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Topical Gallium III and Its Effects on Rheumatoid Arthritis Related Joint Pain

Summary

RA is a chronic autoimmune disease with symptoms including joint pain and stiffness, reduced range of motion and function of joint, fatigue, loss of appetite, fevers, dry eyes and mouth, and rheumatoid nodules (5). While current therapeutic protocols offer potential reduction of RA symptoms, there are shortcomings such as side effects of drugs, invasiveness of surgery, and time/money expenditure of physical and occupational therapies. Topical gallium nitrate (GN) is potentially a safe, effective, non-invasive addition to available therapies.

Subjective and objective improvements were observed after treatment of painful joints secondary to rheumatoid arthritis. Subjective findings were measured by AIMS II survey administered before and after treatment. Results indicated all patients had a decrease in their AIMS II score with 5.67 as the average number of points dropped. This translates as an average 17.64 percent improvement in pain perception and functionality. Objective findings demonstrate an average drop in CRP measures by 2.78 mg/L. 83% of patients were measured with a decreased CRP.

Introduction

Arthritis is a common cause of joint pain. In the United States during 2010-2012, 52.5 million people were diagnosed with arthritis (1), including 294,000 children under the age of 18 (2). More specifically, Rheumatoid Arthritis (RA) effected an estimated 1.5 million adults in 2007 (4). RA is a chronic autoimmune disease with symptoms including joint pain and stiffness, reduced range of motion and function of joint, fatigue, loss of appetite, fevers, dry eyes and mouth, and rheumatoid nodules (5).

The American College of Rheumatology offers treatments recommendations including medications, surgery, and non-pharmacologic therapies. The latter includes physical or occupational therapy, splints or joint assistive aids, patient education and support, and weight loss (3). While each of these therapies offer potential reduction of RA symptoms, there are shortcomings such as side effects of drugs, invasiveness of surgery, and time/money expenditure of physical and occupational therapies.

Gallium nitrate (GN) is a semi-metallic element with properties similar to iron and aluminum. It has shown efficacy in treatment of an array of disorders including accelerated bone resorption, and autoimmune disease (11).

Accelerated bone resorption is one of several features of cancer-related hypercalcemia. Other effects include stimulation of bone formation, inhibition of osteoclasts, and modification of the mineral composition of bone. The mechanism by which GN corrects hypercalcemia is not fully understood. It appears to involve inhibition of osteoclast-mediated bone resorption, stimulation of bone formation, and alteration of the mineral composition of bone. However, GN is not cytotoxic to bone cells (16).

Animal and in vitro studies have shown GN to suppress some immune reactions without being cytotoxic or globally immunosuppressive. It appears to target responses mediated by T lymphocytes and macrophages (11). In vitro studies on rat T-cells demonstrated that GN blocks mitogenic and antigen-specific proliferative response without toxicity to the cells (17). Some poor rats found themselves with adjunctive arthritis, a t cell-mediated autoimmune type analogous to RA in humans. Rats that received GN had less synovitis, cartilage degeneration, and bone related abnormalities than the control group (18).

Human case reports have demonstrated elimination of arthritis-related inflammation and pain (12). This study also demonstrated positive findings when administering GN to relieve joint pain associated with RA.

Materials and Methods

Patients were initially screened for a pre-existing diagnosis of RA. Qualified subjects had a first office visit during which a health history, subjective, and objective information was gathered including physical exam of effected joints, AIMS II survey, and blood work. Blood tests included glucose, hgA1C, CRP, ESR, CCP antibodies, TIBC, UIBC, iron (serum and sat), cholesterol (total), triglycerides, TSH, fT3, and fT4. Additionally, gastric HCL was measured. Once the confirmatory blood test results became available, the first treatment appointment was scheduled.

There were a total of three treatments per subject. Each treatment session included a review of effected joints, subjective assessment of pain and functionality, and application of topical GN. General health questions were also included, such as quality of sleep, appetite, fatigue levels, and activity changes. Each subject returned within one to two weeks for subsequent treatments.

Following the third treatment session, exit blood tests and AIMS II survey were completed for comparison with initial data.

Results

Subjective and objective improvements were observed after treatment of painful joints secondary to rheumatoid arthritis. Subjective findings were measured by AIMS II survey administered before and after treatment. Results indicated all patients had a decrease in their AIMS II score with 5.67 as the average number of points dropped. This translates as an average 17.64 percent improvement in pain perception and functionality. Objective findings demonstrate an average drop in CRP measures by 2.78 mg/L. 83% of patients were measured

with a decreased CRP. There were no significant findings with the remaining blood tests. 66.7% of subjects were hypo or achlorhydric.

Discussion

Topical gallium nitrate (GN) is potentially a safe, effective, non-invasive addition to current therapies for the relief of joint pain. Mechanisms of action include anti-inflammatory (19), bone density stabilization (16), antibacterial (20), anti-iron III (21) and anti-aluminum III (22) effects (12). GN is easy to administer with minimal side-effects. The only reported or observed side effects were temporary puritus and xeroderma at the application site. Patient compliance was exceptional, likely due to the ease of application, reduction of pain, and negligible side-effects.

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