

# Comparison of Epidural Irrigation with 3 Drug Cocktail and 2 Drug Cocktail for Postoperative Analgesia in Patients Undergoing Lumbar Discectomy Surgery: A Prospective Single Blind Randomised Controlled Study

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**Abstract:** Purpose: Comparison of Epidural irrigation with Bupivacaine, Triamcinolone and Buprenorphine in one group with Triamcinolone and Buprenorphine in one group for postoperative analgesia in patients undergoing Lumbar Discectomy Surgery. Methods: A prospective single blind randomised controlled study for 60 ASA I and II adult patients scheduled for elective herniated lumbar discectomy under general anesthesia. All patients involved in the study were diagnosed to have Intervertebral lumbar disc prolapse with neural compression. Pain scores with the visual analogue scale, time required for demand of first parenteral analgesic and side effects were assessed during the postoperative period. The epidural space was applied topically over the nerve root prior to closure with 1 ml of 0.25% Bupivacaine, 40 mg Triamcinolone, 300mcg Buprenorphine (3 drug cocktail) in group I (n = 30) and 40 mg of Triamcinolone & 300 mcg of Buprenorphine (2 drug cocktail) in group II (n = 30). A blinded investigator assessed the post-operative pain using a 0-10 point Visual Analogue Scale (0-no pain, 10-unbearable pain). Significant pain was indicated by VAS > 5 and used as a cut off point for rescue analgesia with Tramadol 50 mg IV. Both the groups were compared for rescue analgesia - time from wound infiltration to time of administration of first dose of Tramadol and total consumption of Tramadol in 24hrs. Results: Mean VAS scores were similar in both group I as compared to group II. Patients treated with infiltration of Epidural space with Triamcinolone and Buprenorphine had similar effect to epidural infiltration with Bupivacaine, Triamcinolone and Buprenorphine in control of pain at 24 hours post-surgery. However the pain control immediately post surgery upto 12 hrs was much significant in patients who received cocktail of 3 drugs. Patient requiring rescue analgesia was significantly higher in those who received 2 drug cocktail. Conclusion: Epidural Irrigation with Buprenorphine-Triamcinolone and Bupivacaine-Triamcinolone-Buprenorphine provided similar pain relief at 24hrs post-surgery. Pain control immediately post surgery upto 12 hrs was much significant in patients who received cocktail of 3 drugs. Both of the combination of which can effectively control the post-operative pain in patients undergoing lumbar discectomy and minimise the use of IV opioids and thus their systemic side effects.

**Keywords:** Epidural Irrigation, Cocktail, Buprenorphine, Triamcinolone, Bupivacaine, Lumbar Discectomy.

## 1. Introduction

Lumbar Discectomy is one of the most common orthopaedic surgeries performed. Management of pain in the post operative period will ensure early rehabilitation and is a daunting task for the pain management team. Epidural Infusion, IV Infusion, IM and IV administration are the different modalities how the pain alleviating drugs are administered to patients in various combination to achieve pain free or minimal bearable pain post surgery.

Grabow in 1982 described the epidural administration of opioids after spinal surgery. Within 15 to 60 minutes of administration, analgesic effect of epidural opioids is noted, and the effect lasts for 16 to 24 hours. However the pain recurs. To overcome this, inserting epidural catheters intra operatively was adopted and found to be effective as it prolonged the analgesic effect. Epidural hematoma and

infections are rare but serious complication associated with indwelling epidural catheters and it has restrained some doctors from advocating this method.

Post operatively pain results from sensitization of afferent fibres at surgical site and blocking this sensitization through a local anaesthetic infiltration by the surgeon is a promising modality of alleviating pain after the surgery as shown by a study of Schenk MR [4]. This technique is low cost, safe and simple. It has been proved to be effective in pain management and early rehabilitation in Total Knee Arthroplasty surgeries [3]. We found this newer modality of local infiltration of analgesics at surgical site to be very effective in our arthroplasty surgeries and adopted the same technique in our lumbar spine surgeries where we irrigated the epidural space with analgesics. Bupivacaine (local analgesic) and triamcinolone (corticosteroids) are most widely used for management of post operative pain by

irrigating them over epidural space. Buprenorphine an opioid derivative is very safe and effective analgesic with minimal systemic side effects.

## 2. Materials and Methods:

Sixty ASA I and II adult patients scheduled for elective herniated lumbar discectomy under general anesthesia were enrolled in a randomized prospective study after written informed consent.

The patients included were belonging to the age group of 18 yrs to 50 yrs, undergoing one level lumbar discectomy and this one being their first major surgery. Patients who had disc bulge at two levels or spondylolisthesis, spondylodiscitis, those with diabetes type 2, psychiatric illness or those allergic to any of the drugs we administered were excluded from the study. All patients involved in the study were diagnosed to have intervertebral lumbar disc prolapse with neural compression. Magnetic Resonance Imaging was used for diagnosis and was correlated with clinical findings. They all were treated conservatively initially when it failed (>3months), were considered for surgical management and enrolled into the study.

All surgeries were performed by single surgeon, procedure were carried out from September 2013 to August 2015. Standard pre-, intra- and post-operative management was adopted for all patients. Patients were prone positioned. Using image intensifier the surgical level was identified and the exposure was obtained through standard microdiscectomy approach. The nerve root was identified and protected and the prolapsed disc was excised. Following checklist was followed to ensure adequate decompression of nerve root before wound closure –

- i) Confirmed no dural pressure from disc or annulus or flavum
- ii) Exiting and traversing nerve root foramina were checked with ball tip probe
- iii) Adequate lateral recess decompression was noted

Pain scores with the visual analogue scale, time required for demand of first parenteral analgesic and side effects were assessed during the postoperative period.

Based on the randomisation, the epidural space was irrigated with 1 ml of 0.25% Bupivacaine, 40 mg Triamcinolone, 300mcg Buprenorphine (3 drug cocktail) in group I (n = 30), 40 mg of Triamcinolone & 300 mcg of Buprenorphine (2 drug cocktail) in group II (n = 30) applied topically over the nerve root prior to closure. Wound closure was performed in

layers with no drain. All patients were given Paracetamol 1g IV at 8hr interval in the post operative period. A blinded investigator assessed the post operative pain using a 0-10 point Visual Analogue Scale (0-no pain, 10-unbearable pain). Significant pain was indicated by VAS > 5 and used as a cut off point for rescue analgesia with Tramadol 50 mg IV. Both the groups were compared for rescue analgesia - time from wound infiltration to time of administration of first dose of Tramadol and total consumption of Tramadol in 24hrs. Signs of opioid side effects like drowsiness, nausea, vomiting, and pruritus were noted.

## 3. Results

Both groups in our study were comparable with respect to age, weight, Male to Female ratio, and duration of surgery.

Mean VAS scores were similar in both group I as compared to group II [FIGURE 1]. In group I (3 drug cocktail) - 30% patients required analgesia within first 4hrs, 54% in 4-8hrs, 16% in > 8hrs. In group II (2 drug cocktail) - 50% patients required rescue analgesic within 4 hrs, 30% in next 4hrs, by 8 hrs every patient were administered rescue analgesia. Addition of Bupivacaine enhanced the effect of analgesia in group I and the total dose of rescue analgesic used was significantly lower in patients of group I [FIGURE 2] [TABLE 2,3]. However the pain control was similar in both the groups at 24hr [FIGURE 1]. Opioid related side effects like nausea, vomiting, pruritus, and drowsiness not noted in any of the patients.

Mann Whitney U and Wilcoxon w tests [TABLE 4] were used to compare the Statistical Results. The value of p <0.05 suggested the results were significant.

**Table 1**

Gender			
	Male	Female	Total
Three Drug	19	11	30
	63.3%	36.7%	100.0%
Two Drug	21	9	30
	70.0%	30.0%	100.0%
	40	20	60
	66.7%	33.3%	100.0%

**Table 2: Group-I: Three Drug**

	Time_1st_dose	Time_2nd_Dose	Hr_4	Hr_8	Hr_16	Hr_24
Valid	30	30	30	30	30	30
Missing	0	0	0	0	0	0
25	4.00	16.00	3.00	2.00	2.00	1.00
50	6.00	18.00	4.00	3.00	2.00	1.00
75	8.00	20.00	5.00	3.00	3.00	2.00

**Table 3: Group-II: Two Drug**

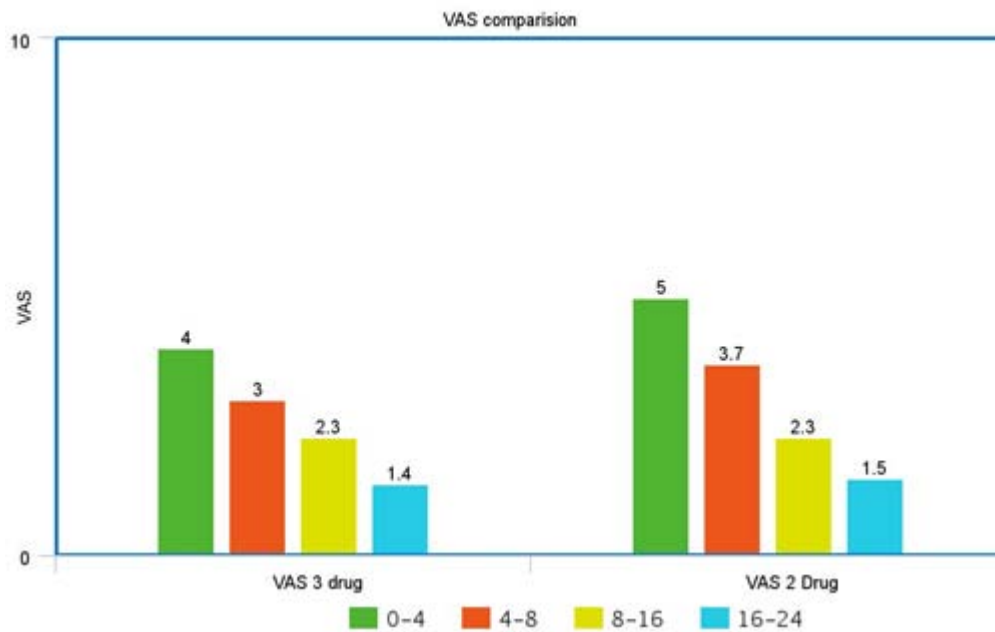
	Time_1st_dose	Time_2nd_Dose	Hr_4	Hr_8	Hr_16	Hr_24
Valid	30	30	30	30	30	30
Missing	0	0	0	0	0	0
25	2.00	10.00	4.00	3.00	2.00	1.00
50	4.00	16.00	5.00	4.00	2.00	2.00
75	8.00	18.00	6.00	5.00	3.00	2.00

**Table.4: Statistical result**

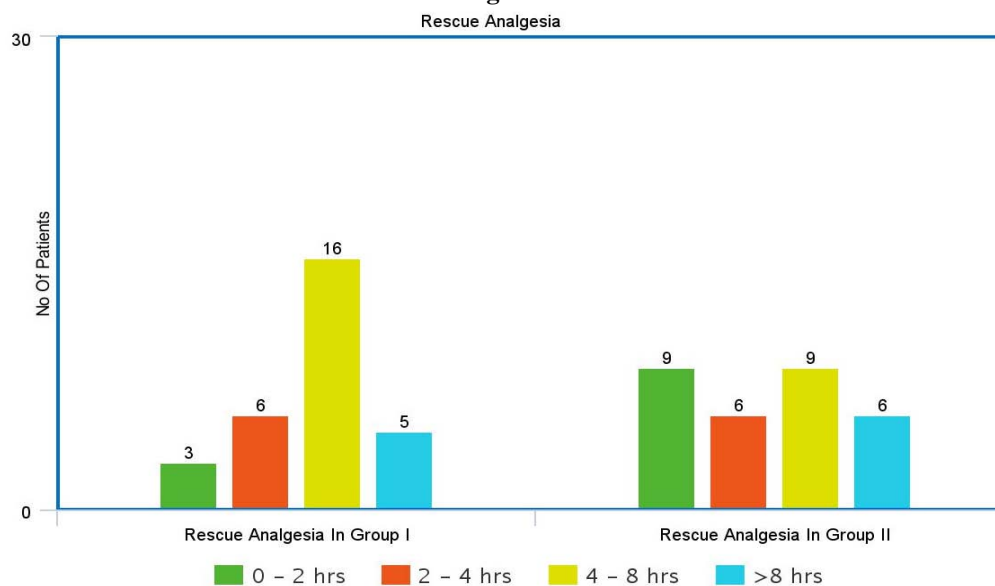
Test Statistics<sup>a</sup>

	Time_1st_dose	Time_2nd_Dose	Hr_4	Hr_8	Hr_16	Hr_24
Mann-Whitney U	311.000	237.500	267.000	270.000	404.000	405.000
Wilcoxon W	776.000	702.500	732.000	735.000	869.000	870.000
Z	-2.097	-3.187	-2.786	-2.817	-0.752	-0.769
Asymp. Sig. (2-tailed)	0.036	0.001	0.005	0.005	0.452	0.442

a. Grouping Variable: Group



**Figure 1**



**Figure 2**

#### 4. Discussion

In the study we conducted, patients treated with infiltration of Epidural space with Triamcinolone and Buprenorphine had similar effect to epidural infiltration with Bupivacaine, Triamcinolone and Buprenorphine in control of pain at 24hrs post-surgery. However the pain control immediately post surgery upto 12hrs was much significant in patients who received cocktail of 3 drugs. Patient requiring rescue analgesia was significantly high in those who received 2 drug cocktail. The systemic side effects of IV analgesics given post operatively can be effectively decreased by locally irrigating the epidural space with analgesics and corticosteroid. Our study does not have a control group to compare and is a limitation of it. The results of our study on effective pain management with Bupivacaine, Buprenorphine and Triamcinolone in various combination were comparable to other studies [1,3].

Epidural irrigation with analgesics has been shown to be a reliable technique for pain relief and interest in the use of this technique has been recently revived. This technique is simple, safe and involves low cost. 0.25% Bupivacaine is most widely used for this purpose. Bupivacaine 0.25% used alone or combined with opioid or steroid had a better pain control and lower opioid requirement when compared with placebo [5]. Bupivacaine used in conjunction with Corticosteroids provide a cumulative effect and results in a better analgesic effect [1,3].

In a systematic review by Bakur A Jamjoon[5] Corticosteroids infiltration post discectomy reduce the post operative pain significantly. Corticosteroids acts against pain by inhibiting inflammation and therefore prevent the secretion of mediators which stimulate afferent nerve fibres. These drugs inhibit edema, fibrin formation, capillary dilatation, leukocyte aggregation (early inflammatory response), proliferation of capillaries and fibroblasts, collagen formation and scarring (late effects of inflammation) [4]. Steroids prevent epidural fibrosis and limit the degree of scar formation after lumbar surgery and thus decreases pain [5]. As a contradiction Hashemi et al reported that addition of Triamcinolone to epidural Bupivacaine cannot improve post operative lumbar discectomy pain relief significantly [6].

Adding Buprenorphine to corticosteroid or local anaesthetic can significantly enhance the quality of post operative analgesia [7]. The anti-inflammatory action of corticosteroids and the peripheral action of opioids particularly in inflamed tissue provides better analgesia over a long duration [8]. Buprenorphine when added to Bupivacaine in peritubal block it prolonged the duration of analgesia [9]. Addition of Buprenorphine not only prolongs the duration but also the quality of analgesia. Respiratory depression, pruritus, nausea, vomiting, and urinary retention are complications secondary to systemic and spinal administration of Buprenorphine. However in our study none of the patients had these side effects.

#### 5. Conclusion

Epidural Irrigation with Buprenorphine-Triamcinolone and Bupivacaine-Triamcinolone-Buprenorphine provided similar pain relief at 24hrs post-surgery. Pain control immediately post surgery upto 12hrs was much significant in patients who received cocktail of 3 drugs. Both of the combination of which can effectively control the post-operative pain in patients undergoing lumbar discectomy and minimise the use of IV opioids and thus their systemic side effects.

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