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Intra-articular metallic gold micro particles relieve pain and enhance function in patients with knee osteoarthritis

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Aim of Investigations

Many patients suffering from osteoarthritis (OA) do not get adequate pain relief. Current therapies relieve pain to some extent and up to 30% having an arthroplasty do not achieve sufficient improvement.

Animal studies indicate gold ions have a long-acting effect on OA pain. The immuno-modulatory effect of gold ions have for more than 50 years a known anti-inflammatory effect in the treatment of rheumatic arthritis. Gold ions alter the function of macrophages by inhibiting lysosomal enzymes and lowering production of pro-inflammatory cytokines11,12.

Dissolucytotic metallic gold (DMG) ions have an immune-suppressive effect in laboratory testing13-15 (Figure 1-3). Animal studies prove the effect of gold implantation in arthritic joints16-18. Injection of DMG in animal models stimulate the immune system19-21. The carrier for injecting the DMG micro particles is hyaluronic acid22-24.

No studies have investigated the effect of intraarticular gold micro particles implant for treatment of knee osteoarthritis in humans. The present open, pilot study aimed to investigate if gold ions have a role in treating knee osteoarthritis25.

Methods

A cohort of 30 patients referred for treatment of knee OA, aged ≥18years, pain ≥ 3 months, synovial effusion on MRI, and Kellgren-Lawrence OA grade 3-4 were included. Exclusion criteria were hip dysplasia. A cohort of 30 patients referred for treatment of knee OA, aged ≥18 years, BMI 28.8 (22.8-41.7), 18 were men 12 women. 32 met the criteria, 1 did not attend and 1 refused. Age was 63 (46-75) year, BMI 28.8 (22.8-41.7), 18 were men 12 women. Metallic gold 20 mg, 72,000 pieces, 20-40 µm in diameter (Berlock-Micro-Implants, BMI, Goldtreat APS) were injected into the knee joint using the patient’s own synovial fluid as the carrier. Outcome measures were WOMAC pain, stiffness and function, PainDetect questionnaire, and Quantitative Sensory Testing (QST) (pressure pain threshold assessed over the knee joint) at inclusion and after 8 weeks.

References
13. Sten Rasmussen MD PhD

Results

Pain and function improved in 25 of 30 patients. WOMAC pain decreased from 9 (6-16) to 3 (0-15), stiffness from 4 (1-8) to 2 (0-8), function from 29 (14-51) to 11 (0-41) (Figure 4). PainDetect decreased from 10 (1-26) to 3 (0-19) (Figure 5). Pain pressure threshold decreased (anti-hyperalgesia) from 398kPa (276-1043) to 616kPa (349-1089) (Figure 6). All differences, P < 0.05 (Wilcoxon sign test).

Conclusions

Intra-articular metallic gold improved joint pain, stiffness and function. The increased pressure pain threshold indicate less joint hyperalgesia. Intra articular gold particles may modify the synovial inflammation as a part of the sensitization in knee OA patients. In this cohort of patients with moderate to severe knee osteoarthritis and synovial effusion intra-articular metallic gold relieved pain and enhanced function in more than 80% of the patients. This study suggests a basis for a future placebo controlled randomized trial in OA patients.

Figure 1-3

Folded protein Un-folded protein

Figure 5

Figure 6

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