



A study on knee joint effusion with osteoarthritis by musculoskeletal ultrasonography- before and after management

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ABSTRACT

AIM: The aim of study is to investigate the changes of knee joint effusion before and after osteoarthritis of knee, using musculoskeletal Ultrasonography. **DESIGN:** Prospective, follow-up study. **SETTING:** Department of Physiotherapy, Chalmeda Anand Rao Institute of Medical sciences, Karimnagar. **METHODS AND MATERIALS:** 20 cases of unilateral knee osteoarthritis were assessed by PHILIPS EnviSor CH D Ultrasonographic examination of knee effusion. Subjects were prospectively assigned to the follow-up treatment of Interferential stimulation and Non-thrust Manual exercise (including Knee, Hip and and Leg muscles. A 15 session treatment program, 30 minute per day was performed for KOA. **OUTCOME MEASURES:** Before and after intervention, we assessed knee joint effusion through ordinal scale. T –test was used for comparison between pre and post treatment results in respectively. **RESULTS:** 12 cases (women 7, men 5) were identified and a total 20 subjects of knee OA. The mean score of effusion (2.75); T-value (2.20%) in the nonthrust manual exercise and interferential current. **CONCLUSION:** Significantly reduction in knee effusion in patients with knee osteoarthritis.

Keywords: Knee osteoarthritis, musculoskeletal ultrasonography, Knee effusion, Interferential current



INTRODUCTION

In 1743, Willams Hunter first described Osteoarthritis. Osteoarthritis is a condition that primarily affect the articular cartilage, but involve the entire joint, including the subcondral bone, ligaments, capsule, synovial membrane and periarticular muscles (Brandt.KD. et.al 2009). The basic aim of physiotherapy is to prevent disability, improve joint range of motion, reduce pain, stiffness, and improve muscular strength, fitness and Quality of life. The purpose of study is to investigate whether changes of knee joint effusion in patients with osteoarthritis before and after Physiotherapy treatment using musculoskeletal Ultrasonography. Musculoskeletal Ultrasonography is a noninvasive, lowcost, bedside procedure that may be used and to assess osteoarthritic joints (Iagnocco.A. 2008). Ultrasound detects changes of intra articular knee effusion and inflammatory arthritis (Coopenberg.PL.et.al 1978 & Kanfman RA. Et.al,1982). The purpose of this study is to investigate the changes of knee joint effusion before and after osteoarthritis of knee, using by musculoskeletal ultrasonography .

METHODS AND MATERIALS

The study was conducted in the Department of Physiotherapy and association with Department of Radio- Diagnosis and Imaging, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar. The prospective, Follow-up study was done from first August 2008 to December 2009. Inclusion Criteria were as follows • Knee pain with independence walking. • Aged between 40-75 years (Both female and male). • PHILIPS EnVisor C HD Musculoskeletal Ultrasonography. • Ultrasonic Gel. • L12- 3 MHZ probe/ Transducer. • Universal Goniometry • Interferential stimulation (IFS) modality. • Nonthrust manual exercise • Knee effusion Imaging Record • Digital Camera. Exclusion Criteria were • A history of knee and Hip Replacement surgery • Psoratric Arthritis • Unable to walk without assistance • Non-steroid anti-inflammatory Drugs. • Corticosteroid injections • Radicular pain below knee and • A History of malignancy. Musculoskeletal Ultrasonography Imaging PHILIPS EnVisor CH D M2540 A Ultrasound System (L12-3 MHZ, Bothell, WA, USA 98041). Linear transducer was used to

determine the presence of joint effusion (Meenagh.G. et.al 2006). Therefore a total 20 subjects with osteoarthritis of knee were investigated in this study.

Examination of knee effusion was obtained by measuring the anterior posterior scan along the main axis of the bursa. The probe was placed just above the superior border of the patella with knee in 30 degree flexion. The AP diameter was scored (Grade) as 0/Absent, 1/mild < 5mm, 2/moderate (5-10mm), 3/severe (>10mm) (Kakati .P.et.al 2008).

Treatment Protocol: Interferential current modality (LIFEMED V 744 04 04, Chennai, India). Alternating current frequency 50, 4000-4100HZ was used for this study. The treatment duration was applied to 20 minutes. The stimulation parameters of machines beat frequency 30HZ, sweep frequency 80 m second, wave 4 PV (6/6), Carbonized rubber electrodes, power/Voltage 230 V. The pairs of rubber electrodes were placed over the trigger points of the knee joint. The intensity of the current was set a comfortable level as determined by subjects and ranged from 10 – 50 mA. The patient position was supine lying with comfortable support and 20 degree flexed knee. Non thrust manual exercise as repetitive passive movement of varying amplitudes and of low velocity, applied at different points through the range of motion, depending on the effect desired (Cameron. WM, 2006). The number of repetitions time 5-10 per session of program. Duration of treatment time KOA was 15 sessions. The patients recorded in a diary their use of base, spectrum, intensity, treatment time of therapeutic modality and exercise.

Statistical Analysis: Before and after intervention, we assessed knee joint effusion through ordinal knee effusion scale. t – test analysis was used for comparison between the pre and post treatment results in respectively. The value were expressed in mean, +_ standard deviation and median with statistical significance considered when $P < 0.05$.

RESULTS AND DISCUSSIONS

20 subjects were enrolled in this study. However, 8 patients did not undergo the evaluations due to lack of regularity and were automatically excluded; therefore, a total of 12 patients participants in this study. All patients imaging were saved in consent forms before the evaluations.

The initial total knee effusion was not statistically different ($P < .05$), indicating that the initial effusion status of all participants in this study. Change of total effusion for KOA, the 2 measurements were taken in figure 4. After 15 sessions of treatment,

decreased to effusion approximately (t-2.20) of the observation. For analysis of the data showed that the decrease in knee effusion was significantly changed after 15 sessions of IFS/ Non-thrust manual knee exercise (T=37.77 and 20.2) respectively.

This is first controlled study to evaluate musculoskeletal ultrasonography detected changes in the effusion of knee with osteoarthritis of knee after interferential stimulation and non -thrust manual exercise. It is specifically used to increased arterial circulation, reducing spasm of muscles, pain, relaxation and changes in knee effusion. Kakati P.et.al (2008) observed that knee effusion and synovial thickening could be detected using ultrasonography in patients with Rheumatoid arthritis. Our study sample consisted of 12 cases OA Knee followed -up Pre-treatment and post treatment results showed Table 5 and 6. The results of this study demonstrated, the total knee effusion only was examined. Significantly changes between 10-15 sessions of interferential stimulation and non-thrust manual exercise. However, in this study, pharmacological therapy, injections and replacement of surgery of knee/Hip were excluded. Following 15 sessions of Interferential current and Nonthrust manual exercise, although reduction of the knee joint effusion was significant (12 Subjects of Knee OA).

LIMITATIONS OF THE STUDY: There are few limitations in the study. • Large sample size may give better understanding of reduction in knee effusion with osteoarthritis. • This study was needed to explore the difference between musculoskeletal ultrasonographic image and Hematological findings of effusion. • Future studies are needed to evaluation of the cost effectiveness of using musculoskeletal ultrasonography for assessing the condition progress compared with other techniques and the effect of the interferential stimulation and non- thrust manual exercise on control of knee effusion.

CONCLUSION

Our study results shows that, Interferential stimulation and Non-thrust manual exercise with musculoskeletal ultrasonography a significantly reduction in knee joint effusion with Osteoarthritis of knee. So, it is a low cost, short term relief, and promotion of health in senior citizens.

Conflict of Interest: None

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