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ULTRASOUND GUIDED GOLD-INDUCED CYTOKINE (GOLDIC) TREATMENT IN PATIENTS WITH OSTEOARTHRITIS OF KNEE ON IMPROVING PAIN AND FUNCTION: A CASE SERIES

Physical Medicine & Rehabilitation

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ABSTRACT

Osteoarthritis of the knee is a chronic degenerative musculoskeletal disorder associated with pain, functional limitation, and reduced quality of life. In recent years, regenerative medicine has emerged as a promising modality for managing osteoarthritis by targeting inflammation and tissue degeneration. Gold-Induced Cytokine (GOLDIC) therapy is an autologous conditioned serum rich in anti-inflammatory and regenerative cytokines produced by incubating whole blood with gold particles. This case series evaluates the effectiveness of ultrasound-guided intra-articular GOLDIC injections in patients with knee osteoarthritis. Three patients diagnosed with knee osteoarthritis based on American College of Rheumatology criteria and radiological grading received three intra-articular injections of 3 mL GOLDIC serum at weekly intervals under ultrasound guidance, followed by a structured rehabilitation program. Pain and functional outcomes were assessed using the Visual Analogue Scale (VAS) and Knee Injury and Osteoarthritis Outcome Score (KOOS) at baseline and during follow-up at one, three, and six months. All patients demonstrated clinically significant reduction in pain and improvement in functional scores, which were sustained throughout the follow-up period. No major adverse effects were observed. GOLDIC therapy appears to be a safe and promising minimally invasive regenerative option for managing knee osteoarthritis. Larger randomized controlled trials are warranted to establish its long-term efficacy and cost-effectiveness.

KEYWORDS

GOLDIC, knee osteoarthritis, regenerative medicine, autologous conditioned serum, pain, function

INTRODUCTION

Osteoarthritis (OA) is the most common degenerative joint disease and a leading cause of disability worldwide, particularly affecting weight-bearing joints such as the knee. Although traditionally considered a degenerative condition, OA is now recognized to have a significant inflammatory component involving cytokine-mediated cartilage degradation and synovial inflammation. The prevalence of knee OA in India ranges from 22% to 39%, contributing substantially to pain, functional impairment, and reduced quality of life. Conventional treatment strategies mainly provide symptomatic relief and do not reverse disease progression. Regenerative therapies such as platelet-rich plasma, autologous conditioned serum, and stem cell therapy are gaining interest. GOLDIC therapy utilizes gold-induced cytokine modulation to enhance anti-inflammatory and regenerative processes, offering a novel approach in OA management. Gold-Induced Cytokine (GOLDIC) is an autologous serum enriched with anti-inflammatory and regenerative cytokines, growth factors, and stem cell–related mediators, produced by exposing whole blood to gold particles. It enhances the body's natural regenerative mechanisms and promotes tissue repair while exerting immunomodulatory effects. This study aimed to observe the effectiveness of Gold-Induced Cytokine (GOLDIC) injection therapy in patient with osteoarthritis of knee on improving pain and function.

MATERIALS AND METHODS:

This prospective case series was conducted in the Department of Physical Medicine and Rehabilitation at a tertiary care center. Three patients with clinically and radiologically confirmed knee osteoarthritis (Kellgren–Lawrence grade II–III) were included. Pain was assessed using the Visual Analogue Scale (VAS), and function was evaluated using the Knee Injury and Osteoarthritis Outcome Score (KOOS). Autologous blood was incubated with gold particles at 37°C for 24 hours and centrifuged to obtain cytokine-rich serum. Each patient received three intra-articular injections of 3 mL GOLDIC serum at weekly intervals under ultrasound guidance, followed by a supervised rehabilitation program for three months.

CASE SERIES

Case 1: A 62-year-old female with left knee osteoarthritis (KL grade III) presented with chronic pain and stiffness. Baseline VAS was 8 and KOOS was 36.

Case 2: A 58-year-old male with right knee osteoarthritis (KL grade II) presented with pain and swelling. Baseline VAS was 7 and KOOS was 40.

Case 3: A 51-year-old female with left knee osteoarthritis (KL grade II) presented with pain and functional limitation. Baseline VAS was 9 and KOOS was 33.

Figure 1: Preparation of Gold-Induced Cytokine (GOLDIC) serum from autologous blood using a sterile filtration system

Figure 2: Ultrasound-guided intra-articular administration of Gold-

Induced Cytokine (GOLDIC) serum into the knee joint under aseptic conditions.

RESULTS:

All patients demonstrated progressive improvement in pain and functional scores at one, three, and six months follow-up as shown in the following table. Improvements were sustained, and no significant adverse effects were reported.

Table – 1 Follow-up And Outcome Assessment (VAS and KOOS Scores)

Case	Outcome Measure	Baseline	1st Month	3rd Month	6th Month
Case 1	VAS	8	5	4	2
	KOOS	36	53	68	93
Case 2	VAS	7	4	2	2
	KOOS	40	65	72	91
Case 3	VAS	9	7	5	3
	KOOS	33	48	73	87

DISCUSSION:

GOLDIC therapy demonstrated significant improvement in pain and functional outcomes in patients with knee osteoarthritis. The therapeutic effect is attributed to upregulation of plasma gelsolin, growth factors, and stem cell-related cytokines, leading to anti-inflammatory and regenerative effects. Previous studies have reported similar beneficial outcomes with GOLDIC therapy in osteoarthritis and other degenerative musculoskeletal conditions.

Previous literature supports the beneficial role of GOLDIC therapy in osteoarthritis and other degenerative musculoskeletal conditions. Pithadia et al. reported a case study involving patients with Grade IV knee osteoarthritis, demonstrating promising improvements in pain relief and functional outcomes following GOLDIC therapy, suggesting its potential effectiveness even in advanced stages of the disease.

In a clinical study evaluating the safety and efficacy of GOLDIC therapy in knee osteoarthritis, Schneider et al. observed rapid and sustained improvement across all domains of the Knee Injury and Osteoarthritis Outcome Score (KOOS), indicating significant benefits in pain reduction, functional capacity, and quality of life. The functional gains noted in the present case series are consistent with these findings.

Beyond knee osteoarthritis, the therapeutic potential of GOLDIC has been explored in other degenerative conditions. Godek et al., in a randomized controlled trial involving patients with degenerative lumbar spinal stenosis, demonstrated that GOLDIC could serve as a novel symptomatic treatment option, highlighting its broader applicability in degenerative spine disorders.

Furthermore, Schneider et al. conducted the first human clinical trial evaluating GOLDIC therapy in Achilles tendinopathy and reported promising clinical outcomes along with impressive healing observed on follow-up magnetic resonance imaging, suggesting a true regenerative effect at the tissue level. Collectively, these studies reinforce the anti-inflammatory and regenerative potential of GOLDIC therapy, supporting its role as a minimally invasive treatment option in musculoskeletal degenerative disorders.

LIMITATIONS:

Small sample size, lack of control group, short-term follow-up, and cost are the major limitations of this case series.

CONCLUSION:

Ultrasound-guided GOLDIC injection therapy is a promising minimally invasive regenerative treatment option for knee osteoarthritis, showing sustained improvement in pain and function. Further large-scale randomized controlled trials are needed.

Declaration Of Patient Consent

Informed written consent was obtained from all patients for publication of clinical information.

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Conflicts Of Interest: There are no conflicts of interest.

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