



Case Series

Ultrasound-Guided Shoulder Anterior Capsular (SHAC) Block for Adhesive Capsulitis: A Case Series

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ABSTRACT

Background: Adhesive capsulitis (frozen shoulder) is a debilitating condition characterized by progressive shoulder immobility and pain, often hindering effective physiotherapy and prolonging recovery. The Shoulder Anterior Capsular (SHAC) block is a novel intervention offering targeted, motor-sparing analgesia that reduces immobility and pain, leading to faster recovery times.

Case Series: This case series aimed to evaluate the feasibility, safety, and early clinical outcomes of the ultrasound-guided SHAC block using 5% dextrose and bupivacaine in patients with adhesive capsulitis. Ten patients (aged 31–73 years) with clinically diagnosed adhesive capsulitis underwent an ultrasound-guided SHAC block, targeting the interfacial and pericapsular planes of the anterior shoulder to anesthetize articular nerve branches while preserving motor function. Pain scores (Visual Analog Scale, VAS), functional improvements, and patient feedback were assessed immediately post-procedure and at follow-up intervals ranging from 2 days to 12 weeks.

Conclusion: All patients experienced rapid and significant pain relief, with VAS scores dropping from 7–9 to much lower levels within 15–30 minutes post-SHAC block. Immediate analgesia enabled same-day physiotherapy, leading to sustained functional improvements at 12 weeks in those following rehabilitation protocols. No complications were reported. The SHAC block is a promising, safe, and effective motor-sparing approach for pain management in adhesive capsulitis, facilitating early and active rehabilitation.

Keywords: Adhesive capsulitis, frozen shoulder, SHAC block, pain management

BACKGROUND

Adhesive capsulitis (AC), commonly known as frozen shoulder, is a painful and functionally limiting musculoskeletal condition characterized by a progressive restriction of both active and passive shoulder movements (1). It affects approximately 2–5% of the general population, with a higher prevalence in individuals over 40 years of age and a clear female predominance (2). Risk factors include prolonged immobilization and metabolic conditions such as diabetes mellitus and thyroid dysfunction (3).

The disease progresses from an initial inflammatory phase to fibrosis and thickening of the joint capsule, particularly involving the rotator interval and coracohumeral ligament (4). While first-line treatments include oral analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), intra-articular corticosteroid injections, and physiotherapy (5), recovery can be prolonged and incomplete.

Regional anesthetic techniques are often used to provide pain relief and enable early mobilization. However, commonly used blocks, such as the interscalene and supraclavicular upper trunk (SCUT) blocks, are associated with significant motor blockade and a risk of phrenic nerve involvement (6). Posterior approach nerve blocks, which typically target the suprascapular and axillary nerves, may also provide incomplete analgesia due to inconsistent coverage of the anterior capsule's sensory innervation (7).

To overcome these limitations, the Shoulder Anterior Capsular (SHAC) block has recently been developed. This ultrasound-guided technique delivers targeted analgesia directly to the anterior shoulder capsule by anesthetizing the articular sensory branches of the suprascapular, axillary, subscapular, lateral pectoral, and musculocutaneous nerves (8). The motor-sparing nature of the SHAC block enables immediate post-procedure mobilization and active physiotherapy, which are essential for reversing joint stiffness and restoring function.

In this case series, we describe the technique, analgesic outcomes, functional recovery, and patient perspectives of ten patients with adhesive capsulitis who underwent a SHAC block using a combination of 5% dextrose and bupivacaine.

Methods

All patients presented to the pain clinic with a diagnosis of adhesive capsulitis, confirmed by a history of pain for at least three months and a clinical examination revealing a painful, restricted range of motion in the affected shoulder joint. No other painful joints were noted. All patients provided informed consent for the procedure and for subsequent case reporting. The ultrasound-guided Shoulder Anterior Capsular (SHAC) block was performed with meticulous attention to anatomical landmarks and real-time ultrasound visualization. The patient was positioned supine with the affected arm slightly abducted and maximally externally rotated to stretch the subscapularis muscle for better visualization. A high-frequency linear ultrasound probe was positioned transversely on the anterior shoulder. The probe was moved from the coracoid process medially to the proximal humerus laterally to identify the interfascial plane between the deltoid and subscapularis muscles. After sterile preparation, a 20-gauge needle was advanced in-plane from a lateral to medial direction. Hydro-dissection of the interfascial plane was performed with 5 to 10 mL of 5% dextrose in water (D5W), followed by 10 mL of 0.25% bupivacaine. The needle was then advanced into the pericapsular area, just anterior to the shoulder joint capsule, where an additional 10 mL of 0.25% bupivacaine mixed with 5 mL of D5W was deposited. The total injectate volume was 20–25 mL. No sedation was used.

Patient progress was monitored closely. Baseline pain (VAS) and QuickDASH scores were recorded pre-procedure. (Figure 1,2) Pain levels were reassessed 15 minutes post-injection, followed by gentle shoulder mobilization. Patients were discharged with instructions for daily home exercises. Formal physical therapy began on Day 3. Follow-up visits occurred at 2 days, 2 weeks, 4 weeks, and 12 weeks to assess complications and progress. A final QuickDASH score was taken at the 12-week follow-up.

Case Presentations

All patients presented to the pain clinic with a diagnosis of adhesive capsulitis, confirmed by a history of pain for at least three months and a clinical examination revealing a painful, restricted range of motion in the affected shoulder joint. The diagnosis was based on clinical findings, as no pathological tests or other investigations were performed.

Case 1: A 50-year-old female, BMI of 27, presented with left shoulder pain for three months. Her pre-procedure VAS score was 8 out of 10, which dropped to 2 immediately after the SHAC block. Her procedural VAS score was 2, she had minimal discomfort during the procedure. She took all physiotherapy sessions as per the protocol. At 12 weeks, mild pain on shoulder internal rotation remained. Rest all shoulder movements were painless. Her QuickDASH score improved from 70.5 at pre-procedure to 11.4 at 12 weeks.

Case 2: A 45-year-old male, BMI of 25, with a six-month history of right shoulder pain, stiffness, and night pain had a pre-procedure VAS score of 8 out of 10. Her VAS dropped to 1, immediately post-procedure. He experienced only minimal pain during the procedure, which was rated as 2 out of 10. His pain relief sustained during physiotherapy sessions, which he followed as per the protocol. His QuickDASH score improved from 63.6 pre-procedure to 9.1 at 12 weeks followup.

Case 3: A 31-year-old male, BMI of 26, presented with right shoulder pain for three months following a minor trauma. His pre-procedure VAS score was 8, which dropped to 2 after the block. Patient experienced almost no discomfort during the procedure. Rated his procedural VAS score as 1 out of 10. Patient skipped few physiotherapy sessions. Mild pain remained in shoulder internal rotation and overhead abduction above 90 degrees at 12 weeks. The QuickDASH score improved from 68.2 to 11.4.

Case 4: A 73-year-old female with a history of diabetes mellitus, BMI 27, presented with severe right shoulder pain and stiffness for eight months. Her pre-procedure VAS score of 9 was reduced to 2 immediately post-procedure. Her procedural pain score was 2 out of 10. Patient's pain increased to 4 after 3 days and stayed at VAS score of 4 till 12 weeks. Her stiffness reduced slowly with physiotherapy. Her range of motion remained restricted in internal rotation. Her QuickDASH score improved from 63.6 to 13.6 at 12 weeks.

Case 5: A 23-year-old male, with BMI 26, with a 10-month history of left shoulder pain and stiffness had a pre-procedure VAS score of 7 out of 10, which dropped to 2 after procedure. His QuickDASH score improved from 68.2 to 9.1 at 12 weeks. His procedural pain was 3 out of 10, slightly higher than other patients. The patient had followed physiotherapy protocol and had no co-morbidities.

Case 6: A 55-year-old female, with BMI 27, with a history of post-menopause and hypothyroidism presented with right shoulder pain for six months. Her pre-procedure VAS score of 8 out of 10 was reduced to 3 after the block. Her procedural pain score was 2 and her QuickDASH score improved from 65.9 to 13.6 at 12 weeks. Mild pain and restriction in range of motion persisted in internal rotation and overhead abduction at 12 weeks. The patient complied with physiotherapy protocol.

Case 7: A 45-year-old male, with BMI 27, presented with right shoulder pain for four months. His pre-procedure VAS score of 9 dropped to 3 after the block. His procedural VAS score was 2. His QuickDASH score improved from 63.6 to 15.9. The patient had poor compliance to physiotherapy. There were no known co-morbidities.

Case 8: A 55-year-old female with BMI of 26, and history of diabetes presented with right shoulder pain for five months. Her pre-procedure VAS score of 7 out of 10 was reduced to 2, and her QuickDASH score improved from 70.5 to 15.9. Her procedural pain score was scored at 2. The patient completed physiotherapy sessions as per schedule, however, her muscle strength was very poor.

Case 9: A 72-year-old male, with BMI 26, presented with left shoulder pain for five months. His pre-procedure VAS score of 8 out of 10 was reduced to 2. The procedural pain score was 2. His QuickDASH score improved from 68.2 to 13.6. The patient attended physiotherapy sessions as per schedule.

Case 10: A 69-year-old male, with BMI of 24, with a history of post-radiotherapy presented with right shoulder pain for four months. His pre-procedure VAS score of 9 out of 10 was reduced to 2 after procedure, and his QuickDASH score improved from 70.5 to 11.4. His procedural pain score was slightly higher, scored at 3 out of 10, probably due to tissue scarring after radio-therapy.

All procedures were performed between Jan- Mar 2025. The results of follow-up at 12 weeks are as mentioned in the table below. (Table 1).

Case No.	Age/ Gender	Height (cms)	Weight (kgs)	BMI	Clinical Presentation	Procedural pain VAS score	Pre-procedure VAS score	Post procedure VAS score (after 15 minutes)	Pre-procedure QuickDASH score	QuickDASH score at 12 weeks post-procedure
1	50/F	166	75	27	Left shoulder pain for 3 months	2	8	2	70.5	11.4
2	45/M	165	67	25	Right shoulder pain for 6 months, stiffness, night pain	2	8	1	63.6	9.1
3	31/M	170	75	26	Right shoulder pain for 3 months, secondary to minor trauma	1	8	2	68.2	11.4
4	73/F	146	58	27	Severe right shoulder pain for 8 months, stiffness, diabetes mellitus	2	9	2	63.6	13.6
5	23/M	162	67	26	Left shoulder pain for 10	3	7	2	68.2	9.1

					months, stiffness					
6	55/F	141	54	27	Right shoulder pain for 6 months, post- menopause , hypothyroid	2	8	3	65.9	13.6
7	45/M	170	77	27	Right shoulder pain for 4 months	2	9	3	63.6	15.9
8	55/F	155	62	26	Right shoulder pain for 5 months, diabetic	2	7	2	70.5	15.9
9	72/M	164	70	26	Left shoulder pain for 5 months	2	8	2	68.2	13.6
10	69/M	170	71	24	Right shoulder pain for 4 months, post- radiotherapy	3	9	2	70.5	11.4
MEAN scores of ten patients						2.1	8.1	2.1	67.28	12.5

Table 2: General Timeline of SHAC Block Intervention and Outcomes

Time Point	Activity/Outcome
Day zero	Patient assessment, pain and QuickDASH score captured pre-procedure SHAC block administered under ultrasound guidance
Within 15–30 mins after procedure	Immediate pain relief (average reduction VAS 7–9 → 1–3)
Day 2	Follow-up visit and patient encouraged to begin home exercises
Day 3–7	Formal physiotherapy initiation
Day 14	Follow-up visit. Continued rehabilitation, gradual gains in abduction/external rotation
04 weeks	Follow-up visit.
12 weeks	Follow-up visit. Final reassessment of pain, mobility, satisfaction and QuickDASH score



Figure 1: Patient and ultrasound probe position for SHAC block

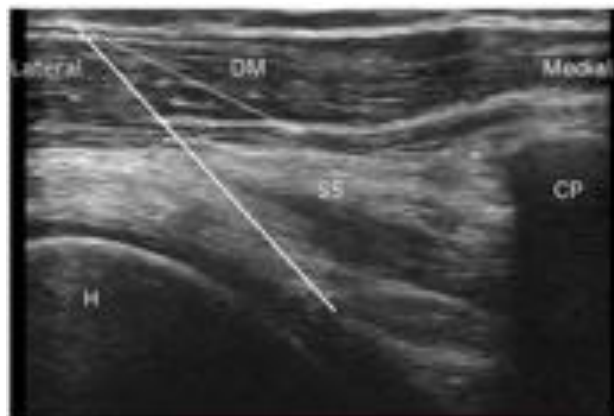


Figure 2: Ultrasound image and needle path for SHAC block

LEGENDS: Ultrasound image of right shoulder for Shoulder Anterior Capsular (SHAC) block. The dotted line indicates needle trajectory for interfascial plane injection and solid line indicates the trajectory of the needle for pericapsular space injection. Anatomical structures identified include the Coracoid Process (CP), Deltoid Muscle (DM), Humeral Head (H), and Subscapularis myotendinous junction (SS).

DISCUSSION

This case series demonstrates that the ultrasound-guided Shoulder Anterior Capsular (SHAC) block with 5% dextrose and bupivacaine is a safe and effective motor-sparing intervention for the immediate and sustained relief of pain in adhesive capsulitis. Our findings highlight its potential to facilitate early, pain-free physical therapy, which is crucial for restoring function and preventing the long-term morbidity associated with this condition.

Mechanism of the SHAC Block

The SHAC block provides targeted analgesia by interrupting the pain–spasm feedback loop characteristic of adhesive capsulitis. It achieves this by depositing local anesthetic and dextrose solution into the fascial plane anterior to the subscapularis tendon and adjacent to the shoulder joint capsule, where the sensory branches converge.

SHAC shares conceptual similarity with the pericapsular nerve group (PENG) block, which targets the articular branches of the axillary, suprascapular, and musculocutaneous nerves that supply the anterior–inferior capsule. By precisely bathing these sensory fibers while sparing the motor nerves of the deltoid and rotator cuff, the SHAC block enables immediate post-procedure mobilization. This motor-sparing property represents a key clinical advantage, allowing patients to begin physiotherapy without delay. [9, 10].

Comparison to Traditional Treatments

Historically, interscalene brachial plexus blocks (ISBs) have been the gold standard for shoulder analgesia, but they carry a high risk of motor block and complications like ipsilateral hemidiaphragmatic paresis due to phrenic nerve blockade [11]. The SHAC block, in contrast, offers a viable, motor-sparing alternative. Recent research comparing combined suprascapular and axillary nerve blocks (SSAX), a technique similar in principle to SHAC, to ISBs found that while ISBs provide better immediate postoperative pain control, the SSAX block results in a better quality of pain relief at 24 hours with fewer adverse effects [12].

For adhesive capsulitis, the SHAC block also appears to offer advantages compared to traditional intra-articular (IA) corticosteroid injections. A comparative study found that a combined suprascapular and axillary nerve block provided significantly better pain relief and greater improvements in active and passive range of motion over a 12-week period than IA steroid injections alone [13]. This suggests that a targeted nerve block may be more effective than a simple IA injection in managing the multi-faceted pain of adhesive capsulitis.

The Role of Dextrose in Perineural Injections

Our use of 5% dextrose in the SHAC block solution is based on the growing body of evidence supporting its use in treating chronic pain. Perineural injection therapy (PIT) with dextrose is theorized to address neuropathic pain by modulating the function of C-fibers and reducing neurogenic inflammation [14,15]. Dextrose injections may also act as a hydro dissection agent, physically separating nerves from surrounding fascia and relieving compressive neuropathies. In the context of adhesive capsulitis, where nerves become entrapped by fibrotic tissue, this mechanism may be particularly beneficial in providing long-term symptomatic relief beyond the immediate analgesic effect of the bupivacaine.

Patient perspectives were overwhelmingly positive. Those who completed follow-up expressed extreme satisfaction with the rapid pain relief and the subsequent improvements in their arm function. Patients reported being able to sleep through the night and perform personal care tasks again, which markedly improved their overall quality of life. These patient-reported outcomes underscore the profound impact that effective pain reduction and functional restoration in adhesive capsulitis can have on daily living.

We acknowledge some limitations in this case series. The sample size is small. We did not obtain MRI imaging of the shoulder, and quantitative range-of-motion measurements with goniometers were not performed. Future studies or case series would benefit from formally tracking range-of-motion improvements (e.g., degrees of abduction and external rotation). Despite these limitations, our observations align with the growing body of evidence suggesting that targeted shoulder capsular blocks can serve as a powerful adjunct in managing frozen shoulder.

Conclusion

SHAC block, performed under ultrasound guidance with 5% dextrose and local anesthetic, provides rapid pain relief in patients with adhesive capsulitis while preserving motor function. This facilitates early mobilization and active participation in physiotherapy, thereby supporting faster recovery of shoulder function.

Conflicts of Interest: The authors declare no conflicts of interest.

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Running Head: Ultrasound-Guided SHAC Block for Adhesive Capsulitis: A Case Series

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