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RESEARCH ARTICLE

Clinical Comparison of the Efficacy and Safety of Intra-Articular Injections of Sodium Hyaluronate and MethylPrednisolone in the Treatment of Osteoarthritis of Knee

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ABSTRACT:

The main objective of this study is to determine the safety and efficacy of the intra-articular injections (IA) of Sodium hyaluronate and methylprednisolone in the treatment of osteoarthritis (OA) of knee. The study was carried out in the orthopedic department of a multispeciality hospital for a period of 6 months from November 2013 to April 2014. Total number of 46 patients with OA of knee were categorized into two treatment groups, sodium hyaluronate (Group A, n= 26) and methylprednisolone (Group B, n= 20). Group A and B patients received sodium hyaluronate IA injection once a week for continuous 3 weeks and methylprednisolone IA injection once in 6 months. Pain score was assessed based on VAS (Visual Analogue Scale) and the recordings were done at baseline (1st visit), review 1 (2 weeks after IA injection), review 2 (4 weeks after IA injection) and review 3 (8 weeks after IA injection). ADRs for both the treatment groups were monitored and assessed. Sodium hyaluronate significantly reduced the VAS mean pain score with baseline-6.27, review 1-5.00, review 2-3.96 and review 3-3.15 for Group A patients and baseline-7.79, review 1-6.15, review 2-5.15 and review 3-5.68 for Group B patients. Edema and rashes were seen in Group A patients, similarly, edema and insomnia were seen in Group B patients which was mild to moderate. Sodium hyaluronate was safe and effective for OA of knee when compared with methylprednisolone.

KEYWORDS: Osteoarthritis, intra-articular injections (IA), Sodium hyaluronate, Methylprednisolone, Visual Analog Scale (VAS).

INTRODUCTION:

Osteoarthritis is a disease characterized by a mixture of degradative and reparative processes in the articular cartilage, subchondral bone associated with marginal osteophyte formation, and low grade inflammation. Osteoarthritis involves mainly the hips, knees, spine, and the interphalangeal joints. Its clinical presentation is usually mono articular or oligoarticular with fluctuations in intensity and localization over time.⁽¹⁾

Currently available pharmacological therapies target palliation of pain and include analgesics (i.e. acetaminophen, cyclooxygenase-2-specific inhibitors, nonselective nonsteroidal anti-inflammatory drugs, tramadol and opioids), intra-articular therapies (glucocorticoids and hyaluronic acid, HA), and topical treatments (i.e. capsaicin and methylsalicylate).⁽²⁾ Intra-articular treatment with hylans has recently become more widely accepted in the armamentarium of therapies for OA pain.⁽³⁾ In recent years, intra-articular viscosupplementation with hyaluronate-derived products has gained popularity as a modality for the treatment of osteoarthritis of the knee. Hyaluronic acid provides the elastic and viscous function of synovial fluid, protecting

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the joint from the compressive and shear forces.⁽⁴⁾ Intra-articular corticosteroid injections are frequently used to treat acute and chronic inflammatory conditions. Intra-articular injections decrease inflammation and swelling, which decreases pain and increases the joint mobility. Results vary, depending on the type of joint injected. Small non weight-bearing joints have better results than larger weight-bearing joints.⁽⁵⁾ The intra-articular corticosteroid cannot prevent the pain derived from weight-bearing forces across the joint. Therapy is generally limited to three or four injections per year because of the potential systemic effects of the drugs and also because of the need for more frequent injections indicates poor response to therapy⁽⁶⁾. Thus a prospective study was carried out to evaluate the safety and efficacy of intra-articular injections of Sodium Hyaluronate and Methylprednisolone in patients with Knee OA.

MATERIALS AND METHODS:

This prospective cohort study was carried out in a well facilitated government hospital in Tamil Nadu with the approval of the institutional ethical committee for a period of 6 months from November 2013 to April 2014. The study included 46 patients with osteoarthritis of knee who were selected based on the inclusion criteria such as patients above 18 years of either gender, patients who were willing to take IA injections, patients with other co-morbid conditions (Hypertension, Diabetes, Cardiac problems, Hyperlipidemia) and subjects who had not taken corticosteroid for any conditions previously. Exclusion criteria included pregnancy and lactating woman. The informed consent was obtained from the patients who were enrolled in the study. Total number of 46 patients with OA of knee were categorized into two treatment groups, sodium hyaluronate (Group A, n= 26) and methylprednisolone (Group B, n= 20). Group A and B patients received sodium hyaluronate IA injection once a week for continuous 3 weeks and methylprednisolone IA injection once in 6 months. Pain score was assessed based on VAS and the recordings were done at baseline (1st visit), review 1 (2 weeks after IA injection), review 2 (4 weeks after IA injection) and review 3 (8 weeks after IA injection). ADRs for both the treatment groups were monitored. Statistical Analysis was done by using Mann-Whitney U test to compare the review of pain scores and to determine the significant difference between the study groups.

RESULTS:

This prospective study comprising of 46 knee OA patients treated with intra-articular injections of Sodium Hyaluronate and Methylprednisolone depicted the following results. The demographic details of the patients such as age, gender, social habits, occupation, Body mass Index (BMI) and types of OA are shown in Table 1. The distribution based on IA injection in OA Patients are shown in Table 2.

TABLE 1: DEMOGRAPHIC DETAILS OF THE STUDY POPULATION

PARAMETERS	NO.OF PERSONS (n = 46)	PERCENTAGE OF PATIENTS (%)
Age wise distribution		
35-45	7	15.2%
45-55	22	47.8%
55-65	17	37%
Gender wise distribution		
Male	13	28.3%
Female	33	71.7%
Social habit wise distribution		
Smoker/ Alcoholic	7	15.2%
None	39	84.8%
Distribution based on occupation		
Security	12	26.1%
Attendar	3	6.5%
House wife	23	50%
Daily labourer	8	17.4%
Distribution based on BMI		
19-25	10	21.7%
25-30	16	34.8%
>30	20	43.5%
Types of OA among patients		
OA-L	26	56.5%
OA-R	12	26.1%
OA-B	8	17.4%

TABLE 2: DISTRIBUTION BASED ON INTRA-ARTICULAR INJECTION IN OA PATIENTS

IA INJECTION	NO. OF PERSONS (n = 46)	PERCENTAGE OF PATIENTS (%)
Sodium hyaluronate	26	56.5%
Methylprednisolone	20	43.5%

There was a significant difference in the mean changes in VAS scores between the treatment groups as shown in Table 3 and Figure 1. The ADR between the two groups are shown in Table 4.

TABLE 3: COMPARISION OF MEAN and SD CHANGES OF VAS PAIN SCORE AMONG GROUP A and B PATIENTS

VAS SCORE (Mean±SD)	IA INJECTION		P-VALUE
	GROUP A (n=26)	GROUP B (n=20)	
Baseline	6.27±1.43	7.79±1.13	0.0004*
Review 1	5.00±1.41	6.15±1.04	0.0156*
Review 2	3.96±1.56	5.15±1.09	0.0012*
Review 3	3.15±1.38	5.68±1.00	0.0001*

*Statistically significant difference by Mann-Whitney U test

TABLE 4: DISTRIBUTION OF ADR IN GROUP A AND GROUP B PATIENTS

ADR	PERCENTAGE OF PATIENTS (%)	
	GROUP A (n=26)	GROUP B (n=20)
Edema	26.9	30
Rash	7.7	0
Insomnia	0	25

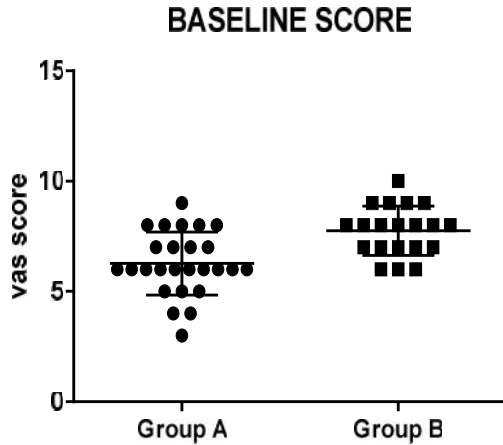


FIG 1: Comparison of pain scores between Group A and Group B Patients. Mann - Whitney U test was carried out at 95% confidence interval using Graph pad. Prism. Statistically significant difference (<0.05) was observed between the groups.

DISCUSSION:

This study comprising of 46 OA Knee patients treated with the intra-articular injections of Sodium hyaluronate and Methylprednisolone consisted of more number of female patients affected with Knee OA compared to male patients.⁽⁷⁾ Maximum numbers of patients in age group of 45 - 55 years were affected with osteoarthritis of knee.⁽⁸⁾ Prevalence of more number of osteoarthritis on left knee was seen in this study. More patients were found to be obese which is a major risk factor for causing the osteoarthritis of knee.⁽⁹⁾⁽¹⁰⁾ In our study we found that house wives were more prone to osteoarthritis of knee.⁽¹¹⁾ The mean and SD changes of pain found by using VAS scale in Group A and Group B was 6.27 ± 1.43 and 7.79 ± 1.13 (baseline); 5.00 ± 1.41 and 6.15 ± 1.04 (Review 1); 3.96 ± 1.56 and 5.15 ± 1.09 (Review 2) and 3.15 ± 1.38 and 5.68 ± 1.00 (Review 3) respectively. There was a reduction in the VAS pain score for Group A and Group B patients from 6.27 and 7.79 (baseline) to 3.15 and 5.68 (Review 3) respectively.⁽¹²⁾ The study revealed a statistically significant difference in VAS score between the study groups. In our study, corticosteroid has shown pain relief for only 4 weeks (short term) whereas sodium hyaluronate has shown its efficacy for 8 weeks (long term).⁽¹³⁾⁽¹⁴⁾ Insomnia (25%) and Edema (30%) were reported in Methylprednisolone treated group whereas Edema (26.9%) and Rash (7.7%) were reported in Sodium Hyaluronate group (local inflammatory reaction).⁽¹⁵⁾⁽¹⁶⁾

CONCLUSION:

Thus the study suggests that sodium hyaluronate was found to be safe and effective in treatment of OA of knee when compared with methylprednisolone in our study population. As the duration of the study was shorter,

further long term studies are required to confirm the efficacy and safety profile of Hyaluronic acid in a larger population study group.

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