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RANDOMIZED COMPARATIVE TRIAL MEASURING RELATIVE EFFICACY OF GLUCOSAMINE SULPHATE, CHONDROITIN SULPHATE ALONE AND THEIR COMBINATION IN KNEE OSTEOARTHRITIS

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ABSTRACT Osteoarthritis is the most prevalent form of arthritis which can be debilitating, particularly in the elderly. The aim of therapy in osteoarthritis is to reduce pain and improve joint function. Apart from physical therapy multiple drugs are used to improve joint function. We compared the relative efficacy of glucosamine sulphate, chondroitin sulphate and their combination in the treatment of this disease. Patients were divided into three groups each receiving glucosamine sulphate 500 mg TDS (Group A), chondroitin sulphate 400 mg BD (group B) and the combination of both glucosamine 500 mg BD and chondroitin sulphate 400 mg BD (Group C) respectively. They were followed up and assessed using WOMAC index. Significant reduction in symptoms score was observed in all the three groups. The maximum drug effect in decreasing the mean pain score was with glucosamine followed by the combination. Overall reduction in symptoms score was maximum with combination with mean change of 16.17±5.60 in favour of combination.

KEYWORDS : Osteoarthritis, glucosamine, chondroitin sulphate

Introduction:

Osteoarthritis is the commonest form of arthritis and most frequent cause of physical disability among elderly population. (1) Osteoarthritis is characterized by the depolymerization of mucopolysachharides, physico chemical alterations of collagen fibers, functional and metabolic change in chondrocytes and abnormal synthesis of proteoglycans. Several chondroprotective agents have been introduced in particular the glycosaminoglycans (GAG's).(2) Among the molecules that have been examined glucosamine sulphate and chondroitin sulphate seem to be capable of interfering with various pathological mechanisms of osteoarthritis stimulating synthetic activity of chondrocytes and inhibiting the chondrolysis provoked by degrading enzymes released in articular cavity during process of osteoarthritis.(3)

Aims and Objectives:

To assess the relative efficacy of glucosamine sulphate, chondroitin sulphate alone and their combination in treatment of knee osteoarthritis

Material and Methods:

The patients who were having clinical and radiologically proved osteoarthritis of knee joint were included in the study. It was randomized comparative study of twelve week duration to measure the relative efficacy of glucosamine sulphate, chondroitin sulphate alone and their combination in management knee osteoarthritis. Patients after selection were carefully screened for exclusion criteria.

Disease status in each patient was adjudged according to the WOMAC index (modified)(4) and the patients were grouped under three groups of twenty fivepatients in each of which one received glucosamine sulphate 500 mg TDS (Group A) and second chondroitin sulphate 400 mg BD (group B) and third received the combination of both glucosamine 500 mg BD and chondroitin sulphate 400 mg BD (Group C). WOMAC score was assessed at beginning of study, after 6 week, after 12 week and efficacy of the drugs was assessed by taking means of improving / worsening in disease activity as denoted by reduction in mean score of WOMAC index successively. Total 15 patients were lost to follow up (4 in glucosamine group, 8 in chondroitin group and 3 in combination group). Total 60 patients remained at the end of the study.

Results and Discussion:

In our study out of 75 patients 45 (60 %) were females and 30 (40 %) were males. Female preponderance of the disease has been proved in various previous studies. Mean age in group A was 59.56 years , in group B was 61.36 years and in group C was 59.48 years . In present study 78.66 % patients had bilateral involvement whereas 21.33 % patients had unilateral involvement. In our study we have noticed that BMI of individual has also an impact on progress and severity of disease. As the BMI increases severity of disease also increases. A linear correlation has been observed in BMI and base line WOMAC score. The radiological grading was based on kellegrens-lawrens classification.(5) It was observed in our study that as the duration of disease increased the radiological grade also progressed. Showing the severity of disease, the efficacy of drugs was assessed by evaluating the change in patients WOMAC score related to pain stiffness and function from the base line score, at 6 week and 12 week. The overall base line score was 51.52± 9.14 mean reduction at 6 week was 11.14± 5.17 and mean reduction at 12 week was 15.71± 5.52. It seems that there is a significant (P<0.001), progressive and constant reduction in overall intensity of articular symptoms related to pain, stiffness and functional disability.

It is clear from these observations that glucosamine and chondroitin alone and their combination are able to constantly ameliorate the symptomatology of osteoarthritis. Significant reduction in symptoms score was observed in all the three groups. To compare the efficacy of drugs in all the three groups with each other we applied analysis of variance (ANOVA) test. By analyzing the variance related to pain we conclude the computed value of F (4.673) was more than the standard value (3.19) so the test was significant (P <0.05). The maximum drug effect in decreasing the mean pain score was with glucosamine with mean change 3.90± 1.44. The effect of combination in this regard is next with mean change of 2.95±1.68 and chondroitin is least effective with mean score 2.41±1.29. This shows the glucosamine (1500 mg/day) is most effective in reducing pain.

Analysis variance related to stiffness we concluded that computed value of F (2.61) is less than the standard value so that test was insignificant (P>0.05).It means that the effect of all the three groups are similar in relieving stiffness. Although the mean change in the score of stiffness is maximum with glucosamine (1.76±1.19) but the difference from other is statistically not significant.

Analysis of variance related to function shows that the computed value of F (8.895) is more than the standard value (6.75), so the test is significant (P<0.001) this indicates that all the drugs are dissimilar in reducing the function score . The maximum effect is seen with the combination with mean change of 1217±64, glucosamine is next with mean change of 10.38±4.84 and chondroitin is found least effective with mean change of 6.38±1.97 .so far regarding functional improvement, combination is best.

Analysis of variance related to overall improvement in symptom score shows that the computed value of F (7.705) is more than the

standard one. Thus the test is significant (P <0.001) it indicates that different effects are observed in all the three groups in overall reduction of symptom score. Overall reduction in symptom score was maximum with the combination with a mean change of 16.17±5.60. Glucosamine was next with mean change of 15.71±5.52 and chondroitin was found to be least effective with mean change of 10.47±3.11. Our findings are in consonance with a US study conducted by DAS, A .Jr. HammadJA.(6) They have concluded that the monotherapy is preferable to chondroitin.Our finding that combination therapy is better than glucosamine alone has also been substantiated by study conducted by Lippiella L. et al. They concluded that disease modifying effect of combination of glucosamine and chondroitin sulphate was synergistic and superior to either agent alone.

For comparing the efficacy of the drug among three groups ANOVA test was applied. It was proved that all the three groups were not alike (P<0.001) and had different effect in relievingpain, functional disability and overall improvement in disease symptomatology.

On comparing one group with other it was concluded that combination was found slightly superior to the glucosamine alone in improving the overall score but the difference was not statisically significant. The difference between glucosamine and chondroitin was found significant (P<0.05) in favour of glucosamine. Difference between combination and chondroitin was found to be significant(P<0.05). It is clear from these observations that glucosamine and Chondroitin alone and in combination are able to constantly ameliorate the symptomatology of osteoarthritis. Significant reduction in symptom score was observed in all the three groups.

To compare efficacy of drugs with each other we applied analyses of variance (ANOVA). Test by analyzing the standard value (3.19) so the test was significant (P<0.05). The maximum drug effect was in decreasing the mean pain score was with glucosamine with mean change 3.91±1.44 .the effect of combination in this regard is next with mean change 2.95±1.68 and chondroitin is least effective with the mean score 2.41±1.29. This shows that glucosamine (1500 mg / day) is most effective in reducing pain.

Analysis of variance related to overall improvement in symptoms score shows that the competed value of F (7.705) is more than the standard one thus the test is significant (P<0.001) . It indicate that different effects are observed in reduction of symptoms score. Overall reduction in symptoms score was maximum with combination with mean change of 16.17±5.60 in favour of combination. Thus we have concluded that chondroitin was found to be least effective among all those groups. Combination and glucosamine are almost equally effective.

Conclusion:

We conclude that glucosamine is the most effective, safe and economical symptom modifying drug for osteoarthritis.

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