisfaction and quality of life outcomes further bolstered the case for SSNB in our study. While a direct comparative study by Patel et al. did not focus on patient satisfaction, they did find that quality of life measurements significantly favored SSNB over intraarticular steroids.[23] Our findings of 8.5 ± 1.2 on a 0-10 VAS for satisfaction

Table 1: Demographicand baseline clinical characteristics

Parameters	SSNB Group (n=25)	IAS Group (n=25)
Mean Age (years ± SD)	52 ± 6	53 ± 5
Gender (M/F)	12/13	11/14
Mean Duration of Symptoms (weeks ± SD)	10 ± 2	11 ± 2
Initial Mean SPADI Score (± SD)	70 ± 10	72 ± 12

Table 2: Interventiondetails

Parameters	SSNB Group (n=25)	IAS Group (n=25)
Number of patients	25	25
Injectable volume	10 ml	10 ml
Injectable concentration	0.5% ropivacaine + 40 mg triamcinolone	0.5% ropivacaine + 40 mg triamcinolone

Table 3: Mean SPADI score changes over time

Time Period (weeks)	SSNB Group Mean SPADI Score (±SD)	IAS Group Mean SPADI Score (±SD)
0	70 ± 10	72 ± 12
2	55 ± 9 (p<0.01)	65 ± 11 (p=0.04)
4	40 ± 7 (p<0.001)	56 ± 10 (p=0.03)
8	30 ± 5 (p<0.0001)	45 ± 8 (p=0.02)
12	25 ± 4 (p<0.0001)	38 ± 7 (p=0.01)

Table 4: Patient satisfaction, quality of life, and adverse events

Parameters	SSNB Group	IAS Group
Satisfaction (0-10 scale)	8.5 ± 1.2	7.0 ± 1.5 (p=0.02)
Quality of Life (0-100 scale)	85 ± 10	78 ± 12 (p=0.03)
Adverse Events		
Injection site pain	2 (8%)	4 (16%)
Mild systemic effects	1 (4%)	3 (12%)

and 85 ± 10 on the SF-36 scale for QoL reaffirm Patel et al.'s observations.

Physical therapy, as an adjunct to these interventions, remains a mainstay in managing frozen shoulder. Our high compliance rates, especially in the SSNB group, reiterate its importance. Rizk et al. emphasized that the success of interventions like SSNB or intraarticular steroids is heavily contingent on complementary physiotherapy.[24]

A study by Klç et al. found SSNB, when combined with physical therapy, to enhance pain relief and improve function more than physical therapy alone.[25] These findings align well with our observations and emphasize the potential advantages of SSNB for patients with frozen shoulder.

While we observed a notable benefit with SSNB, the literature also documents the utility of intraarticular steroids. Sun et al. conducted a meta-analysis of randomized controlled trials and reported that intraarticular steroids, when followed by physical therapy, significantly improved SPADI scores and external rotation range compared to physiotherapy alone.[26] Individual studies by Lee et al. and Bulgen et al. bolster this perspective, indicating the benefits of intraarticular steroids.[27]

In tracing the historical roots of SSNB, it was Wertheim and Rovenstine who first described it in 1941.[28] Ozkan et al. delved into the utility of nerve stimulator-guided SSNB in patients with refractory frozen shoulder, observing a commendable improvement.[29] Furthermore, Sonune et al.'s research that juxtaposed ultrasound-guided SSNB with intraarticular steroids reported an accelerated improvement in VAS and shoulder range of motion with SSNB.[30] Our choice of 0.5% ropivacaine might explain the pronounced difference in SPADI scores as compared to some other studies.

It's noteworthy that our results suggest initial rapid relief with SSNB, potentially enhancing patient compliance with physical therapy, nighttime comfort, and possibly the overall healing trajectory.[31,32]

However, our study isn't devoid of limitations, including its modest sample size and the reliance exclusively on clinical evaluations rather than imaging techniques like MRI. A novel approach, combining intraarticular steroids with SSNB, might be more effective than each treatment individually, a hypothesis necessitating further scrutiny. Moreover, exploring SSNB's feasibility in a patient-controlled analgesia framework could be a future direction

to ensure enhanced physiotherapy compliance.

However, it's pertinent to acknowledge that individual patient characteristics, exact diagnosis, severity, and accompanying treatments can influence outcomes. Further multi-centre trials with more extended follow-up can offer more in-depth insights.

6. Conclusion

Adhesive capsulitis, commonly referred to as frozen shoulder, presents a significant clinical conundrum in orthopaedic and rehabilitation domains. The aim of this study was to elucidate the relative efficacy of suprascapular nerve block (SSNB) versus intraarticular steroids, particularly when integrated with physical therapy, in the management of this condition.

The data gleaned from our investigation unequivocally underscores the therapeutic superiority of SSNB. Patients within this intervention group manifested a notable decline in SPADI scores, registering a 64% mean reduction over the 12-week observation period. This aligns favourably with extant literature and delineates the pronounced therapeutic potential of SSNB. Furthermore, ancillary outcomes, such as enhanced patient satisfaction and improved quality of life metrics, bolster the clinical prominence of SSNB.

Conversely, while intraarticular steroids demonstrated therapeutic benefits, they did not parallel the rapid and sustained efficacy observed with SSNB. Such findings augment the clinical inclination towards considering SSNB as a frontline intervention for frozen shoulder.

However, it is imperative to approach these findings with circumspection. Variabilities in patient demographics, the exact pathological stage, and differential post-intervention physiotherapeutic regimens can potentially modulate therapeutic outcomes. Additionally, a comprehensive appraisal of the safety and tolerability of SSNB across diverse patient cohorts remains paramount.

In summation, this study provides robust evidence advocating for the incorporation of SSNB in the therapeutic arsenal against periarthritis shoulder. Nonetheless, as with all medical interventions, continuous scrutiny through expansive, multicentric trials with extended follow-up durations remains essential to further consolidate SSNB's position in the treatment paradigm of adhesive capsulitis.

7. Source of Funding

None.

8. Conflict of Interest

None.

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