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Original Research

Efficacy of tocotrienol and turmeric (curcuma longa) in knee osteoarthritis

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ABSTRACT:

Background: Osteoarthritis (OA) is the most prevalent musculoskeletal disorder worldwide and increasingly important in public health concern. The present study was conducted to compare the efficacy of tocotrienol and turmeric (curcuma longa) in knee osteoarthritis. **Materials & Methods:** 72 patients of knee osteoarthritis of both genders were divided into 4 groups. Group I- Diclofenac 50 mg, Group II- Diclofenac 50 mg + CL 500 mg, Group III- Diclofenac 50 mg + Tocotrienol 200 mg and Group IV- Diclofenac 50 mg + CL 500 mg + Tocotrienol 200 mg. Parameters such as knee pain by VAS and SOD were determined. **Results:** Grade 1 was seen in 10, 9, 7 and 6 and grade 2 in 8, 9, 11 and 12 in group I, II, III and IV respectively. VAS score 0 was 7.4, 14.2, 15.4 and 15.6, VAS 60 in 6.1, 10.6, 10.5 and 9.2, VAS 120 was 4.3, 7.1, 8.2 and 6.3 in group I, II, III and IV respectively. The difference was significant (P< 0.05). The mean SOD at 0 was 2.5, 2.4, 2.8 and 2.7 at SOD 0, 2.9, 3.2, 3.7 and 3.2 at SOD 60 and 3.1, 3.8, 3.9 and 3.7 at SOD 120. The difference was significant (P< 0.05). **Conclusion:** Combination of standard drug+ curcumin+ tocotrienol was found to be better than other regimen.

Key words: curcumin, osteoarthritis, tocotrienol

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INTRODUCTION

Osteoarthritis (OA) is the most prevalent musculoskeletal disorder worldwide and increasingly important in public health concern.[1] It is a degenerative disease with multifactorial etiology characterized by biochemical/morphological alterations in the synovial membrane and joint capsule, and defect in articular cartilage, marginal hypertrophy in bone, subchondral sclerosis. Pathological changes present in the late stage of OA like softening, ulceration, and focal disintegration of the articular cartilage and synovial inflammation. The main clinical symptoms are pain, joint instability and stiffness may be experienced due to inactivity.[2] It is also known as degenerative arthritis, which commonly affects the hands, feet, spine, and large joints. Mostly OA have unknown cause and are referred to as primary OA. Osteoarthritis is thought to be a collection of different disease pathways resulting in the common outcome of joint failure, rather than 1 disease with a common pathway. One critical pathway is through inflammatory factors.[3]

Curcuma longa extract (CL) has been used in both Ayurvedic and traditional Chinese medicine to treat arthritis. Curcumin, the principal component in CL, is highly pleiotropic, with anti-inflammatory, analgesic, antioxidant, anti-cancerous, and wound-healing properties. Tocotrienol is a subfamily of vitamin E and known for its wide array of medicinal properties, involved in prevention and treatment of various communicable and non-communicable diseases.[4] Curcumin is also a traditional Indian medicine used in treatment biliary digestive disorder, wounds, and rheumatic diseases. It possesses both anti-inflammatory and antioxidative activities. Curcumin exists as 2 tautomeric forms, keto and enol.[5] The present study was conducted to compare the efficacy of tocotrienol and turmeric (curcuma longa) in knee osteoarthritis.

MATERIALS & METHODS

The present study comprised of 72 patients of knee osteoarthritis of both genders. The consent was obtained from all patients.

Data such as name, age, gender etc. was recorded. Patients were divided into 4 groups. Grade1: Doubtful narrowing of joint space and possible osteophyte lipping. Grade 2: Definite osteophyte, definite

narrowing of joint space. Grade 3: Moderate multiple osteophytes, definite narrowing of joint space, some sclerosis and possible deformity of bone contour. Grade 4: Large osteophytes, marked narrowing of joint space, severe sclerosis and definite deformity of bone contour physiology of cartilage.

All patients received Curcumin extract (CL) 500 mg or Tocotrienol 200 mg or (CL 500mg + tocotrienol 200 mg) as drugs twice a day daily. The effect on following groups was compared: Group I-Diclofenac 50 mg (twice a day), Group II- Diclofenac 50 mg + CL 500 mg (twice a day), Group III- Diclofenac 50 mg + Tocotrienol 200mg (twice a day) and Group IV- Diclofenac 50 mg + CL 500 mg + Tocotrienol 200mg (twice a day). Parameters such as knee pain by VAS, IL- 1β, SOD were determined. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III	Group IV
Status	Control	Curcumin	Tocotrienol	Curcumin+Tocotrienol
Grade 1	10	9	7	6
Grade 2	8	9	11	12

Table I shows that grade 1 was seen in 10, 9, 7 and 6 and grade 2 in 8, 9, 11 and 12 in group I, II, III and IV respectively.

Table II Comparison of VAS

Time	Group I	Group II	Group III	Group IV	P value
VAS 0	7.4	14.2	15.4	15.6	0.12
VAS 60	6.1	10.6	10.5	9.2	0.34
VAS 120	4.2	7.1	8.2	6.3	0.05

Table II, graph I shows that VAS score 0 was 7.4, 14.2, 15.4 and 15.6, VAS 60 in 6.1, 10.6, 10.5 and 9.2, VAS 120 was 4.3, 7.1, 8.2 and 6.3 in group I, II, III and IV respectively. The difference was significant (P< 0.05).

Graph I Comparison of VAS

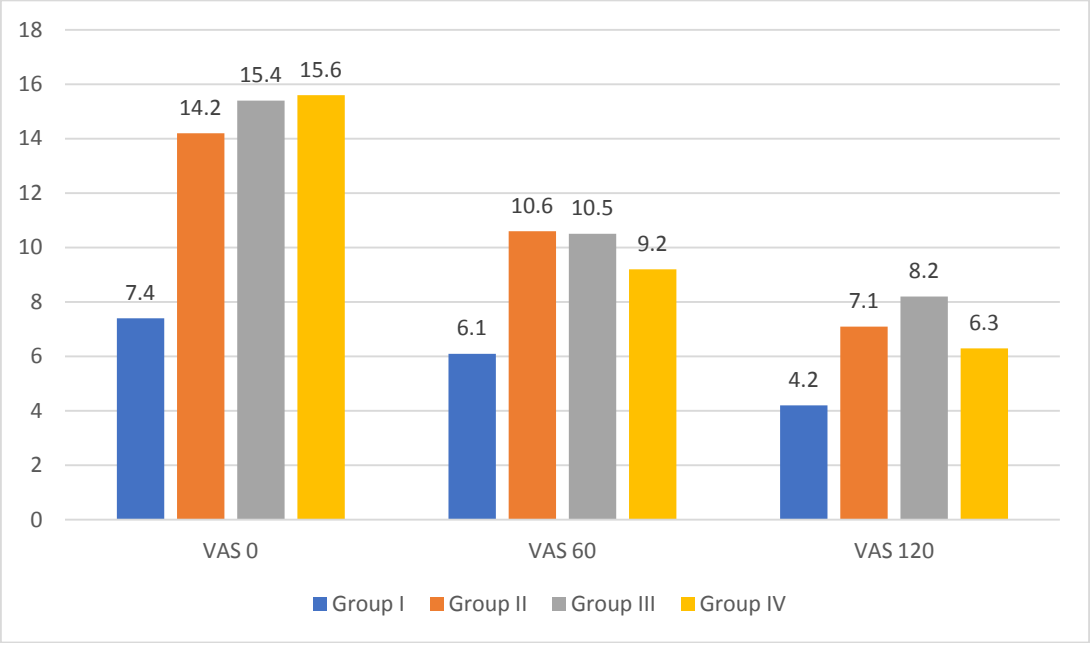
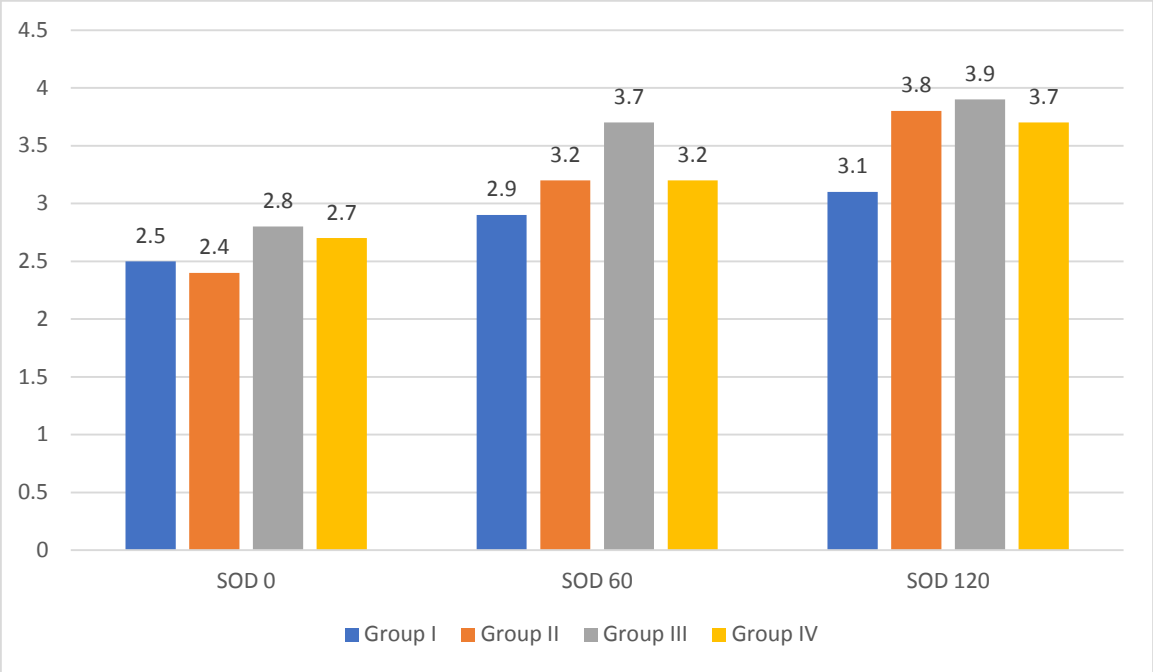


Table III Comparison of SOD score in all groups

SOD score	Group I	Group II	Group III	Group IV	P value
SOD 0	2.5	2.4	2.8	2.7	0.15
SOD 60	2.9	3.2	3.7	3.2	0.04
SOD 120	3.1	3.8	3.9	3.7	0.05

Table III, graph II shows that mean SOD at 0 was 2.5, 2.4, 2.8 and 2.7 at SOD 0, 2.9, 3.2, 3.7 and 3.2 at SOD 60 and 3.1, 3.8, 3.9 and 3.7 at SOD 120. The difference was significant (P< 0.05).

Graph II Comparison of SOD score in all groups



DISCUSSION

Knee osteoarthritis is a chronic joint disease characterized by joint pain and functional loss, leading to impaired quality of life and a tremendous socioeconomic burden.[6] Despite its large disease burden, no approved disease-modifying drugs currently are available to treat osteoarthritis.[7] The current pharmacologic therapies, such as acetaminophen and nonsteroidal anti-inflammatory drugs, do not slow structural progression and are associated with gastrointestinal, renal, and cardiovascular complications. These medications have a low to moderate effect on pain, resulting in patient dissatisfaction, which hastens joint replacement.[8] Considering the high prevalence of osteoarthritis and the suboptimal pharmacologic management options, an urgent need exists for safer and more effective drugs to treat osteoarthritis symptoms.[9] The present study was conducted to compare the efficacy of tocotrienol and turmeric (curcuma longa) in knee osteoarthritis.

In present study, grade 1 was seen in 10, 9, 7 and 6 and grade 2 in 8, 9, 11 and 12 in group I, II, III and IV respectively. A meta-analysis demonstrated that serum high-sensitivity C-reactive protein levels were elevated in patients with osteoarthritis compared with control participants. Proinflammatory cytokines, including interleukin-1, tumor necrosis factor-, and interleukin-6, contribute to the progression of cartilage loss of osteoarthritis.[10]

We found that mean VAS score 0 was 7.4, 14.2, 15.4 and 15.6, VAS 60 in 6.1, 10.6, 10.5 and 9.2, VAS 120 was 4.3, 7.1, 8.2 and 6.3 in group I, II, III and IV respectively. Bharti et al[11] in their study 72 patients with OA were divided into 4 groups. Group I- Diclofenac 50 mg (twice a day), Group II- Diclofenac 50 mg + CL 500 mg (twice a day), Group III- Diclofenac 50 mg + Tocotrienol 200mg (twice a day) and Group IV- Diclofenac 50 mg + CL 500 mg + Tocotrienol 200mg (twice a day). Parameter such as knee pain by VAS, WOMAC score, IL- 1β, SOD were determined. All the patients were found to be suffering from Grade 2 and Grade 3 osteoarthritis. Out of 72 patients enrolled in the study, 39 (54.2%) were Grade 2 and rest 33 (45.8%) were Grade 3. Difference in Grade of osteoarthritis among patients of above four groups was not found to be statistically significant (p=0.581). VAS score was significant at day 120 (P< 0.05). A significant WOMAC score at 60 and 120 days (P< 0.05).IL1-β and SOD showed significant difference at day 60, 120 respectively (P< 0.05).

We found that mean SOD score at 0 was 2.5, 2.4, 2.8 and 2.7 at SOD 0, 2.9, 3.2, 3.7 and 3.2 at SOD 60 and 3.1, 3.8, 3.9 and 3.7 at SOD 120. Wang et al[12] determined the efficacy of Curcuma longa extract (CL) for reducing knee symptoms and effusion-synovitis in patients with symptomatic knee osteoarthritis and knee effusion-synovitis. 70 participants with symptomatic knee osteoarthritis and ultrasonography-defined effusion-synovitis. 2 capsules of CL (n = 36) or matched placebo (n = 34) per day for 12 weeks was given. The 2 primary outcomes were changes in knee pain on a visual analogue scale (VAS) and effusion-synovitis volume on magnetic resonance imaging (MRI). The key secondary outcomes were change in Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and cartilage composition values. Outcomes were assessed over 12 weeks. CL improved VAS pain compared with placebo by -9.1 mm (95% CI, -17.8 to -0.4 mm [P = 0.039]) but did not change

effusion-synovitis volume (3.2 mL [CI, -0.3 to 6.8 mL]). CL also improved WOMAC knee pain (-47.2 mm [CI, -81.2 to -13.2 mm]; P = 0.006) but not lateral femoral cartilage T2 relaxation time (-0.4 ms [CI, -1.1 to 0.3 ms]). The incidence of adverse events was similar in the CL (n = 14 [39%]) and placebo (n = 18 [53%]) groups (P = 0.16); 2 events in the CL group and 5 in the placebo group may have been treatment related.

CONCLUSION

Authors found that combination of standard drug+ curcumin+ tocotrienol was found to be better than other regimen.

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