ORIGINAL ARTICLE

Intra Articular Cortico Steroid Injections in the Management of Osteoarthritis Knee

Shahid Hussain,[1] Asif Qayoom[2], Manzoor Ahmad[3]

[1]Department of Orthopedics, District Hospital Kupwara
[2] Apollo Hospital, New Delhi
[3]DHSK

ABSTRACT

Objective: The aim of the study was to assess therapeutic efficacy, adverse events and patient satisfaction of intraarticular(IA) corticosteroidinjectionsforkneeosteoarthritis(OA).

Methods: Ninety-six (96) patientswithOAoftheknee participated in the present study. The inclusion criteria included (1) Resting visual analog scale pain >50 mm (2) Radiographic evidence for osteoarthritis (as per Kellgren-Lawrence scale) plus; age ≥50yrs, morning stiffness ≤ 30 min and crepitus on motion. Baseline Western Ontario and MacMaster University OsteoarthritisIndex (WOMAC) and visual analogue score (VAS) were documented. Patients received intra-articular injections oftriamcinolone acetonide 40 mg in the affected knee. The patients were reviewed at 1 weeks, 4 weeks and 8 weeks post-injection with final analysis at 3 months. Use of over the counter analgesia in the form of acetaminophen was allowed for concomitant analgesia.

Results: Ninety-six patients (male =45, female=51) with mean age of 50±5 years (range 45-55); duration of symptoms 5.7 ± 0.5 years and mean body mass index (BMI) 29.4kg/m2 were available at final follow-up. The VAS scores at baseline were:- at rest=71 and after 30 meter walk=80 and improved to 35 and 40, respectively. Improvement in pain and disability based on the WOMAC scores were significant. The overall efficacy "Knee Society Score" was judged as excellent in 56.25%, satisfactory in 21.87%, fair in 18.75%, and poor in 3.12%. The beneficial effects stayed till 4-6 weeks.

Conclusion: Intra-articular steroid injections for knee OA is safe and effective. The symptomatic relief is prompt, particularly in presence of inflammation (Effusion/synovitis). Proper patient selection and aseptic precautions yield satisfactory results.The need for concomitant analgesia is reduced.

Key Words: *Intra-articular injection; Corticosteroid, Knee Osteoarthritis,*
JMS: 2019; 22(1):43-48 DOI: https://doi.org/10.33883/jms.v22i2.371

INTRODUCTION

Osteoarthritis is the most common degenerative joint disease afflicting the mankind [Dieppe, 1998][1]. It is a major cause of pain and disability with financial consequences to the individual and society [Dieppe, 1998][1][Bonnet C, Walsh D, 2005][2].Nearly 50% adults, in particular the obese, will develop symptomatic knee OA by 9th decade of life [Murphy L, Schwartz TA, 2008][3].The hallmark feature is the breakdown in the articular cartilage of joints such as the knee and hip manifesting clinically with joint pain, stiffness, and joint enlargement. Knee osteoarthritis results from a complex interplay of mechanical and idiopathic factors that alter the balance between degradation and repair

Correspondence:
Dr. Shahid Hussain, MS
Email: Drshahid2006@gmail.com

Access this article online

Website: www.jmsskims.org

DOI: https://doi.org/10.33883/jms.v22i2.371

How to cite this article: Hussain S, Qayoom A, Ahmad M. Intraarticular corticosteroid injections in the management of osteoarthritis knee. jms [Internet]. 2019May27 [cited 2019Jun.8];22(2). Available from: http://www.jmsskims.org/index.php/jms/article/view/371

Received: 08-01-2019 Accepted: 24-04-2019

of articular cartilage. The altered chondrocyte function leads to deterioration in the ground substance, or proteoglycans. The cartilage breaks down and manifests as joint space narrowing on radiographs. This causes abnormal transmission of weight across the joint leading to characteristic features of osteoarthritis. Recent studies suggest that inflammation in the form of effusion/ synovitis is present in most patients with symptomatic osteoarthritis [David H. Neustadt, 2006][4].

Both congenital and environmental factors play a role in the development of OA. These factors include aging, obesity, sex (especially post-menopausal women),malalignment of joint axis and joint trauma [Fleming BC, et al, 2005][5]. The primary goal of treatment of osteoarthritis is pain relief. There are several options for treating osteoarthritis of the knee; these include conservative (deloading the knee with weight loss, analgesics, physiotherapy/ physical modalities, weight-relieving braces, intra-articular injections) and surgical treatment (osteotomy, arthroplasty). Failure of conservative treatments, and pain/functional impairment hindering activities of daily living, is an indication for intra-articular injections in the treatment of osteoarthritis [David H. Neustadt, 2006][4]. The purpose of this study was to evaluate both clinical and functional outcomes, patient satisfaction, adverse events and need for concomitant analgesia for knee osteoarthritis after steroid injection.

Intraarticular (IA) corticosteroid injections have been used for more than half a century since 1951, when Thorn first injected hydrocortisone into the knee joint for pain relief and control of local inflammation [Thorn, 1951][6]. Since then, these injections have emerged as a viable treatment modality for nonoperative care of symptomatic osteoarthritis. Though the relief is temporary, appropriate and judicious use of intra- and periarticular corticosteroids is very effective in reducing pain and inflammation in osteoarthritis helping the patient to tide over acute episodes [Hollander JL, 1980][7]. Intraarticular corticosteroid injection of the knee is a well-established procedure and favorable reports on the use of intra-articular steroids in osteoarthritis are numerous [Raynauld JP et al, 2003][8]. American College of Rheumatology (ACR) practice guidelines also supports use of intraarticular corticosteroid injections for the treatment of knee osteoarthritis [ACR Guidelines, 2000][9]. Presently, intra-articular corticosteroids are indicated for patients with knee OA who fail to respond to conservative measures like physical therapy and pharmacological agents including NSAIDS and interleukin-1 inhibitors etc [David H. Neustadt, 2006][4], [Kim RH et al, 2011][10]. The injections are particularly effective in presence of synovitis and / or effusion.

MATERIALS AND METHODS

Subjects

The study was carried out at Sub-District Hospital Kupwara between August 2014 and July 2016, 96 patients were recruited for this prospective study. Patients were counseled regarding the procedure, the benefits and complications thereof and their consent obtained. The study was approved by the DHSK ethics committee. The inclusion criteria included the following (1) Resting visual analog scale pain >50 mm (2) Radiographic evidence for osteoarthritis (as per Kellgren-Lawrence scale [Grade 1 to 3]) plus; age ≥50yrs, morning stiffness ≤ 30 min and crepitus on motion. Patients with grade 4 osteoarthritis, those who had received previous intraarticular hyaluronic acid or glucocorticoid injection within previous three months were excluded. Patients with secondary osteoarthritis (inflammatory joint disease, crystal arthropathy, infection) and those with history of arthroplasty and coagulopathy were also excluded. In cases with bilateral knee osteoarthritis, patients chose the more symptomatic knee for injection.

Assessment

Patient details and baseline characteristics were documented (age, sex, body mass index, grading of knee OA comorbidities, and concomitant medications). The WOMAC and VAS pain scores were noted [Bellamy N, 2000][12]. The WOMAC scores range from 0 to 96 (best to worst score) based on subdomains of pain (5 items), stiffness (2 items), and function (17 items). The visual analog scale (VAS) ranged from 0 to 100 mm (VAS; 0 is best, 100 is worst). The VAS and WOMAC was used as a self-administered questionnaire in accordance with the developers' instructions. Patient satisfaction was determined as per Likert scale [Linkert, Rensis, 1932][13] (Figure 1).

Intervention

Under aseptic precautions, 40 mg triamcinolone acetonide was injected into the affected knee via supero-lateral

approach with a 22-gauge needle in minor operating room. Patients were instructed to give rest to the part for a day following the intra-articular injections. Synovial fluid analysis was done in 24 patients with effusion. Synovial fluid was evaluated for gross appearance (color, clarity, and viscosity), microscopic examination (leukocyte counts, glucose and protein levels), and crystal studies (for crystal arthropathy). Patients were then followed-up at 1, 4 and 8 weeks with final follow up at 3 months.

RESULTS

Subject Characteristics

There were 51 females (53.1%) and 45 males (46.8%).Table1 shows the patient details. Comorbid conditions, including controlled hypertension and hypothyroidism, 80% patients had used NSAIDS, 50% had used diacerin while 35% had received physical modality at some point of time. Analysis was done by the other 2 units of the hospital with lowest score being taken as final score.

Table1: Patient demographics

Parameter/Category	Number & Percentage
Total number of patients	96
Sex	
Female,n(%)	51 (53.1%)
Males, n (%)	45 (46.8%)
Age	
Mean(SD)	50(±5)
Range	45 to 55
BodyMassIndex(kg/m^2)	
Mean(SD)	29.4(3.8)
Knee OA Grading as per Kellgren-Lawrence Classification	
Grade I	0
Grade II	39 (40.62%)
Grade III	57 (59.3%)
Grade IV	0

Outcome

A. Evaluation of visual analog pain scale (VAS).

1. VAS at rest: Visual analog pain scale (VAS) revealed an average score of 71 pre-injection at rest. From this base line, the value dropped to 35

2. VAS after walking: Walking 30 m revealed an average pain score of 80 pre-injection that dropped to 40.

B. The WOMAC scores improved with a median decrease from 60 to 44 points.

At 1 month, 78.12 % patients (75) improved with corticosteroid injection while 18.75% (18) remained the same. 3.12% (3) patients reported worsening of symptoms. The scores however returned to baseline after 6 to 8 weeks.

C. Secondary outcome measures included patient satisfaction as per Linkert scale and frequency of local adverse events [Linkert, Rensis, 1932]13. (78.12%) patient satisfaction with the corticosteroid injection was significant. The patient satisfaction remained so at 3 months also with patients quoting good symptomatic relief with HA injection even though VAS and WOMAC scores indicating otherwise. There were no systemic adverse events reported. Local adverse events included increased pain and raised local temperature that responded to oral antibiotics.

The effect of intra articular corticosteroids on joint space was evaluated on serial knee x-rays using Kellgren-Lawrence scale. No deleterious effects (joint space narrowing, osteophyte formation etc) were noted.

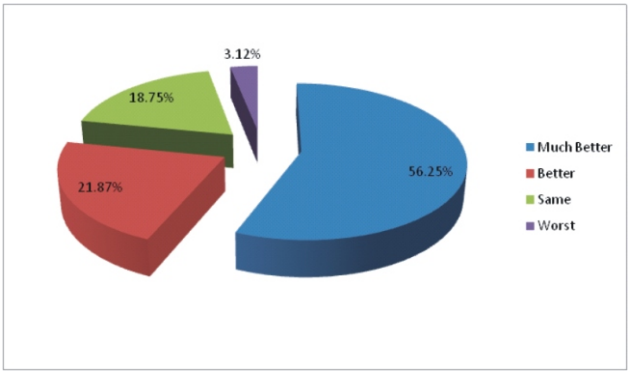


Figure 1 Patient satisfaction at 6 weeks after corticosteroid injection

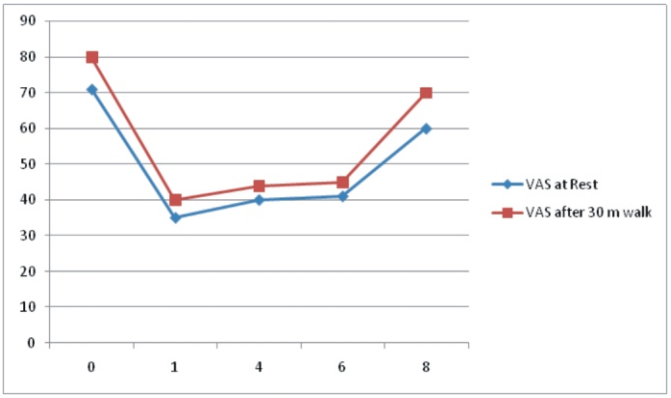


Figure 2 Change in VAS score (Weeks post treatment)

DISCUSSION

Osteoarthritis is a slowly evolving degenerative joint disease commonly affecting the weight bearing joints of the lower limbs. It is the most common form of joint disorder in the elderly with prevalence expected to increase as the older adult and obese populations grow [Dieppe P, 1998][1], [Chandler GN, Wright V, 1958][14]. Pathologically, OA is a complex interplay between degradation and repair of the articular cartilage [Revell PA et al, 1988][15].

Non-steroidal anti-inflammatory drugs (NSAIDS) have been the mainstay of pharmacological treatment in knee osteoarthritis, but have well documented adverse effects. The elderly, in particular are at risk of gastrointestinal (ulceration/ bleeding), renal and cardio-vascular complications [Fries JF, 1998][16]. Rehabilitative modalities including quadriceps strengthening exercises, ultrasound and shortwave diathermy are effective but there are issues with compliance and financial implications. Patients need to attend the Physical Medicine and Rehabilitation clinics regularly for at least 2 weeks to obtain beneficial effects of the above mentioned modalities. Intra-articular hyaluronic acid offers another option for the treatment of OA. The procedure however requires a series of multiple injections.Recently, however single shot preparations of hyaluronic acid are available.Hyaluronic acid is costly and it is not till 3-4 weeks that the beneficial effects show up [Bellamy N et al, 2006][17].

Corticosteroids have been used since decades and are considered part of treatment algorithm for symptomatic osteoarthritis [Blyth T et al, 1994][18]. Acute exacerbations/ flares are often associated with synovitis and effusion, rendering inflamed arthritic knee appropriate target for corticosteroids therapy. Although effective in acute episodes, some studies suggest a protective role for intra-articular steroids [Williams JM, Brandt KD, 1985][19], [Pelletier J-P et al, 1995][20]. These effects are probably mediated by inhibition of pro-inflammatory mediators including metalloproteases [Pelletier J-P et al, 1995][20].Studies suggest favorable results in terms of pain relief and function for corticosteroid injections, the beneficial effects lasting for up to 4 weeks [Cederlof S, Jonson G, 1966][21], [Friedman DM, Moore ME, 1980][22], [Matzkin EG, Curry EJ, Kong][23] . Though repeat corticosteroid injections have been implicated in cartilage destruction in animal models [Papacrhistou G, et al. 1997][24], there is no real evidence to support similar effects on human cartilage. Conversely, in vivo/ in vitro studies have shown that corticosteroid injections can, in fact, retard progression of structural changes [Williams JM, Brandt KD, 1985][19], [Pelletier J-P et al, 1995][20].

There are numerous reports on safety and efficacy of intra-articular steroids in knee osteoarthritis [Altman RD et al. 1987][25], [Brandt KD et al, 1991][26]. Most patients experience striking pain relief and improved range of motion [Dieppe, 1998][1], [David H. Neustadt, 2006][4]. Valtonen reported significant reduction of pain and tenderness in osteoarthritis knees injected with corticosteroid compared with placebo. His studies also showed favorable results though the duration of effect varied with the preparation and the dosage [Valtonen EJ, 1995][27]. Recent studies also support use of corticosteroids in osteoarthritis knee [Juergen Steinmeyer, Fritjof Bock,etal][28], [Jüni P, Hari R, Rutjes AWS, et al][29],

CONCLUSION

Appropriate and judicious use of intra-articular steroid injections is effective in acute painful episodes of knee osteoarthritis. The beneficial effects of pain relief and functional improvement are prompt (take a few days to a week) and last for up to 4-6 weeks. Elderly Osteoarthritic patients with gastrointestinal, renal and cardiovascular comorbidities are good candidates for steroid injection. Adverse events, particularly sepsis is rare when proper technique is used. The modality is useful in poor patients who cannot afford costly treatment modalities like intra-articular hyaluronic injections or are reluctant for surgical procedures like joint replacement.

Conflict of Interest : Nil

Financial Source: Nil

REFERENCES

1. Dieppe P: Osteoarthritis. Acta Orthop Scand Suppl 1998;281:2-5
2. Bonnet C, Walsh D. Osteoarthritis, angiogenesis and inflammation. Rheumatology 2005;44:7-16
3. Murphy L, Schwartz TA, et al. Lifetime risk of symptomatic knee osteoarthritis. Arthritis Rheum. 2008;59:120713

4. David H. Neustadt. Intra-articular injections for osteoarthritis. Cleveland Clinic Journal of MEdicine Volume 73 Number 10 October 2006
5. Fleming BC, et al. Ligament injury, Reconstruction and Osteoarthritis. Current Opinion in Orthopedics. 2005;16(5):354-362
6. Thorn, quoted by Hollander JL, et al. Hydrocortisone injected into arthritic joints. J Am Med Assoc. 1951;147:1629-1635.
7. Hollander JL. Osteoarthritis: perspectives on treatment. Postgrad Med 1980; 68:161164, 167168.
8. Raynauld JP, Buckland-Wright C, Ward R, et al. Safety and efficacy of long-term intraarticular steroid injections in osteoarthritis of the knee: a randomized, double-blind, placebo-controlled trial. Arthritis Rheum 2003; 48:370377
9. American College of Rheumatology Subcommittee on Osteoarthritis Guidelines. Recommendations for the medical management of osteoarthritis of the hip and knee: 2000 update. Arthritis Rheum 2000;43:190515.
10. Kim RH, Springer BD, Douglas DA. Knee reconstruction and replacement. In: Flynn F, ed. Orthopaedic Knowledge Update. Rosemont, IL: American Academyof Orthopaedic Surgeons; 2011:469-475.
11. Kellgren JH, Lawrence JS. Radiological assessment of osteoarthrosis. Ann Rheum Dis 1957;16:494501.
12. Bellamy N. WOMAC osteoarthritis index users guide. Queensland, Australia: University of Queensland; 2000. p 1-43.
13. Linkert, Rensis (1932). "A Technique for the Measurement of Attitudes". Archives of Psychology 140: 155.
14. Arden N, Nevitt MC. Osteoarthritis: epidemiology. Best Pract Res Clin Rheumatol. 2006;20(1):3-25.
15. Revell PA, Mayston V, Lalor P, Mapp P. The synovial membrane in osteoarthritis: a histological study including the characterization of the cellular infiltrate present in inflammatory osteoarthritis using monoclonal antibodies. Ann Rheum Dis 1988;47:3007.
16. Fries JF. The epidemiology of NSAID gastropathy: the ARAMIS experience. J Clin Rheumatol. 1998;4(5 suppl):s11-s16.
17. Bellamy N, Campbell J, Robinson V, Gee T, Bourne R, Wells G. Viscosupplementation for the treatment of osteoarthritis of the knee. Cochrane Database Syst Rev. 2006;19(2):CD005321.
18. Blyth T, Hunter JA, Stirling A. Pain relief in the rheumatoid knee after steroid injection: a single-blind comparison of hydrocortisone succinate, and triamcinolone acetonide or hexacetonide. Br J Rheumatol 1994;33:4613.
19. Williams JM, Brandt KD. Triamcinolone hexacetonide protects against fibrillation and osteophyte formation following chemically induced articular cartilage damage. Arthritis Rheum 1985;28: 126774.
20. Pelletier J-P, Di Battista JA, Raynauld J-P, Wilhelm S, Martel- Pelletier J. The in vivo effects of intraarticular corticosteroid injections on cartilage lesions, stromelysin, interleukin-1 and oncogene protein synthesis in experimental osteoarthritis. Lab Invest 1995;72:57886.
21. Cederlof S, Jonson G. Intraarticular prednisolone injection for osteoarthritis of the knee: a double blind test with placebo. Acta Chir Scand 1966;132:5327.
22. Friedman DM, Moore ME. The efficacy of intraarticular steroids in osteoarthritis: a double-blind study. J Rheumatol 1980;7:8506.
23. Matzkin EG, Curry EJ, Kong Q, Rogers MJ, Henry M, Smith EL. Efficacy and Treatment Response of Intra-articular Corticosteroid Injections in Patients With Symptomatic Knee Osteoarthritis. .J Am Acad Orthop Surg. 2017 Oct;25(10):703-714.
24. Papacrhistou G, et al. The effect of intraarticular hydrocortisone injection on the articular cartilage of rabbits. Acta Orthop Scand Suppl. 1997;275:132-134.
25. Altman RD, Fries JF, Bloch DA, Carstens J, Cooke TD, Genant H, et al. Radiographic assessment of progression in osteoarthritis. Arthritis Rheum 1987;30:121425.
26. Brandt KD, Fife RS, Braunstein EM, Katz B. Radiographic grading of the severity of knee osteoarthritis: relation of the Kellgren and Lawrence

grade to a grade based on joint space narrowing, and correlation with arthroscopic evidence of articular cartilage degeneration. Arthritis Rheum 1991;34:13816.

27. Valtonen EJ. Clinical comparison of triamcinolonehexacetonide and betamethasone in the treatment of osteoarthrosis of the knee-joint. Scand J Rheumatol Suppl 1981;41:17.
28. Juergen Steinmeyer, Fritjof Bock, Johannes Stöve; Pharmacological treatment of knee osteoarthritis: Special considerations of the new German guideline. Orthop Rev (Pavia). 2018 Dec 6; 10(4): 7782
29. Jüni P, Hari R, Rutjes A, et al. Intra-articular corticosteroid for knee osteoarthritis. Cochrane Database Syst Rev 2015; (10):CD005328.