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Assessment of Functional outcome in the Osteoarthritis Knee following Vitamin D3 supplementation using Oxford Knee Score

Rahul Bhardwaj ,Vipin Sharma ,Vipan Kumar, Narinder Singh*, Prajwal Anand, Anu Kumar
Department of Orthopaedics, Dr RPGKMC Kangra at Tanda (Himachal Pradesh)

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ABSTRACT: Objective . OA is the most common articular disease of the developed world and a leading cause of chronic disability . Vitamin D supplementation has been known to improve pain and knee function in patients with Knee OA. The aim of this study was to evaluate effectiveness of vitamin D supplements in improving pain and function in the patients with OA Knee.
Methods:104 patients with OA Knee who fulfilled inclusion criteria and consented to participate were enrolled for study. Patients of OA Knee were blinded and randomized to receive either Tab Vit D3 or identical placebo tablet. Vitamin D3 Tab was administered in a dose of 60000U/Week for 3 months in 12 doses while placebo tablets with identical dosing schedule were used for control group. The patients who received Vitamin D3 tablets were allocated to Case group (n=54) while those receiving identical placebo tablets were grouped as controls (n=50). 4 patients from case group were lost to follow up. Functional outcome score using Oxford Knee Score (OKS score) was assessed in both groups at 3 mo,6mo and 1 year .
Results : While baseline OKS Score were comparable in case and controls , there was significant improvement in follow up scores in case group vs controls at 3 mo,6mo and 1 year follow up
Conclusion: Vitamin D3 supplementation is effective in improvement in OKS (Oxford Knee Score) in patients with osteoarthritis knee.
Key Words : Knee, OKS, Osteoarthritis, Vitamin D3

I. INTRODUCTION

Osteoarthritis (OA) is one of the most prevalent conditions resulting to disability particularly in the elderly population. OA is the most common articular disease of the developed world and a leading cause of chronic disability, mostly as a consequence of the knee OA and/or hip OA[1]. The economic costs of OA are high, including those related to treatment, for those individuals and their families who must adapt their lives and homes to the disease, and those due to lost work productivity [2].

Patients with OA are at a higher risk of death compared with the general population. History of diabetes, cancer, or cardiovascular disease and the presence of walking disability are major risk factors. Excess mortality is observed for all diseases with specific causes of death but is particularly pronounced for cardiovascular complications. Knee OA is more important not only for its high prevalence rate compared with other types of OA but also for its presentation at earlier age groups particularly in younger age groups of obese women. The incidence of knee OA increases by age and further increase with longer lifetime and higher average weight of the population [3].

Pain and other symptoms of OA may have a profound effect on quality of life affecting both physical function and psychological parameters. Patients with knee osteoarthritis tend to increase their physical limitations, pain and functionality restriction with disease progression [4].

As we know Vitamin D3 receptor (VDR) has an important function in regulating calcium metabolism and cellular function in bones. There is evidence from a number of epidemiological studies suggesting that low dietary intake of vitamin D3 and low serum 25-OH-D3 levels are associated with increased radiological progression of knee OA [5],[6].

Whether there is improvement in functional outcome in OA Knee patients is a matter of debate. In the present study we aimed to assess functional outcome of Osteoarthritis Knee patients following Vitamin D3 supplementation using OKS score.

II. PATIENTS AND METHODS

This prospective, double-blind, randomized controlled study was conducted at outpatient department (OPD) of a teritiary care institute over a period of one year (2018-19) . The patients with osteoarthritis knee having

vitamin D3 levels <40 ng/ml and following ACR criteria were enrolled in the study while patients receiving daily supplementation of Vitamin D3, Calcium, and drugs interacting with effects of Vitamin D3, use of steroids, patients undergoing surgery during the study, patients having diseases including lymphoma, sarcoidosis, tuberculosis, hyperparathyroidism, malabsorption disorders, GFR<30, history of inflammatory joint disease, and pregnancy, and not willing to participate were excluded.

A total of 104 patients were randomized to two groups (Case n=54,Controls n=50) to receive either Tab Vit D3 preparation or an identical looking placebo .Vit D3 supplementation was provided to case group in the form of 60000 U weekly X 3 mo in 12 doses., and controls were provided with identical looking placebo tablets [Fig.1].

Outcome Assessment

Knee function assessment was measured in the form of Oxford Knee Score(OKS) [Fig. 1].

Statistical Analysis

Data were expressed as frequency, percentage, median, and interquartile range (IQR). Normality of data was assessed using Shapiro Wilk test. Categorical variables were compared using Chi square test. Skewed data were compared using Mann Whitney U test. P value <0.05 was considered significant. Statistical analysis was performed using SPSS v21.

III. RESULTS

Among cases (n=54) and age , sex matched controls(n=50) grading of knee OA was comparable (P>0.05) (Table 1). 41% of the patients had bilateral knee osteoarthritis while 30% of the patients had right knee osteoarthritis. Type of knee osteoarthritis was comparable between controls and cases (P=0.971). 4 cases were lost to follow up from case group. Assessment by Oxford Knee Score in both groups was done at baseline, 3 months, 6 months and 1 year. Baseline OKS Score was comparable in controls in comparison to cases at baseline (15.0 [13.0, 18.0] vs. 16.0 [15.0, 18.0]; P=0.111). While there was significant improvement in OKS scores among cases as compared to controls [3 months (23.0 [20.0, 26.0] vs. 15.0 [11.0, 17.25]; P<0.0001), 6 months (23.0 [20.75,26.0] vs. 12.0 [9.0, 14.0]; P<0.0001), and 12 months (26.5 [23.75, 31.0] vs. 11.5 [9.75, 13.0]; P<0.0001)].

[Table1,Fig 2] .

IV. DISCUSSION

So far research on the role of vitamin D in improving outcomes in Knee Osteoarthritis is inconclusive. Literature has shown many studies analyzing effect of Vitamin D3 supplementation on functional outcome in Knee OA patients. Some studies have noted improvement in knee function following Vitamin D3 supplementation by mean -1.36 (95% CI, -1.87 to -0.85) over the placebo group which had a mean 0.69 (95% CI,-0.03 to 1.41; effect size = 0.06). This was accompanied by significant biochemical changes in serum total calcium, 25(OH)D and alkaline phosphatase. The results above suggested there was a small but statistically significant clinical benefit to vitamin D3 treatment in patients with knee OA [7].

On the contrary in another study functional outcome in Knee OA following Vitamin D3 supplementation was studied in a discrete subset of patients with higher age and BMI ≥30 kg/$m^{2.}$ [8]. This study did not show a difference in functional progression of KOA between older adults with obesity who took vitamin D supplements at baseline and those who did not, which could be due to less bioavailability of Vit D3 and hence requirement of high doses of Vitamin D3 or higher grades of OA Knee in the study . It could be a reason for not improvement in KOOS functional scale in their study [8].

In another study a two year RCT of 2000 IU/day oral cholecalciferol for patients with vitamin D insufficiency was performed [5]. The primary outcomes were MRI assessed cartilage thickness, radiographic JSN and pain. The population studied had similar baseline concentrations of vitamin D but greater baseline JSW (approximately 5mm vs. 3.5mm). The results demonstrated that despite 63% of patients achieving target concentrations of vitamin D, there were no significant improvements in any of the outcomes.

[5]. While the present study has shown that vitamin D3 supplementation was effective in improved functional outcome of knee OA patients in terms of KOOS score. While baseline KOOS Scores were comparable in case and control group [38.0 (31.50, 60.0)] vs 34.0 (32.0, 64.0), P= 0.657] , there was significant improvement in cases (received Vit D3 supplementation) as compared to controls (who received placebo); at 3 mo,6mo and 1 year follow up

V. LIMITATIONS

The study has few limitations like small sample size, not considering different Vitamin D3 doses and their effects, and not incorporating any

adverse events reported during study. Multicenteric studies with large sample size would be required to arrive at tangible results.

VI. CONCLUSION

Vitamin D3 supplementation in the dose 60000 U weekly for 3 mo in 12 doses is effective in improvement in functional outcome of the patients with OA Knees. OKS score is an effective way to assess functional outcome in Knee OA patients.

REFERENCES

[1]. Grazio S, Balen D. [Obesity : risk factor and predictor of osteoarthritis]. Lijec Vjesn.131:22-6.
[2]. Altman RD. Early management of osteoarthritis. Am J Manag Care. 2010;16 Suppl Management:S41-7.
[3]. Bliddal H, Christensen R. The treatment and prevention of knee osteoarthritis: a tool for clinical decision-making. Expert Opin Pharmacother. 2009;10:1793-804.
[4]. Sutbeyaz ST, Sezer N, Koseoglu BF, Ibrahimoglu F, Tekin D. Influence of Knee Osteoarthritis on Exercise Capacity and Quality of Life in Obese Adults. Obesity. 2007;15:2071-6
[5]. McAlindon TE, Felson DT, Zhang Y, Hannan MT, Aliabadi P, Weissman B, et al. Relation of dietary intake and serum levels of vitamin D3 to progression of osteoarthritis of the knee among participants in the Framingham Study. Ann Intern Med. 1996;125:353-9.
[6]. Ding C, Cicuttini F, Parameswaran V, Burgess J, Quinn S, Jones G. Serum levels of vitamin D3, sunlight exposure, and knee cartilage loss in older adults: The Tasmanian older adult cohort study. Arthritis Rheum. 2009;60:1381-9.
[7]. Sanghi D, Mishra A, Sharma AC, Singh A, Natu M, Agarwal S, et al. Does vitamin D3 improve osteoarthritis of the knee: A randomozed controlled pilot trial. Clin Orthop Relat Res. 2013;471:3556–62
[8]. Zbehlik AJ, Barre LK, Batsis JA, Scherer EA, Bartels SJ. Vitamin D supplementation and functional knee osteoarthritis progression in older adults with obesity : data from the osteoarthritis initiative. 2015; J Aging Res Clin Practice 2015;4(1):12-15.