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'Comparison of Analgesic Effects of Tramadol and Butorphanol in Reduction of Propofol Induced Pain '

Dr.S.Vinaya kumar[1], Dr.V.Uday kiran[2], Dr.A.Venkateswara rao[3], Dr.Kirankumar gera[4]

[1]*(Associate professor, Department of anaesthesiology, Siddhartha medical college/ NTR University of health sciences, Andhra Pradesh,India)*
[2]*(Post graduate,Department of anaesthesiology, Siddhartha medical college/ NTR University of health sciences, Andhra Pradesh,India))*
[3]*(Professor,Department of anaesthesiology, Siddhartha medical college/ NTR University of health sciences, Andhra Pradesh,India)*
[4]*(Associate professor,Department of anaesthesiology, Siddhartha medical college/ NTR University of health sciences, Andhra Pradesh,India)*

Abstract:
Background*: Propofol is a commonly used drug for induction of Anaesthesia because of its rapid onset and short duration of action, easy titration and favorable profile for side-effects. It is well known that intravenous injection of Propofol is associated with pain. The mechanism of Propofol injection pain is still unclear. The incidence ranges from 30-90% and is recognized as an unpleasant experience by the patient. Propofol premixed with Lignocaine or pre-treatment with lignocaine is time tested and accepted modality for alleviating IV Propofol induced pain. Tramadol synthetic opioid, butorphanol kappa agonist, Metoclopramideand Ondansetron have also been advocated.*
Aims and objectives*: To compare the efficacy of Tramadol and Butorphanol in reducing the pain induced by propofol injection. To study the side effects of the propofol and the study drugs.*
Materials and methods*: 60 patients aged between 18 to 60 yrs. belonging to ASA grade I & II were randomly divided into 2 groups in a double-blind manner, each group consists of 30 patients*
1. GROUP - received 50 mg of tramadol diluted to 3cc
2. GROUP - received 1 mg of butorphanol diluted to 3cc
Patients were preoxygenated with 100% oxygen for 3 min. A tourniquet was applied and inflated to 70 mm Hg in which the IV line was secured. Then the study drugs were administered through IV cannula at the rate of 0.5 ml/s. After 2 min of injecting the study drug, tourniquet was deflated and immediately injection propofol 2 mg/kg at the rate of 0.5 ml/s was administered for induction of anesthesia.
The pain score results obtained are tabulated and analyzed.
Results:*Comparing pain during propofol injection 16.7% in tramadol group and 50.0% in butorphanol group did not have any pain,30.0% in tramadol group and 43.3% in butorphanol group had mild pain, 43.3% in tramadol group and 6.7% in butorphanol group had moderate pain,10.0% in tramadol group and 0% in butorphanol group had severe pain.*
Difference between two groups is statistically significant.
Conclusion: *Comparing pain during propofol injection 16.7% in tramadol group and 50.0% in butorphanol group did not have any pain,30.0% in tramadol group and 43.3% in butorphanol group had mild pain, 43.3% in tramadol group and 6.7% in butorphanol group had moderate pain,10.0% in tramadol group and 0% in butorphanol group had severe pain.*
Difference between two groups is statistically significant.
Key Word*: Propofol; tramadol; Butorphanol;*

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I. Introduction

Propofol is a commonly used drug for induction of Anaesthesia because of its rapid onset and short duration of action, easy titration and favorable profile for side-effects. It is well known that intravenous injection of Propofol is associated with pain. The mechanism of Propofol injection pain is still unclear. The incidence ranges from 30-90% and is recognized as an unpleasant experience by the patient

Propofol premixed with Lignocaine or pre-treatment with lignocaine is time tested and accepted modality for alleviating IV Propofol induced pain. Tramadol synthetic opioid, butorphanol kappa agonist, Metoclopramideand Ondansetron have also been advocated

II. Material and Methods

This prospective comparative study was carried out on patients of Department of Anaesthsiology, Siddhartha medical college and general hospital, Vijayawada, Andhra Pradesh from November 2018 to November 2019. A total 60 adult subjects (both male and females) of aged ≥ 18, years were for in this study.

Study Design: Prospective open label observational study

Study Location: This was a tertiary care teaching hospital-based study done in Department of Anaesthsiology, Siddhartha medical college and general hospital, Vijayawada, Andhra Pradesh

Study Duration: November 2018 to November 2019.

Sample size: 60 patients.

Inclusion criteria:

1. The study includes 60 patients between 18-60 years of age under ASA 1 and ASA 2 scheduled for elective surgeries.

Exclusion criteria:

1. Patient refusal
2. Patients with difficulty in communication.
3. Patients with ASA grade 3 and 4
4. Patients with a past history of adverse effect to Propofol, Tramadol and Butorphanol.
5. Patient with H/O epilepsy, cardiac conducting defects, patients on antiarrhythmic drugs, analgesics.
6. Patients with disorders of lipid metabolism.
7. Patients with H/O chronic pain syndromes, thrombophlebitis, neurological diseases.

Procedure methodology

On the day prior to surgery pre anaesthetic evaluation was done and detailed history of cardiovascular system, respiratory system, central nervous system, drug therapy and drug allergy were taken. General Physical Examination, systemic examination& Airway assessment was done.

All patients were explained about the anaesthetic technique & written informed consent taken. Patients were kept NPO for 8hrs prior to surgery.

Routine investigation done. No specific investigations were required pertaining to the study. 60 patients aged between 18 to 60 yrs. belonging to ASA grade I & II were randomly divided into 2 groups in a double-blind manner, each group consists of 30 patients

1. GROUP - received 50 mg of tramadol diluted to 3cc
2. GROUP - received 1 mg of butorphanol diluted to 3cc

Patients were preoxygenated with 100% oxygen for 3 min. A tourniquet was applied and inflated to 70 mm Hg in which the IV line was secured. Then the study drugs were administered through IV cannula at the rate of 0.5 ml/s. After 2 min of injecting the study drug, tourniquet was deflated and immediately injection propofol 2 mg/kg at the rate of 0.5 ml/s was administered for induction of anesthesia.

The pain score results obtained are tabulated and analyzed

PAIN SCORE	SEVERITY OF PAIN
0	No pain when asked 30 seconds after injection
1	Complaint of pain when asked 30 seconds after start of injection
2	Spontaneous complaint of pain by patients
3	Spontaneous complaint of pain associated with grimacing or withdrawal of hand during injection

Statistical analysis

Descriptive data is presented as Mean ±SD and in percentage. Multiple group comparisons were made by one-way ANOVA followed by unpaired t test for pair wise comparison for all the tests.

A "P" value of<0.05 was considered for statistical significance

III. Discussion

The results of this study imply a significant reduction in pain on propofol administration after pre-treatment with butorphanol in comparison to the tramadol group. Intergroup comparison revealed that the incidence and severity of pain with propofol injection was less in the study butorphanol group when compared to the tramadol group.

Opiates were shown to exert peripheral analgesic action in addition to their well-known central effects though a clear-cut discrimination between peripheral and central analgesics is debatable.

Moreover, peripheral opioid receptors have been described and shown to mediate analgesic effect when activated by opioid agonists. The analgesic effect observed in this study with both tramadol and butorphanol can be attributed to the peripheral analgesic effect secondary to their venous retention for 2 min. Tramadol is a centrally acting weak μ-receptor agonist which inhibits noradrenaline re-uptake as well as promotes serotonin release, potentiates the monoaminergic system and can be used to treat moderate and severe pain. In addition to its systemic effect, the local anesthetic effect of tramadol on peripheral nerves has been shown in both clinically and laboratory studies.

Desmeules et al. confirmed that the analgesic effect of tramadol is apportioned between the opioid and monoaminergic components.

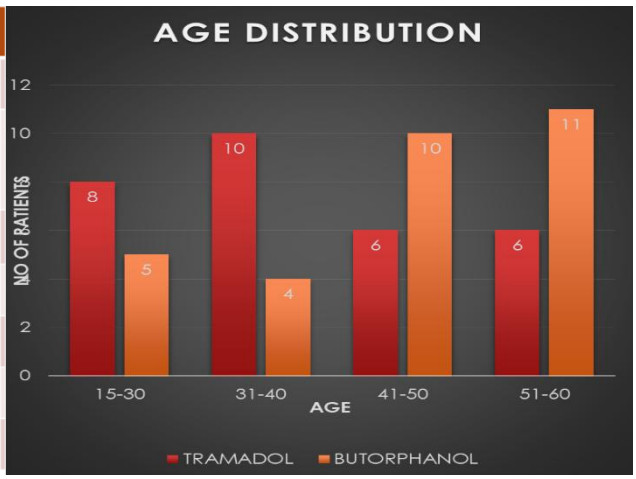
Jou et al. suggested that tramadol affects sensory and motor nerve conduction by a similar mechanism to that of lidocaine which acts on the voltage-dependent sodium channel leading to axonal blockage.Butorphanol is 5-8 times more potent than morphine. After the IV administration, the onset of analgesia occurs within 1 min with a peak effect in about 4-5 min.

The site of action of butorphanol in reducing the pain of propofol injection is not clear, but it could be either through opioid receptors (central and or peripheral), local anesthetic action, or both.

IV. Observation and Results

AGE DISTRIBUTION

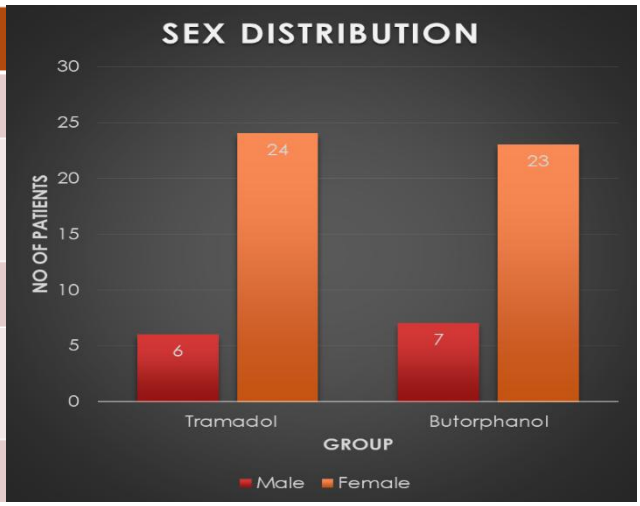
AGE IN YRS	GROUP			
	tramadol		butorphanol	
	Count	% within GROUP	Count	% within GROUP
18-30	8	26.7%	5	16.7%
31-40	10	33.3%	4	13.3%
41-50	6	20.0%	10	33.3%
51-60	6	20.0%	11	36.7%
Total	30	100%	30	100%



Contingency Coefficient 0.260 P value -0.365

SEXDISRIBUTION

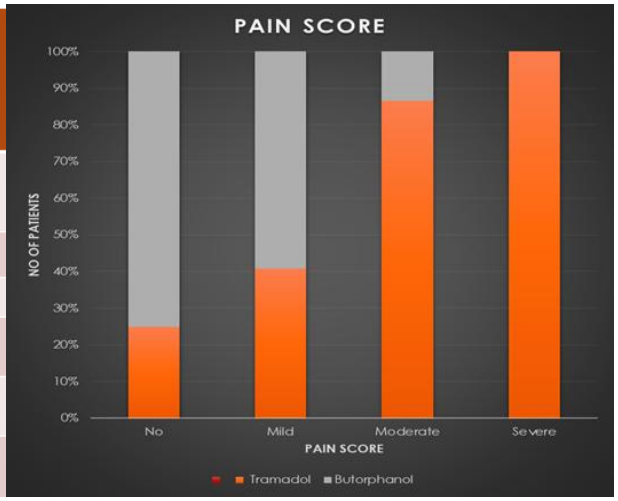
SEX	GROUP			
	tramadol		butorphanol	
	Count	% within GROUP	Count	% within GROUP
Male	6	20.0%	7	23.3%
Female	24	80.0%	23	76.7%
Total	30	100%	30	100%



Contingency Coefficient 0.064 P value -0.830

PAIN SCORE

PAIN GRADING	GROUP				Total	
	Tramadol		Butorphanol			
	Count	% within GROUP	Count	% within GROUP	Count	% within GROUP
No	5	16.7%	15	50.0%	42	46.7%
Mild	9	30.0%	13	43.3%	28	31.1%
Moderate	13	43.3%	2	6.7%	16	17.8%
Severe	3	10.0%	0	0%	4	4.4%
	30	100%	30	100%	90	100%



CONTINGENCY COEFFICIENT 0.519 P VALUE <0.01

Comparing pain during propofol injection 16.7% in tramadol group and 50.0% in butorphanol group did not have any pain,30.0% in tramadol group and 43.3% in butorphanol group had mild pain, 43.3% in tramadol group and 6.7% in butorphanol group had moderate pain,10.0% in tramadol group and 0% in butorphanol group had severe pain.

Difference between two groups is statistically significant.

V. Conclusion

Thus, we conclude that pretreatment with perioperatively used opioids tramadol 50 mg or butorphanol 1 mg effectively reduced the pain of propofol injection with fewer self-limiting mild side effects such as pruritus and erythema.

statistical significance is achieved among both study drugs. We conclude that butorphanol is effective in reducing propofol induced pain when compared with tramadol.

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