International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Evaluating the Efficacy and Safety of Intra - Articular Corticosteroid versus Hyaluronic Acid Injections in the Treatment of Knee Osteoarthritis: A Comparative Analysis of Randomized Controlled Trials

Dr Ashwani Sadana, Dr Choudhary Abdul Sabur, Dr Devansh Saxena

Abstract: ***Overview**: Articular cartilage deterioration is a prevalent, chronic joint condition known as osteoarthritis (OA) of the knee. It has been shown that intra - articular HA injections are helpful in the treatment of osteoarthritis (OA), since they improve the viscosity of synovial fluid and joint lubrication, restore hyaluronan synthesis, prevent proteoglycan breakdown, and have analgesic and anti - inflammatory properties. For the past ten years, CS have been used to treat OA, and they seem to be reasonably safe. Because CS affect both the mechanisms that contribute to the functioning of inflammatory cytokines and the cytokines themselves, they have anti - inflammatory actions. **Materials and procedures**: In order to find randomized controlled trials (RCTs) evaluating the safety or effectiveness of intraarticular corticosteroid injections against intraarticular hyaluronic acid injections for the treatment of knee osteoarthritis, two reviewers conducted an electronic literature search. Findings: At the conclusion of the first month (p = 0.018), there was a significant difference in pain between the two groups; however, at the end of the second and third months (P = 00.167 and P = 0.720), there was no significant difference. The physical function issue was considerably better in the groups receiving corticosteroids (P = 0.026) and Hylan (P = 0.043). **Discussion**: Over time, the various treatments' capacity to cure patients differed. The two medications (HA and CS) seemed to be equally beneficial for pain in the short term (≤1 month) according to the VAS of knee OA. But after at least three months, it was shown that HA had a higher relative impact than CS.*

Keywords: Intra - articular injections, hyaluronic acid, corticosteroid, knee osteoarthritis.

1. Introduction

The widespread chronic joint disease known as osteoarthritis (OA) of the knee is typified by secondary hyperosteogeny and articular cartilage degradation (1).35% of people over 65 have OA, which frequently results in excruciating knee pain (2). In the USA, the estimated number of individuals with OA is 46 million, or 22% (3). A range of therapies are needed for OA in order to reduce pain and enhance functioning. Rest, medicine, various non - invasive therapies, nonsurgical invasive interventions, and surgical interventions are some of the therapeutic techniques that are now being used. However, intra - articular injections of various medications may be used prior to surgical surgery if pain continues after rest, medicine, and other non - invasive therapies have failed. Typically, these consist of corticosteroids (CS), hyaluronic acid (HA), and It has been shown that intra - articular HA injections are effective in treating osteoarthritis (OA), since they improve synovial fluid viscosity and joint lubrication, restore hyaluronan synthesis, prevent proteoglycan breakdown, and have analgesic and anti - inflammatory properties. The safety of HA is still debatable, though. Intra - articular HA injections should be avoided as a number of studies (4–8) have shown that using HA may increase the risk of both local and major adverse effects.

For the past ten years, intra - articular CS injections have been used to treat OA, and they seem to be reasonably safe. Because CS inhibit both the processes that contribute to the functioning of inflammatory cytokines and the cytokines themselves, they exert anti - inflammatory actions (9). Nevertheless, the lasting effect of CS is significantly smaller than the suggested time between doses (10). As a result, the short - term impacts are acceptable; however, more research is needed to determine the long - term implications.

In order to ascertain whether treatment approach was more successful, the current study compared intra - articular HA injection with CS. Additionally, it sought to ascertain if intra - articular HA injections were linked to a decreased rate of adverse events in comparison to CS.

2. Materials and Methods

At our institute at F. H. M. C. Agra, randomized controlled trials (RCTs) comparing the safety or effectiveness of intraarticular corticosteroid injections versus intraarticular hyaluronic acid injections in the treatment of knee osteoarthritis.

Our regular OPD patients served as test subjects. In order to treat knee OA, we incorporated existing RCTs that compared the safety and effectiveness of intraarticular CS with intraarticular HA in human subjects. A minimum of one outcome, such as the visual analog scale (VAS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the percentage of patients who use rescue medication after starting treatment, the percentage of patients who stop taking it for knee pain, the range of motion in the knee, and adverse events, had to be included in every randomized controlled trial.

69 patients in the corticosteroid group, who were 57.0 ± 9.1 years old, and the 71 patients in the Hylan group, who were

58.5 ± 8.3 years old. Males made up 12.7% of the Hylan group and 17.4% of the corticosteroid group. The two groups shared the same occupation status marital status, level of education, and level of cigarette smoking. All 140 patients who were recruited finish the three - month follow - up.

Reviewers use a common data extraction form to independently extract pertinent information from papers. For every trial, information was extracted, including the publication date, author, study design, number and demographics of participants, HA/CS dose, regimen and frequency, withdrawal rate, follow - up period, and outcome measures. When required, the studies' figures were used to approximate the means and standard deviation.

We made use of the Windows version 5.3 of the Review Manager software. The meta - analysis was conducted by The Cochrane Collaboration (2014) in Copenhagen, Denmark, at The Nordic Cochrane Centre. Mean difference (MD) and 95% confidence interval (CI) were employed to evaluate continuous variable results. Relative risks (RR) with a 95% confidence interval (CI) were shown for dichotomous outcomes. The I2 and c2 tests were used to evaluate the heterogeneity of the studies. We utilized a f fixed - effects model to evaluate when I2<50% and P>0.1; otherwise, a random - effects model was employed. In addition, subgroup analysis was carried out when heterogeneity was present in order to investigate its origin.

Table 1: Baseline Demographic Information

	Corticosteroid		Hylan		P value Chi Square
	n	%	n	%	
Sex					
Male	12	17.4	9	12.7	0.435
Female	57	82.6	62	87.3	
Occupation					
Housekeeper	55	79.7	56	78.9	0.708
Retired	2	2.9	4	5.6	
Occupied	12	17.4	11	15.5	
Education					
Less than High School Diploma	54	77.3	53	74.6	0.615
High School Diploma or more	15	21.7	18	25.4	
Marital					
Live Together	68	98.6	70	98.6	0.984
Live Alone	1	1.4	1	1.4	
Smoking					
No	68	98.6	70	98.6	0.984
Yes	1	1.4	1	1.4	

3. Results

Pain (VAS)

Similar to the Hylan group's 7.52 ± 2.17 (P = 0.313) pain level, the corticosteroid groups was 7.15 ± 2.01 prior to the intervention. At the conclusion of the first month, pain in the corticosteroid group had dramatically decreased to 5.69 ± 2.33 (P < 0.001). Pain increased to 5.90 ± 2.33 at the end of the second month, but it was still significantly less than it was before to the intervention (P < 0.001). The pain score rose to 6.56 ± 2.15 at the conclusion of the third month, and there was no statistically significant difference with primary pain (P = 0.200). At the conclusion of the first month, pain in the Hylan group had dramatically decreased to 6.63 ± 2.03 (P < 0.001).

At the conclusion of the third month, the pain score rose to 6.70 ± 2.01, but it was still considerably less than the initial pain (P = 0.020). At the conclusion of the first month (P = 0.018), there was a significant difference in pain between the two groups; however, at the end of the second and third months (P = 00.167 and P = 0.720), there was no significant difference.

WOMAC score

Prior to three months following the intervention, there was no statistically significant difference between pain (P = 0.093) and stiffness (P = 0.712) in the corticosteroid group and pain (P = 0.109) and stiffness (P = 0.112) in the Hylan group. Conversely, the physical function issue was considerably better in the Hylan (P = 0.043) and corticosteroid (P = 0.026) groups.

KOOS score

After three months, the corticosteroid (P = 0.010) and Hylan (P = 0.003) groups both had symptom improvement. Additionally, daily activity increased in the Hylan (P = 0.046) and corticosteroid (P = 0.026) groups. In contrast, neither the Hylan (P = 0.170) nor the corticosteroid (P = 0.099) groups reported a decrease in pain three months following the intervention.

4. Discussion

A meta - analysis of studies comparing HA with CS for the treatment of OA was conducted in the current study, and the findings showed that the various therapies' curative effects changed with time. The two medications (HA and CS) seemed to be equally beneficial for pain in the short term (≤1 month) according to the VAS of knee OA. But after more than three months, it was shown that HA had a higher relative impact than CS. In contrast, no statistically significant changes were seen between the two knee OA treatment regimens for other markers, such as the Lequesne index, KSS, and maximum flexion. Likewise, there was no discernible variation in the adverse effects between the two medications.

The findings suggest that, in comparison to CS, the therapeutic benefit of HA might remain longer. Additionally, Bannuru et al. (10) carried out a meta - analysis of systematic reviews examining the effectiveness of intra - articular HA against intra - articular CS in the treatment of OA.

Notwithstanding these variations, the meta - analysis's conclusions agreed with the current study's findings. The therapeutic response in this meta - analysis was time - based, as a result of pooling the data for each time point independently. This was one of its distinctive features. Then, a significant portion of the treatment response pattern was ascribed to various therapies. Nevertheless, not every experiment included all of the clinical information related to every time point. As a result, the publicly available data were gathered for comparison study. There are other comparable prospective RCTs, however the full data were not made accessible.

An investigation was also conducted into the two Interventions' safety. Most of the injections were made with the knee flexed at approximately 90˚, without the use of ultrasound or fluoroscopy guidance, at an injection site lateral to the patellar tendon and above the tibial plateau. Notably, the occurrence rate did not differ significantly between the two therapies, and the adverse effects were either uncommon or negligible (37, 38). Arthralgia, pain at the injection site, swelling in the joints, and edema at the injection site were the most frequent side effects.

We propose that clinical operators should exercise caution while doing injections to reduce discomfort, localized pain after injection, and flushing, as no joint space loss was detected at the knee joint following interventions in OA. The present was not without its constraints. First off, there weren't many trials included, which might have led to a lack of meaningful effectiveness. Furthermore, the pooling of a range of HA agents with varying molecular weights, origins, viscosities, and cross - linking caused issues for the meta - analysis. Sensitivity analysis may be carried out to prevent this kind of bias. However, as this could have skewed the evaluation as a direct comparison between several agents, sensitivity analysis based on the viscosity or molecular weights was not carried out. Additionally, because there was insufficient data, sensitivity analyses that compared one type of CS agent with another type of HA agent failed.

The meta - analysis's findings, in summary, showed that while HA and CS both provide comparable levels of pain alleviation in the short term (up to one month), HA is more effective than CS over a longer time frame (up to six months). The two therapies have comparable potential for unfavorable outcomes. Clinicians can create a therapy regimen for patients with osteoarthritis by knowing the duration of clinical efficacy and side effects of these two medications. Large sample sizes and long - term follow - ups are necessary for future high - quality RCTs, nevertheless.

References

[1] Poole AR, Rizkalla G, Ionescu M, et al: Osteoarthritis in the human knee: a dynamic process of cartilage matrix degradation, synthesis and reorganization. Agents Actions Suppl 39: 3 - 13, 1993.
[2] Ringdahl E and Pandit S: Treatment of knee osteoarthritis. Am Fam Physician 83: 1287 - 1292, 2011.
[3] Hootman JM and Helmick CG: Projections of US prevalence of arthritis and associated activity limitations. Arthritis Rheum 54: 226 - 229, 2006.
[4] Rutjes AW, Jüni P, da Costa BR, et al: Viscosupplementation for osteoarthritis of the knee: a systematic review and meta - analysis. Ann Intern Med 157: 180 - 191, 2012.
[5] Campbell J, Bellamy N and Gee T: Differences between systemmatic reviews/meta - analyses of hyaluronic acid/hyaluronan/hylan in osteoarthritis of the knee. Osteoarthritis Cartilage 15: 1424 - 1436, 2007.
[6] Arrich J, Piribauer F, Mad P, et al: Intra - articular hyaluronic acid for the treatment of osteoarthritis of the knee: systematic review and meta - analysis. CMAJ 172: 1039 - 1043, 2005.
[7] Lo GH, LaValley M, McAlindon T and Felson DT: Intraarticular hyaluronic acid in the treatment of knee osteoarthritis: a meta - analysis. JAMA 290: 3115 - 3121, 2003.
[8] Medina JM, Thomas A and Denegar CR: Knee osteoarthritis: should your patient opt for hyaluronic acid injection? J Fam Pract 55: 669 - 675, 2006.
[9] Creamer P: Intra - articular corticosteroid treatment in osteoarthritis. Curr Opin Rheumatol 11: 417 - 421, 1999.
[10] Bannuru, RR, Natov NS, Obadan IE, et al: Therapeutic trajectory of hyaluronic acid versus corticosteroids in the treatment of knee osteoarthritis: a systematic review and meta - analysis. Arthritis Rheum 61: 1704 - 1711, 2009.