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Efficacy of transdermal patches of buprenorphine and diclofenac in osteoarthritis

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Abstract

Background: Osteoarthritis (OA) is the most common chronic degenerative condition of joints especially in ageing population. The present study compared the efficacy of transdermal patches of Buprenorphine and Diclofenac in relation to pain relief.

Materials and methods: 60 patients of Osteoarthritis were divided into 2 groups of 30 each. Group I patients received buprenorphine transdermal patch 10µg-hr per week and group II patients received diclofenac sodium patch 200 mg per day. Numeric rating scale (NRS) and WOMAC index was recorded.

Results: Group I had 16 males and 14 females and group II had 12 males and 18 females. The mean pain score before applying patch was 6.5 and 6.1 in group I and II, after 1 week was 5.4 and 3.2 in group I and II, after 2 weeks was 4.3 and 2.3 and after 3 weeks was 3.5 and 3.1 in group I and II respectively. The mean WOMAC index before applying patch was 58.5 and 59.2 in group I and II, after 1 week was 35.4 and 29.2 in group I and II, after 2 weeks was 27.2 and 19.2 and after 3 weeks was 26.5 and 25.1 in group I and II respectively. The difference was significant ($P < 0.05$).

Conclusion: Both diclofenac and buprenorphine patch is an effective and safe treatment modality for symptomatic OA of the knee.

Keywords: Buprenorphine, diclofenac, osteoarthritis

Introduction

Osteoarthritis (OA) is the most common chronic degenerative condition of joints especially in ageing population. Over the age of 30, up to 6% of adults are symptomatic of knee arthritis and around 3% are symptomatic of hip arthritis. It is a common cause of difficulty in walking and has heavy impact on daily activity and day to day life style. The pain is main symptom that bring the patient to the doctors. Many people with pathological and radiological evidence of OA have no symptoms^[1].

Current practice solutions in osteoarthritis (OA) have come a long way: from dismissing OA as a phenomenon of inevitable degeneration to acknowledging its etiology, prevalence, symptomatology, and limitations on physical function in modern times^[2]. OA continues to be the most common joint disorder in the world, and many patients remain undiagnosed. As a disorder labeled “wear and tear,” the consequences of OA will certainly continue to rise as the population ages and as the percentage of the workforce older than 65 years of age increases^[3]. Not only does symptomatic OA cause chronic pain and diminish quality of life, it can also add a distinct emotional component to the functional disability experienced. Pain and stiffness plague patients with OA. OA-related pain is challenging to treat because it is generated via a multitude of both inflammatory and mechanical nociceptive conduits^[4].

Buprenorphine is a opium alkaloid thebaine and belongs to the 6,14-endo-ethano-tetrahydro-orphine. It is a semi-synthetic, centrally acting opioid. Partial agonist: μ -receptor and antagonist: κ and δ -receptor. Diclofenac sodium is an aryl-acetic acid derivative. It is an analgesic antipyretic-anti-inflammatory drug. It inhibits prostaglandin synthesis and is somewhat COX-2 selective inhibitor^[5]. The present study compared the efficacy of transdermal patches of Buprenorphine and Diclofenac in relation to pain relief.

Materials and Methods

The present study was conducted among 60 patients of Osteoarthritis of both genders. All patients were informed regarding the study and their consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 30 each. Group I patients received buprenorphine transdermal patch 10µg-hr per week and group II patients received diclofenac sodium patch 200 mg per day. A thorough clinical examination was performed. X-ray knee, AP and lateral were performed. Numeric rating scale (NRS) was recorded. WOMAC index was also recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

| Groups | Group I | Group II |
|--------|---------------------------------|-------------------------|
| Drug | Buprenorphine transdermal patch | Diclofenac sodium patch |
| M:F | 16:14 | 12:18 |

Table 1 shows that group I had 16 males and 14 females and group II had 12 males and 18 females.

Table 2: Assessment of pain score in both groups

| Pain score | Group I | Group II | P value |
|--------------|---------|----------|---------|
| Before | 6.5 | 6.1 | 0.15 |
| After 1 week | 5.4 | 3.2 | 0.02 |
| 2 weeks | 4.3 | 2.3 | 0.04 |
| 3 weeks | 3.5 | 3.1 | 0.12 |

Table 2, Figure 1 shows that mean pain score before applying patch was 6.5 and 6.1 in group I and II, after 1 week was 5.4 and 3.2 in group I and II, after 2 weeks was 4.3 and 2.3 and after 3 weeks was 3.5 and 3.1 in group I and II respectively. The difference was significant ($P < 0.05$).

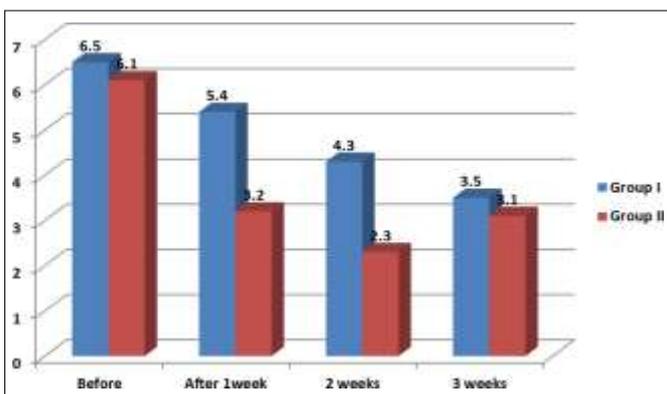


Fig 1: Assessment of pain score in both groups

Table 3: Assessment of WOMAC index in both groups

| Pain score | Group I | Group II | P value |
|--------------|---------|----------|---------|
| Before | 58.5 | 59.2 | 0.12 |
| After 1 week | 35.4 | 29.2 | 0.04 |
| 2 weeks | 27.2 | 19.2 | 0.01 |
| 3 weeks | 26.5 | 25.1 | 0.14 |

Table 3, Figure 1 shows that mean WOMAC index before applying patch was 58.5 and 59.2 in group I and II, after 1 week was 35.4 and 29.2 in group I and II, after 2 weeks was 27.2 and

19.2 and after 3 weeks was 26.5 and 25.1 in group I and II respectively. The difference was significant ($P < 0.05$).

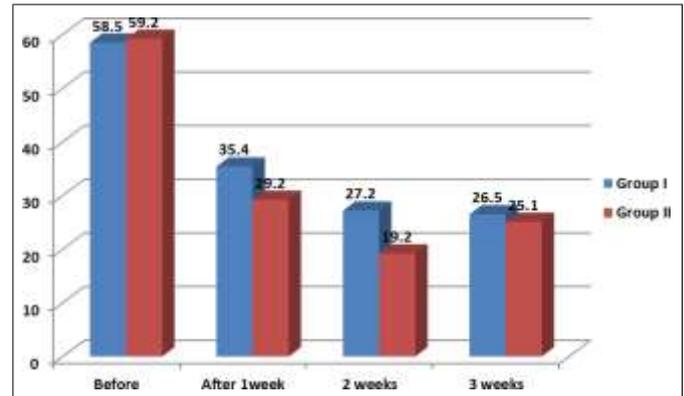


Fig 2: Assessment of WOMAC index in both groups

Discussion

According to recent American College of Rheumatology guidelines, non-pharmacologic therapies are mandatory in all patients, even if pharmaceuticals are prescribed. Educating patients and providing recommendations for realistic lifestyle modifications are also important in the management of OA. It is our opinion that the treatment of osteoarthritis starts with lifestyle changes before prescribing medication and non-pharmacological therapies [6]. Weight loss is important in reducing symptoms as well as for palliating the progression of OA in weight-bearing joints such as the knee and hip. Modest weight reduction using proper diet and exercise routines should be stressed in overweight patients. Periodic monitoring for compliance is important, and referrals to weight loss programs may be used to improve compliance [7]. Sleep hygiene, regular exercise, smoking cessation, and moderate consumption of alcohol are all recommended for general health. These lifestyle modifications may sound like common sense; however, they may be more challenging to patients than simply taking a pill and going to see a therapist [8]. The present study compared the efficacy of transdermal patches of Buprenorphine and Diclofenac in relation to pain relief.

In present study, group I had 16 males and 14 females and group II had 12 males and 18 females. We found that mean pain score before applying patch was 6.5 and 6.1 in group I and II, after 1 week was 5.4 and 3.2 in group I and II, after 2 weeks was 4.3 and 2.3 and after 3 weeks was 3.5 and 3.1 in group I and II respectively. Jaiswal *et al.* [9] in their study 50 patients of either sex and age were randomly divided in 2 groups (B and D) of 25 each. Group B: Buprenorphine patch, received per week 10µg-hr Group D: Diclofenac sodium patch, received per day 200 mg Diclofenac. Results obtained were statically comparable in both groups B and group D regarding Pain score (NRS), WOMAC index, Stiffness subscale score of WOMAC. Patient satisfaction was statistically comparable in both groups. Results were clinically better in group D as compare to group B. The side effects noted were minimal in both groups B and group D and easily manageable statically comparable in both groups B and group D.

We found that mean WOMAC index before applying patch was 58.5 and 59.2 in group I and II, after 1 week was 35.4 and 29.2 in group I and II, after 2 weeks was 27.2 and 19.2 and after 3 weeks was 26.5 and 25.1 in group I and II respectively. Physical modalities are noninvasive, time-honored approaches to pain and should be considered for OA. The most common are heating and cooling modalities [10]. Heating can be superficial (heat

packs or compresses) or deep (ultrasound, diathermy, microwave, laser) and is delivered via conduction (conventional heat packs), convection (whirlpool, baths, paraffin), or convection (radiant heat). Therapeutic cold has an anti-inflammatory and primary analgesic effect and is excellent for reducing acute inflammation and slowing down the speed of nerve conduction^[11]. Heat relieves pain via a relaxation effect of the tissues as it is thought to increase collagenase activity. However, heat can cause vasodilation and may worsen inflammation. Limitations to the use of heat and cold modalities include neuropathic sensory loss, metallic foreign bodies or implants, certain surgical procedures, and temperature-sensitive hematologic or rheumatologic conditions. Transcutaneous electrical nerve stimulation is thought to block pain signals at the dorsal root neurons via the gate theory^[12].

Conclusion

Both diclofenac and buprenorphine patch is an effective and safe treatment modality for symptomatic OA of the knee.

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