



Comparing Mannitol and Hypertonic Dextrose Injections for Knee Osteoarthritis Pain and Function: A Randomised Trial

Nasrin Barzegar¹, Rezvan Ghaderpanah¹, Hamid Reza Farpour^{2,3}, Mohammad Esmail Ghorbani Nejad¹

¹Student Research Committee, Department of Physical Medicine and Rehabilitation, Shiraz University of Medical Sciences, Shiraz, Iran; ²Orthopaedic and Rehabilitation Research Centre, Department of Physical Medicine and Rehabilitation, Shiraz University of Medical Sciences, Shiraz, Iran; ³Shiraz Geriatric Research Centre, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

Corresponding Author: Hamid Reza Farpour, Faculty of Medicine, Shiraz University of Medical Sciences, Zand Ave, Shiraz 7187646610, Iran; Tel.: +989171179541, Fax: +987132319040, E-mail: farporh@sums.ac.ir, farporh@gmail.com

ABSTRACT

Introduction: Knee osteoarthritis is a chronic and age-related disease that causes joint stiffness, pain, and biomechanical changes in the joint, resulting in decreased activity and performance. Prolotherapy is one of the methods of injection therapy in the management of this disease. Drugs such as hypertonic dextrose and mannitol have been introduced as prolotherapy drugs. The aim of this study is to evaluate the efficacy of intra-articular injection of mannitol compared to prolotherapy with hypertonic dextrose in terms of pain relief and functional improvement in patients with knee osteoarthritis. **Patients and Methods:** A total of 48 patients with KOA were randomly divided into two groups: hypertonic dextrose (24 patients) and mannitol (26 patients). All patients received three intra-articular injections of either hypertonic dextrose or mannitol at two-week intervals. Visual Analogue Pain Scale (VAS), Oxford Knee Scale (OKS), and Western Ontario McMaster University Osteoarthritis Index (WOMAC) questionnaire scores were the outcome measures assessed before and 2, 4, and 8 weeks after the injections. **Results:** There were no statistically significant differences in pre-injection demographic characteristics between the two groups ($p > 0.05$). Results showed that VAS and OKS scores decreased over time ($p < 0.001$). Both interventions significantly improved the mean scores of WOMAC pain, WOMAC stiffness, WOMAC function, and WOMAC total score. There were not any serious side effects in any of the groups. **Conclusion:** The results showed that prolotherapy is an effective and safe treatment. Although both groups had improvements in outcome measures during follow-up up to 8 weeks after the intervention, no statistically significant difference was found between the two groups.

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INTRODUCTION

Osteoarthritis, the most common type of arthritis, is the main reason of musculoskeletal disability and pain worldwide and imposes an enormous economic burden on society and individuals. The prevalence of symptomatic knee OA in adults over 60 years of age is approximately 10% in men and 13% in women. The total number of individuals affected by symptomatic OA is expected to increase due to the aging population and the obesity epidemic.¹

The management of osteoarthritis (OA) involves various approaches such as medications, physical therapy, occupational therapy, and surgery, with the goal of relieving pain and improving joint function.^{2,3} Despite ongoing efforts, treatments that effectively modify the progression of OA have not yet achieved sufficient

efficacy for widespread approval. The American College of Rheumatology (ACR) guidelines recommend non-surgical treatments, although these methods do not address the underlying cause of OA.⁴

One of the therapies for KOA, which may be recommended, is intra- and periarticular injections into the knee. Platelet-rich plasma (PRP), hyaluronic acid, methylprednisolone, and human platelet lysate are some of the substances used for intra-articular knee injections. Hypertonic dextrose injection, also known as "prolotherapy,"⁵ has attracted much attention since it was first used to treat musculoskeletal pain in the 1950s. It is an injection-based treatment that has been used in recent years for various painful chronic musculoskeletal conditions such as tendinitis and OA.⁶ The main principle of prolotherapy is the injection of

analysis; Hamid Reza Farpour: Visualisation, Investigation, Conceptualisation, Methodology, Review & Editing manuscript, and Project administration; Mohammad Esmaeil Ghorbani Nejad: Formal analysis, Software, Writing- Original draft. All authors commented on the previous versions of the manuscript and revised it. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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ETHICAL CONSIDERATIONS

The manuscript has been approved by all authors and has never been published or under the consideration for publication elsewhere. We confirm that all figures and tables are original and created by authors. We guarantee that all authors listed on the title page have read the manuscript and attest to the validity and legitimacy of the data. The study was conducted in accordance with the ethical standards of the Declaration of Helsinki and Good Clinical Practice. It was also approved by the Ethics Committee of Shiraz College of Medical Sciences (ethics number: IR.SUMS. MED. REC.1398.314) and registered with clinical trial registration number: IRCT20190912044756N1, registration date: 2020-08-24.

DATA AVAILABILITY STATEMENT

The data supporting this study's findings are available from the corresponding author upon reasonable request.

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