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ORIGINAL ARTICLE

Role of Epidural Steroid and Local Anesthetic in Post-Operative Outcome Following Lumber Discectomy

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ABSTRACT

Aim: The purpose of the study was to assess the outcome of epidural infiltration of local anesthetic and steroid intraoperatively in comparison with placebo (saline) after lumbar discectomy.

Study Design: A prospective double blinded randomized controlled trial conducted in a tertiary care centre over two and half years' duration, from July 2019 to December 2021

Methods: 70 subjects enduring lumbar discectomy were randomised to the intraoperative infiltration of triamcinolone acetonide (40mg/ml, 2ml) and bupivacaine (0.5%, 3ml) in A group or B group who were given equal (5ml) volume of normal saline. Infiltration was achieved after decompression and discectomy, and just before the incision was closed. In the postoperative period, the standard procedure of physiotherapy and intravenous paracetamol administration were used. Supplementary analgesics with tramadol was used solitary in patients requiring greater pain control. The VAS scale was used to access pain post-operatively and use of opioids was documented. Primary outcomes measures included immediate post-operative VAS back pain, infection rate and opioid use. The subjects were reassessed at six-weeks and three months after surgery.

Results: No patient in A group needed opioid analgesic while 14 patients in group B needed additional tramadol as a pain killer for pain relief ($p = 0.01$). At the third hour after surgery, the VAS result was lower significantly in A group in comparison to the group B ($p < 0.05$). No infection or other serious complication was reported and no revision surgery was performed in either group. One patient in each group stated residual radiculopathy, but after 6 weeks both patients' symptoms resolved.

Conclusions: Intraoperative administration of local anaesthetics and steroids is fruitful in reducing pain only for a brief time afterwards the surgical procedure, without affecting the infection rate and long-standing outcomes in comparison to the placebo.

Keywords: Triamcinolone, Bupivacaine, Lumber discectomy, Postoperative pain

INTRODUCTION

Treatment of post-operative pain ensuing lumbar discectomy is an important part of the technique, and several post-operative procedures for pain management covering a widespread variety of measures are used in everyday exercise around the world.[1-2]. Though, immediately after the surgery, numerous subjects endured back pain and delayed discharge from hospital. Generally well-known and used approaches for treating pain postoperatively comprise oral painkillers such as opioids and incision infiltration with local anaesthetics[3-4]. Few authors have advocated the supplementary usage of epidural steroids[5]. The corticosteroids are given in the decompressed nerve root after discectomy and before wound closure[6]. This is because the steroids decrease the inflammation near the neuronal elements; this decreases the patient's pain. Though, the practice of intraoperative corticosteroids given epidurally is controversial[7]. Cenic et al institute that 49% of spinal surgeons in Canada used steroids given epidural later to lumbar discectomy. Akindur et al found in systematic review of eighteen trials that steroids given epidurally suggestively reduced drug usage and short-term pain; though, it also tended to get added infections, though it was not statistically significant. The authors continue to commend more valuation of the complications and safety associated with the usage of corticosteroids given intraoperatively[8]. Additional analyses report an increased risk of cerebrospinal fluid leakage and formation of hematoma. Our operating standards involve the infiltration of triamcinolone to the nerve root which was decompressed before closing the wound[9-10]. This analysis was intended to evaluate the outcomes of this practice for post-operative pain immediately after surgery and opioid use in patients enduring 1-2-level lumbar discectomy, along with the complication rate.

MATERIAL AND METHODS

It was a double-blinded and prospective, controlled study held in a tertiary care hospital for two and half years' duration from January 2019 to December 2021. The institutional research commission approved the study. Eligible patients are those identified with 1-2 levels of herniation of lumbar disc on MRI and clinical symptoms associated with this pathology. All patients received conservative treatment for minimum six-weeks with analgesia and physiotherapy before to enlist for surgery. The individuals who underwent spinal fusion, bilateral decompression, revision discectomy or discectomy done for cauda equina syndrome and those who had epidural injection recently were not included in the analysis. The 2 groups of patients were made with randomization technique. Group A (35 patients) were given epidural anesthesia with local anesthesia and steroids prior to wound closure and in B Group (35 control patients) normal saline infiltrated at the wound site prior to closure. The same technique of general anesthesia was given to all patients. Patients were given GA with fentanyl (1.5 mcg / kg) and propofol, lidocaine (1.5 mg / kg). Ten milligram Morphine was given as intraoperative analgesic.

The volunteers were placed in a Wilson frame with prone position, and the image intensifier was used to access the accurate level. The site of incision was infiltrated with 10 ml of 2% lidocaine and adrenaline 1 / 10,000 before incision. The affected side was exposed using a standard method, the nerve root which was affected; recognized and preserved, and the discectomy was done. After ensuring good nerve decompression and hemostasis, conferring to the randomization, 2ml of triamcinolone acetonide (40mg/ml) and 3ml of bupivacaine (0.5%) (group A) and 5 ml of normal saline (group B); were administered before closing the wound. No drainage was used in any of the procedures. The post-operative analgesic regimen consisted of intravenous paracetamol (1 g TDS) and 100 mg tramadol given as needed. All patients underwent a standard post-operative physiotherapist assisted mobilization. During the 1st month after operation, subjects were counseled not to have strenuous activity. One day after surgery; the patients were discharged. Pre-operative and post-operative pain in the back was measured by the VAS at 1, 2, 3, 4, 6, 8, 12 and 24 hours after surgery. This is an 11-point scale with "0" being

no pain and "10" being the severe pain endured. It is a proven and known classification for assessing chronic and post-operative pain. Both groups were followed for three months afterwards the surgical procedure. The subjects were examined for signs of impaired wound healing, infection, recurrent or residual symptoms, and neurological deficit or emerging back pain. The member directing the medicine for pain and evaluating the VAS did not know which group of patients they were allocated. The study duration was also blinded for the patients. Statistical analysis was achieved using Fisher exact test and the Mann-Whitney U test in the software of STATA. This assessment was applied as the VAS values did not match the standard distribution. P <0.05 was taken as statistically significant.

RESULTS

70 patients were recruited in this randomized study; 35 in both groups A and B. In group A: the patients mean age was 34.3 years and for B group, it was 37.2 years. The ratio of women to men in group A was 1.4:1.1 and in group B, it was 1.3:1. There was no substantial change among the groups in relations of gender, age, and the pre-operative VAS pain score. In the first and second hours after surgery, the VAS result in the studied group was lesser than in the group of control, but it was not significant. At the third hour after surgery, the visual analogue score result was subordinate suggestively in the studied group in comparison to the group of control (p <0.05) (Table 1).

Table 1: Median Visual Analogue Scale (VAS) Score

Time	Group A	Group B	p
1h	3	3	0.760
2h	3	8	0.130
3h	4	8	0.044
4h	4	5	0.430
6h	4	5	0.340
8h	4	5	0.250
12h	3	4	0.320
24h	3	4	0.370

Except for the usual paracetamol regimen used in both groups in A group, no patient needed additional analgesia. In group B, administration of 100 mg of tramadol in the third hour after surgery was required in 14 (40%) of 35 patients. After tramadol, the group B VAS reduced at 4 hours after surgery, while in group A it remained low.

No statistically significant alteration was noted among the 2 groups in terms of VAS at four, six, eight, twelve and twenty-four hours postoperatively. No serious complications were reported and no patient required revision surgery. During the three-month observation period, no infection was detected. 1 patient in each group stated residual radiculopathy, but after 6 weeks both patient symptoms resolved. The visual analogue scale for pain in back was not significantly different at any follow-up till three months.

DISCUSSION

After discectomy; post-operative pain is common symptom and can often be entitled failed back syndrome that recurs or continues for ages afterwards the index surgery[11-12]. It is related with a higher frequency of problems postoperatively, counting respiratory and cardiovascular complications. Pain has been shown to be caused not only by compression of nerve tissue mechanically, but likewise by inflammation instigated by a damaged disc. Steroids are cast-off intra-operatively to control this inflammatory course for over two years[13-14]. The injected corticosteroids relieve pain by impeding inflammatory process and thus averting the neuropeptides secretion that causes the stimulation of the thin nerve fibers[15]. These remedies constrain together the initial response of inflammation (fibrin formation, edema, leukocyte aggregation, capillary dilation) and additionally this process late effects are also inhibited (proliferation of fibroblasts and capillaries, scarring and collagen formation). The steroids are assumed to reduce epidural fibromatosis and scar tissue formation in long-term, but this outcome is provocative in the literature[16-17]. Jamjoom et al. In 2014, he published 15 studies systematic review evaluating the effectiveness of steroids given epidurally in lumbar discectomy. This was a descriptive review due to the heterogeneity of the research designs and the way they presented the results[18]. In terms of early pain scores, nine obtainable of eleven studies exhibited a momentous decrease in scores of pains after using steroids. In addition, these studies were newer than those with a negligible decrease. Lowell et al. stated three patients with epidural abscess given steroids after discectomy out of 32 patients[19]. The writer described that in a further 439 cases where epidural steroids were not used, there were no other cases of infection after discectomy. In a meta-analysis and systematic review by Akinduro et al. Concentrating on the jeopardy of complications, he institutes a relationship amid the usage of intraoperative steroids for discectomy and infection jeopardy, but this augmented risk was not included in the statistics[20]. There was no important change in the overall complication ratio between the control group and steroid group. Also, steroids have been be effective in reducing post-operative pain in the instantaneous post-operative time, but solitary one study presented a change after six-weeks[21]. This review authors determined that the main restriction of this analysis was that maximum studies evaluating steroid use were not designed with complications in mind. Given that after discectomy surgery; the complication ratio is indeed low, the writers determined that more researches concentrating on the proportion of steroid-related complications are desirable to evaluate the effectiveness of this regimen[22-23].

This study outcomes displayed that steroid given epidurally suggestively reduced post-operative pain for short time of 3 hours only afterwards the operation. Though the decrease in pain accredited to steroids given epidurally after surgery persisted <2 hours, the effect was adequate to reduce opioid use. This study main limitation is the insignificant sum of patients, so perhaps occasional complications of discectomy were not detected. Also the three months' follow-up is relatively shorter to apprehend the possible reduced failed back in steroid group.

CONCLUSION

Intraoperative administration of epidural triamcinolone and bupivacaine is fruitful in reducing pain only for a brief time afterwards the surgical procedure, without affecting the infection rate and long-standing outcomes in comparison to the placebo.

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