



COMPARISON OF PROPOFOL WITH BUTORPHANOL AND PROPOFOL WITH NALBUPHINE FOR TOTAL INTRAVENOUS ANAESTHESIA IN SHORT SURGICAL PROCEDURES

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ABSTRACT

Total intravenous anaesthesia (TIVA) is defined as a technique of anaesthesia which involves the use of only intravenous drugs. In this study, the combination of Propofol with Nalbuphine was compared with Propofol with Butorphanol in a double blinded prospective trial in patients undergoing general anaesthesia for short surgery. 80 patients belonging to ASA grade I and II of either sex undergoing short surgeries under TIVA were included in our study. Patients were randomized equally into 2 groups with 40 patients each. Group I received Nalbuphine with Propofol and Group II received Butorphanol with Propofol. Blood pressure, MAP and heart rate were monitored every 5 minutes till the end of surgery.

The changes in heart rate and MAP between the two groups was not significant but group II had increased blood pressure a few times during surgery. The emergence time was significantly prolonged in Nalbuphine group.

KEYWORDS : Propofol, Nalbuphine, Butorphanol, TIVA,

Total intravenous anaesthesia (TIVA) is defined as a technique of anaesthesia which involves the use of only intravenous drugs for anaesthesia. It was first attempted in 1652¹. Various combinations have been used, there is still a search for the best combinations of drug and techniques with minimum side effects, rapid recovery, rapid onset, and early discharge.

TIVA can be used with either spontaneous ventilation in short surgical procedure or with endotracheal intubation in long surgical procedure. TIVA has some advantages over inhalational agents such as decreased nausea and vomiting, early recovery and avoiding the agents that cause malignant hyperthermia².

It was difficult in older times to do anaesthesia under TIVA due to unavailability of syringe pumps and fear of awareness. But now newer short-acting agents with combinations of syringe pumps and target controlled infusion have made TIVA a popular method³.

Nalbuphine is distinguished from other agonist-antagonist analgesics in having greater antagonist activity at μ receptors and fewer behavioural effects at analgesic doses than Pentazocine or Buprenorphine^{4,5}.

Propofol is an intravenous hypnotic drug that is used for induction and maintenance of sedation and general anaesthesia. It exerts its effects through potentiating the inhibitory neurotransmitter γ -aminobutyric acid (GABA) at the GABA_A receptor⁶. It has high clearance and rapid decline in the blood concentration or the context sensitive half time is less for propofol.

Butorphanol tartrate is a mixed agonist antagonist. It is an agonist at kappa receptors and partial antagonist at μ receptor⁷.

In this study, the combination of Propofol with Nalbuphine was compared with Propofol with Butorphanol in a double blinded prospective trial in patients undergoing general anaesthesia for short surgery.

Hemodynamic variables and time to recovery were compared.

MATERIAL AND METHODS

After approval from institutional ethical and scientific committee and after written and fully informed consent of 80 patients belonging to ASA grade I and II of either sex undergoing short surgeries under TIVA were included in our study.

The study was double blinded prospective observational study.

80 patients were randomized equally into two groups to receive either Propofol with Nalbuphine or Propofol with Butorphanol.

Group I

Nalbuphine with Propofol.

Group II

Butorphanol with Propofol.

INCLUSION:

1. Patients ranged from 18-60 years of age.
2. ASA I and II.
3. Patients undergoing elective surgery that has a maximum duration of 30 minutes.
4. Surgeries in supine position only.

EXCLUSION:

1. Patients allergic to Propofol, Nalbuphine or Butorphanol.
2. Patients requiring intubation.
3. Hypotensive patients.
4. Patients presenting with any neurological or psychological condition.
5. Full stomach patients, difficult airway patients.

All patients were visited preoperatively and pre anaesthesia check-up was completed, present history, past history, allergic history, physical examination, and laboratory examinations were done including ECG. Using computer generated randomization; patients were allotted into two groups comprising 40 patients each Group I and Group II

All patients were kept NPO for 8 hours; premedicated with Inj Ranitidine 50 mg I.V.

On reaching the operation theatre, electrocardiogram, non-invasive blood pressure, oxygen saturation, and temperature were recorded. Ringer's lactate was started after securing a 20 G intravenous cannula. Glycopyrrolate 0.2 mg, Midazolam 0.02 mg/kg and Nalbuphine 0.1 mg/kg I.V or Butorphanol 20 mcg/kg were injected.

After 5 minutes of the analgesics dose, Inj Propofol 2 mg/kg was given I.V slowly over 1 min. Then the maintenance of anaesthesia was started with Propofol as a stepped down scheme. Propofol 125 mcg/kg/min for the first 10 minutes then 100 mcg/kg/min for the next 10 minutes followed by 75 mcg/kg/min till the end of surgery.

All patients were kept on spontaneous ventilation and were given oxygen using Hudson mask @5 ltr/ min.

Blood pressure both systolic and diastolic, mean blood pressure and heart rate were monitored every 5 minutes till the surgery is finished.

Intraoperative depth of anaesthesia was monitored using clinical signs like rise in blood pressure, heart rate, limb movement, lacrimation and sweating.

Postoperative sedation was monitored every 2 minutes using Ramsay sedation score.

The patient was monitored until the score reached 3.

Ramsay Sedation Score

- Score 1 Anxious, agitated, restless
- Score 2 Cooperative, oriented, tranquil
- Score 3 Responsive to commands only
- Score 4 Brisk response to light glabellar tap or loud auditory stimulus
- Score 5 Sluggish response to light glabellar tap or loud auditory stimulus
- Score 6 No response to light glabellar tap or loud auditory stimulus

The obtained results were sent for statistical analysis. P value less than 0.05 was considered significant.

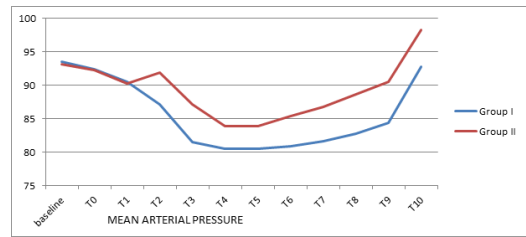
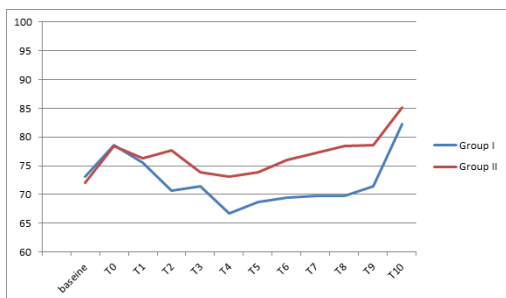
RESULTS

Parameter	Group I (40)	Group II (40)	P VALUE
Age in years	35.25±9.523	35.47±9.80	0.857
Weight in kg	59.85±6.51	58.7±5.23	0.1760
Sex M/F	19/21	18/22	
ASA I/II	27/13	26/14	
Duration Of Surgery	26.2±1.98	26.52±1.99	0.9751

RECORDING

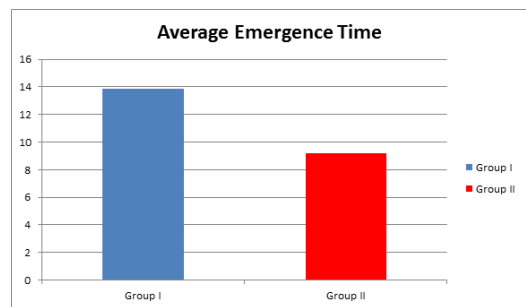
- Baseline
- T0 - Before giving Butorphanol or Nalbuphine.
- T1 - 1 minute after giving Butorphanol or Nalbuphine.
- T2 - 5 minutes after Butorphanol or Nalbuphine.
- T3 - 2 minutes after giving propofol.
- T4 - At time of incision or procedures.
- T5 - 5 minutes after incision or procedures.
- T6 - 10 minutes after incision or procedures.
- T7 - 15 minutes after incision or procedures.
- T8 - 20 minutes after incision or procedures.
- T9 - At the end of surgery.
- T10 - At minimum sedation score 3.

Heart Rate	Group I	Group II	P value
Baseline	73.05±4.31	72.02±0.63	0.6323
T0	78.60± 5.87	78.45±0.74	0.749
T1	75.55±6.02	76.35±0.60	0.600
T2	70.75±5.41	77.72±0.16	0.163
T3	71.42± 5.28	73.90±0.11	0.112
T4	66.67± 5.12	73.07±0.21	0.213
T5	68.70± 4.50	73.92±0.08	0.083
T6	69.52± 4.45	76.05±0.07	0.076
T7	69.70± 4.39	77.22±0.11	0.111
T8	69.75± 4.97	78.40±0.40	0.401
T9	71.47± 4.66	78.57±0.09	0.097
T10	82.25± 5.36	85.20±0.41	0.415



Mean Blood Pressure	Group I	Group II	P value
Baseline	93.57± 5.91	93.22± 4.98	0.28
T0	92.35± 5.54	92.30± 5.50	0.96
T1	90.57± 4.86	90.32± 5.75	0.29
T2	87.20± 4.22	91.95± 6.27	0.01
T3	81.57± 3.96	87.10± 5.34	0.06
T4	80.50± 3.31	83.95± 4.81	0.02
T5	80.52± 3.33	83.85± 4.14	0.17
T6	80.85± 3.46	85.42± 3.94	0.42
T7	81.70± 3.06	86.82± 3.78	0.19
T8	82.80± 3.32	88.65± 3.73	0.47
T9	84.47± 3.35	90.55± 3.84	0.39
T10	92.82± 3.72	98.25± 3.69	0.95

Average Emergence Time	Group I	Group II	P value
Time in minutes	13.85± 2.178	9.225±1.576	0.0467



DISCUSSION

In the time when outpatient ambulatory surgeries are gaining popularity, the role of anaesthesia technique that decreases hospital stay and has few adverse effects such as nausea and vomiting is gaining importance.

Earlier we didn't have drugs that are safe and short acting. Fentanyl is the best drug for these procedures but the non-availability of Fentanyl in certain institutions led to the search of other available alternatives. Butorphanol and Nalbuphine, are being increasingly employed as intravenous sedation agents. Both are equianalgesic and Nalbuphine is equipotent with Morphine parenterally. Their pharmacokinetics are similar; Nalbuphine has a longer duration of action. Both may precipitate an abstinence syndrome in narcotic-dependent persons and will probably be associated with low-level drug abuse potential. They are both agonists of the κ opioid receptor and partial agonists of the μ receptor. Butorphanol is a partial agonist of the σ receptor responsible for psychotomimetic effects. The incidence of adverse effects is low, sedation being the most common. In cardiac-risk patients, Nalbuphine does not increase cardiac work or oxygen requirements; nor do increasing doses of Nalbuphine increase the duration of respiratory depression. Both drugs possess plateau respiratory depressant actions⁸. In our study, the aim was to compare Nalbuphine and Butorphanol with Propofol and find out its effect on hemodynamics and time to recovery.

CONCLUSION

In our study, the heart rate between the two groups was not significant. There was a significant fall in mean arterial pressure in both groups compared to their pre-operative values.

The mean arterial pressure between the two groups was not significant for majority of time but group II had increased blood pressure a few times during surgery.

Depth of anaesthesia was adequate in both groups.
The emergence time was significantly prolonged in Nalbuphine group.

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