



Intra Venous Butorphanol versus Intravenous Nalbuphine for (Intra Operative) Balanced Anaesthesia and Post Operative Analgesic Effect in Patients Undergoing Laparoscopic Surgery

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Laparoscopic surgery has replaced many of the open surgeries because of its advantages. Both the groups of drugs have hemodynamic stability, analgesia, sedation and decrease the requirement of other anesthetic drugs. So we have chosen Butorphanol and Nalbuphine to study the analgesia and hemodynamic changes in both groups. In our study mean heart rate was lower in Butorphanol group compare to Nalbuphine group. Similarly fifty patients of ASA I&II scheduled for elective laparoscopic surgery, were randomized in to butorphanol group and nalbuphine group. It was observed that there was significant rise in systolic blood pressure & Diastolic Blood pressure after intubation in fentanyl group compare to Butorphanol. This study finds that suppression of sympathetic response to laryngoscopy and intubation was better with Butorphanol than Fentanyl. This study analysis indicates that both Butorphanol and Nalbuphine help in maintaining a steady haemodynamic state all throughout the procedure.

Keywords: *Haemodynaics; butorphanol; fentanyl.*

1. INTRODUCTION

Nalbuphine is a semi-synthetic opioid agonist-antagonist. Indicated for the relief of moderate to severe pain. It can also be used as a supplement to balanced anaesthesia, for preoperative and postoperative analgesia, and for obstetrical analgesia during labor and delivery [1,2].

Butorphanol is a morphinan-type synthetic agonist-antagonist opioids analgesic. The most common indication for butorphanol is management of moderate to severe pain, as a supplement for balanced general anaesthesia. Butorphanol is also quite effective at reducing post-operative shivering [3].

Laparoscopic surgeries is also known as minimally invasive surgical procedures which are performed with assistance of video surgery pneumoperitoneum should be created by insufflation with air or carbon dioxide. The created pneumoperitoneum causes several pathophysiological changes during the surgery such as increase in systemic and pulmonary vascular resistance and extreme patient positioning.

Nalbuphine is a semi-synthetic opioid agonist-antagonist. Butorphanol is a morphinan-type synthetic agonist-antagonist opioids analgesic. Laparoscopic surgery is an invasive surgical procedures during which pneumoperitoneum is created which causes several pathophysiological changes during the surgery such as increase in systemic and pulmonary vascular resistance and extreme patient positioning [4-6]. Hence this study is to compare the hemodynamic stability of Intra venous Butorphanol and Intra venous Nalbuphine for (intra operative) balanced anaesthesia and post-operative analgesic effect in patients undergoing laparoscopic surgeries.

2. METHODOLOGY

2.1 Source of Data Collection

The study group (60) comprise of patients admitted in the hospital for laparoscopic surgeries. The study group was not blinded in the study period.

2.2 Method of Data Collection

2.2.1 Inclusion criteria

- Male/Female patients of age group 20 to 60 yrs.

- ASA I and ASA II.
- Scheduled for elective laparoscopic surgeries.

2.2.2 Exclusion criteria

- Patients using beta blockers, calcium channel blockers, angiotensin converting enzyme inhibitors.
- Patients above 20 years of age and below 60 years of age.
- Patients with history of cardiac, pulmonary, hepatic and renal diseases.
- Patients undergoing non-laparoscopic surgeries.
- Patients with difficult airway
- History of allergy to the study drug.
- Pregnancy. Patient unwillingness.

2.3 Preanaesthetic Evaluation

Patients were visited on the previous day of surgery, and the procedure was explained to them. A detailed medical history was taken, and systemic Examinations were carried out and relevant investigations were advised. Patients were given tab. Ranitidine 150 mg and tab alprazolam 0.25 mg the previous night. Nil per oral status of 8 hrs was maintained for all patients.

The study group of 60 patients (ASA I & II) physical status aged 20-60 years were selected who were scheduled to undergo elective laparoscopic surgeries. They were randomized and allotted into two groups.

Group B received Inj Butorphanol 20 mc g/kg IV before induction (n=30) With Inj propofol 2 mg/kg IV and Group N received Inj Nalbuphine 0.2 mg/kg with Inj propofol 2 mg/kg Iv-(n=30).

2.4 Parameters those were Observed and Analyzed

Hemodynamic stability during the surgery were assessed for the following parameters-Heart rate, systolic blood pressure (SBP), diastolic blood pressure (DBP), End tidal Carbon dioxide (EtC O₂) and oxygen saturation were observed and recorded at baseline, after administering the drug, after intubation, insufflation of Co₂, at 30 and 45 minutes and after extubation.

2.5 Statistical Tools

The information collected regarding all the selected cases were recorded in Master. Data analysis was done with the help of computer using Epidemiological Information Package (EPI 2008).

Using this software range, frequencies, percentages, means, standard deviations, chi square and 'p' values were calculated. Kruskal Wallis chi-square test was used to test the significance of difference between quantitative variables and Yate's test for qualitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

The study group (60) comprise of patients admitted in the hospital for laparoscopic surgeries. The patients randomly assigned to one of two groups (B&N), of which one group is Injected with Butorphanol (20 mcg/kg) and the other with Nalbuphine (0.2 mg) after which, post- extubation, vital parameters, sedation score, anxiety scores were recorded.

3. RESULTS

Both the Groups B and N were statistically comparable with regard to the mean heart rate where it was statistically insignificant ($P > 0.05$) during the baseline and after administering the drug (Table 1).

Table 1. Mean heart rates

Variables	Group B		Group N		p - value
	Range	Mean±SD	Range	Mean±SD	
Baseline	60 - 112	82.9 ±12.23	63 -110	86.20 ±12.70	0.309
After administering the drug	55 - 90	74.17 ±12.79	60 -118	80.23 ±14.02	0.067
After intubation	54 - 104	76.17 ±10.27	70 -118	89.87 ±3.31	0.003
After insufflation of Co ₂	55 - 102	79.03 ±12.62	68 -124	89.43 ±12.44	0.004
After 30 minutes	55 - 105	77.80 ±11.40	60 -124	85.97 ±12.25	0.012
After 45 minutes	55 - 110	77.50 ±11.90	65 -127	86.43 ±12.41	0.000
After Extubation	60 - 95	79.27 ±8.87	62 - 106	84.27 ±10.02	0.021
Post Op	60 - 95	79.43 ±9.23	65 -123	85.14 ±10.15	0.004
Grand Mean		78.2838		85.9425	
p-value				0.0241	

Groups B and N were statistically comparable with regard to the systolic blood pressure where it was statistically insignificant in both systolic and diastolic pressure. Both the Groups B and N were statistically comparable with regard to the oxygen saturation where it was statistically insignificant ($P > 0.05$) at all point of time i.e., during the baseline, after administering the drug, after intubation

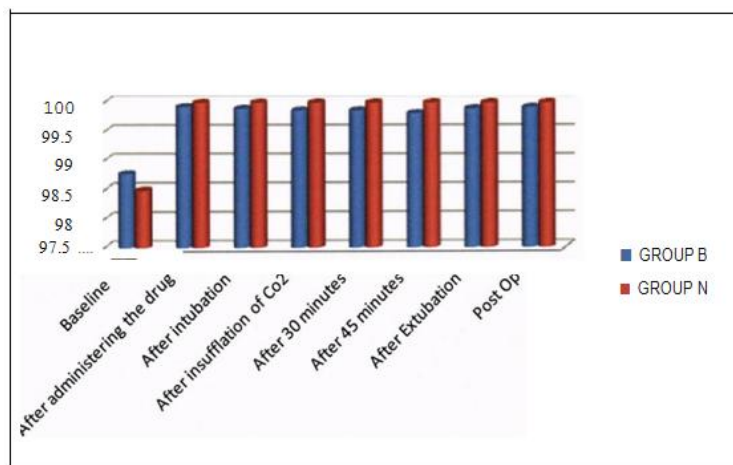


Fig. 1. Oxygen saturation comparison

Both the Groups B and N were statistically comparable with regard to the mean heart rate where it was statistically insignificant ($P > 0.05$) during the baseline and after administering the drug. However, it was statistically significant ($P < 0.05$) after intubation, after insufflation of CO₂, after 30 minutes, after 45 minutes, after extubation and during Post operative period

Table 2. Diastolic blood pressure comparison

Variables	Group B		Group N		p - value
	Range	Mean±SD	Range	Mean±SD	
Baseline	62 - 100	80.3±9.24	53 -107	85.27 ±12.16	0.0802
After administering the drug	54 - 96	77.2±10.63	50 - 88	71.37 ± 8.88	0.0612
After intubation	57 - 109	83.53 ±12.35	60 -116	89.73± 12.51	0.0592
After insufflations of CO ₂	61 - 102	76.53± 9.95	56 -106	82.23 ± 12.12	0.0480
After 30 minutes	60 - 100	76.88 ±9.44	57 -100	81.14 ±12.55	0.0410
After 45 minutes	58-105	77.76 ±11.84	56 - 98	79.44 ±12.41	0.0090
After Extubation	51 - 100	79.70±11.65	60 - 97	78.87 ±10.92	0.0041
Post Op	53 - 104	79.94 ±10.98	62 -100	79.02 ±10.52	0.0104
Grand Mean		78.98		80.8838	
p-value					0.0001

Both the Groups B and N were statistically comparable with regard to the diastolic blood pressure where it was statistically insignificant ($P > 0.05$) during the baseline and after administering the drug. However, it was statistically significant ($P < 0.05$) after intubation, after insufflation of CO₂, after 30 minutes, after 45 minutes, after extubation and during post-operative period

Table 3. Ramsay sedation score

Variables	Group B		Group N		p-value
	Mean	SD	Mean	SD	
Pre-Op	1.72	0.67	1.17	0.41	0.0074
Post-Op 0 hour	2.76	0.62	2.03	0.59	0.0010
Post-Op 1 st hour	2.41	0.51	1.62	0.42	0.0012
Post-Op 2 nd hour	2.39	0.43	1.63	0.51	0.0002
Post-Op 4 th hour	1.94	0.59	1.17	0.32	0.0001
Post-Op 6 th hour	1.42	0.47	1.04	0.07	0.0004
Post-Op 8 th hour	1.39	0.43	1.09	0.02	0.0120
Grand Mean	1.91		1.31		
p-value					0.0024

Among the cases, with respect to the Ramsay Sedation Score, both the groups were statistically comparable and were statistically significant ($P < 0.05$) at 1 hour, 2 hours, 4 hours, at 6 hours and 8 hours

4. DISCUSSION

Both the group of drugs has hemodynamic stability, analgesia, sedation and decreases the requirement of other anesthetic drugs. So we have chosen Butorphanol and Nalbuphine to study the analgesia and hemodynamic changes in both groups. mean heart rate was lower in Butorphanol group compare to Nalbuphine group. Post-operative sedation and analgesia remained for longer duration in Butorphanol group as compared to nalbuphine group Similar study conducted by Bill D. Atkinson, Linda J. Truitt, et al. [7,8] concluded that Butorphanol provided better hemodynamics than Fentanyl. However the rise in heart rate and blood pressure were not up to the 20% of pre-operative value. There was no significant effect in oxygen saturation or EtCO₂ values. Rao satyanarayana V, Srinivas B, Muralidar A, et al comparison of butorphanol and fentanyl for balanced anaesthesia in patients undergoing laparoscopic surgeries under general anaesthesia. Fifty patients of ASA I & II scheduled for elective laparoscopic surgery, were randomized in to butorphanol group and

nalbuphine group. There was significant rise in systolic blood pressure & Diastolic Blood pressure after intubation in fentanyl group compare to Butorphanol the observations are similar to our study. Shital S. Shweta Mhambrey, SambharanaNayak, et al. [9] study to compare effect of equipotent dose of butorphanol versus fentanyl on intraoperative and postoperative recovery characteristic in patient undergoing laparoscopic surgery. From the results it was found that Butorphanol 20mcg/kg prevents response to endotracheal intubation to a greater extent than Fentanyl 1 mcg/kg. The observations are similar to our study.

5. CONCLUSION

We found that Butorphanol and Nalbuphine were cardio stable, but there was significant fall in heart rate and diastolic blood pressure in patients who received Butorphanol as premedication as compared to the patients who received Nalbuphine, in which there was rise in heart rate and blood pressure intraoperatively. However the rise in heart rate and blood pressure were not up to the 20% of pre-

operative value. There was no significant effect in oxygen saturation or EtCO₂ values. Post-operative sedation and analgesia remained for longer duration in Butorphanol group as compared to nalbuphine group.

CONSENT

An informed valid consent was taken from all the patients.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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