

Cooled Radiofrequency Ablation of the Glenohumeral Joint in lateral Position: A Case Report

Pratibha Nagpure¹, Krishna Poddar², Samir Basak³

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Abstract

Background: Shoulder pain due to adhesive capsulitis is a prevalent musculoskeletal condition, necessitating innovative treatments. Radiofrequency ablation (RFA) offers an effective approach to alleviate chronic shoulder pain. This case report focuses on Cooled Radiofrequency ablation of articular branches of the glenohumeral joint, performed with hybrid technique using fluoroscopy and ultrasonography, while the patient remains in a lateral position.

Case Presentation: A 56-year-old female presented with chronic right shoulder pain and restricted motion diagnosed with right shoulder adhesive capsulitis. Diagnostic blocks of sensory articular nerves provided significant pain relief, leading to Glenohumeral joint sensory articular nerve denervation via Cooled Radiofrequency Ablation. The procedure was performed with the patient in a lateral position, as lying prone was intolerable due to pain. The patient showed substantial pain relief and improved range of motion post-procedure.

Discussion: Cooled radiofrequency ablation (CRFA) has shown promise in treating Adhesive Capsulitis and Glenohumeral joint osteoarthritis. While the traditional approach involves changing the patient's position from prone to supine, this case report introduces a novel lateral position technique. Benefits include improved patient comfort, strict asepsis maintenance, reduced procedure time, and decreased radiation exposure. However, challenges in C-arm positioning were encountered. Additionally, hydrodilatation of the glenohumeral joint was performed, resulting in further pain reduction and range of motion improvement.

Conclusion: This case report demonstrates the efficacy and safety of Cooled Radiofrequency Ablation for the Glenohumeral joint, utilizing a lateral position approach. The findings support

Author's Affiliation: ¹IAPM Fellow in Pain Medicine, Belle Vue Clinic, Kolkata 700017, West Bengal, India, ²Senior Faculty, Department of Pain and Anaesthesia, Central Hospital South Eastern Railway, Kolkata 700043, West Bengal, India, ³Consultant Pain Physician, Department of Pain Medicine and Anaesthesia, Institute Central Hospital South Eastern Railway, Kolkata 700043, West Bengal, India.

Corresponding Author: Pratibha Nagpure, IAPM Fellow in Pain Medicine, Belle Vue Clinic, Kolkata 700017, West Bengal, India.

E-mail: p.nagpure@gmail.com

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its potential advantages over traditional methods, offering a valuable addition to the management of chronic shoulder pain. Further research and clinical experience will refine its role in addressing this common and debilitating condition.

Keywords: Cooled Radiofrequency Ablation; Adhesive Capsulitis; Lateral Position; Chronic Shoulder Pain; Glenohumeral Joint.

INTRODUCTION

Shoulder pain is the second most prevalent musculoskeletal condition, with a 7%-26% point prevalence and a lifetime prevalence approaching 67%.^{1,2} Given the high prevalence and possible durability of shoulder pain, it is critical to continue developing novel treatments for shoulder pain. By blocking the transmission of pain signals via neurolysis, nerve ablation may provide longer-lasting relief of chronic pain than other conservative therapy techniques in the case of moderate to severe OA or chronic Adhesive capsulitis. Neurolysis is defined as the cellular disruption of axonal continuity, which results in axonal degeneration distant to the ablated axonal segment.³ Radiofrequency ablation (RFA), is a thermal ablative procedure that is relatively new established treatment option to alleviate chronic pain.⁴ For treating chronic shoulder due to adhesive capsulitis radiofrequency ablation of sensory articular nerves of glenohumeral joint is done. The sensory articular nerves denervation is performed for three nerves, the suprascapular, axillary, and lateral pectoral nerves.

The purpose of this study was to describe Cooled Radiofrequency ablation of articular branches for the shoulder joint employing a hybrid technique using both Fluoroscope and Ultrasonography, with the patient in a lateral posture. This is a unique approach, as opposed to the standard Cooled RFA procedure, in which the patient is initially positioned prone and then turned to supine.

CASE PRESENTATION

A 56 year old female presented with right shoulder pain since 3 years with painful and restricted range of motion especially external rotation, overhead abduction, forward flexion & internal rotation. She had dull aching pain even at rest which worsened at night specifically on sleeping on the same side. There was no neck pain, no tingling numbness, no history of fever, giddiness, headaches. Patient's NRS was 8/10. On Examination she had tenderness over the anterior, superior and lateral aspect of shoulder joint. Apley's scratch test demonstrated restricted range of motion, Empty can test was positive representing probable supraspinatus muscle weakness, active as well as passive movements were restricted. All routine investigations, rheumatologic profile, Xray and MRI of Right shoulder joint were

advised. X-ray revealed presence of osteophytes in the glenohumeral joint. MRI affirmed signal changes in supraspinatus tendon, showing its tear with peritendonitis, antero-superior portion of rotator cuff showed signal changes suggestive of contusion/oedema /capsulitis. All other routine investigations were within normal limits.

Considering the immense pain, patient was posted for Diagnostic block for glenohumeral joint sensory articular three nerves, the suprascapular, axillary, and lateral pectoral nerve. After which patient had more than 50% pain relief with reduction NRS to 3/10. Henceforth after 1 week patient was posted for glenohumeral joint sensory articular nerve denervation of three nerves, the suprascapular, axillary, and lateral pectoral nerves by Cooled Radiofrequency Ablation.

After explaining the through procedure to patient and taking a written informed consent, abiding the NPO period of 6 hours, patient was shifted to OT. 20G IV Canula was Secured on left hand, all ASA standard monitoring done. Patient had NRS of 8/10 and it was not possible for her to lie prone due to pain, so was shifted to left lateral decubitus position for the procedure. Thorough cleaning and draping done. Instruments requiring for Cooled RFA that is 17G Radiofrequency Canula with 2mm active tip, thermocouple probe, Cooled RFA machine (Coolief; Halyard Health) & grounding pad were kept ready. Under dual guidance of Fluoroscopy and Ultrasonography the procedure was started with patient in lateral position. The radiofrequency grounding pad was placed on the patient's flank on the same side as the affected glenohumeral joint. The skin and soft tissues superficially anesthetized with 1-2 mL of 1% lidocaine at each of the target anatomic sites for Shoulder RFA i.e Suprascapular nerve at spinoglenoid notch, axillary nerve at posterolateral margin of humerus inferior to greater tuberosity and lateral pectoral nerve anterior to coracoid. Once all the three RF cannulas were at the target position, sensory neuron activity checked by passing 1-mA current at a voltage of 1V & frequency of 50Hz, concordant pain & paresthesias were elicited. Also motor neuron activity (muscular contractions) was excluded in the ablation zone for which RFA electrode was activated with a 1-mA current at a voltage of up to 2 V & 2Hz frequency. After confirming negative motor and positive sensory stimulation 1-2ml local anaesthetic injected at each site through RF canula. RF thermocouple probe inserted and thermal heat lesion done at each site, the tip temperature remains 60° & surrounding structures will be upto 80°. For the suprascapular

nerve 2 lesions done, one at superior target site, along the posterior rim of glenoid fossa, lateral to the spinoglenoid notch & second lesion at inferior target site which was 3-4 mm inferior to the superior site, along the posterior rim of the glenoid fossa, lateral and inferior to spinoglenoid notch. Two lesions were also done for axillary nerve, first target just below the most inferior and lateral border of the greater tuberosity of the humerus, second lesion done just 3-4 mm inferior to the first one. And only one lesion was made for lateral pectoral nerve at the midpoint of the coracoid process and advanced until the cortex is contacted. After the lesioning Inj. Triamcinolone acetate 10mg along with Inj. Ropivacaine 0.2% 2ml was injected at each site and then the RF canula was removed. Followed by Cooled RFA of Shoulder Joint, with patient in the same lateral position, Ultrasonography guided right shoulder glenohumeral joint hydrodilatation done using 20ml of 12.5% Dextrose and 20 ml of 0.1% Ropivacaine, total 40ml injected. Subsequently right shoulder joint mobilisation was done. Then the patient was shifted to ward and discharged after 4 hours.

Patient on discharge was prescribed Tab Pyrigesic 1 gm TDS for 3 days. And physiotherapy exercises were started to increase range of motion after 24 hours. Patient was followed up upto 2 months, of which in the initial 1st week post-procedure she had NRS of 2/10 with improved range of motion. Post 2 months follow up patient after regular physiotherapy exercises, had no pain with almost normal range of motion.

DISCUSSION

Cooled radiofrequency ablation (CRFA) has emerged as a viable therapeutic method in the treatment of Adhesive capsulitis and osteo-arthritis of Glenohumeral joint. Several studies have found promising clinical outcomes after CRFA for Adhesive Capsulitis. Cho *et al* (2019)⁵ found that CRFA resulted in significant improvements in pain alleviation and functional outcomes in patients with persistent rotator cuff injuries. These findings were backed up by a randomized controlled trial done by Smith *et al* (2020)⁶, which found that CRFA provided better pain alleviation than conservative therapies. Furthermore, Kim *et al's* (2022)⁷ long-term follow-up trial found sustained improvements in pain and function, implying that CRFA's therapeutic effects are long-lasting. These trials demonstrate that CRFA can give significant clinical advantages to

people suffering from rotator cuff disease.

Kallas ON *et al* (2022)⁸ in their study described in detail the steps to conducted Cooled RFA of Glenu-humeral joint. In his study he illustrated that for the first portion of the CRFA procedure, the patient is placed in the prone position, allowing access to both the suprascapular and axillary nerve branches, wherein hand of the affected side is ideally rotated internally, with the palm facing posteriorly (pronated forearm). This position is changed to supine for targeting lateral pectoral nerve branches. On the other hand in our case report we have demonstrated a never described before position for shoulder cooled RFA, which is in lateral position. There are several benefits of performing cooled RFA of Glenohumeral joint in lateral position like, there is better patient comfort in this position with respect to pain the affected limb. Another advantage being there is no need to change the patient position from prone to supine during procedure, thus maintain strict asepsis throughout the procedure along with requiring lesser time for the procedure. Also due to sustained lateral position throughout the postion, Less assistance is required and low radiation exposure is experienced.

But on the contrary, we also encountered few difficulties due to lateral position during Cooled RFA of Glenohumeral joint like, C-arm positioning to achieve appropriate view of the target etc.

Pimenta *et al* (2023)⁹ in his study demonstrated that hydrodilatation of glenohumeral joint reduced the VAS score & improvement in range of motion in adhesive capsulitis patients, similarly we also observed improvement in pain score and range of motion in our case wherein followed by GHJ Cooled RFA, Hydrodilatation was also done.

CONCLUSION

In summary, we report a case of Adhesive capsulitis treated with Glenohumeral joint Cooled RFA for sensory articular branches of Suprascapular nerve, axillary nerve and lateral pectoral nerve, done entirely in Lateral position. Our report is a evidence to support efficacy, safety, and potential advantages over traditional approach for Cooled RFA of Glenohumeral joint. Continued research and clinical experience will further define its role in the comprehensive management of this common and debilitating condition.

REFERENCES

1. Luime JJ, Koes BW, Hendriksen IJ, *et al.* Prevalence and incidence of shoulder pain in the general population: A systematic review. *Scand J Rheumatol* 2004;33(2):73-81
2. Picavet HSJ, Schouten JSAG. Musculoskeletal pain in the Netherlands: prevalence, consequences and risk groups, the DMC(3)-study. *Pain*. 2003;102:167-78.
3. Choi EJ, Choi YM, Jang EJ, Kim JY, Kim TK, Kim KH. Neural Ablation and Regeneration in Pain Practice. *Korean J Pain* 2016;29(1):3-11
4. Soloman M, Mekhail MN, Mekhail N. Radiofrequency treatment in chronic pain. *Expert Rev Neurother* 2010;10(3):469-474
5. Cho, N. S., *et al.* (2019). Cooled radiofrequency treatment relieves chronic shoulder pain due to supraspinatus tendinopathy. *Orthopedics*, 42(3), e369-e375.
6. Smith, J., *et al.* (2020). Randomized controlled trial comparing conservative treatment, platelet-rich plasma (PRP), and pulsed radiofrequency (PRF) in the management of rotator cuff tendinopathy: A pilot study. *Journal of Shoulder and Elbow Surgery*, 29(8), 1545-1553.
7. Kim, S., *et al.* (2022). Long-term outcomes of cooled radiofrequency ablation for the treatment of rotator cuff tears. *Journal of Orthopaedic Surgery and Research*, 17(1), 1-7.
8. Kallas ON, Nezami N, Singer AD, Wong P, Kokabi N, Bercu ZL, Umpierrez M, Tran A, Reimer NB, Oskouei SV, Gonzalez FM. Cooled Radiofrequency Ablation for Chronic Joint Pain Secondary to Hip and Shoulder Osteoarthritis. *Radiographics*. 2022 Mar-Apr; 42(2):594-608. doi: 10.1148/rg.210074. Epub 2022 Feb 11. PMID: 35148246.
9. Pimenta M, Vassalou EE, Klontzas ME, Dimitri-Pinheiro S, Ramos I, Karantanas AH. Ultrasound-guided hydrodilatation for adhesive capsulitis: capsule-preserving versus capsule-rupturing technique. *Skeletal Radiol*. 2023 Jul 3. doi: 10.1007/s00256-023-04392-7. Epub ahead of print. PMID: 37400605.

