

The effect of epidural morphine sponge in postoperative pain control after Microdiscectomy

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ABSTRACT

Opiates such as morphine are one of the most effective classes of medication prescribed to treat both acute and chronic pain. They act to suppress pain through mu-receptor activation on primary afferent nerve fibers, dorsal horn neurons and supraspinal pain center neurons. When morphine is administered epidurally, it diffuses to the cord substance, producing analgesia [1]. The aim of this study was to check the efficacy of this method for controlling postoperative lumbar pain after microdiscectomy.

In a randomized clinical trial, numbers of 100 patients were included into two equal groups due to low back radicular pain and underwent microdiscectomy. In study group, an absorbable gelatin sponge (Gelfoam) is contoured to the epidural space, placed in methylprednisolone acetate (40-80 mg), and then injected with 2 mg/ml morphine and control group received an absorbable gelatin, placed in methylprednisolone acetate (40-80 mg) and were injected with normal saline (5mL) as a placebo. The main outcome to be compared between trial and placebo groups were: Patient comfort rate in recovery room and ward, amount of analgesics used, postoperative ambulation time, post operative hospitalization days. The restlessness and agitation during recovery in study group was lower than control group. Mean systolic blood pressure increment was lower in morphine group. Only 6% of patients in study group compared to 98% in placebo group had either moderate or severe pain six hours after operation. Mean morphine dose used for study group was 10.75 mg compared to 21.4 mg among control group patients ($P < 0.0001$). Mean ambulation time was 2 days among study group patients compared to 2.6 days in control group. Mean hospitalization length was 4.7 and 7 days in study and control group respectively. By means of the technique assigned to the patient (an epidural morphine sponge) during Lumbar microdiscectomy the results were: Better controlled postoperative pain, early ambulation of patients and decreased hospitalization length.

Key words: Morphine; Epidural; Microdiscectomy; Postoperative pain

INTRODUCTION

Pain is the unpleasant physical and emotional experience [1]. Nowadays it is the most clinical complaint of most patients. About 8% of American population suffer from acute or postoperative pain [2]. Operative tissue damage generated an acute nociceptive pain in reaction to focal peripheral nerve or tissue injuries [1]. Well postoperative pain management can lead to quality of life; reduce length of hospitalization and satisfaction of patients [3; 4].

Severe postoperative pain can be occurring after major spinal fusion surgery, this pain persists for at least 3 days [5-11].

Low back and radicular pain are frequently caused by disc herniation, this pains are the most common presentations in clinical practice [12;13]. Lumbar discectomy for herniated nucleus pulposus is one of the most common operations performed on the spine [14;15]. The goal of this treatment is to minimizing patients pain, but discectomy is painful for many patients [15]. Recently the clinical and basic knowledge of pain transmission and modulation has great

progression, but most postoperative pains are still treated inadequately [16-20]. Postoperative pain delays mobilization and physical therapy, increases the length of hospitalization and alters the patient opinion on recovery [15;20]. Poor pain control has been directly associated with increased complications, such as deep venous thrombosis, pulmonary embolism, infection, myocardial ischemia and postoperative chronic pain [16]. Some clinicians use postoperative analgesics, but others use alternative methods, such as intraoperative local anesthetics and/or corticosteroids [20; 21].

Opioids intermittent administration or continuous infusion through an epidural catheter is a common method for pain relief after surgery [22].

Typically injection and catheterization is performed by special needles in the epidural space that have complications such as perforation of dura, bleeding and severe headaches, infections and abscesses in this space. But as regards in this method, the epidural space is under direct vision during discectomy and dura set aside to achieve the disc, so there is no possibility of above complications in this method. We also in this study according to the safety of this procedure evaluated low dose morphine (2 mg) as a long-term and acceptable analgesia, prevent postoperative pain complications and check the efficacy of maintained method for analgesia in postoperative lumbar microdiscectomy.

MATERIALS AND METHODS

One hundred patients in the age range 25 - 65 years, ASA class I - II, which were referred to Tabriz Imam Reza hospital and scheduled for lumbar microdiscectomy surgery in one level enrolled in this randomized, double-blind, clinical trial with placebo control. It should be noted that the protocol of the study was approved in Tabriz Medical University Research Ethics Committee and an informed consent was obtained from each patient.

Exclusion criteria were under age 25 and over 65 year, ASA class III or IV, drug addiction, treatment with opioids or CYP1A2 - inhibitors such as fluvoxamine, previous chronic pain, hypochondriasis and drug sensitivity.

100 patients who were selected placed in two groups (each group with 50 patients) randomly. In intervention group (I) an absorbable gelatin sponge (Gelfoam) is contoured to the epidural space, placed in methylprednisolone acetate (40-80 mg), and then injected with 2 mg/ml morphine, and comparison group (II) received an absorbable gelatin, placed in methylprednisolone acetate (40-80 mg) and were injected with 5 ml of normal saline on operation site. Surgeon, anesthetist, nurses and patients had no information of solution was used into the epidural space (double-blind study).

Before induction of anesthesia pain score was assessed by Visual analogue scale (VAS) then All patients were premedicated by Fentanyl 2 g/kg, Midazolam 0.04 mg/kg and underwent general anesthesia before surgery with the routine method of anesthesia induction by Nesdonal 4 mg/kg, Atracurium 0.5 mg/kg). Maintenance was as an inhalation with Isoflurane and combination of N₂O + O₂ with equal ratio.

During operation before closure of the fascia and subcutaneous tissues, under direct vision, for group I and for group II absorbable gelatin sponge (Gelfoam) placed in epidural space and nerve roots of operation site. Then fascia and subcutaneous tissue were closed and the skin was sutured. At the end of surgery patients transferred to the recovery after reversing muscle relaxant and tracheal extubation, in the recovery patients were investigated in terms of vital signs and agitation rate. Patients transferred to the ward after complete awakening. Back pain and radicular pain intensity separately were assessed at 6, 12, 18 and 24 hours after surgery. Assessment of pain was performed by VAS scale as mentioned above with categorical methods. (0-3=mild, 4-5= moderate, 6-8= sever, 9-10= very sever).

In the ward when patients had mild or moderate pain, Diclofenac 100 suppository if needed as PRN (maximum one suppository every 6 hours) and 5 mg IM Morphine used for severe pain as PRN. Information about the patient's pain and total dose of Diclofenac and morphin which used as postoperative analgesic was recorded. The data were analyzed by SPSS™ 17 software.

Qualitative variables evaluated by using Chi-square tests, or Fishers exact test depending on circumstances

RESULTS

There was no significant difference between two groups in terms of age and sex. Increase in postoperative systolic blood pressure compare with preoperative, showed a significant difference between two groups ($P < 0.05$), this amount in group I on average was 9.7 mmHg and 17.6 mmHg in the group II.

Restlessness and agitation in group I was 40% and in group II was 84% that showed a significant difference between two groups ($P < 0.0001$). The frequency of cases with moderate and severe pain (pain severity level based on categorical assessment) in preoperative period had no significant difference between two groups (98% in group I and 100% in group II). The frequency of cases with moderate and severe pain in postoperative period in group II (control) was significantly higher than group I (case) (Fig 1).

The average amount of analgesic medication delivered by patients in the ward in group I approximately was 10.75 mg and 21.4 mg per patient in group II.

Patient's comfortable walking time in the ward (after surgery) in group I on average was 2 days and in group II was 2.6 days ($P < 0.0001$).

Patient's postoperative hospitalization days in group I was 4.7 days and in group II was 6 days that showed a significant difference between two groups ($P < 0.0001$).

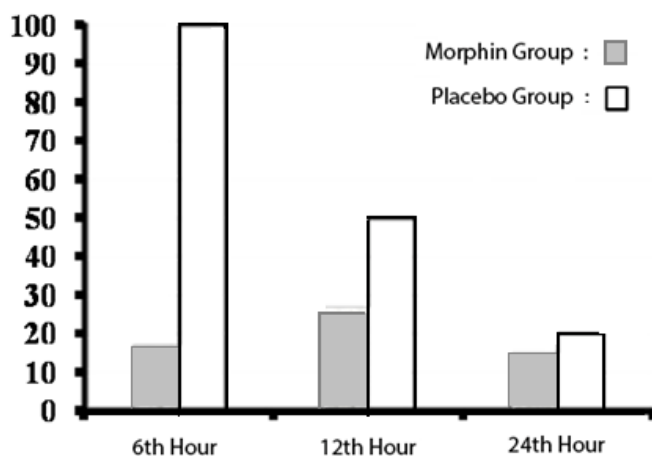


Figure 1. percentage of moderate and severe pain in post-operation patients

DISCUSSION

Administration of 2-10mg epidural morphine prior to surgery leading to 12 to 24 hours pain relief [23]. A single dose of epidural morphine was enough to pain relief and could reduce postoperative morbidity. Respiratory depression as a postoperative complication is dose dependant [3]. In our study, potent postoperative analgesia observed without respiratory depression, nausea, urinary retention and other adverse effect of morphine by injecting of single low dose of epidural morphine. Inadequate post operative pain management can lead to increase of catecholamine release and hemodynamic changes such as hypertension and tachycardia which can be harmful for patients with coronary heart disease, increase morbidity and length of hospital stay [3; 22]. Hypertension, agitation and restless rate seem to vary significantly between two study groups which denote well control of postoperative pain with epidural morphine injection. There was a downward trend in pain in both groups after surgery that appear most marked within first 18 hours but not so thereafter. Deference with respect to length of hospital stay and duration of being bed rest has significant treatment effect of epidural morphine. Morphine consumption rate was seen to vary between groups, and in group I was lower than group II. Decreasing risk of myocardial ischemia, hypertension and tachycardia by epidural morphine injection was suggested by Yeager (et al) [23]. In 2000 Gerhard (et al) noted that epidural morphine in comparing with intravenous morphine was effective in controlling of post operative pain [24]. Selma Sophie (et al) had demonstrated the analgesic efficacy of Bupernorphine after lumbar disc surgery [25].

Also in 2006 Schenk (et al), have evaluated efficacy of epidural analgesia versus intravenous analgesia, and reported the efficacy of epidural analgesia in comparing intravenous analgesia, [11], Farmery (et al), reported that low-dose epidural clonidine significantly reduced the demand for morphine and reduced postoperative nausea with few side effects [26]. In 2007

Lotfinia et al evaluated Intraoperative use of epidural methylprednisolone or bupivacaine for postsurgical lumbar discectomy pain relief and demonstrated that use of epidural methylprednisolone or bupivacaine have no beneficial efficacy in pain relief with in 96 hour after surgery, maybe their conclusion was due to delayed release of methylprednisolone or non-inflammatory mechanism of acute pain after surgery [20]. Other studies have also evaluated the efficacy of epidural morphine in spinal surgery, in 1992 Walkakul et al, reported the efficacy of epidural morphine in pain controlling after lumbar discectomy [27].

In a meta analysis which was done by Meylan in 2006, beneficial and harmful effects of epidural morphine without local anesthesia in 645 patients who underwent surgery, demonstrated the efficacy of morphine in controlling pain within 24 hours [28].

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CONCLUSION

By means of the technique assigned to the patient (an epidural morphine sponge) during Lumbar microdiscectomy the results were better control of postoperative pain, early ambulation of patients and decreased hospitalization length.

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