

Case Report

Serial Intra-articular Low Dose Corticosteroid Injections for Frozen Shoulder Pain Management: A Case Report

Inklebarger J¹, Parkunan A², Krishnaswamy K³, Kumar D⁴, Galanis N⁵

¹Healthshare, NHS Clinical Service, St. Charles Hospital, London

²Consultant Physiotherapist & Clinical Lead, West London MSK, Healthshare Ltd.

³Consultant Physiotherapist, BMAT & West London MSK Orthopaedic Lead Healthshare Ltd

⁴Clinical Lead MSK Services (Rheumatology) Consultant Physiotherapist, London for Healthshare Ltd.

⁵Associate Professor, Department of Orthopaedic Surgery Aristotle University of Thessaloniki Thessaloniki, Greece

Correspondence address: Dr. James Inklebarger,

Healthshare ,NHS Clinical Service, St. Charles Hospital, London

HealthShare Ltd, Central London, Suite 17, 20 Churchill Square, Kings Hill, West Malling, Kent ME19 4YU, UK.

Abstract: Idiopathic frozen shoulder (IFS), follows a three-phase progression of synovial inflammation to adhesive synovitis, to more mature adhesions with less synovitis, and finally mature adhesions. [1]

In early stage 1 & II disease, a one-off 80 mg intra-articular corticosteroid injection (CSI) has reported efficacy in dampening cytokine-mediated pain and inflammation, and chemically ablating the synovitis early, which may prevent fibrosis and shorten the course of disease. [2]

However, hydrodilatation with steroid-only injection studies report inconclusive results. [3] Other reports advocate an early one-off 80 mg CSI as the customary management. Veteran clinicians however, have reported anecdotal success with much smaller doses of serial 20 mg depo-steroid injections, performed depending on symptoms, at 1-8 week intervals. This approach methodology has found some recent support in the literature. [4]. Many IFS patients are also diabetics, [5] and serial lower dose CSI may avoid serum glucose fluctuations in diabetic patients.

INTRODUCTION

Primary idiopathic frozen shoulder (IFS) is defined as global pain and restriction of shoulder movement with no other identifiable cause of shoulder pathology. The incidence of IFS is 3%-5% in the general population, but may be up to 20% in diabetes. [6], with a peak incidence at ages forty to sixty.

IFS begins with a painful (freezing) inflammatory phase, progressing to shoulder stiffness, (frozen phase), fibrosis and probable histologic change. [7]

Optimal early pain management remains controversial. RCT trials with or without hydrodilatation), have reported little difference in long-term outcome, whereas other studies have reported early stage corticosteroid injections (CSI) relieve pain, restore function, and shorten the course of disease. [2].

CLINICAL FINDINGS

Early phase IFS diagnosis may be challenging as presentation may be similar to injuries or other conditions. Diabetes, Dupuytren's, and prior frozen shoulder may provide early clues, once other referred pain and capsular pattern causes

such as glenohumeral osteoarthritis have been excluded. Rotator cuff tear and impingement tests may be also be non-specifically positive, [6] and early stage IFS may be a diagnosis of exclusion. Pain-elicited pressure on the corocoid process (corocoid pain test) is also a very specific sign. [8], as are MRI findings of coracohumeral ligament thickening in later stage disease, and sub-coracoid fat triangle obliteration. [9]

CASE REPORT

An 80 year-old right-handed female with a one year history of constant progressive 10/10 right shoulder pain-restriction and on an orthopaedic surgical waiting list, was re-directed to our outpatient clinic. A one-off corticosteroid injection several months prior had provided only short term pain relief.

Past history included impaired glucose regulation, hypothyroidism, and atrial fibrillation. Her medications were diclofenac, paracetamol, pravastatin, esomeprazol, diltiazam, digoxin, and warfarin. Her INR was 2.2, with ESR/CRP normal.

A mild dorsal kyphosis was noted. There was no gross upper limb muscle atrophy. Neck range of motion was full, pain free, and Spurling's test was negative. Palpation of the cervical and thoracic spine was generally unremarkable. A mild degree of (ACJ) acromioclavicular joint osteoarthritis was noted on x-ray.

The upper limbs were neurovascularly intact. Right shoulder abduction was limited to 40 degrees with 0 degrees external rotation. The right coracoid process was focally tender. [8]

Special consent for warfarin (bleeding), and the potential for temporary increase in blood sugar were discussed. An intra-articular right shoulder anatomical landmark posterior approach corticosteroid injection was performed using an initial dose of 40 mg of triamcinolone acetonide (Kenalog) in 5 ml of lidocaine was performed. On four-week follow-up, she reported being completely pain-free with undisturbed sleep for around 3 weeks. Original intense pain suddenly returned to 2 days prior while riding in a bus that had 'jerked,' causing her to quickly raise the right arm. On re-examination however, she was now pain free with the arm resting by her side, and achieved 90 degrees of passive abduction, but with 9/10 pain beyond this range. External range of motion remained limited to zero. Focal coracoid process palpatory tenderness had abated. She was keen to have the injection repeated and be referred onward to physiotherapy. Her INR was low at 1.7, due to recent dental work.

Repeat injection was performed with Kenalog reduced to 20 mg. She was referred to physiotherapy and reviewed 6 weeks later, noting sustained pain abatement, better sleep, restored activity function, and improved range of motion, and she had stopped oral pain medications. She was advised to continue on with her rehabilitation program. On 6 month follow-up her right shoulder was essentially pain-free with bilaterally equal abduction. End of range right shoulder external rotation remained restricted at 20/45 degrees. She was discharged and advised to continue on with her self-directed strengthening and range of motion exercises.

DISCUSSION

Routine plain x-rays prior to injection are advised for differentiating other causes of shoulder pain and stiffness such as occult fracture and osteoarthrosis. Up to 10% of shoulder neoplasms are missed on plain x-ray, and may be difficult to distinguish clinically from primary frozen shoulder. Therefore, lack of corticosteroid injection response, timely MRI, CT, and radionuclide scanning are warranted to exclude more serious pathology, and avoid potential catastrophic delays. [10]

Though the efficacy of CSI with or without hydrodilatation remains controversial [3], corticosteroid injections performed in the early stages of IFS, may help to dampen cytokine-mediated inflammation, abate pain, and may also shorten the course of disease. One such 2007 study noted decreased pain and improved range of motion with to both stage one and two frozen shoulder, but with a one-off injection of 80 mg

depomedrol. [2]. Variation in research outcomes may be related to differences in study design.

It would also appear that in practice, some clinicians limit CSI in suspected cases of frozen shoulder to a one-off injection. The reasons for this limitation are unclear, but an initial lack of post-injection pain abatement and short-time response in some patients, along with concerns about CSI side effects may discourage repeat procedures.

However, some experienced clinicians have noted that successful pain management during the early inflammatory stages of IFS, may be achieved with serial low-dose CSI. Though initial injection (s) may be short acting, serial injections over a course of several weeks may steady pain relief, carrying the patient more comfortably through a shortened course of resolution and into rehabilitation. Serial injections at 3-4 week intervals with 20 mg. corticosteroid, may be more desirable for steady pain management, dampening side effects such as diabetic fluctuations of blood sugar levels, and avoiding surgical referrals.

Competing and financial Interests: None to declare.

ACKNOWLEDGEMENTS: Special thanks to Dr. Keith Bush and Dr John Tanner for their foundation guidance and training, that has provided the groundwork for this approach to frozen shoulder management.

DISCUSSION

Therefore, in lack of corticosteroid response, further imaging studies such as shoulder MRI, CT and radionuclide scanning have been recommended by some authors to exclude more serious pathologies and avoid catastrophic delays.

REFERENCES

1. Neviasser RJ, Neviasser TJ (1987) The frozen shoulder. Diagnosis and management. *Clin Orthop* 223:59-64
2. Marx RG, Malizia RW, Kenter K, Wickiewicz TL, Hannafin JA, (2007), Intra-articular Corticosteroid Injection for the Treatment of Idiopathic Adhesive Capsulitis of the Shoulder, *HSSJ*;3:202-07
3. Uppal HS, Evens JP, Smith C, (2015), Frozen shoulder: A systematic review of therapeutic options, *World J Orthop*;6(2): 263-268. [PubMed]
4. Kim HK, (2016), Corticosteroid injection for adhesive capsulitis in primary care: a systemic review of randomized clinical trials, *Singapore Med J*;57(12):646-57
5. Milgrom C, Novack V, Weil Y, Jaber S, Radeva-Petrova DR, Finestone A, (2008), Risk factors for idiopathic frozen shoulder, *Isr Med Assoc J*;10(5):361-4. [PubMed]
6. Manske RC, Prohaska D, (2008), Diagnosis and management of adhesive capsulitis, *Curr Rev Musculoskelet Med*; 1(3-4): 180-189. [PubMed]
7. Hand GC, Athanasou NA, Matthews T, Carr AJ. The pathology of frozen shoulder. *J Bone Joint Surg Br.*

2007;89:928–932. [PubMed]

8. Carbone S, Gumina S, Vestri AR, Postacchini R, (2010), Coracoid pain test: a new clinical sign of shoulder adhesive capsulitis, *Int Orthop*; 34(3): 385–388. [PubMed]

9. Zhao W, Zheng X, Liu Y, Yang W, Amirbekian V, Diaz LE, Huang X, Zhang X, (2012), An MRI Study of Symptomatic Adhesive Capsulitis, *PLoS One*; 7(10): e47277. [PubMed]

10. Quan GMY, Carr D, Schlicht S, Powell G, Choong PFM, (2005), Lessons learnt from the painful shoulder; a case series of malignant shoulder girdle tumours misdiagnosed as frozen shoulder, *Int Semin Surg Oncol*;2:2