

Multifunctional single-walled carbon nanotube films

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Background: There is a putative role of vitamin D in osteoarthritis (OA) based on animal, epidemiological and human clinical studies. Short term clinical studies suggest beneficial influence of vitamin D on local changes in the bone which probably accounts for diminished pain experienced in knee OA (KOA). Inadequate sunlight exposure and lower serum levels of 25(OH)D appears to be associated with an increased risk for progression of OA knee. Some chronic analgesic users with OA knee were more likely to be in lower categories of 25(OH) D compared to women with asymptomatic OA.

Objectives: On the basis of above background this study was planned to assess the effect of vitamin D on the progression of disease.

Methods: A six month, double blind, randomized and placebo controlled trial of vitamin D, in vitamin D insufficient OA knee subjects (serum 25(OH)D levels <50 nmol/L) was conducted. 150 subjects of primary OA knee, diagnosed by ACR guidelines, were subjected to personal interview to determine their vitamin D intake (by 3 day dietary recall and food frequency table) and the daily sunlight exposure in hours. Serum levels of calcium, phosphorus, alkaline phosphatase and 25(OH) D were measured to determine their vitamin D profile. We identified 64 vitamin D insufficient subjects out of 150 primary OA knee patients. These were randomized by random allocation table for intervention. In cases a bolus dose of calciferol in 60,000 IU/day for 10 days followed by 6,000 IU/month for six months was administered and in controls a placebo in the same schedules and durations was given. Primary outcome measures were clinical WOMAC scores (pain, stiffness and physical function) and VAS for knee pain. Secondary outcome measures were radiological features (joint space width, osteophyte scores, subchondral sclerosis scores and tibio femoral alignment) and KL grades. The serum levels of vitamin D were assessed by using Enzyme Linked Immunosorbent Assay (ELISA) and calcium/phosphorus/alkaline phosphatase by UV end point method. Statistical analysis was performed on an intension to treat basis.

Results: There was no significant baseline difference of age, sex, analgesic frequency, dietary vitamin D intake, serum levels of vitamin D, calcium, phosphorus and alkaline phosphatase and in clinical and radiological scores between the cases and controls. BMI (25.96 vs 25.65, $p=0.75$) and pain (10.94 vs 10.64, $p=0.66$) was higher in the placebo group although difference was not statistically significant. There was no significant difference in radiological features and KL grades from baseline and at 6 months in both the groups. At six month, both the groups had an improvement in WOMAC and VAS pain scores but vitamin D showed benefit over placebo from baseline ($p<0.01$); for WOMAC physical function vitamin D group showed significant improvement over placebo which remained same as their baseline levels.

Conclusions: Although a long term study is being recommended to establish radiological progression, if any, this short term randomized placebo control trial yields a beneficial effect of vitamin D in pain and physical function outcomes in KOA. Vitamin D intake was beneficial in symptomatic improvement of KOA.

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Small gap sleeve bridging can improve the accuracy of peripheral nerve selective regeneration

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The major key to functional recovery following peripheral nerve injury is the accurate regeneration of axons to their original target end organs. Abundant studies were focused on how to improve the accuracy of peripheral nerve regeneration. Our previous studies have confirmed the possibilities of using small gap sleeve bridging to substitute the traditional epineurium neuroorrhaphy. This study was designed to investigate if small gap sleeve bridging can improve the accuracy of peripheral nerve selective regeneration. Femoral nerve of SD rat was employed to generating preferential regeneration animal model. The accuracy of peripheral nerve selective regeneration were compared by calculating the misrouting ratio of regenerating axons. The number of regenerating motor axons in distal stump are 1249.67 ± 66.32 (group I) and 1186.50 ± 54.62 (group II) ($P=0.05$). The misrouting axons in group I (568.67 ± 21.36) is significantly more than group II (378.17 ± 29.86) ($P<0.05$). The misrouting ratio in group I (45.56 ± 1.80) is significantly higher than group II (31.93 ± 3.05) ($P<0.05$). The results suggested that more accurate reinnervation can be got by small gap sleeve bridging than traditional epineurium neuroorrhaphy.

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