

Painful osteoarthritic knee joints; a comparative study between intra-articular steroids and combined physiotherapy modalities treatment.

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الخلاصة

أجريت الدراسة على ثلاثون مريضاً في وحدة التأهيل الطبي مستشفى الديوانية التعليمي. 13 (44%) من الذكور و17 (56%) من الإناث ممن لديهم فصال عظمي في ركبة أو ركبتين طبقاً إلى تصنيف الجمعية الأمريكية للروماتيزم والذين يعانون من ألم حاد وتم تقسيم العينة إلى مجموعتين (15 لكل مجموعة عشوائياً) تم إعطاء واحد غرام من علاج اسيتامينوفين مرتين يومياً و 7.5 ملغرام ميلوكسيكام لياً لجميع أفراد العينة كعلاج مساعد. المجموعة الأولى عولجت بحقن موضعي لمادة مثيل بردنزولون اسيتيت (80ملغرام\2مل). المجموعة الثانية عولجت بإثني عشر جلسة علاج طبيعي (10دقائق تحفيز تداخلي و20 دقيقة مجال كهرومغناطيسي). استخدم مقياس ووماك (WOMAC) لتقييم أفراد العينة قبل الدراسة وفي الأسبوع الأول والثاني والرابع والثامن والسادس عشر. تم متابعة أعراض الألم ، التصلب والفعاليات البدنية وتسجيل متغيراتها. كلا المجموعتين حصل على تحسن محسوس. المجموعة الأولى حصلت على تحسن سريع منذ الأسبوع الأول وحتى نهاية الدراسة. المجموعة الثانية حصلت على تحسن ولكن بصورة أبطأ واستمر إلى نهاية الدراسة. كون النتائج في الحالتين متساوية تقترح الدراسة تفضيل العلاج بالحقن الموضعي لعدم وجود الآثار الجانبية وملائمته من الناحية العملية للمرضى كونهم يرغبون بالعودة السريعة للعمل وبكلفة أقل وتجاوز عدم مطابقتهم للعلاج بوسائل العلاج الطبيعي بسبب الفقر وعدم تيسر وسائل المواصلات لإكمال جلسات العلاج الطبيعي. توفر أجهزة الأمواج الكهرومغناطيسية والتحفيز المتداخل بشكل مبسط ومحمول يكون نافعاً لمرضى الفصال العظمي الموزم في الركبتين.

Abstract

Thirty patients 13males(44%) 17females(56%) who had osteoarthritis of the knees according to ARA classification criteria and presented with acute pain without effusion where randomly assigned into 2 groups to evaluate the effects of intra-articular injection(IAS) and in the other hand combination of interferential current (IFC) with pulsed electromagnetic field (PEF) physiotherapy modalities in treating painful Knee OA. All patients were treated with acetaminophen 1g bid, meloxicam 7.5mg once daily. 15 patients 8males(53%)- 7females (47%) received intra-articular injection of methyl prednisolone acetate(IAS) 80mg/2ml depot. The other group 10females(66.6%) – 5 males (33.3%) was treated by interferential current(IFP) 10 minute sessions with 20 minutes sessions of pulsed electromagnetic field therapy(PEF). The WOMAC (Western Ontario and McMaster Universities) scores index of osteoarthritis were recorded at 0 week, 1st wk ,2nd wk, 4th wk, 8th wk and 16th wk. At follow up visits pain, stiffness and physical function are

the parameters used for comparison. Both intra-articular injection group and combined physiotherapy modalities group had significant improvement. The IAS group had more rapid pain relief and continue till the end of the study. Slow improvement was achieved in the second group. Our current study suggest that IAS is preferable than IFP&PEF in the treatment of OA knee pain from the practical point of view regarding the cost of the instrument, patient compliance, poverty state of the patients and their needs for early return to their jobs. Availability of portable IFP or PEMF is more practical but under education of our patients & its cost are main obstacles in its way of use.

Introduction

Knee_osteoarthritis is the most common type of arthritis.⁽¹⁾ More than 10 million Americans have knee osteoarthritis⁽²⁾. It is also the most common cause of disability in English people (35 years and over) male 69% , female 70%.⁽³⁾

Deterioration of articular cartilage is the main problem associated with knee osteoarthritis. The condition can be caused by previous knee injury , obesity , problems with subchondral bone (the bone layer underneath cartilage) and problems with subchondral bone (the bone layer underneath cartilage).⁽²⁾

When catabolism exceeds cartilage synthesis ,osteoarthritis develops, collagenolytic enzymes thought to contribute to breakdown of cartilage.⁽⁴⁾

Although the main pathology to start with is degenerative (articular cartilage lesion) but the arthroscopic examination of painful OA reveals synovial inflammatory process⁽⁵⁾

According to ARA (American Rheumatism Association) revised criteria which includes

Knee pain + osteophyte on radiographs and at least one of the followings:

- Patient age older than 50 years
- Morning stiffness lasting 30 minutes or less
- Crepitus on motion.^(6,7)

Inflamed joint (warmth , hot, tender ,red , limited range of motion and effusion) means acute stage and the usual therapy for such condition is general physiotherapy, rest and NSIADs^(8,5).

The purpose of this study is to evaluate the effects of intra-articular injection(IAS) and in the other hand combination of interferential current (IFC) with pulsed electromagnetic field (PEF) physiotherapy modalities in treating painful Knee OA according to the WOMAC (Western Ontario and McMaster Universities) index of osteoarthritis.

Corticosteroid (steroid) injections are used to reduce local joint **inflammation**. Steroids are synthetic drugs which act like the natural hormone cortisol. Intra-articular steroid injections are injected directly into an affected joint. The goal of a local, intraarticular steroid injection is to improve joint function while reducing inflammation.⁽⁹⁾

IFC means stimulation by crossing of 2 electrical medium, independent frequencies that work together that effectively stimulate large impulse fibers⁽¹⁰⁾. These frequencies interfere with transmission of pain messages at the spinal cord level and leads to deeper penetration to the tissue with more comfort and increase circulation⁽¹¹⁾.

PEF displays frequencies at the low end of the electromagnetic spectrum⁽¹²⁾ from 6hz up to 500hz with their rate of change high rates of change⁽¹³⁾ are able to induce significant biological currents in tissues their by enabling them to have greater effects. low frequency fields are nonionizing and athermal (no significant heating of the tissue)⁽¹⁴⁾ the wave forms associated with PEFs can be asymmetric, biphasic, aquasi-rectangular or aquasi-triangular in shape, however most sources of PEFs stimulation produce a sinusoidal.⁽¹²⁾

Material and methods

30 patients from rheumatic outpatient clinic in Diwaniya teaching hospital from October/2007 till may/2008 were randomly selected for this study whom were fit with ARA revised criteria for diagnosis of idiopathic OA of the knee and diagnosed after full history, physical examination and the available radiological and blood investigations.

56% were females

44% were males

BW 91 KG average for females

BW 83 KG average for males

Age all more than 50 years(mean age 57)

The patients are randomly divided into 2 groups (15 for each).

All were taught the aim of the study which include for the first group ; IAS and assessed by WOMAC index of osteoarthritis at first visit and after 1week, 2weeks, 4weeks, 8weeks and after 4months.

For the second group the same timing of assessment but the treatment was combination of IFC & PEF and all of them gave their agreement.

For both groups adjuvant treatment of 7.5mg meloxicam tablet at night and adol@(acetaminophen) 1gram twice daily were given .

General advises for knee education (without kneeling, importance of decrease BW and using of western toilette or available alternative).

The first group was prepared for IAS (80mg methyl prednisolone depot preparation mixed with 2.5ml of 2% lidocaine), under complete aseptic condition, 20mg was injected at the maximum tender site of the medial tibial condyle (most common site of osteophyte formation), 60 mg was injected to the patellofemoral joint using the lateral side approach with repetitive massaging and passive flexion and extension movements.

Arrangement of 10 minutes IFC sessions combined with 30 minutes PEF sessions was applied for the second group, daily for the first week, every other day in the second week, twice weekly for the third week and once weekly for the last week.

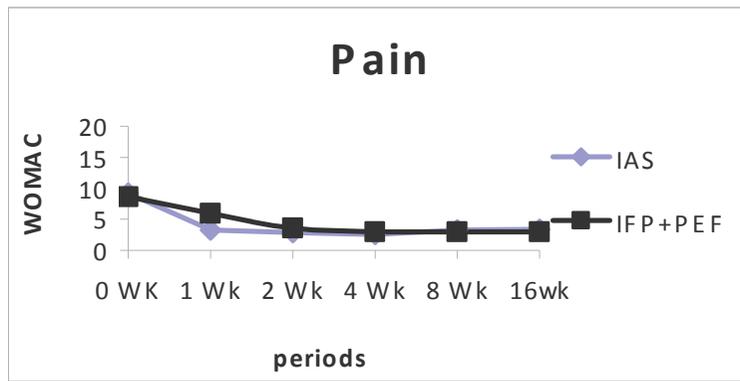


Figure 1: pain assessment

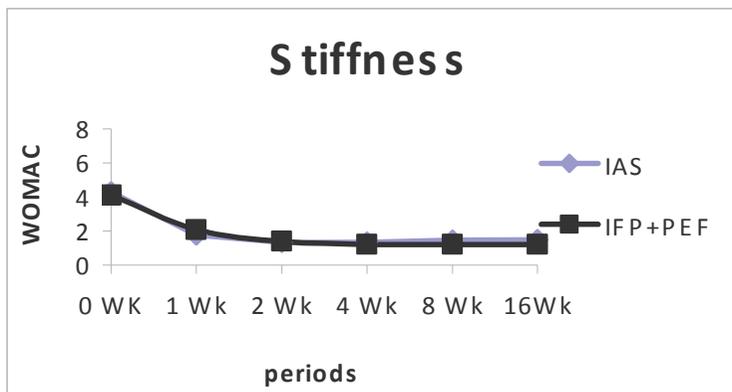


Figure 2: stiffness assessment

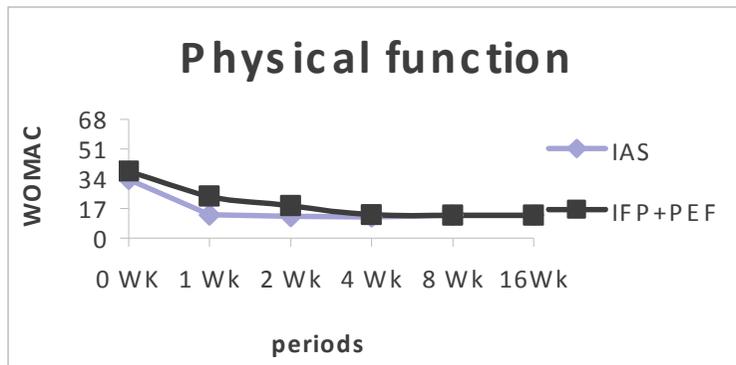


Figure 3: Physical Function assessment.

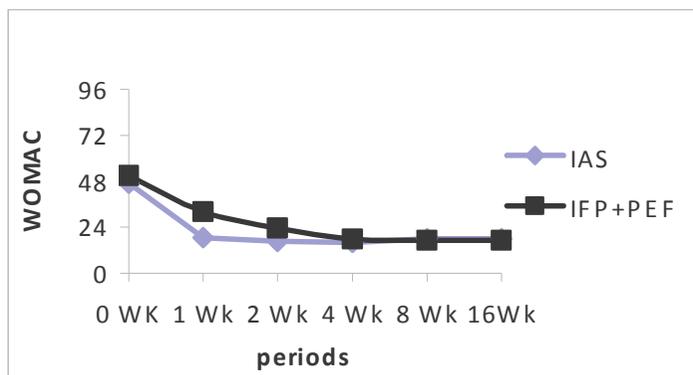


Figure 4: Total WOMAC assessment.

Results

- At the end of the 16th week there was no systemic or local side effects appears after using both types of therapy.
- Pain: significant differences were noted in mean pain score between the two groups and the pain score decrease more rapidly in group of IAS (figure 1). The greatest reduction in pain scores were noted at the first week. In contrast to the other group where the pain decrease gradually but both remain constant between 4 week and 16 week period.
- Stiffness: there was significant improvement in stiffness parameters in both groups (figure 2), continue so in follow up visits till 16th week. In IAS group stiffness scores mild rising from the 4th week till the end of the study.
- Physical function impairment: in the first group (IAS) there was significant rapid decrease in physical function impairment in the 1st week and continue on the same score (figure 3). In the other hand, the

2nd group there was gradual decrease in physical impairment but both remain constant values till the end of study.

- Overall: In the 1st group there was rapid improvement in symptoms and signs of the patient in the 1st week, and stay so till the end of study.(figure4)

In the 2nd group there was gradual improvement but remain constant till the end of the study.

Discussion

Using of either intra-articular steroid(80 mg methyl prednisolone depot preparation) or combination of interferential current stimulation and electromagnetic pulse therapy proved to be significantly reduce the symptoms of painful OA knee in addition to conventional therapy (acetaminophen, meloxicam non steroidal drug with general physical advices) .

IAS reduce the pain by modifying the vascular inflammatory response, inhibit the destructive enzymes, restrict the action of inflammatory cells.

Intra synovial steroid is designed to maximize local effect and minimize the systemic adverse effects⁽¹⁵⁾ as it was cleared in this study (there was no anaphylactic reaction or local systemic reaction). So this explain the rapid relief of OA knee symptoms and its stationary state up to the time of evaluations. This goes with M Godwin ...et al.⁽¹⁶⁾

Interferential current stimulation relieves OA knee pain through its analgesic effect by interference with transition with pain messages at the spinal cord level , its deep tissue penetration stimulate parasympathetic nerve fibers and increase blood flow.⁽¹⁰⁾

Pulsed electromagnetic field stimulation relieves knee OA pain by suppressing the inflammation at the cellular level⁽¹⁷⁾.

Physical treatment by combination IFP & PEF in this study gives better long standing results and relieve with gradual initial response and continue up to 16 weeks of therapy, goes with Thamsborg G., Folrescu A,.. et al 2005⁽¹⁸⁾.

In the other hand, IAS gives rapid relieve of pain, physical function with mild increase in stiffness scores after 4wks till the end of the study.

IFP & PEF disadvantages are costly(only available in the physiotherapy centers), needs high patient compliance and regulations in sessions therapy which is difficult to be followed in our developing countries and the transfer of the patient from his home to the center is also costly and time consuming, while single visit with low cost methyl prednisolone depot and easy injection procedure under sterile condition , without noticeable side effects give more rapid results and

suitable for our undereducated patients those in urgent economical needs of healthy days .

Conclusion and Recommendations

Both IAS use and physical modalities(IFP & PEF) are promising and highly effective in painful OA Knee treatment.

Our current study suggest that IAS is preferable than IFP&PEF in the treatment of OA knee pain from the practical point of view regarding the cost of the instrument, patient compliance , poverty state of the patients and their needs for early return to their jobs.

Availability of portable IFP or PEF is more practical but under education of our patients & its cost are main obstacles in its way of use.

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