Innovare Academic Sciences

International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 7, Issue 2, 2015

Original Article

EVALUATION OF EFFICACY OF EPIDURAL BUTORPHANOL TARTRATE FOR POSTOPERATIVE ANALGESIA

R. VENKATRAMAN[1], R. SANDHIYA[2*]

[1]Associate Professor, SRM Medical College Hospital & Research Centre, Potheri 603203, India, [2]Senior Resident, ESI Postgraduate Institute of Medical Science & Research, Chennai 600072, India, B3, Third Block, Jains Ashraya Phase 3, 199, Arcot Road, Virugambakkam, Chennai 600092, India.
Email: drvenkat94@gmail.com

Received: 06 Nov 2014 Revised and Accepted: 28 Dec 2014

ABSTRACT

Objectives: The objective of this study was to evaluate the efficacy of epidural butophanol 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 analgesic 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 phenomenons 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 SPO_2 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 SPO_2 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

Grade	Conscious level
1	Fully awake
2	Drowsy
3	Sleeping, arousable
4	Arousable to painful stimuli only
5	Not able to awaken

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.

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.

RESULTS

Patients in both the groups were similar in terms of age, weight distribution and type of surgery. The age distribution in both the groups is given in table 2.

The total duration of postoperative analgesia is calculated from the time of epidural drug injection to the time at which patient demands analgesic [ie] VAPS of 6 and above. In group A, the minimum duration of postoperative analgesia was 330 min and the maximum duration was 660 min with a mean of 448.5 and standard deviation of 81.15 min. In group B, the minimum duration of postoperative analgesia was 25 min and maximum duration was 105 min with a mean of 57.25 and standard deviation of 18.19 min.

VAPS score judged the quality of analgesia. In group A, quality was excellent with a score of 0 – 2 in 30 patients and good with a score of 3 – 4 in 10 patients. In group B, quality was excellent with a score of 0 – 2 in 17 patients and good with a score of 3 – 4 in 23 patients. But the quality of analgesia did not last longer when compared to the study group.

In group A, 12 patients had a sedation score of 1, 18 patients had a score of 2 and 10 patients had a score of 3. In patients with sedation score of 2 and 3, it took 60 to 240 min to recover to a score of 1. In group B, 30 patients had a sedation score of 1 and 10 patients had a score of 2. The respiration was not depressed in any patient. Even in patients with a sedation score of 2 and 3, there was not any airway obstruction. There was not any significant hemodynamic change observed in both the groups. In group A, 12 patients had vomiting whereas in group B, 9 patients had vomiting. Urinary retention took place in 1 patient in both study and control groups. The other side effects of epidural narcotics like respiratory depression, pruritus, hypotension and bradycardia did not occur in both the groups.

Table 2: age distribution in study and control groups

	Age in years			
	20 – 29	**30 – 39**	**40 - 49**	**50 – 70**
Study	6	13	12	9
Control	7	9	16	8

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

	Study	**Control**
Herniorrhaphy	14	14
Vaginal hysterectomy	14	14
Abdominal hysterectomy	12	12

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 14.1 ± 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 and 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 in 75% and good in 25% of patients. This correlates with other studies on epidural butorphanol [2, 3, 9,14].

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

1. Dhimar AA, Patel MG, Swadia VN, Desai DJ. Epidural butorphanol: comparison of two different doses for lower limb orthopaedic surgery. J Anaesth Clin Pharmacol 2006;22(1):47-52.
2. Jasleen Kaur, Sukhminder Jit Singh Bajwa. Comparison of epidural butorphanol and fentanyl as adjuvants in the lower abdominal surgery: a randomized clinical study. Saudi J Anesthesia 2014;8(2):167-71.
3. Singh Bhagwat, Nihlani Sanjay. Postoperative analgesia: a comparative study of epidural Butorphanol and epidural Tramadol. J Adv Res Biol Sci 2011;3(2):86-9.
4. Bromage PR, Camporesi E, Chestnut D. Epidural narcotics for postoperative analgesia. Anesth Analg 1980;59:473-80.
5. Reiz S, Westberg M. Side-effects of epidural morphine. Lancet 1980;2(8187):203-4.
6. Rosow CE. Butorphanol in perspective. Acute Care 1988;(12, Suppl 1):2-7.
7. Palacios QT, Jones MM, Hawkins JL. Post caesarean section analgesia: a comparison of epidural butorphanol and morphine. Can J Anaesth 1991;38:24-30.
8. Abboud TK, Moore M, Zhu J. Epidural butorphanol or morphine for the relief of post-cesarean section pain: ventilatory response to carbon dioxide. Anesth Analg 1987;66:887-93.
9. Bharti N, Chari P. Epidural butorphanol-bupivacaine analgesia for postoperative pain relief after abdominal hysterectomy. J Clin Anesth 2009;21:19-22.
10. Shrestha CK, Sharma KR, Shrestha RR. Comparative study of epidural administration of 10 ml of 0.1% bupivacaine with 2mg butorphanol and 10 ml of 0.25% plain bupivacaine for analgesia during labor. JNMA J Nepal Med Assoc 2007;46:1-6.
11. Ruchi Gupta, Simmerpreet Kaur, Saru Singh, KS Aujla. A comparison of epidural butorphanol and tramadol for postoperative analgesia using CSEA technique. J Anaesth Clin Pharmacol 2011;27(1):35-8.
12. Tan PH, Chou AK, Perng JS, Chung HC, Lee CC, Mok MS. Comparison of epidural butorphanol plus clonidine with butorphanol alone for postoperative pain relief. Acta Anaesthesiol Sin 1997;35:91-6.
13. Gupta R, Kaur S, Singh S, Aujla KS. A comparison of epidural butorphanol and tramadol for postoperative analgesia using CSEA technique. J Anaesthesiol Clin Pharmacol 2011;27:35-8.
14. Pokharel K1, Rahman TR, Singh SN, Bhattarai B, Basnet N, Khaniya S. The efficacy and safety of low dose epidural butorphanol on postoperative analgesia following cesarean delivery. JNMA J Nepal Med Association 2008;47(170):57-61.
15. Hunt CO, Naulty JS, Malinow AM, Datta S, Ostheimer GW. Epidural butorphanol-bupivacaine for analgesia during labor and delivery. Anesth Analg 1989;68:323-7.
16. Ackerman WE, Juneja MM, Kaczorowski DM, Colclough GW. A comparison of the incidence of pruritus following epidural opioid administration in the parturient. Can J Anesth 1989;36:388-91.