



POST OPERATIVE ANALGESIA AFTER POSTERIOR LUMBAR INSTRUMENTED FUSION USING EPIDURAL CATHETER V/S INTRAVENOUS ANALGESIA A PROSPECTIVE RANDOMIZED CONTROL STUDY

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ABSTRACT

This eventual study aimed to compare the efficacy of epidural (EDA) versus intravenous (PCA) application of analgesics after lumbar fusion. 62 patients included in our study for elective posterior instrumented lumbar fusion were randomized into two groups. EDA patients received an epidural catheter intraoperatively, and sufentanil was started after a normal post-operative wake-up test. PCA patients received intravenous opioids in the post-operative time. The variance between EDA and PCA groups in terms of patient satisfaction regarding pain relief was not significant. Nevertheless, EDA patients reported less pain on the 3rd day after surgery. There were no most remarkable side effects, such as infection or persisting neurological deficits, in either group. The everyday use of epidural anesthesia for lumbar spine surgery has too many risks and offers minimal benefits over PCA.

KEYWORDS : lumbar fusion, epidural analgesia, intravenous application, perioperative pain.

INTRODUCTION:

Effective post-operative pain control is not only a significance of patient satisfaction; it affects the perioperative morbidity after major abdominal, gynecological, thoracic or spine surgery. Commonly performed spinal surgeries include laminectomies, discectomies, spinal fusion with instrumentation, scoliosis correction, and spinal tumor excision⁽¹⁾. Conventional spinal surgeries often involve extensive dissection of subcutaneous tissues, bones, and ligaments and thus result in a considerable degree of post-operative pain. The pain was severe lasts for 3 days.⁽²⁾ Epidural analgesia offers excellent pain control and a decrease in the total amount of narcotics used, therefore less respiratory depression and sedation. When compared with intravenous pain control, there were side effects including Pruritus, nausea, vomiting, urine retention, and neurologic abnormality. Despite this, the use of epidural analgesia should facilitate mobilization and improve patient outcomes and satisfaction. Cullen et al. and Benzon et al. have suggested that epidural analgesia is superior to parenteral analgesia in a patient undergoing major surgical intervention.^(4,5) Ibrahim et al. have shown that epidural administration of morphine is superior to parenteral analgesia for laminectomies.⁽³⁾ This eventual study was designed to focus on the efficacy of epidural analgesia and intravenous analgesia after posterior lumbar instrumented fusion.

MATERIALS AND METHODS:

The study was conducted in the DEPARTMENT OF NEUROSURGERY at YASHODA SUPER SPECIALITY HOSPITAL, SOMAJIGUDA, HYDERABAD, TELANGANA, INDIA - During the period March 2015 - March 2018. Sixty two patients were included in this study. All the patients who underwent one-level lumbar spine fusion from the standard posterior approach patients scheduled for elective spinal surgery of the lumbar spine for degenerative disc disease were randomly assigned one of two groups.

The study's hypothesis was that EDA is more fruitful compared to intravenous administration of analgesics for post-operative treatment. EDA patients (n=26) received an epidural catheter intraoperatively, whereas PCA patients (n=21) did not.

There was no difference in gender distribution between the groups (P=0.41, Fisher's exact test). Clearance was obtained from the Hospital Ethical Committee of Yashoda Hospital,

Somajiguda, Hyderabad. The local ethics committee refused blinded study with the placement of an epidural catheter in the PCA group on the grounds of low risk or benefit ratio for this group.

Inclusion criteria were defined as age over 20 years, the concurrence of radiological lumbar disc disease and localization of persistent pain under conservative treatment for over three months, elective posterior lumbar instrumented spinal fusion procedure with or without decompression. A standard midline approach was used. All patients received the same protocol for pre-operative preparation. Single-dose prophylactic antibiotics were given.

Exclusion criteria were defined as infection, fracture as an indication for surgery, missing patient consent, language barrier, mental retardation, pre-operative neurological deficit, and known adverse reactions to analgesics. EDA patients more frequently received a transforaminal lumbar intervertebral fusion (TLIF); however, posterior fusion with anterior lumbar interbody fusion (ALIF) was more common in the PCA group. The differences did not reach statistical significance. The decision for other procedures was made according to the underlying pathology and the need for decompression of the stenotic segment.

Surgical technique:

After completing the spinal fusion procedure, a Tuohy needle (20 G, B. Braun, Melsungen, Germany) was placed from the incision's lateral aspect through a separate skin puncture (figure1). The epidural catheter was threaded through the needle and placed in the epidural space under direct vision by the surgeon. The catheter tip was advanced 3cm cephalad to the level of the instrumentation. The catheter was fixed to the skin with a 30cm adhesive bandage across the back. The catheter marking at the skin level was documented and checked during dressing changes to watch for catheter dislocation. After surgery, all patients underwent an unremarkable wake-up test in the operation theater. Afterward, fentanyl was administered via a catheter in the surgical ICU, starting with a 5 ml/hr flow rate. An infusion pump was used to deliver a continuous flow using a 50ml syringe (250 micrograms in 45ml 0.9% saline). Group- (2) patients received intravenous fentanyl infusion (250 micrograms in 45ml 0.9% saline) at a 5ml/hr flow rate. Both the groups were offered a starting bolus dose of 2cc and an

additional bolus dose of 2cc after some time. Paracetamol and diclofenac tablets were used as rescue analgesia for both groups. Results on the VAS were transferred into a Numeric Rating Scale (NRS-0-10). Patients were not aware of the kind of study of treatment given for post-operative pain therapy. All the patients received urinary catheter after they had been anesthetized, which was removed after 48hrs of surgery. Epidural catheter was released after 72 hours.

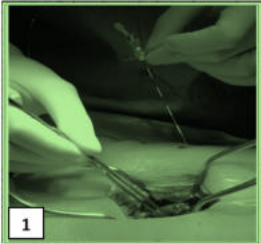


Figure-1 Intraoperative placement of epidural catheter



Figure-2 postoperative epidural catheter in situ with normal drain

RESULT & DISCUSSION:

The doses of adjuvant analgesics given were not different between both groups. PCA patients used fentanyl transdermal patches remarkably more often during the observation period.

The following minor side effects were recorded in EDA patients: loss of sensory function (n=6), motor weakness (n=3), failure or displacement of EDA catheter (n=3). In the PCA group, three out of 26 patients complained about nausea and vomiting. No Cardiopulmonary reactions were in either group. Side effects occurred remarkably more often in the EDA group, but within hours, all resolved completely. Discharge time was 13.9 ± 6.3 days after surgery for the EDA group and 13.4 ± 2.4 for the PCA patients ($P=0.91$, t-test, logarithmic transformation), respectively. The patient was satisfied with post-operative pain.

One patient in each group was not able to rise from a chair without assistance. One further patient in the epidural group required help for personal hygiene preparations.

Climbing stairs was not possible for one EDA and 3 PCA patients. EDA patients reported being well overall significantly more often ($P=0.019$).

Day of surgery All patients were helped to carry out hygiene tasks. EDA patients reported "being well overall" significantly more often about "being well never all" ($P=0.019$). Most patients in both groups suffered from loss of appetite (53% vs. 60%, $P>0.05$). There was no difference in the results of VAS and mobilization between groups. The first day after surgery analysis did not show evidence of differences between the groups in terms of pain, mobilization, need of assistance for daily living activities, appetite, problems during physical therapy, or general well-being. There were significantly fewer reports of disturbances of night sleep due to pain in EDA patients (26% vs. 80%, $P=0.005$). Satisfaction with the pain management was rated higher in the PCA group (2.8 ± 2.7 vs. 1.8 ± 1.8 , $P=0.18$).

On the third day after surgery, Scores were assessed after removal of the epidural catheter. Suffering from pain was rated lower for the EDA group but did not gain statistical significance ($P=0.064$). Mobilization also improved faster for EDA patients. Eighty-five percent of the EDA patients were able to transfer and walk short distances without help compared to 61% in Group 2 ($P=0.058$). Most of the Group 1 patients were independent in the bathroom (85% vs. 52%, $P=0.014$). The eight-day after surgery EDA patients showed an advantage when climbing stairs independently (74% vs. 40%,

$P=0.034$). These patients reported a loss of appetite less frequently ($P=0.044$). There was no difference in answers to general well-being, the course of the hospital stay, the level of pain at that moment, and the overall satisfaction with pain management.

Mean costs for all analgesics used during the hospital stay were significantly higher for EDA patients (31.07 ± 21.72 rupees vs. 5.10 ± 4.14 rupees, $P<0.0001$). These numbers are based on our hospital pharmacy prices in rupees and do not include extra costs. VAS score was significantly lower in the epidural group at any time point. Intravenous group had substantially higher VAS, as compared with the ANOVA. Between the groups difference was significant with p-value <0.05 (Figure-3)

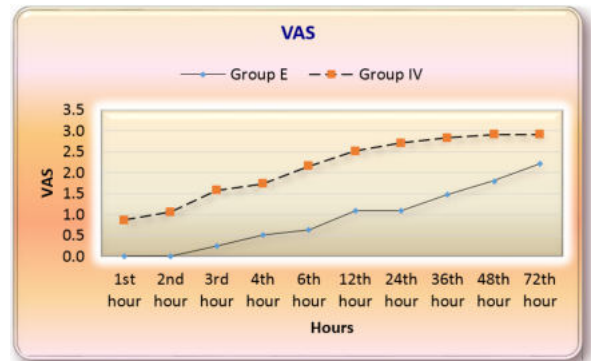


Figure-3

Epidural analgesia is one of the best modalities for controlling post-operative pain after lumbar fusion for two reasons. First, epidural needs no additional procedure for pain control. show very rarely design related neurologic deficits immediately after surgery.

There was no statistical difference in the general demographics such as age, sex, weight, height, and surgery duration between the groups. These results are correlating with all the previous studies.

CONCLUSION:

The epidural administration of analgesia is an effective route for post-operative pain management after lumbar spinal instrumented fusion. Epidural analgesia is a safe and beneficial modality, these groups of patients used less dose of opioids, early mobilization out of bed possible in comparison to intravenous group. Lengths of hospital stay are less, which decreases the overall cost burden of the patients. Side effects are more in the epidural group, but all are minor. Epidural analgesia is better for early (12 h-24 h) post-operative pain management. Epidural analgesia should optimally start just after extubation of the patient, and all such patients should preferably be nursed in a high-dependency unit.

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