Original Research Article

Fentanyl with levobupivacaine versus tramadol with levobupivacaine for combined spinal epidural analgesia in labor

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Abstract

Background: Pain is perceived only by the sufferer as it is a subjective phenomenon. The TCIA (Taxonomy committee of International Association) defined pain as an unpleasant emotional and sensory experience associated with potential tissue damage.

Aim: The present study was conducted to compare the efficacy of post-operative analgesia with epidural Tramadol in combination with levobupivacaine versus fentanyl.

Materials and methods: This study was conducted study was a prospective, randomised comparative study. After ethical committee approval, a total of 100 patients were selected undergoing lower limb and lower abdominal surgeries were included in the study. Inclusion Criteria was patients who had ASA I and ASA II, age between 18-45 years, both males and female patients were included in the study. An informed consent was obtained from all the patients and they were examined thoroughly clinically during the pre-anaesthetic evaluation and routine laboratory investigations were done. 100 patients were allocated into two groups by simple randomisation technique. Group A: Tramadol and Levobupivacaine group (n=50) and Group B: Fentanyl group and Levobupivacaine (n=50).

Results: In the present study, mean age in group I was 55.23±2.35, mean age in group II was 56.85±8.24, and male: female ratio was 18:10 in group I and in group II was 15:8. Duration of surgery in group I was 111.50 minutes and in group II was 112.85 minutes. Mean VAS score was

less than 1 in both the groups was either equal to 1 or less than 1 during the first 24 hours after first dose of epidural analgesic administration. There was no significant difference in the mean heart rate among both the groups statistically ($p>0.05$). There was no significant difference in systolic and diastolic blood pressure among both the groups statistically ($p>0.05$). There was no significant difference in mean arterial blood pressure among both the groups statistically ($p>0.05$). More side effects were seen in group B i.e. fentanyl along with levobupivacaine.

Conclusion: Prolonged analgesia with minimal side effects is provided by adding tramadol to local anesthetic. Fentanyl has certain fetomaternal side-effects, when used as adjuvant to local anesthetic, but it provides a rapid onset of analgesia.

Key words

Fentanyl, Levobupivacaine, Tramadol, Spinal epidural analgesia, Labor.

Introduction

Pain is perceived only by the sufferer as it is a subjective phenomenon. The TCIA (Taxonomy committee of International Association) defined pain as an unpleasant emotional and sensory experience associated with potential tissue damage [1]. The patients who were perceiving the pain were describing pain as inconsistent and unreliable. After surgery, pain is a self-limiting process and after surgery it slowly diminishes over next 24 hours. An acute pain due to surgical trauma with an inflammatory reaction and afferent neuronal barrage initiation is called post-operative pain [2]. When compared to death, pain is more terrible lord of mankind. Associated with autonomic, endocrine–metabolic, physiological and behavioral responses, it is a combined constellation of several unpleasant sensory, emotional and mental experiences precipitated by the surgical trauma. The pharmacology of analgesics and the development of more effective techniques, patients continue to experience considerable pain after surgery, despite the advances in the knowledge of mechanism of the pathophysiology of pain [3]. As it is one of the most distressing outcomes of any surgery, post-operative pain has drawn the attention of a large number of workers, and its ablation brings a great relief to the suffering of patient [4]. To provide an effective post-operative analgesia however all of these have their limitations and drawbacks, traditionally opioids and NSAIDs have been given. A safe technique for post-operative pain relief and equivalent to traditional analgesic methods is epidural analgesia. For major surgery, it is considered by many to be the gold standard analgesia technique. Compared to parenteral analgesia, epidural analgesia is more effective in making patients mobilize and resume their normal activities more quickly. Superior analgesia, improved pulmonary function, fewer cardiac ischemic events, shorter recuperation after joint surgery, better graft survival after lower limb vascular procedures, increased mobility of bowels and associated with an early aggressive mobilization were the known advantages of post-operative epidural analgesia. The opiates with greater affinity for the receptor sites will produce longer duration of analgesia [5]. For post-operative analgesia, epidural morphine (preservative free form) has been extensively used. It is preferred opiates because of its long duration of action with low dosage. However, many side effects have been reported such as nausea, vomiting, pruritis, urinary retension and delayed respiratory depression. Tramadol is a weak opioid agonist analgesic. It interacts with opioid receptors mu, alpha and delta. At doses equipotent with pethidine, typical opioid side effects are less pronounced with Tramadol. The absence of clinically relevant respiratory depression following epidural Tramadol compared with epidural morphine is attributable to different mechanisms of their analgesic action. It can be used to provide prolonged

post-operative analgesia without serious side effects. Fentanyl, a μ opiate receptor agonist which is highly lipophylic, has analgesic potency greater than morphine. The respiratory depressant effect of Fentanyl is less pronounced and of shorter duration as compared to morphine and pethedine. Neuraxial labor analgesia using new local anesthetics such as levobupivacaine has become very popular by virtue of the safety and lesser motor blockade caused by these agents. Combined spinal-epidural analgesia (CSEA) has become the preferred method for labor analgesia as it combines benefits of both spinal analgesia and flexibility of the epidural catheter. Adding opioids to local anesthetic drugs provide rapid onset and prolonged analgesia but may be associated with several maternal and fetal adverse effects. The present study was conducted to compare the efficacy of post-operative analgesia with epidural Tramadol in combination with levobupivacaine versus fentanyl.

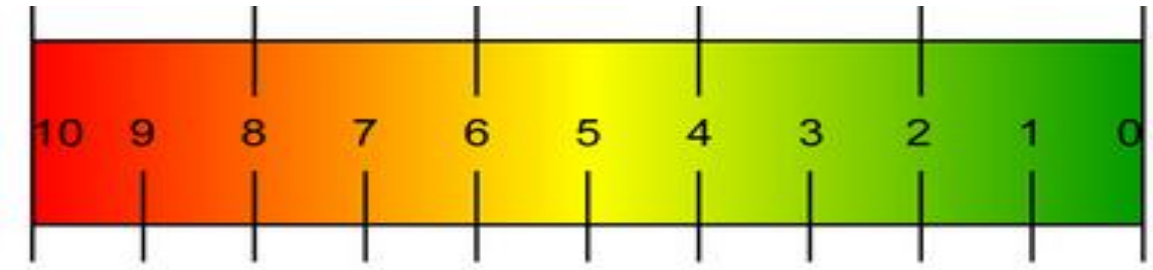
Materials and methods

This study was a prospective, randomised comparative study. After ethical committee approval, a total of 100 patients were selected undergoing lower limb and lower abdominal surgeries were included in the study.

Inclusion Criteria was patients who had ASA I and ASA II, age between 18-45 years, both males and female patients were included in the study.

Exclusion Criteria was ASA physical status III or above, pregnant women, hypertensive patients, bladder surgeries, patients who refuse to undergo anaesthetic technique, and contra-indications to regional anaesthesia.

An informed consent was obtained from all the patients and they were examined thoroughly clinically during the pre-anaesthetic evaluation and routine laboratory investigations were done. 100 patients were allocated into two groups by simple randomisation technique. Group A: Tramadol and Levobupivacaine group (n=50) and Group B: Fentanyl group and Levobupivacaine (n=50). After completion of surgery, patients were shifted to postoperative ward, no analgesics were administered during the intraoperative period. In the post-operative ward, when the patient complained of pain, then haemodynamic parameters such as pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and VAS score were noted. The intensity of pain and relief of pain in epidural space was assessed by visual analogue scale (VAS). 0-nopain to 10- worst imaginable pain.



Worst imaginable pain **No pain**

Results

Table - 1 showed that mean age in group I was 55.23±2.35, mean age in group II was 56.85±8.24, and male: female ratio was 18:10 in group I and in group II was 15:8.

Table - 2 showed the duration of surgery in group I was 111.50 minutes and in group II was 112.85 minutes.

Table - 3 showed that mean VAS score was less than 1 in both the groups was either equal to 1 or less than 1 during the first 24 hours after first dose of epidural analgesic administration.

Table - 4 showed that there was no significant difference in the mean heart rate among both the groups statistically (p>0.05).

Table – 1: Mean age, Male: Female ratio among the two groups.

	Mean Age (years)	**Male: Female ratio**
Group I	55.23±2.35	18:10
Group II	56.85±8.24	15:8

Table – 2: Duration of surgery.

	Duration of surgery (mins)
Group I	111.50
Group II	112.85

Table – 3: VAS score in the two groups.

	Group A (n=50)	**Group B (n=50)**
0 hr	1.5	1.1
1 hr	1	0
2 hrs	1	0
3 hrs	0	0.5
5 hrs	0	0
6 hrs	0.22	0.35
8 hrs	0.1	0.20
9 hrs	0	0.1
10hrs	0	0.34
12hrs	0.25	0.4
24hrs	0	0

Table - 4: Heart rate (mean±SD) beats/ min in both the groups.

Time	**Group A(n=50)**	**Group B(n=50)**
0 hr	85.80 ± 2.51	85.78 ± 4.15
1 hr	80.24 ±5.18	79.40 ± 3.97
2 hrs	80.75 ± 4.14	80.74 ± 5.99
3 hrs	78.47 ± 6.66	85.20 ± 6.73
5 hrs	79.45 ± 8.64	77.90 ± 6.03
6 hrs	82.70 ± 8.16	83.90 ± 7.27
8 hrs	79.68 ± 4.69	79.70 ± 5.59
9 hrs	78.65 ± 7.87	79.10 ± 6.32
10hrs	78.89 ± 9.41	82.80 ± 8.68
12hrs	81.25 ± 8.59	80.90 ± 6.44
24hrs	82.40 ± 7.98	81.44 ± 4.62

Table - 5 showed that there was no significant difference in systolic and diastolic blood pressure among both the groups statistically (p>0.05). There was no significant difference in mean arterial blood pressure among both the groups statistically (p>0.05).

Table - 6 showed that more side effects were seen in group B i.e. fentanyl along with levobupivacaine.

Discussion

In the present study, mean age in group I was 55.23±2.35, mean age in group II was 56.85±8.24, and male: female ratio was 18:10 in group I and in group II was 15:8. Duration of surgery in group I was 111.50 minutes and in group II was 112.85 minutes. Mean VAS score was less than 1 in both the groups was either equal to 1 or less than 1 during the first 24 hours after first dose of epidural analgesic administration. There was no significant difference in the mean heart rate among both the groups statistically (p>0.05). There was no significant difference in systolic and diastolic blood pressure among both the groups statistically (p>0.05). There was no significant difference in mean arterial blood pressure among both the groups statistically (p>0.05). More side effects were seen in group B i.e. fentanyl along with levobupivacaine. Other studies which reported the use of analgesics after surgery are as follows; Chatrath V, et al. [6]; conducted a study to compare fentanyl and tramadol used in CSEA in terms of duration of analgesia and frequency of the adverse fetomaternal outcome. A total of 60 primiparas with a singleton pregnancy in active labor were given CSEA after randomly allocating them in two groups of 30 each. Group I received intrathecal 2.5 mg levobupivacaine + 25 μg fentanyl followed by epidural top ups of 20 ml 0.125% solution of the same combination. Group II received 25 mg tramadol instead of fentanyl. Epidural top ups were given when parturient complained of two painful contractions (visual analogue scale ≥ 4). Data collected were demographic profile of the patients, analgesic

qualities, side- effects and the fetomaternal outcome. Patients in Group II had significantly prolonged analgesia (145 ± 9 minutes) than in Group I (95 ± 7 minutes). Patients receiving fentanyl showed rapid onset of analgesia, but there were more incidence of side-effects like shivering, pruritus, transient fetal bradycardia, hypotension, nausea and vomiting. Only side-effect in the tramadol group was nausea and vomiting. During labor, maternal satisfaction was excellent. Adding tramadol to local anesthetic provides prolonged analgesia with minimal side effects. Fentanyl, when used as adjuvant to local anesthetic, has a rapid onset of analgesia but has certain fetomaternal side-effects. Choi PT, Bhandari M and colleagues (2003) studied a clinical trail of patients undergoing hip or knee replacements, in which post operative lumbar epiduro analgesia was compared to other methods for pain relief. They concluded that for pain relief with movement after surgery, patients receiving epidural analgesia reported lower pain scores than patients receiving systemic analgesia. These benefits are more during early postoperative period [7]. Sawhney S, R.C. Gupta, et al. (2004) had done a prospective, randomized study to evaluate the quality of analgesia provided by Bupivacaine, Morphine and Ketamine given in epidural space, in various combinations in 60 postoperative patients. They concluded that Ketamine and Morphine given as a combination in the epidural space provide an excellent postoperative analgesia. The quality and duration of analgesia provided by the combination is significantly better than those when these drugs were given alone. There was also no change in the incidence and the pattern of complications. Hence they recommended the use of Ketamine (0.5 mg/kg) in combination with morphine (0.05 mg/kg) given epidurally for postoperative analgesia [8]. Premila Malik, Chhavi Manchanda and Naveen Malhotra (2006) had conducted a prospective, randomized double blind study to assess and compare the safety and efficacy of post-operative analgesia with epidural butorphanol and fentanyl. 60 patients were randomly divided into two groups A and B of 31 each receiving epidural butorphanol 2 mg and epidural fentanyl 50 µg respectively. Timing of incremental doses, interval between injections and total dose of analgesic drug given in 24 hrs were recorded. They concluded that both butorphanol and fentanyl are effective and safe drugs for postoperative epidural analgesia with minor side effects [9]. Krishan Yogesh Sawhney, et al. [10]; conducted a study to comparatively evaluate postoperative analgesic efficacy, motor sparing effect, postoperative haemodynamic variations and total postoperative analgesic consumption in first 24 hours. A randomised double blind study was conducted on 100 adult, ASA grade I and II patients, of either sex who had undergone elective lower limb surgery under spinal anaesthesia. According to the group allocated, patients were started on epidural infusion after completion of surgery. Group I (0.2% Ropivacaine), Group II (0.1% Ropivacaine + 2µg/ ml Fentanyl), Group III (0.2% Bupivacaine), Group IV (0.1% Bupivacaine + 2µg/ml Fentanyl) at the rate of 6 ml/hour. VAS scores, epidural consumption, supplemental epidural boluses, rescue analgesics, haemodynamics, motor block, sensory block regression, sedation, nausea and pruritis were recorded by a blinded observer for 24 hours. The haemodynamic parameters were stable in all the groups. Side effects including the motor block were negligible and comparable in all groups. Group I patients had significantly lower VAS scores, mean total epidural consumption, supplemental epidural bolus requirement and rescue analgesic requirement among all groups. It can be concluded that epidural analgesia using Ropivacaine 0.2% infusion is more effective than other study groups when used for postoperative pain relief in lower limb surgeries. Neena Gupta, et al. [11]; conducted a study which aimed to study the role of epidural for labour analgesia using Bupivacaine and Bupivacaine plus Tramadol. Prospective observational study conducted in Obstetrics Department of GSVM Medical College and other associated hospitals of Kanpur, from 01/01/15 - 31/08/16. Epidural analgesia had no adverse effect on duration and outcome of labour as well as neonatal outcome. However, pain relief was

significant in epidural analgesia. Further when comparing parturient with Bupivacaine and Bupivacaine plus Tramadol groups, parturient of group Bupivacaine plus Tramadol were found to have earlier onset and longer duration of analgesia and had lesser pain perception as compared to parturient with Bupivacaine only. Epidural analgesia is an effective method of pain relief. Instead of Bupivacaine alone, Bupivacaine plus Tramadol is more effective for pain relief during labour as an epidural analgesia.

Table – 5: Mean systolic and diastolic blood pressure (mean±SD, beats per min) in the two groups.

	Systolic Blood Pressure		**Diastolic Blood Pressure**	
Time	**Group A (n=50)**	**Group B (n=50)**	**Group A (n=50)**	**Group B (n=50)**
0 hr	122.25 ± 2.87	122.87 ± 2.68	81.87 ± 3.77	81.31 ± 2.12
1 hr	115.80 ± 4.48	114.80 ± 2.46	74.55 ± 4.61	73.20 ± 4.96
2 hrs	115.20 ± 3.92	116.60 ± 4.26	75.31 ± 3.91	75.75 ± 3.45
3 hrs	115.55 ± 5.68	117.40 ± 2.76	75.50 ± 4.44	76.60 ± 3.68
5 hrs	116.40 ± 5.35	115.00 ± 4.52	75.80 ± 3.31	74.90 ± 3.39
6 hrs	118.80 ± 6.17	118.95 ± 6.07	77.00 ± 4.28	76.50 ± 3.03
8 hrs	116.82 ± 5.65	116.50 ± 3.44	76.40 ± 2.06	75.10 ± 4.70
9 hrs	114.55 ± 3.50	113.75 ± 4.98	74.25 ± 3.24	74.45 ± 4.90
10hrs	115.85 ± 5.30	116.90 ± 5.24	74.40 ± 4.79	76.75 ± 5.22
12hrs	118.36 ± 4.34	116.55 ± 6.20	75.31 ± 4.74	76.80 ± 3.31
24hrs	118.45 ± 3.41	118.70 ± 3.34	76.80 ± 5.13	76.70 ± 5.56

Table – 6: Comparison of side effects between the two groups.

	GROUP A	**GROUP B**
Nausea and Vomiting	3	6
Hypotension	0	0
Resp. depression	0	0
Urinary retention	0	1
Pruritis	0	2
Fetomaternal	0	2

Conclusion

Prolonged analgesia with minimal side effects is provided by adding tramadol to local anesthetic. Fentanyl has certain fetomaternal side-effects, when used as adjuvant to local anesthetic, but it provides a rapid onset of analgesia.

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