

## Effect of low-dose intravenous dexamethasone on post-lumbar discectomy pain: Randomized and Double blind study

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### ABSTRACT

The Pain is the most common complaint in various diseases. Postoperative pain is common complication and spatially in elderly patient because of exacerbation of heard and vessel was impotents. The aim of this study was evaluation of the effect of low-dose IV dexamethasone on postoperative pain in patients with lumbar discectomy. In a clinical trial that studied in neurosurgery wards of Shohada and Imam Reza hospitals affiliated to the Tabriz University of Medical Sciences on patients underwent lumbar discectomy, the effect of low-dose IV dexamethasone on postoperative pain was evaluated. 80 patients divided in 2 equal groups, we used IV morphine (present routine treatment) in group A and IV morphine in addition to 8mg IV dexamethasone in group B, for reducing post lumbar discectomy pain. 21 patients in group A, & 22 in group B were male and 19 patients in group A & and 18 in group B were female (P=0.823). Mean age of patients in groups A and B was 39.32 and 39.22 years, respectively (P=0.945). Mean of pain score (VAS) at 6 hours post-operation in group A and B was 6.97 and 6.75, respectively (P=0.065). VAS at 12, 18 or 24 hours post-operation in both groups didn't differ significantly, too (P>0.05). We didn't observe any significant reduction in post lumbar discectomy pain after adding 8 mg dexamethasone into morphine. Regarding other studies, it seems that higher doses of dexamethasone should be used to achieve a significant pain reduction.

**Keywords:** Lumbar Discectomy; Discectomy; Dexamethasone; Postoperative Pain; Pain measurement; VAS

### INTRODUCTION

The Pain is the most common complaint in various diseases, and is the main complaint in half of patients visited by physicians, although, its nature, location, and reason is different [1]. Studies have shown that 30-40% patients feel moderate to severe pain during post surgical period. Bother or suffering due to sensitization of neural terminals is derived of multifactorial event that physiologic, cultural, psychological, and social factors affect on it [2]. Many efforts have been done for control, reducing, or removing of pain so far times. Postoperative pain is common complication and spatially in elderly patients because of exacerbation of heard and vessels, was impotents. Otherwise, not to repress of postoperative pain adequately, rolls importantly in operative dissatisfaction of patients. It's important in patients with low back pain especially hence that pain cause in these

patients is multifactorial. Unbowed pain resulted in reviving psychological factors and dissatisfaction of patients from quality of surgery. Among different causes of low back pain, inter-vertebrae disk lesions are one of the important and dangerous causes [3].

Present treatment methods for relieving pain are established on basis of treatment with analgesic, narcotic and NSAID drugs. If the patient is undergone regional anesthesia, prescription of a long-term analgesic is usually adequate for 24 hours. If the patient hasn't got long-term analgesic or isn't undergone general anesthesia, we may consider IV/IM narcotics. After tolerance of fluids, we may prescribe narcotics, if needed.

Relieving postoperative pain and patient's safety are of the goals of postoperative care. We use different methods to reduce narcotics

consumption & metabolic response to surgical damage, and improving breathing state [4].

Kehlet et al showed in Denmark that we may use epidural opioid, NSAIDs, corticosteroids, and oral/infusion opioid for reducing of post-discectomy pain [5]. Present trend in neurosurgery department of Tabriz University of medical sciences for post-discectomy pain relief is based on prescription narcotics (as pethidine, morphine) at regular times (for example, every 6-8 hrs) ordered routinely after a discectomy. One of the defects of this method is that we may overuse narcotics in some patients and use less than necessary dose in others. Moreover, implementation of such researches results in reducing of post-operative narcotics prescribed, if effect of dexamethasone on post lumbar discectomy pain is established.

## MATERIAL AND METHODS

In a clinical trial research studied in neurosurgery wards of Shohada and Imam Reza hospitals of Tabriz University of medical sciences during June 2008 - March 2009 on patients underwent lumbar discectomy; the effect of dexamethasone on postoperative pain was evaluated. 80 patients divided in 2 equal groups, we used IV morphine (present routine treatment) in group A and IV morphine in addition to 8mg IV dexamethasone in group B, for reducing post lumbar discectomy pain. In patients nominated for lumbar discectomy and without contraindication for dexamethasone (for example: diabetes mellitus) we described them the main goals of study and taught how to scale pain scale using VAS (Visual Analogue Scale);

Then consents was taken and explained them that they could exclude the study anytime they want. The patients that couldn't read the consents themselves, or not capable for it, excluded the study. Addicted (drug or substance abused) patients didn't include the study. The patients divided randomly in 2 groups, A: morphine, and B: morphine + dexamethasone. The patients or researchers weren't aware of drugs or group (double blind). Anesthesia protocol was done for all patients. After surgery, the patient transferred to PACU; Primary dose of morphine as 0.1 mg/kg injected for all patients in PACU, and in group B, 8 mg dexamethasone infused intravenously then the patient transferred to ward. An assistant of anesthesia (that was blind to used drugs) evaluated post-operative pain scale using VAS, at 6, 12, 18 and 24 hours of post-surgery period. In the same period, in cases with severe pain, we prescribed morphine based in patient's demanding; and its dose was registered. Collected data were entered in SPSS 13 software. Matching of 2 groups for age and gender was done. For assessment of relationship between qualitative variations was used Chi-square test, and for comparing of means t-test; Significant level (P-value) was considered <5%.

## RESULTS

In the research, 80 patients underwent discectomy were studied in two equal groups. 43 patients (21 persons in group A and 22 in group B) were male and 39 patients (19 persons in group A and 18 in group B) were female.

**Table 1.** Post-operative pain scale in 2 groups (VAS)

Assessment time of VAS	Group		P
	morphine	Morphine + Dexamethasone	
6 hrs post operation	0.61 ± 6.97	0.43 ± 6.75	0.065
12 hrs post operation	0.48 ± 8.65	0.50 ± 8.47	0.118
18 hrs post operation	0.51 ± 6.20	0.26 ± 6.07	0.178
24 hrs post operation	0.54 ± 5.37	0.56 ± 5.30	0.545

**Table 2.** Compare of post-operative pain scale in 2 sex (VAS)

Assessment time of VAS	Gender		P
	Male	Female	
6 hrs post operation	0.56 ± 6.90	0.51 ± 6.81	0.435
12 hrs post operation	0.50 ± 8.55	0.50 ± 8.56	0.934
18 hrs post operation	0.36 ± 6.09	0.46 ± 6.18	0.302
24 hrs post operation	0.53 ± 5.37	0.57 ± 5.29	0.547

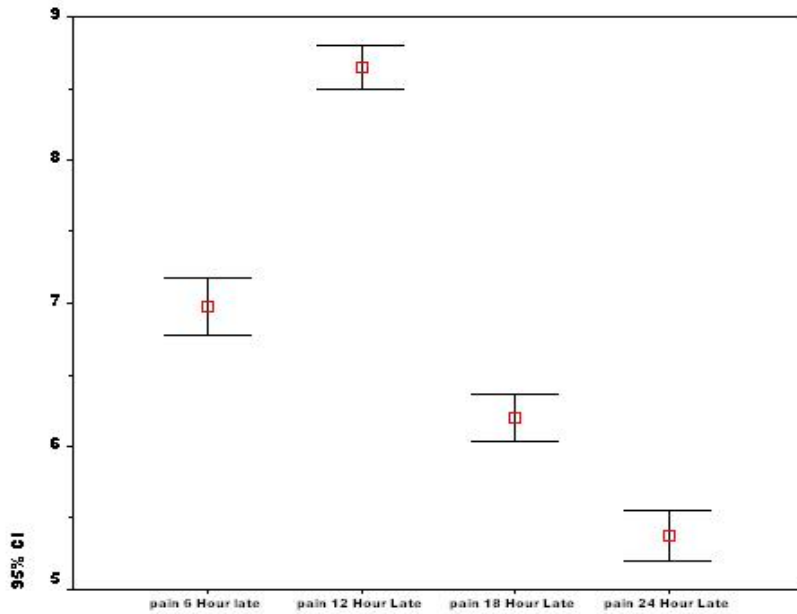


Figure 1. The range of post-operative pain scale (VAS) among patients of group A (P<0.001)

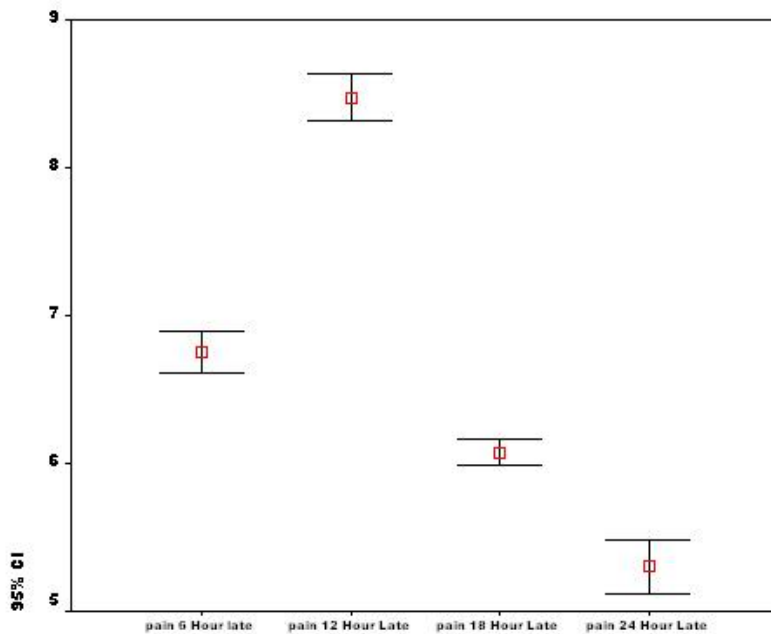


Figure 2. The range of post-operative pain scale (VAS) among patients of group B (P<0.001)

There wasn't significant difference sexually between 2 groups (p=0.82). Mean of age for men was 39.95 +-5.9 and for women 38.48 +- 7.02 yrs; this difference wasn't Significant (p=0.31). Average of age in patients got only morphine (group A) was 39.32 +- 6.98 and in patients got morphine + dexamethasone (group B) 39.22 +- 5.95 yrs; therefore two groups were matched (P=0.95).

Although pain severity (VAS score) in dexamethasone group at 6,12,18, and 24 hrs

post-operation was less versus control group, but they weren't significant; therefore we couldn't prove its effect with this dose & form (Table 1).

There wasn't any significant relation between sex and VAS, 6, 12, 18 or 24 hrs post operation (Table 2).

The pain scale (VAS) among patients of group A at 6, 12, 18 and 24 hrs post-operation were different significant (Fig 1); And in group B were significant, too (Fig 2).

## DISCUSSION

Previous studies done about the effect of corticosteroids on pain relief in post lumbar disc surgeries contain different drugs in various forms (especially epidural; or intravenous). We used dexamethasone 8 mg intravenously.

Dikmen et al at 2005 showed that epidural dexamethasone, given postoperatively, may be an alternative for postoperative pain relief after lumbar laminectomy [6].

In a study done in South Korea, was found that epidural administration of dexamethasone decreased the degree of postoperative pain after simple lumbar discectomy [7].

Tavakol et al found that instillation of morphine and dexamethasone in epidural space after discectomy decreases patient's postoperative pain which result in reduction in narcotic usage. [8].

Foulkos et al in USA concluded that long-life dexamethasone reduces bed-time, post-operation pain, and used dose of narcotic analgesics in patients underwent discectomy [9].

Davis et al understood that use of epidural methylprednisolone is effective in post lumbar discectomy pain [10].

But, Laryne et al found that epidural methylprednisolone post-microdiscectomy doesn't affect significantly on post-operation pain versus control group [11].

King et al concluded that the use of an anti-inflammatory steroid during and after operation significantly reduces the immediate postoperative pain after lumbar discectomy and may be useful in the postoperative management of other surgical procedures [12].

Bonnet et al aimed that simultaneity use of corticosteroids with NSAIDs increased the effect of morphine, and then reduced post discectomy pain [13].

In another study done by Glasser et al, the results indicate that the combination of long-acting anesthetic agents and corticosteroids can reduce postoperative discomfort and subsequently the length of postoperative hospital stay; but doesn't affect on post-operation complications and functions [14].

Salerno et al found that the use of corticosteroids in multimodal analgesia protocols to contribute to the postoperative recovery of the patient by minimizing opioid doses and side effects. However, the optimal

mode, dose, and timing of administration remain unclear [15].

Karst et al in Germany at 2003 did a study that administrated celecoxib during operation and fourteen patients received 20 to 80 mg dexamethasone intravenously during surgery (mean, 40 mg) because of visible signs of compression of the affected nerve root. They understood that celecoxib has no effect on postoperative pain scores and PCA piritramide n. The intraoperative use of 20 to 80 mg dexamethasone is able to significantly decrease postoperative piritramide consumption and pain scores on the first day after surgery [16].

In a research made by Aminmansour et al, patients were randomly assigned to 3 groups. After the skin incision, group 1 received 40 mg, group 2 received 80 mg IV dexamethasone, and group 3 received placebo. Postoperative LBP was decreased in all groups equally. Based on the VAS, mean radicular pain was significantly decreased 4.26 points in group 1, 4.15 points in group 2 versus 2.73 points in group 3 ( $P = 0.006$ ). Mean total morphine used was also significantly lower in group 1 versus group 3 (5.26 vs. 9 mg  $P = 0.012$ ). Intraoperative IV injection of 40 mg dexamethasone could effectively reduce postoperative radicular leg pain and narcotics usage in patients with single-level herniated lumbar disc. Therefore it seems that 40 mg of dexamethasone was suitable dose versus 80 mg [17].

In a meta-analysis surveyed by De Oliveive et al, effects of dexamethasone dose were evaluated by pooling studies into three dosage groups: low (less than 0.1 mg/kg), intermediate (0.11–0.2 mg/kg) and high ( $\geq 0.21$  mg/kg). The mean combined effects favored dexamethasone over placebo for pain. Opioid consumption was decreased to a similar extent with moderate and high dexamethasone, but not decreased with low-dose dexamethasone. No increase in analgesic effectiveness or reduction in opioid use could be demonstrated between the high- and intermediate-dose dexamethasone. Preoperative administration of dexamethasone appears to produce a more consistent analgesic effect compared with intraoperative administration. Dexamethasone at doses more than 0.1 mg/kg is an effective adjunct in multimodal strategies to reduce postoperative pain and opioid consumption after surgery [18].

## CONCLUSION

In summary, regarding these results, it seems the main reason for maladjustment of our study with other researches is location (epidural or IV or others) and time of administration, and dose of dexamethasone. Epidural dexamethasone even with dose of 8 mg is effective in post discectomy pain. We didn't find any significant result about affect of administration 8 mg IV

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dexamethasone intraoperation; thus in IV administration, we might use 20-40 mg dexamethasone versus 8 mg. Higher doses aren't more effective in pain relief, and may increase side-effects.

## ACKNOWLEDGEMENT

This article is resulted from thesis of Dr. Amirhossein Haghiri.

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