



Research Article

A COMPARATIVE STUDY OF BUPIVACAINE AND FENTANYL - BUPIVACAINE IN LOWER ABDOMINAL SURGERY UNDER EPIDURAL ANESTHESIA

Mohan K^{1*} and Mohana Rupa L²

1. Department of Anaesthesia, Sri Sathya Sai Medical College & Research Institute, Tiruporur, Guduvancherry, Ammapettai, Sembakkam, Tamilnadu, India.
2. Department of Pharmacology, Sri Sathya Sai Medical College & Research Institute, Tiruporur, Guduvancherry, Ammapettai, Sembakkam, Tamilnadu, India.

*Corresponding author's Email: koyeedoctor@gmail.com

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ABSTRACT

Background: Fentanyl is an opioid general anaesthetic acting through the opioid receptors. Combination with local anaesthetics increases the onset and duration of analgesia. The present study compared the efficacy profile of epidurally administered bupivacaine alone and fentanyl combined with bupivacaine.

Materials and Methods: A total of 30 adult patients of either sex aged 20-50 years, undergoing lower abdominal elective surgery under epidural anesthesia were included in the present study. Patients were randomly divided into two groups of 15 each. Bupivacaine (0.5%) 20 ml was administered for both the groups epidurally and 100µg fentanyl was given to the second group. The onset and duration of sensory analgesia were observed and compared. Postoperative visual analgesic scale scores were also noted and compared. Data was analyzed using unpaired "t" test.

Results: The demographic profile of patients was comparable in two groups. Onset of analgesia was earliest in second group compared to the first group. The duration of analgesia was also significantly prolonged in second group. There was no significance difference in the VAS scores between two groups throughout the study period.

Conclusions: Fentanyl and bupivacaine group has early onset of analgesia as well as produced prolonged duration. Hence, the combination of fentanyl and bupivacaine may useful in feature clinical settings.

Keywords: Bupivacaine, epidural anesthesia, fentanyl.

INTRODUCTION

Opioid analgesics are commonly used as adjuncts to local anesthetics (LA) in epidural anesthesia. However, the parent drug (morphine) that was initially employed for epidural analgesia had low lipid solubility and a long latency. Its use has been associated with the many of undesirable side effects such as nausea, vomiting, urinary retention and respiratory depression. [1] The search for a better molecule is still going on. Fentanyl is a highly lipid-soluble, strong µ-

receptor agonist and phenyl piperidine derivative with a rapid onset and short duration of action [2]. Earlier studies have compared the narcotics for post-operative epidural analgesia [3-5]. However, none of studies have compared fentanyl as adjuncts for epidural anesthesia. The present study was undertaken to compare the efficacy of epidural fentanyl along with bupivacaine for lower abdominal surgery.

MATERIALS AND METHODS

After Institute's Ethics Committee approval and informed consent from the patients, 30 adult patients of either sex, aged 20-50 years, undergoing lower abdominal surgery under epidural anesthesia were included in the study. Patients with spinal deformity, significant cardio respiratory, hepatic, renal and neurological diseases were excluded from the study. Patients were familiarized with visual analgesia scale (VAS) scoring pre-operatively and taught to grade their pain on the scale. With proper positioning and under all aseptic precautions epidural space was identified in L3-4 intervertebral space using 18G Tuohy's needle with the loss of resistance to air technique. Epidural catheter was threaded 3-4 cm inside the epidural space and fixed. Then, 20 ml of 0.5% plain bupivacaine alone or along with fentanyl was injected into the epidural space. Patients were randomly divided into two groups of 15 each. Bupivacaine (0.5%) 20 ml was administered for both the groups epidurally and 100µg fentanyl was given to the second group. The surgical procedure was started 30 min after the drug injection. In the post-operative period, pain scores were assessed on the VAS scale every hour till 6 h. The onset and duration of sensory analgesia were observed and compared. The data collected was subjected to statistical analysis using SPSS -16 version software. Data was analysed by unpaired "t" test. $P < 0.05$ was considered as a statistical significance.

RESULTS

The two groups were comparable with regard to age, weight, height, gender distribution of the patients and duration of the surgery [Table 1]. The onset and duration of analgesia was hastened with the addition of fentanyl [Table 2]. However, there was no significance difference in the VAS scores between two groups throughout the study period [Table 3].

DISCUSSION

Pruritus, nausea, vomiting, urinary retention and respiratory depression are the most common side effects of narcotic analgesics [6]. Delayed respiratory depression is the most troublesome of these side effects and appears to be largely responsible for the reluctance of anaesthesiologist to use intrathecal or epidural narcotics. This phenomenon is thought to be due to transport of drug in cerebrospinal fluid from the lumbar region to the fourth ventricle, with consequent depression of the medullary respiratory centers. The incidence of delayed respiratory depression appears to be greatest with poorly lipid-soluble narcotic drugs, like morphine [7]. Bromage [1] suggested that lipid-soluble, highly protein bound narcotic analgesics might be less likely to exhibit this phenomenon and this appears to be true for fentanyl.

Opioids used as epidural adjuvants to local anaesthetics to improve the quality analgesia [8, 9]. We chose to investigate fentanyl, a μ -receptor agonist along with bupivacaine for

Table 1: Demographic Data

Characteristics	Bupivacaine (n=15)	Bupivacaine and Fentanyl (n= 15)
Age	40.24 ± 5.66	41.86 ± 6.75
Sex (M:F)	9:6	10:5
Weight (Kg)	66.83 ± 8.56	70.19 ± 9.44
Height (Cm)	159.84 ± 4.06	162.23 ± 3.88
Duration of surgery	89.60 ± 24.57	91.80 ± 26.54

Data was expressed as Mean ± SEM, * $P < 0.05$

Table 2: Comparison of analgesic action of both drugs

Characteristics	Bupivacaine (n=15)	Bupivacaine and Fentanyl (n= 15)
Onset of analgesia (min)	6.60 ± 0.81	3.94 ± 1.24*
Duration of analgesia (hrs)	4.56 ± 5.43	6.92 ± 1.46*

Data was expressed as Mean ± SEM, * $P < 0.05$

Table 3: The mean postoperative pain score in two groups.

Time (hrs)	Bupivacaine (n=15)	Bupivacaine and Fentanyl (n= 15)
1	1.60 ± 2.81	1.54 ± 1.19
2	0.62 ± 0.87	0.50 ± 0.76
3	1.84 ± 1.21	1.79 ± 6.81
4	1.76 ± 1.43	1.56 ± 0.43
5	2.60 ± 1.81	2.33 ± 1.21
6	3.56 ± 1.43	3.16 ± 1.43

Data was expressed as Mean ± SEM, * P < 0.05

intraoperative and post-operative analgesia. Our results demonstrate that the addition of fentanyl quickens the onset of analgesia. In the present study, majority of the patients in group two had good quality of analgesia. No patient group two received any supplemental analgesic during the surgery. The pain scores as assessed on the VAS were almost similar in the post operative period with bupivacaine and fentanyl - bupivacaine treatment [Table 3]. However, the duration of analgesia was significantly prolonged with the addition of fentanyl to bupivacaine. We observed duration of analgesia with 20 ml 0.5% bupivacaine alone to be 4-5 h; this is consistent with the earlier study done by Modig and Paalzov [10]. The duration of analgesia was prolonged with the addition of 100 µg fentanyl (6-7 h) in our study, consistent with that given by Cousins and Mather [11] (5-7 h).

CONCLUSION

Addition of the opioids, i.e., fentanyl with bupivacaine significantly quickens the onset and increased the duration of analgesia and provides more effective and longer duration of analgesia as compared with bupivacaine alone. A single bolus dose of fentanyl along with bupivacaine given at the start of epidural anesthesia provides good intraoperative and post-operative analgesia.

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