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Low level laser therapy versus intra-articular hyaluronic acid injection in treatment of osteoarthritis knee: A comparative study

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Abstract

Background & Objectives: Osteoarthritis is a very common chronic degenerative disease that could impose significant costs to the health system. Although osteoarthritis can affect all joints, knee osteoarthritis is the most common type. Non-surgical treatments include corticosteroids injection, hyaluronic acid, platelet-rich plasma, low level laser therapy & more. The aim of this study was to investigate the efficiency of LLLT versus intra-articular hyaluronic acid for the treatment of knee osteoarthritis.

Methods: 100 patients allocated into two groups (LLLT Group A - 50 & IAHA Group B - 50), Group A received low level Laser therapy and Group B received intra-articular Hyaluronic acid therapy through superolateral approach. Outcomes were measured using VAS score and WOMAC scoring system.

Results: Both groups showed improvement but there was a significant improvement in Group B IAHA with reduced VAS score and WOMAC score (40.87 ± 11.71) compared to Group A LLLT with WOMAC score (68.09 ± 8.27). Therefore, the reduction in symptoms was better in IAHA group compared to LLLT group.

Conclusion: The results of this randomized comparative study showed that Intra-articular HA injection was more effective than LLLT in treatment of Osteoarthritis knee grade I and II. LLLT and HA are few non-surgical treatment modalities considered for knee joint osteoarthritis.

Keywords: Intra-articular hyaluronic acid, knee osteoarthritis, low level LASER therapy, efficiency.

Introduction

Osteoarthritis is a degenerative joint disease in which the cartilage that cushions the bones wear off and the bones rub against each other resulting in pain and stiffness. The word 'osteoarthritis' originated from the Greek word "osteo" meaning "of the bone", "arthro" meaning "joint", and "itis" meaning inflammation. Although the "itis" of osteoarthritis is a misnomer – inflammation is not a conspicuous feature that is present in rheumatoid or autoimmune types of arthritis. Most cases of osteoarthritis have no known cause and are referred to as primary osteoarthritis. Primary osteoarthritis is mostly related to aging. It can present as localized, generalized or as erosive osteoarthritis. Secondary osteoarthritis is caused by another disease or condition.

Osteoarthritis (OA) is the second most common rheumatologic problem and is most frequent joint disease with prevalence of 20% to 40% in India. In OA, there is damage and loss of articular cartilage. Additionally there is subarticular bone remodeling, osteophyte formation, periarticular muscle weakening and synovial inflammation. OA is a result of an imbalance between the breakdown and repair of the joint tissue. The imbalance in breakdown and repair of the joint tissue increases with increase in age. OA diagnosis is defined based on the method used for evaluation: subjective, radiological or clinical. In radiological OA definition, Kellgren and Lawrence score is the most commonly used score to identify and grade the OA severity. The clinical OA definition is based on the presence of joint pain along with the above features whereas the subjective OA definition is based on patient's assessment. OA affects spine, hip, hand and knee joints but the most commonly affected joint in OA is the knee.

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Aims & Objectives

The main objective of this study is to investigate:

1. The effectiveness of Low Level Laser Therapy and Intra-articular Hyaluronic acid injection in patients presenting with osteoarthritis knee. (Kellgren and Lawrence grade 1 & grade 2).
2. Improvement in the activities of daily living due to each therapy.

Materials and Methods

Source of data & materials

Data was collected from patients who come to Rajarajeswari medical college and hospital (RRMCH) with diagnosis of osteoarthritis of knee joint after obtaining informed consent.

Method of collection of data Sample size

A total of 100 cases satisfying the inclusion criteria attending OPD at RRMCH, Bangalore was included in the study.

Results

Table 1: Age distribution comparison between two groups

		Group			
		LLLT		IA HA	
		Count	%	Count	%
Age	<50 years	25	50.0%	25	50.0%
	51 to 60 years	17	34.0%	15	30.0%
	61 to 65 years	8	16.0%	10	20.0%

$\chi^2 = 0.347, df = 2, p = 0.841$

In LLLT group, 50% were in the age group <50 years, 34% were in the age group 51 to 60 years and 16% were in the age group 61 to 65 years. In IA HA group, 50% were in the age group <50 years, 30% were in the age group 51 to 60 years and 20% were in the age group 61 to 65 years. There was no significant difference in age distribution between two groups.

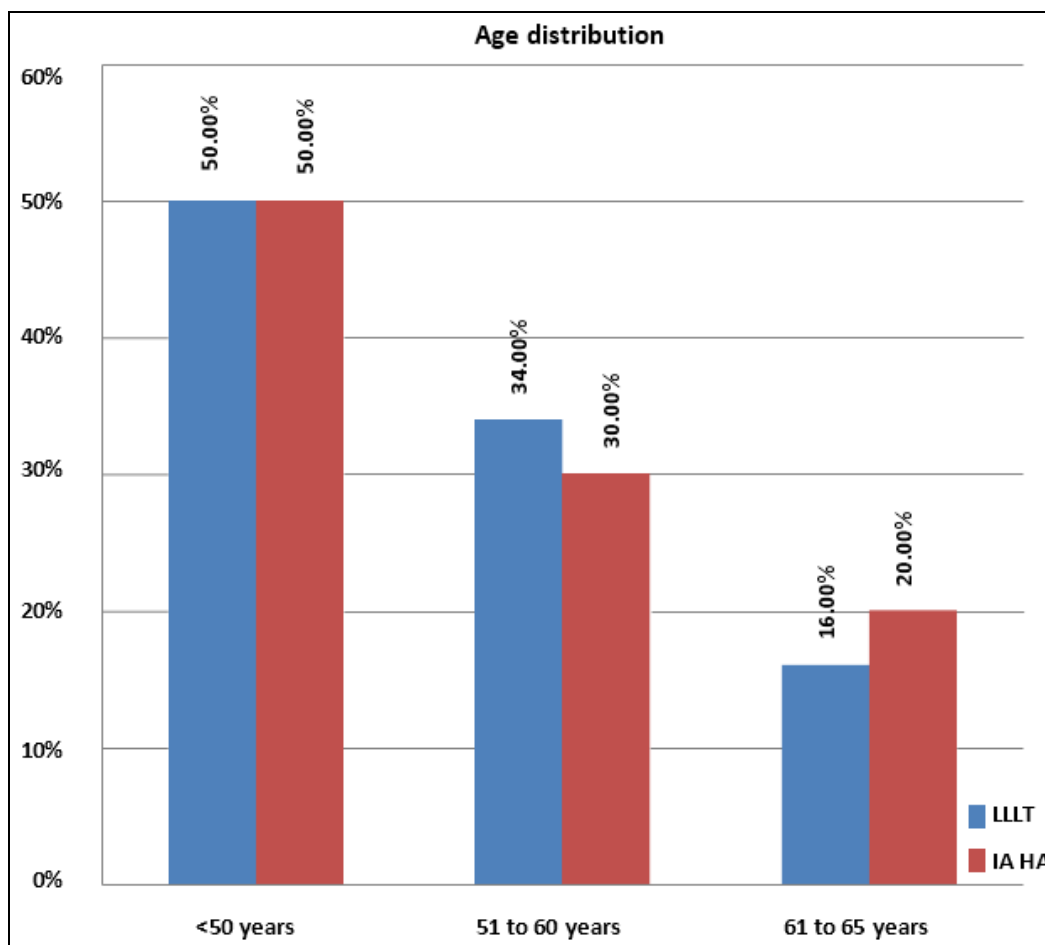


Fig 1: Bar graph showing Age distribution comparison between two groups

Table 2: Sex distribution comparison between two groups

		Group			
		LLLT		IA HA	
		Count	%	Count	%
Sex	Female	25	50.0%	21	42.0%
	Male	25	50.0%	29	58.0%

$\chi^2 = 0.644, df = 1, p = 0.422$

In LLLT group, 50% were males and 50% were females and in IA HA group, 58% were males and 42% were females. There was no significant difference in Sex distribution between two groups.

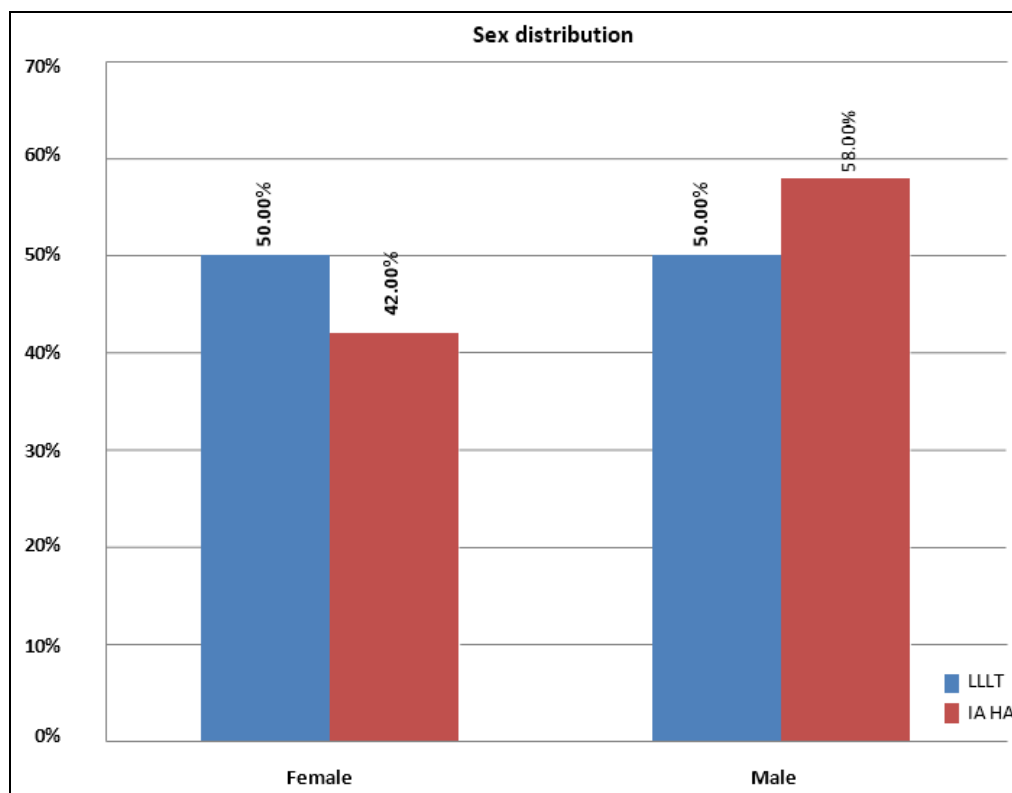


Fig 2: Bar graph showing Sex distribution comparison between two groups

Discussion

The present study was intended to compare the effects of intra-articular injection of hyaluronic acid and LLLT in the treatment of knee osteoarthritis symptoms. The understanding of the pathogenic mechanisms and pathoanatomic changes in osteoarthritis raises the need for new therapeutic interventions.

In OA there is functional inadequacy of the chondrocytes to synthesize the main components of the extracellular matrix and collagen fibrils with quality, necessary to fulfill its primary biological role, hydrophilic nature, elasticity, and compressive ability of cartilage hyaline. The pathological process involves the cartilage, the underlying bone, synovial tissue and also all the intra-articular and periarticular structures.⁷⁸

The laser radiation is determined by the characteristics such as wavelength, radiation mode (continuous or pulse), pulse duration, energy, and power. It was found that laser radiation in spectral range 600–1064 nm has the deepest penetration in tissues. The structure of tissue changes the physical properties of laser radiation (coherency and polarization parameters).⁷⁹

Conclusion

The results suggested that hyaluronic acid improved movement restriction and pain in patients proving to be more effective compared to low level LASER therapy (LLLT). These results were true in both grade 1 and 2 grades of osteoarthritis. And no adverse effects were noted in both groups of this study.

Hyaluronic acid is useful in the management of osteoarthritis, literature data seems to indicate its ability to reduce pain and improve joint function, with a potential structure modifying activity if used in the early part of the disease.

However, in patients with osteoarthritis, a combination of these two treatments can be administered to alleviate pain and reduce movement restrictions. Usage any of these methods has its own effects and complications.

Effective treatment strategies in OA remain an important and critical area for research. Many management strategies exist, but none are particularly effective to halt the disease progression. This pharmaceutical gap must be addressed in order to reduce the burden of OA. More studies should be conducted in the future to judge the efficacy of the two methods in a long term study.

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