

Comparative Study of Nalbuphine and Tramadol for Postoperative Pain Relief in Patients of Short Surgical Procedures under TIVA

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ABSTRACT

Introduction: For short surgical procedures, total intravenous anaesthesia (TIVA) is better than general anaesthesia. Short acting opioids are usually used with propofol in TIVA for postoperative pain relief. The aim of our study was to compare the efficacy and safety of nalbuphine and tramadol for postoperative pain relief in short surgical procedures.

Material and methods: In this prospective, randomized, double blinded, controlled study 60 patients of either sex, aged between 20 to 50 years with ASA grade I and II scheduled for elective short surgical procedures under TIVA were selected and randomly divided into two groups. Group N received nalbuphine 0.25 mg/kg and group T received tramadol 2 mg/kg.

Result: Pain scores on visual analogue scale (VAS) were not significantly different upto 3rd postoperative hour but after that pain scores on VAS were significantly low in nalbuphine group. Mean sedation scores were significantly more at 2nd and 4th postoperative hour in nalbuphine group. Side effects like nausea vomiting were significantly more in tramadol group.

Conclusion: Nalbuphine is better analgesic than tramadol for postoperative pain relief in short surgical procedures.

Keywords: Nalbuphine, Tramadol, Propofol, TIVA, Short Surgical Procedure

and patients with anticipated difficult airway were excluded from the study. Randomization of patients was done by closed envelop method and divided into 2 groups.

Group N (n=30): Received nalbuphine 0.25 mg/kg

Group T (n=30): Received tramadol 2 mg/kg

All patients were kept nil per orally for 6 hours. After shifting in operating room, intravenous (I.V) line was secured with 18 G cannula and ringer lactate infusion started. Multipara monitor was attached and baseline vitals heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and oxygen saturation (SpO₂) were recorded. Patients were premedicated with injection glycopyrrolate 0.004mg/kg and midazolam 0.05 mg/kg intravenously. Intravenous nalbuphine 0.25mg/kg and tramadol 2 mg/kg was given 5 minutes before induction according to group allocation. Induction and maintenance of anaesthesia was done by propofol as described by Robert et al.⁴ LMA was inserted 1 minute after loss of eyelash reflex and proper placement was confirmed by chest expansion. Patients were allowed to breath spontaneously with 100% O₂ using Bain's circuit. Data were collected by another anaesthesiologist who was blinded to both study drugs and group allocation of patients. Vital parameters were recorded before induction and every 5 minutes intraoperatively and every hour postoperatively in PACU. Duration of surgery was noted down. In PACU, postoperative pain was assessed by visual analogue scale (VAS) as 0: No pain, 1-3: Mild pain, 4-6: Moderate pain, 7-10: Severe pain, every hour till pain score on VAS was 4 or more. Rescue analgesia injection diclofenac 75mg I/M given and time noted down as duration of analgesia. Patients sedation was recorded as 0: alert, 1: sometimes drowsy but easily aroused, 2: often drowsy but easily aroused, 3: often drowsy and difficult to arouse, 4: unarousable at 1, 2 and 4 hour postoperatively. Side effects like nausea, vomiting, headache, respiratory depression were also recorded.

STATISTICAL ANALYSIS

Statistical analysis was done by chi-square test and unpaired t- test and results were expressed in mean±S.D and absolute number. P-Value <0.05 was considered significant.

INTRODUCTION

For short surgical procedures total intravenous anaesthesia (TIVA) is better than general anaesthesia (G.A), as TIVA gives better intraoperative hemodynamic stability with earlier recovery and less postoperative nausea and vomiting (PONV).¹ Propofol provides rapid and smooth recovery with absence of hangover effect and lower incidence of PONV.² Propofol with remifentanyl infusion is ideal for short surgical procedure.³ As short acting opioids like fentanyl, sufentanil, alfentanil and remifentanyl are not easily available and are under the control of misuse of drugs act, we decided to compare nalbuphine and tramadol in short surgical procedure. The aim of our study was to compare the efficacy and safety of nalbuphine and tramadol for postoperative analgesia in short surgical procedures and parameters of comparison was intraoperative hemodynamic changes, postoperative analgesia, postoperative sedation and any adverse effects.

MATERIAL AND METHODS

After taking institutional ethical committee approval, 60 patients of either sex, aged between 20-50 years with ASA grade I and II scheduled for elective short surgical procedures like dilatation and evacuation (D and E), dilatation and curettage (D and C), incision and drainage (I and D), fibroadenoma, lipoma, cyst excision and circumcision were selected for this prospective, randomized, double blinded study. Patients with ASA grade III or more, patients allergic to opioids and propofol, obese patients

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RESULT

Patients demographic data (age, sex, ASA grade), type and duration of surgery were comparable and statistically insignificant between the groups ($P>0.05$) (Table-1). There were no significant variation in intraoperative and postoperative hemodynamic parameters between the groups ($P>0.05$). Postoperatively pain scores on VAS were low in nalbuphine group in all study timings, but upto 3 hours difference was insignificant in comparison to tramadol group (Table-2). Postoperative sedation score was comparable between group N and group T at 1st hour but mean sedation scores were significantly more in group N at 2nd and 4th hour, none of the patients of either group had sedation score more than 2 (Table-3). Mean duration of analgesia was significantly more in group N (6.3 ± 0.7 hour) compared to group T (5.7 ± 1.2 hours). Significant difference in incidence of nausea and vomiting was noted between the groups, only 2 patients in group N had nausea but no vomiting while in group T, 6 patients had nausea and 5 patients had vomiting. No other side effects were noted in either group.

	Group N (n=30)	Group T (n=30)
Age (years)	25.3± 1.5	24.5±1.8
Sex (M:F)	20:10	18:12
ASA grade (I/II)	25 5	27 3
Types of surgery		
D and E/ D and C	6	5
I and D	3	3
Fibroadenoma	4	6
Lipoma	5	4
Cyst excision	7	8
Circumcision	5	4
Duration of surgery	30.1±3.4	31.4±2.7

Table-1: Demographic data, Type and Duration of surgery

	Group N (n=30)	Group T (n=30)	P- Value
1 st hour	0.44±0.32	0.56±0.27	0.12
2 nd hour	0.59±0.38	0.68±0.25	0.28
3 rd hour	0.66±0.51	0.81±0.42	0.21
4 th hour	0.84±0.31	1.05±0.43	0.03
6 th hour	1.29±0.67	1.68±0.52	0.01
8 th hour	2.31±0.73	2.82±0.99	0.02

Table-2: Postoperative visual analogue scale (VAS) (Mean ± S.D)

	Group N (n=30)	Group T (n=30)	P- Value
	Number of patients	Number of patients	
After 1 hour			
S.S 0	4	8	
S.S 1	20	18	0.20
S.S 2	6	4	
After 2 hour			
S.S 0	6	13	
S.S 1	21	16	0.03
S.S 2	3	1	
After 4 hour			
S.S 0	13	22	
S.S 1	16	8	0.01
S.S 2	1	0	

Table-3: Postoperative sedation score (S.S)

DISCUSSION

Nalbuphine is synthetic opioid of phenethrene series. It is partial agonist at kappa receptor and antagonist at mu receptor and causes less respiratory depression than other opioids.^{5,6} It provides cardiovascular stability with less nausea and vomiting when used in TIVA.⁷ Tramadol is synthetic opioid, it stimulates the mu receptor and also decreases the reuptake of norepinephrine and serotonin.⁶ Opioid and nonopioid mechanism of action acts synergistically but analgesia is mainly due to nonopioid receptor mechanism.^{8,9} Robert et al described manual infusion scheme for target blood propofol concentration of 3 mcg/ml consisted of loading dose of 1mg/kg followed by an infusion of 10mg/kg/hr for 10 minutes, 8 mg/kg/hr for next 10 minutes and 6 mg/kg/hr thereafter.⁴

In our study, pain scores on VAS were significantly less in nalbuphine group after 3rd postoperative hours, means nalbuphine had better pain control than tramadol. Bone ME et al compared nalbuphine and fentanyl and found nalbuphine had significantly lower pain score than fentanyl.¹⁰ Khalid et al compared nalbuphine and tramadol in dilatation and evacuation and found nalbuphine had better pain control than tramadol.¹¹ Daina MG et al compared nalbuphine with tramadol and reported that more rescue analgesia was required in nalbuphine group compared to tramadol group.¹² Intraoperative and postoperative hemodynamic changes were comparable in both the groups, the result of our study was supported by study of Kamath SS et al.¹³ Postoperative sedation score was insignificant at 1st hour between the groups while significantly more in nalbuphine group at 2nd and 4th hours. Solanki RN et al found average sedation score was significantly higher in nalbuphine group (1.025) than tramadol group (0.125).¹⁴ Liaqat N et al reported that mean time for requirement of rescue analgesic was statistically insignificant between nalbuphine and tramadol.¹⁵ Incidence of nausea and vomiting was found significantly high in tramadol group in our study. Previous studies also document higher incidence of PONV in tramadol.^{13,14,16}

CONCLUSION

We conclude that nalbuphine is better analgesic than tramadol for short surgical procedures, as it provides better relief of postoperative pain with good sedation, hemodynamic stability and lower incidence of PONV.

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