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Comparative Study of Epidural Bupivacaine with Butorphanol and Bupivacaine with Tramadol for Postoperative Pain Relief in Infra-Umblical Surgeries

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Abstract

Introduction: To compare the efficacy of combination of epidural local anesthetic with tramadol and butorphanol in infra-umblical surgeries. *Aims and Objectives:* To evaluate duration of analgesia, analgesic efficacy, and safety profile of two groups of drugs-epidural butorphanol with bupivacaine and epidural tramadol with bupivacaine. *Material and Methods:* A prospective, randomized controlled, double-blinded study was undertaken in 60 patients scheduled for infra-umblical surgeries. Group I received epidural butorphanol 2 mg + bupivacaine 0.125% as first dose and subsequent doses, butorphanol 1 mg + bupivacaine 0.125% (total volume 10 ml). Group II received epidural tramadol 2 mg/kg + bupivacaine 0.125% as first dose and subsequent doses, tramadol 1 mg/kg + bupivacaine 0.125% (total volume 10 ml). Observed parameters were the quality of analgesia, sedation, and hemodynamic parameters in the intra and post-operative period. Time for request of rescue analgesia was noted in all the patients. *Results:* Visual analog scale better with butorphanol group than tramadol at 30 min after first dose. Onset of action faster with butorphanol but duration of analgesia longer with tramadol. Sedation was seen more commonly in patients with butorphanol group where as incidence of nausea and vomiting was hign in tramadol group. *Conclusion:* Epidural butorphanol has better quality of post-operative pain relief but the reduced duration of analgesia and sedation are the limiting factors. Epidural tramadol along with antiemetic administration is prefered for bariatric, geriatric patients, ambulatory surgeries and in patients with compromised respiratory system where sedation can be disastrous.

Keywords: Butorphanol; Epidural; Tramadol.

Introduction

Pain is an unpleasant experience (sensory or emotional) associated with actual or potential damage or decribed in terms of similar damage [1]. Millions of patients undergo surgeries which is usually associated with considerable post-operative discomfort. Apart from its physiological effects, post operative pain can be a major cause of fear, anxiety, resentment and adverse relationship with doctors and nurses. Postoperative pain relief is not only desirable but also important for immediate postoperative enteral nutrition, reduction in perioperative stress responses and organ dysfunction, avoidance of fatigue, early mobilization and discharge from the hospital [2]. Therefore, optimal pain relief is the main consideration for the anesthesiologist. The techniques of pain relief are varied and are well known for their relative advantages and disadvantages. The discovery of opioid receptors has opened a new horizon in the pain management. By passing the blood and blood-brain barrier, small doses of opioids administered in either the subarachanoid or epidural spaces provide profound analgesia. This has undoubtedly proved a major breakthrough in pain management [4].

Local anesthetics in addition with opioids increases the duration of analgesia reducing frequent supplementation of drugs and hence reduction in dosage and less frequency of systemic side effects attributable to each drug. Butorphanol, a mixed agonist-

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antagonist opioid, and tramadol, a moderately potent opioid agonist have been used for this purpose [4,5,6]. Combination of butorphanol and local anesthetics has been studied more often during labor in parturients [7]. There is paucity of studies comparing the efficacy of the above mentioned combination in infra-umblical surgeries which are cause of morbidity in majority of hospital admissions. Butorphanol has been proven to have minimal side effect profile among opioids [6]. In our study, we made an attempt to assess the efficacy of butorphanol in comparison to well-established drug tramadol in combination with local anesthetic agent (bupivacaine) through epidural route for the management of postoperative pain in infra-umblical surgeries.

Aims and Objectives

The Aims and Objectives of the present study were to evaluate and compare the duration and efficacy of epidural butorphanol and epidural tramadol when given along with 0.125% bupivacaine for postoperative analgesia in patients undergoing infra-umblical surgeries and to evaluate the associated side effects.

Material and Methods

This randomized controlled, prospective double-blinded study was conducted on 60 patients of age 18–60 years of American Society of Anesthesiologists (ASA) Class I and II undergoing infra-umblical surgeries such as abdominal hysterectomy, inguinal hernioplasty and infra-umblical exploratory laparotomy, after obtaining approval from institutional Ethics Committee. Patients with ASA class III, IV and V and those with neurological disorders, coagulopathies, local or systemic infection, anatomical deformity of spine, patients suffering from respiratory, cardiac, hepatic, renal, central nervous system (CNS) diseases, and hypersensitivity to local anesthetics were excluded.

After obtaining informed consent, patients were randomly allocated into two groups of 30 each. The drug solution was prepared in two separate syringes of 10 ml and 20 ml. The solution for 10 ml syringe was given as initial bolus postoperatively and top ups were given from 20 ml syringe.

Group I (n=30) received. - Butorphanol 2 mg + bupivacaine 0.125% (total volume 10 ml) first dose and subsequent doses, butorphanol 1 mg + bupivacaine 0.125% (total volume 10 ml).

Group II (n=30) received Tramadol 2 mg/kg + bupivacaine 0.125% (total volume 10 ml) first dose and subsequent doses, tramadol 1 mg/kg + bupivacaine 0.125% (total volume 10 ml).

Detailed preanaesthetic checkup of the patient was done a day prior to surgery and patient kept fasting for 6-8 hours. Patients were explained about linear visual analogue score where 0 denoted "no pain" while 10 "worst pain imaginable". On the day of surgery tablet alprazolam 0.25 mg orally was given 2 hours prior to surgery and patients were reassessed in the pre anesthetic room.

In the Operating Room intravenous line was started and all the patients were preloaded with 10 ml per kg Ringer Lactate over 15-20 minutes. Readings of heart rate, blood pressure and peripheral arterial oxygen saturation were measured and recorded.

Epidural catheter insertion was performed in sitting position through midline approach with the help of 18-gauge Tuohy's epidural needle after taking all aseptic precautions. Epidural space was identified by using loss of resistance technique. Test dose given with injection lignocaine 1% with adrenaline (1:200,000) in the volume of 3 ml given through the epidural catheter to confirm the epidural space and prevent inadvertent dural or intravascular puncture. No accidental dural puncture was noted. Surgery was done under Subarachanoid Block.

After completion of surgery, patient shifted to recovery room. The first dose of drugs given when the patient had VAS >4 after negative aspiration test and Pre & Post dose vitals were recorded. Monitoring of pain (10 point VAS on which 0 indicated "no pain," 1- 3 mild pain, 4 - 7 moderate pain and 8 - 10 severe pain), sedation by Ramsay sedation score (1 - anxious and agitated, 2 - cooperative, oriented, tranquil, 3 - asleep and responding to verbal commands, 4 - asleep but brisk response to light stimulus, 5 - sluggish response to stimulus, 6 - asleep without response to stimulation), hemodynamic parameters, respiratory rate (RR) and SpO2 done every 10 min until 30 min and thereafter at hourly intervals after each epidural dose and subsequent doses were given 8 hourly or when VAS score >4 for total 24 h. Injection diclofenac sodium 75 mg intramuscularly was given as rescue analgesia. Onset of analgesia (time from injection of the study medication to first reduction in pain intensity to almost complete relief) and duration of analgesia (time from epidural injection to the time of first request for additional pain medication) were observed in both groups following epidural doses.

Incidence of hypotension (systolic BP <90 mm Hg

or >25% below baseline) or bradycardia (<50/min) were looked for and treated with vasopressors and atropine, respectively. Side effects that were specifically looked for were nausea, vomiting, pruritis, respiratory distress (RR <12/min), and lower extremity motor blockade.

Results

The two groups were found to be comparable in demographic data-age and gender. Onset was faster with butorphanol than tramadol. The mean VAS score was highly significant in Group I at 10 min, 30 min and 5 h when compared to Group II. Rescue analgesia doses were lesser in Group II because of increased duration of analgesia when compared to Group I. Time of duration of analgesia in Group II was significantly more when compared to Group I both following first epidural dose and top up doses. In Group II, the patient was calm whereas up to almost 2 h after butorphanol, the patient remained sedated and he could be easily arousable on verbal commands. A statistically significant ($P < 0.05$) difference was seen between the two groups more so within 4 h of administration of the drug. Nausea and vomiting more in Group II which was easily treatable with antiemetic.

Table 1: Age and sex distribution of the Patients

	Group I	Group II	Intergroup Significance
Age in years (Mean ±SD)	39.2±1.06	38.06±12.90	NS
sex F:M	7:23	5:25	NS

Table 2: Duration of Analgesia

	Group I	Group II	Intergroup Significance
Duration of analgesia in hrs	5.35±0.29	6.25±1.58	S

Table 3: Side effects

Side effects	Group I (no. of patients)	Group II (no. of patients)	Significance
Sedation	28	14	HS
Nausea	-	4	S
Vomiting	-	4	S
Bradycardia	-	-	
Pruritis	-	-	
Respiratory depression	-	-	
Hypotension	-	-	

Discussion

Effective pain control is essential and has been recognized as a prime concern for anaesthesiologists.[5] Postoperative pain relief has a main role in immediate postoperative intake of oral nutrition, reduction in perioperative stress responses and organ dysfunction, avoidance of fatigue, better mobilization and earlier postoperative discharge [2].

Combined spinal epidural anaesthesia finds a common place for perioperative management of infra-umblical surgeries. It combines the advantages of both spinal and epidural technique by initially providing an intense sensory and motor block of rapid onset. After the surgical procedure and regression of spinal analgesia the epidural catheter is used to provide post operative pain relief [5]. Opioids acting on spinal cord receptors provide distinct advantage over its systemic administration in view of better quality of analgesia, lower sedation scores, preservation of physiological function and improved outcome.

The present study was designed to compare the epidural action of butorphanol (2mg) and tramadol (100mg) for VAS, sedation scores, heart rate, blood pressure, respiratory rate and SpO_2 at various time intervals upto 24 hrs postoperatively. Timing of incremental doses, interval between the injections, total dose given in 24 hrs and requirement of rescue analgesia were recorded. In addition to all these, side effects such as nausea, vomiting, pruritis, respiratory depression, hypotension and bradycardia were also taken into account.

In our study pulse rate after giving the epidural dose decreased statistically significantly when compared with baseline readings but clinically this difference was insignificant in both the groups

postoperatively whereas on intergroup comparison the decrease between the groups was insignificant statistically at all the time intervals in 24 hour period. Dhimar A et al found no change in pulse rate after giving epidural butorphanol 2 mg [2]. This may directly be attributed to the drug itself or to its effective analgesic action, thus making the patients reasonably comfortable and haemodynamically stable [7]. In our study systolic and diastolic blood pressure were found to decrease significantly statistically but insignificant clinically compared to baseline in both the groups after the administration of epidural dose but the difference of systolic and diastolic blood pressure on intergroup comparison was found insignificant.

In terms of duration of analgesia it was observed that epidural tramadol had prolonged analgesia when compared to 2 mg butorphanol which was similar to study done by Abboud TK et al and found duration of analgesia with epidural butorphanol 2 mg to be 6 hours [8]. Dhimar A et al in their study found duration of analgesia to be 8 hours. The difference from our study could be due to the fact that local anaesthetic was used along with butorphanol.

In our study VAS scores were significantly lower after 1 hour of giving butorphanol as compared to tramadol which was similar to study done by Palacios Q et al and Rawal H et al.

The difference in time intervals for giving epidural top up in both the groups was found significant for all the top ups. This was in accordance with the study by Malik P et al where they found significant difference in time of giving epidural top up for both butorphanol and fentanyl [5]. Majority of the patients in group I (butorphanol) required total 4 dosages (bolus + top up) whereas in group II (tramadol) they required total 3 dosages.

Epidural analgesia improves the post-operative morbidity and patient remains haemodynamically stabilized with lower side-effects.

Hunt et al studied on butorphanol (2mg) as a initial dose and found that duration of analgesia was prolonged on quick onset and dose of bupivacaine could be reduced to 50% and leads to sedation which is benificial in post-operative period.

Siddik-Sayyid et al studied on Tramadol 100 mg and led to conclusion that there was no significant difference between 100 and 200 mg tramadol given epidurally. Tramadol 100 mg when used as first epidural dose followed by 50 mg tramadol both in combination with 0.125% bupivacaine. As pain intensity at surgical site decreases and analgesic requirement becomes lesser.

Conclusion

From our study, we found that both epidural butorphanol and tramadol were effective for postoperative analgesia in patients undergoing infra-umblical surgeries. However, butorphanol group has reduced analgesia duration but the quality of pain relief and onset of action was better as compared to tramadol group. Butorphanol group has reduced incidence of intra-operative and post-operative nausea and vomiting as compared to tramadol group but higher incience of sedation.

In the light of a fore mentioned facts, we concluded that epidural butorphanol has better quality of post-operative pain relief but the reduced duration of analgesia and sedation are the limiting factors. Epidural tramadol along with antiemetic administration is more suitble for bariatric, geriatric patients, ambulatory surgeries and in patients with compromised respiratory system where sedation can be disastrous.

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