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Original Research Article

Comparative study of efficacy of Tramadol versus Pethidine in post-operative pain control following laparoscopic abdominal surgeries

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Abstract: Post-operative pains following surgical procedures are very important aspect for overall success of treatment and well-being of patients. Surgeons and anesthetists have used various drugs to control postoperative pain relief. We in the present study tried to evaluate the efficacy of Tramadol for postoperative pain control compared with Pethidine in patients undergoing various laparoscopic abdominal surgeries. This study was performed in CAIMS Hospital Karimnagar. 60 patients divided into two groups (n=30) The patients were undergoing various abdominal surgical procedures like Laparoscopic Cholecystectomy, Hysterectomy and Appendectomy, Group I receiving Tramadol and Group II receiving Pethidine. Fifteen minutes before the end of surgery, patients were randomly given Tramadol HCl IV 1.0 mg/Kg loading dose followed by 50mgIV every 4 -6 hours up to total max daily dose of 400mg. The second group of patients received Pethidine HCl IV 1.0mg/kg loading dose followed by 25mg IV every 4-6 hours not exceeding 400mg/day. The cumulative analgesic consumption over 24 hours was monitored and post-operative pain by Visual Analogue Scale (VAS) was compared between the two groups. The Mean age of Group I was 35.5 and Group II was 39.5. All the patients selected for the study belonged to ASA class I or II categories. The VAS scores in Group I were 5.5 ± 1.0 and Group II were 4.5 ± 1.0 the p values were significant. The number of patients requiring rescue analgesia (VAS > 6) with IV fentanyl 1µg/Kg in Group I was 11 and in Group II it was 4 patients. The cumulative analgesic consumption in Group I at the end of 12 hours were 250 ± 50 mg and Group II was 150 ± 25 mg and at the end of 24 hours Group I values were 300 ± 50 mg and Group II was 200 ± 25 mg. The efficacy of tramadol for management of post-operative pain in equianalgesic doses is slightly inferior compared to pethidine as suggested by the pain scores, cumulative analgesic requirements and rescue analgesic required, however unlike other opioids, tramadol has no respiratory depression effects and does not affect the cardiovascular functions adversely. It may be used as a safe alternative analgesic in cases where opioids otherwise contraindicated.
Keywords: Tramadol, Pethidine, Postoperative pain

INTRODUCTION

Pain defines pain as "An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" [1] Post-operative pain is an important area of concern because of several unwanted consequences that includes excessive use of analgesics, longer periods of hospitalization, intolerance to diet and poor quality of life over all [2] The cause of post-operative pain is due to surgery millions of cells are damaged, evoking the pathway of inflammation, releasing abundant chemical mediators that triggers the sensory nerves which in turn evokes pain. Anesthetists and surgeons must do everything possible to eliminate post-operative pain. Several analgesics used in treatment of post-operative pain and their side effects like respiratory depression, sedation, a dynamic ileus, urinary retention are the areas of concern while choosing a suitable analgesic [3] Many studies have found that pre-emptive analgesia to be effective in perioperative pain [2, 4] Tramadol is a synthetic, centrally acting analgesic with distinct mechanisms of actions, it acts as a weak opioid agonist with selectivity for the µ receptors also binds weakly to κ and δ receptors and a weak inhibitor of nor-adrenaline and serotonin (5-HT) reuptake. This dual mechanism of action is due to the two enantiomers of recemic tramadol [5-7]. The (+) - enantiomer has a higher affinity for the µ receptor and more effective inhibitor

of 5-HT reuptake, whereas the (-)-enantiomer is more effective inhibitor of nor-adrenaline reuptake [8]. The opioid and non-opioid mechanisms of action of tramadol are thought to act synergistically on descending inhibitory pathways in central nervous system resulting in modulation of pain in the spinal cord [5, 9]. The efficacy of intravenous tramadol has been established in several studies [10-12]. Parentral tramadol effectively relieves moderate to severe post-operative pain associated with several types of surgeries including abdominal, orthopedic and cardiac surgeries. Pethidine is used as an analgesic, although chemically unrelated to morphine, it interacts with μ receptors. It is having only tenth of potency of morphine after parentral injection the onset of action is more rapid but shorter duration 2-3 hours. Side effects include dry mouth, blurred vision and tachycardia [13]. There is paucity of data comparing the analgesic action of Tramadol with Pethidine. With this background we tried to compare the analgesic efficacy of Tramadol with Pethidine in patient undergone laparoscopic abdominal surgeries.

MATERIALS AND METHODS

This study was conducted in CAIMS, Karimnagar. Institutional Ethical committee permission was obtained and written informed consent was obtained from patients. All the patients included in the study were belonging for ASA (American Society of Anesthesiologists) classification of physical status I and II undergoing laparoscopic abdominal surgical procedures like Laparoscopic Cholecystectomy, Hysterectomy and Appendectomy. Patients with history of Hypertension, Diabetes Mellitus, CV disorders, cerebrovascular disease or any other significant medical conditions were excluded in the study. 60 patients divided into two groups of 30 each were randomly selected and allotted. Glycopyrrolate 4μg/Kg, IM, Ondansetron 4mg IV was given prior to anesthesia. All patients were intubated with appropriate sized cuffed endotracheal tube passed orally and placement confirmed with auscultation and End tidal CO_2 concentration. Anesthesia was maintained with sevoflurane with O_2 (1.5 L/min) and N_2O (1.5 L/min). Anesthesia was maintained with N_2O to O_2 mixture of 60:40. Anesthetic depth was maintained to reach the target value of around 40 by manipulating sevoflurane vaporizer setting. Ventilation was controlled to maintain End Tidal CO_2 concentration of 30-35 mmHg. Fifteen minutes before the end of surgery, patients were randomly given in Group I Tramadol HCl IV 1.0 mg/Kg loading dose followed by 50mgIV every 4 -6 hours up to total max daily dose of 400mg. The Group II patients received Pethidine HCl IV 1.0mg/kg loading dose followed by 25mg IV every 4-6 hours not exceeding 400mg/day. Scores of pain, sedation and hemodynamic variables, heart rate were recorded. The level of pain was assessed by VAS score Each patient was given a copy of Visual Analog Scale (VAS) with readings from 0 to 10 with grades of 1 (0=no pain and 10 = severe pain) The patients were asked to use this scale to note their pain intensity and record it on pain diary. Duration of anesthesia, time to tracheal extubation and number of patients (VAS > 6) requiring supplementary analgesia with IV fentanyl 1μg/Kg was recorded. PNOV post-operative nausea and vomiting was recorded and other side effects were recorded.

RESULTS

The mean age of Group I (Tramadol) was 35.5 years and Group II (Pethidine) was 39.5 and male to female ratio in Group I and Group II was 2:1. All the patients included in the study were belonging to ASA I and II categories. The mean duration of surgeries in group I was 166 minutes and group II was 151.5 minutes given in table 1.

Table-1: showing the profile of patients involved in the study

	Group I (Tramadol) (n=30)	Group II (Pethidine) (n=30)
Age	35.5 ± 7	39.5 ± 8.5
Weight in Kgs	65.5 ± 7.5	68.5 ± 6.5
Gender male/Female	20/ 10	21 /9
ASA I/II	10/20	12 /18
Type of Surgery Appendectomy Cholesystectomy Hysterectomy	 21 7 2	 22 5 3
Mean Duration of surgery	166 ± 25	151.5 ± 30

Several recovery parameters were recorded in the patients that included the time to suction catheter response in Group I 8.91 min and Group II was 8.10 min, time to obey verbal commands was 6.06 mins in group I and 7.01 mins in group II. Post-operative nausea and vomiting (PNOV) was recorded in 7 patients in group I and 5 patients in group II. The Visual analogue scale (VAS) scores (0= no pain and 10 = worst pain) were recorded in the group I the average VAS score was 5.5 and group II average VAS score was 4.5 and the p values were found to be significant. Number of patients (VAS > 6) requiring supplementary analgesia with IV fentanyl 1µg/Kg was 11 in group I and 4 in group II the calculated p values were found to be significant see table 2.

Table-2: showing the recovery profiles with VAS and PNOV

Recovery variables	Group I [Tramadol] (Mean ± SD)	Group II [Pethidine] (Mean ± SD)
Time to suction catheter response (min)	8.91 ± 2.87	8.10 ± 2.29
Time to obey verbal commands (min)	6.06 ± 3.94	7.01 ± 4.04
Time to tracheal extubation	14.01 ± 4.59	13.90 ± 3.99
PNOV	7	5
Visual Analogue Scale (0-10)	5.5 ± 1.0	4.5 ± 1.0*
Time for ambulation (hrs)	11.90 ± 5.9	10.0 ± 6.5
No. of patients requiring ondansetron	7	5
No. of patients requiring rescue analgesia (VAS > 6)	11	4*

Values in Mean ± SD, * significant p value

The cumulative analgesic consumption in Group I (Tramadol) was compared to Group II (Pethidine) in the post-operative periods was recorded in table 3. In Group I Tramadol HCl IV 1.0 mg/Kg loading dose fifteen minutes before the end of surgery followed by 50mgIV as required by subject up to total max daily dose of 400mg. The Group II patients received Pethidine HCl IV 1.0mg/kg loading dose followed by 25mg IV every 4-6 hours not exceeding 400mg/day. The cumulative analgesic consumption in group I at the end of 12 hours was 250 mg and group II was 150. At the end of 24 hours the cumulative analgesic consumption in group I was 300 and group II was 200 the p values were found to be significant at 12 hours and 24 hours.

Table-3: Cumulative analgesic consumed during postoperative periods

	Group I (Tramadol mg) mean ± SD	Group II (Pethidine mg) mean ± SD	P value mean ± SD
4^{th} hour	100 ± 50	25 ± 25	0.57
6^{th} Hour	150 ± 50	50 ± 25	0.10
8^{th} hour	200 ± 50	100 ± 25	0.11
12^{th} Hour	250 ± 50	150 ± 25	<0.05*
24^{th} hour	300 ± 50	200 ± 25	< 0.04*

Values in Mean ± SD, * significant p value

DISCUSSION

The present study was conducted in order to compare the efficacy of tramadol with pethidine in post-operative pain control following laparoscopic abdominal surgeries. Although there are several studies conducted to determine the analgesic efficacy of tramadol compared with various other compounds, there is a paucity of data in relation to comparison of tramadol versus pethidine in post-operative surgical patients. One such study by Hakki U *et al.;* comparing the analgesic effect of Morphine, Pethidine and Tramadol for post-operative pain management following abdominal Hysterectomy found patients reporting equivalent pain scores with all the drugs with similar side effects. However the Tramadol group required more rescue analgesic as compared to the other two groups [14]. This is in agreement with our present study where more numbers of patients in tramadol group required rescue analgesia. Parth P *et al.;* comparing the analgesic effect of pethidine and

tramadol found that IV tramadol 2mg/Kg provides similar effects on pain detection and tolerance threshold to IV pethidine 1mg/Kg in 16 healthy volunteers [15]. In the present study we used IV Tramadol 1mg/Kg and Pethidine 1mg/kg initial dose for equianalgesic comparison of efficacy. In a study by MN Nazar *et al.;* comparing the analgesic effect of tramadol with diclofenac sodium found that the pain scores and indirectly the pain relief were not significantly different when diclofenac sodium 75mg or tramadol 50mg was given post-operatively after third molar surgery. Comparison of pain scores at the end of 24 hours tramadol brought about marginal increase in the pain relief, although statistically not significant [11]. AA Abdelhalim *et al.;* compared the analgesic effects of Tramadol 1mg/Kg with Lornoxicam 8mg for post-operative pain relief in patients undergoing ENT surgical procedures. They reported that both drugs helped to reduce the postoperative opioid requirement and, consequently, minimized the related adverse effects of the opioids [16]. One of the important advantages of Tramadol is that it has negligible side effects typically associated with opioid agonists. Tramadol has minimal effects on respiration as demonstrated by studies in children and adults [17-19]. In one study by P Tarkkila *et al.;* comparing the respiratory effects of IV Tramadol 0.6mg/kg and IV Pethidine 0.6mg/kg found that pethidine caused significant respiratory depression although tidal volume was not affected by either tramadol or pethidine. They concluded that tramadol 0.6mg/kg was not associated with respiratory depression unlike equipotent dose of pethidine [20]. Quantitative assessment of analgesic efficacy is often difficult because pain is subjective in nature and thus bound to be effected by the type of personality and emotional factors [21]. In absence of any truly objective measures, the patient's assessment of pain using categorical verbal response (VRS) or visual analogue (VAS) scales are accepted as standard subjective measures of analgesic efficacy [22-24]. In the present study it was found that Average VAS score in Group I was 5.5 ± 1.0 and Group II was 4.5 ± 1.0, the number of patients requiring rescue analgesia with fentanyl in group I was 11 and group II was 4 indicating that the analgesic efficacy of tramadol was lesser when compared of pethidine. The time to extubation was similar in two groups was comparable in tramadol group it was 14.01 min and 13.90 in pethidine group indicating there is no awakening effect of Tramadol. The overall post-operative drug consumption was also greater in the Tramadol group as compared to Pethidine group. The overall adverse effects post-operative nausea and vomiting (PNOV) of the tramadol group was similar to pethidine group.

CONCLUSION

The efficacy of tramadol for management of post-operative pain in equianalgesic doses is slightly inferior compared to pethidine as suggested by the pain scores, cumulative analgesic requirements and rescue analgesic required, however unlike other opioids, tramadol has no respiratory depression effects and does not affect the cardiovascular functions adversely. It may be used as a safe alternative analgesic in cases where opioids otherwise contraindicated.

Conflict of interest: None

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REFERENCES

1. Chaturvedi S, Chaturvedi A. Postoperative pain and its management. Indian Journal of Critical Care Medicine. 2007 Oct 1; 11(4):204.
2. Møiniche S, Kehlet H, Dahl JB. A Qualitative and Quantitative Systematic Review of Preemptive Analgesia for Postoperative Pain Relief. The Role of Timing of Analgesia. The Journal of the American Society of Anesthesiologists. 2002 Mar 1; 96(3):725-41.
3. Austrup ML, Korean G. Analgesic agents for the postoperative period: opioids. Surgical Clinics of North America. 1999 Apr 1; 79(2):253-73.
4. Trampitsch E, Pipam W, Moertl M, Sadjak A, Dorn C, Sittl R, Likar R. Preemptive randomized, double-blind study with lornoxicam in gynecological surgery. Schmerz (Berlin, Germany). 2003 Jan; 17(1):4-10.
5. Bamigbade TA, Langford RM. Tramadol hydrochloride: an overview of current use. Hosp Med 1998 May; 59: 373-76.
6. Barkin RL. Focus on tramadol: a centrally acting analgesic for moderate to moderately severe pain. Formulary 1995 Jun; 30:321-25.
7. Abel SR. Tramadol: an alternative analgesic to traditional opioids and NSAIDs. J Pharm Care Pain Symptom Control 1995; 3 (1): 5-29.
8. Lesley J. Scott, Caroline M. Perry. Tramadol-A Review of its Use in Perioperative Pain. Drugs 2000 Jul; 60 (1): 139-76.
9. Lee CR, McTavish D, Sorkin EM. Tramadol: a preliminary review of its pharmacodynamic and pharmacokinetic properties, and therapeutic potential in acute and chronic pain states. Drugs 1993 Aug; 46: 313-40.
10. Shankariah M, Mishra M, Kamath RA. Tramadol versus ketorolac in the treatment of postoperative

pain following maxillofacial surgery. Journal of maxillofacial and oral surgery. 2012 Sep 1; 11(3):264-70.
11. M Nabeel Nazar, Ashok K Ramadorai. Efficacy of post-operative oral tramadol and diclofenac sodium on pain relief following mandibular third molar surgery: A double blind, randomized controlled trial. J Pain Manage 2014;7(2):137-45.
12. Shukla U, Prabhakar T, Malhotra K, Srivastava D, Malhotra K. Intraperitoneal bupivacaine alone or with dexmedetomidine or tramadol for post-operative analgesia following laparoscopic cholecystectomy: A comparative evaluation. Indian journal of anaesthesia. 2015 Apr; 59(4):234.
13. KD Tripathi. Essentials of medical pharmacology. Cp-34 Opioid Analgesics and antagonists. Seventh Edition Jaypee Brothers Medical publishers 2013: 475-76.
14. Unlugenc H, Vardar MA, Tetiker S. A comparative study of the analgesic effect of patient-controlled morphine, pethidine, and tramadol for postoperative pain management after abdominal hysterectomy. Anesthesia & Analgesia. 2008 Jan 1; 106(1):309-12.
15. Parth P, Madler C, Morawetz RF. Analgesic Effects Of Pethidine And Tramadol As Assessed By Experimentally Induced Pain In Man-A Double-Blind Comparison. Anaesthesist. 1984 Jan 1; 33(5):235-9.
16. Abdelhalim AA, Al Harethy S, Moustafa M. Efficacy of post-operative oral tramadol and diclofenac sodium on pain relief following mandibular third molar surgery: A double blind, randomized controlled trial. Saudi Journal of Anesthesia 2014; 8(1): 38-44.
17. Houmes RJ, Voets MA, Verkaaik A, Erdmann W, Lachmann B. Efficacy and safety of tramadol versus morphine for moderate and severe postoperative pain with special regard to respiratory depression. Anesthesia & Analgesia. 1992 Apr 1; 74(4):510-4.
18. Vickers MD, O'flaherty D, Szekely SM, Read M, Yoshizumi J. Tramadol: pain relief by an opioid without depression of respiration. Anaesthesia. 1992 Apr 1; 47(4):291-6.
19. Bösenberg AT, Ratcliffe S. The respiratory effects of tramadol in children under halothane anaesthesia. Anaesthesia. 1998 Oct 1; 53(10):960-4.
20. Tarkkila P, Tuominen M, Lindgren L. Comparison of respiratory effects of tramadol and pethidine. European journal of anaesthesiology. 1998 Jan 1; 15(1):64-8.
21. Portenoy RK, Lesage P. Management of cancer pain. The Lancet. 1999 May 15; 353(9165):1695-700.
22. Jamison RN. Comprehensive pretreatment and outcome assessment for chronic opioid therapy in nonmalignant pain. Journal of pain and symptom management. 1996 Apr 1; 11(4):231-41.
23. Montauk SL, Martin J. Treating chronic pain. American family physician. 1997 Mar; 55(4):1151-60.
24. Wulf H, Neugebauer E, Maier C. Practice guidelines for the management of acute pain. Int J Acute Pain Manage 1997; 1: 41-45.