EVALUATION OF EFFICACY OF EPIDURAL BUTORPHANOL TARTRATE FOR POSTOPERATIVE ANALGESIA

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ABSTRACT

Objectives: The objective of this study was to evaluate the efficacy of epidural butorphanol tartrate in postoperative analgesia and to monitor its side effects.

Methods: 80 patients of ASA 1 and 2 scheduled for elective abdominal and gynaecological procedure were chosen for the study. At the end of surgery, study group received 2mg of butorphanol in 10 ml normal saline through an epidural catheter and the control group received 10 ml of normal saline. Postoperatively vitals, VAPS, sedation score and side effects were pointed. Patients received rescue analgesia when VAPS was greater than 6.

Results: Epidural butorphanol produced duration of analgesia of 7.46 ± 1.35 hours. The quality of analgesia was excellent in 75% of patients and good in 25% of patients. The two main adverse effects observed were sedation and vomiting. Sedation may be beneficial to patients in the immediate postoperative period.

Conclusion: Epidural butorphanol produces long lasting, good quality analgesia with minimal side effects.

Keywords: Butorphanol, Epidural anaesthesia, Postoperative analgesia, Sedation, Abdominal, Gynaecological surgeries.

INTRODUCTION

Postoperative pain gives rise to various physiological and psychological phenomena and effective pain control is vital for early mobilization and postoperative discharge [1]. Narcotic analgesics are frequently used as adjuncts to local anesthetics [LA] in epidural anesthesia. They hasten the onset, enhance the quality of the block as well as prolong the duration of analgesia [2]. Role of neuraxial regional techniques, particularly epidural infusions is now well established. When compared with conventional opioid analgesia they can provide superior analgesia, earlier mobilization, and earlier restoration of bowel function and reduced risk of postoperative respiratory and thromboembolic complications. Therefore efforts centered on these techniques not only challenge traditional thinking but also improve the overall outcome of the patient [3].

Epidural administration of μ-receptor opioid agonists such as morphine produces profound postoperative analgesia but is associated with troublesome side effects such as pruritus, nausea, vomiting, urinary retention, and respiratory depression [4,5]. Butorphanol is a mixed agonist-antagonist opioid with strong kappa-receptor agonist and weak mu-receptor agonist/antagonist activity [6]. The analgesic efficacy of epidural butorphanol is comparable to that of morphine, with less respiratory depression, pruritus, and nausea and vomiting [7, 8]. Butorphanol is a lipid-soluble narcotic and has been frequently used for post-operative analgesia and labor analgesia [9, 10].

Postoperative pain warrants rapid and effective pain management which can be provided by oral, parenteral or epidural route. Opioids remain the choice of analgesia for severe pain and it can be administered by different routes. But opioids like morphine can produce several adverse effects including respiratory depression. Butorphanol is a synthetic, lipid soluble opioid with agonist – antagonist property and minimal side effects. This study was made to evaluate the efficacy of epidural butorphanol tartrate for postoperative analgesia for lower abdominal and gynaecological surgeries. The duration and quality of analgesia along with complications of epidural butorphanol were observed.

MATERIALS AND METHODS

This study was performed at a tertiary medical college hospital in Madurai. 80 patients were chosen for the study divided as 40 patients in each group. Patients who were scheduled for lower abdominal and gynaecological surgeries were selected for this study. Patients of ASA physical status 1 and 2 were chosen for this study with the age distribution of 20 to 70. At first hospital, ethical committee approval was obtained. After getting informed consent from patients, they were randomly divided into 2 groups. Group A was taken as the study group and Group B as a control group. The 10 point visual analogue pain scale [VAPS] was explained to all patients.

All patients were assessed preoperatively before enrolling for the study. Patients were premedicated with injection Midazolam 0.07 mg/kg intramuscularly 1 hour before surgery. Baseline measurement of pulse rate, blood pressure and SPO2 was done. An intravenous infusion line with Ringer lactate was started. Patients were placed in the right lateral position on a horizontal table. Under strict aseptic precautions, epidural puncture was performed using a 16 G Tuohy needle and epidural catheter introduced. The patient was turned to supine position. A test dose of 3 ml of 1.5% lignocaine with adrenaline was given. Then 8 – 12 ml of 1.5% lignocaine with adrenaline was given in incremental doses so as to achieve the level needed for surgery. The pulse rate, blood pressure and SPO2 were monitored throughout surgery.

At the end of surgery, in study group 2mg of butorphanol in 10 ml of normal saline was injected through the epidural catheter. In the control group, 10 ml of normal saline was injected through the epidural catheter. Patients were observed in the recovery room. The level of consciousness was assessed every hour and graded depending on the sedation score. The pulse rate, blood pressure and respiration were monitored.

The sedation score was invoked as in Table 1.
Table 1: sedation score

<table>
<thead>
<tr>
<th>Grade</th>
<th>Conscious level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fully awake</td>
</tr>
<tr>
<td>2</td>
<td>Drowsy</td>
</tr>
<tr>
<td>3</td>
<td>Sleeping, arousable</td>
</tr>
<tr>
<td>4</td>
<td>Arousable to painful stimuli only</td>
</tr>
<tr>
<td>5</td>
<td>Not able to awaken</td>
</tr>
</tbody>
</table>

To assess pain, VAPS was utilized. Patients were called upon to mark a point in the 10 point VAPS scale according to the intensity of pain in fig. 1.

![Visual analog pain scale](image)

Fig. 1: Visual analog pain scale

The pain score was assessed every hour and total duration of postoperative analgesia was taken as the period from the time of giving epidural drug till the patient’s requirement of systemic analgesia. The rescue analgesic was used when VAPS score was more than 6. Patients were observed for any side effects like respiratory depression, nausea, vomiting, urinary retention, hypotension, pruritus and headache.

Table 2: age distribution in study and control groups

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 – 29</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>30 – 39</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>40 - 49</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>50 - 70</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

This study was done in patients undergoing Hysterectomy and Herniorrhaphy and their distribution in study and control groups in given in table 3.

Table 3: case distribution in study and control groups

<table>
<thead>
<tr>
<th></th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniorrhaphy</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Vaginal hysterectomy</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

DISCUSSION

Opioids as epidural adjuvants to LA improve the quality of the block and provide a dose-sparing effect. Butorphanol is a synthetic, lipid-soluble opioid with strong kappa-receptor agonist activity. Kappa-receptors seem to be involved in somatic as well as visceral pain modulation and are thus useful in reducing postoperative pain [9]. In our study, the duration of analgesia with 2mg of epidural butorphanol was found to be 7.46 ± 1.35 hours which correlate with most of the other studies.

Kaur et al [2] compared epidural butorphanol and fentanyl as adjuvants to bupivacaine in the lower abdominal surgery. They concluded that with the addition of butorphanol to bupivacaine, the duration of analgesia was found to be 7.64 ± 1.41 hours. Bhagwat [3] reported duration of analgesia with 1mg of epidural butorphanol to be around 4 hours. Palacios [7] compared doses of one, two, and 4mg of epidural butorphanol with 5 mg of epidural morphine for postcesarean section analgesia in term parturients. Epidural butorphanol provided three to 4 hours of effective analgesia with significantly lower frequency of pruritus than morphine. Adequacy of analgesia was indistinguishable between morphine and butorphanol. Abboud et al [8] reported an onset time of 0.38 ± 0.04 hours and duration of analgesia of 5.06 ± 2.37 hours with two mg of epidural butorphanol in postcesarean section patients. Bharti et al [9] did a study to evaluate the efficacy of epidural butorphanol with and without bupivacaine in providing postoperative analgesia following abdominal hysterectomy. They reported an onset time of 141 ± 2.6 min and duration of 4.4± 0.7 hrs for epidural butorphanol. Gupta [11] reported duration of 5.35 ± 0.292 hours with 2mg of epidural butorphanol. Various studies using epidural butorphanol for post-operative analgesia have reported the duration of analgesia to be 4-6 h, 5 h and 5.35 h with 0.5mg, 1mg, 2mg respectively [8, 12, 13].

The pain scores as assessed on the VAS were low and remained low for a significant time in the post-operative period with epidural butorphanol. The quality of analgesia as assessed by VAPS was excellent with a score of 0 – 2 in 9 patients and with a score of 3 – 4 in 10 patients. The principal advantage of butorphanol is its fewer side effects. Previous studies have shown significantly lower frequencies of pruritus, nausea, and vomiting in patients receiving epidural butorphanol as compared with epidural morphine and fentanyl [2, 3, 7, 8, 9, and 14]. The two major complications noted with epidural butorphanol in our study are sedation and vomiting. In our study, about 45% were drowsy and 25% of patients were sleeping but arousable. Previous studies have also reported drowsiness or
somnolence in 50% to 72% of patients receiving epidural butorphanol [8, 15]. Mild sedation may be beneficial to patients in the immediate postoperative period [9]. 30% of patients had vomiting in our study. This fig. is greater than most of the other studies done on epidural butorphanol [2, 7, 8].

None of the patients developed respiratory depression consistent with other studies. Although no clinical evidence of respiratory depression with epidural butorphanol has been reported thus far, a transient depression of the carbon dioxide response curve was observed by Abboud after 1.5 hours in patients receiving two to 4 mg of epidural butorphanol [8]. Ackerman [16] showed that 60% of patients receiving epidural morphine and 46.7% of patient receiving epidural fentanyl developed pruritus as compared with only 6.7% of patients in the epidural butorphanol group. None of the patients developed pruritus in the present study. No patient had urinary retention in either of the groups, consistent with the study by Ackerman et al.

CONCLUSION

In conclusion, administration of 2mg epidural butorphanol provides analgesia lasting for 6 – 9 hours. The quality of analgesia as assessed by VAPS was excellent in 75% and good in 25% of patients. The advantage of epidural butorphanol over other narcotics is the incidence of fewer side effects.

CONFLICT OF INTERESTS

None.

REFERENCES

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