

A comparison of haemodynamic responses with pethidine vs. butorphanol in open cholecystectomy cases

Tabedar S¹, Maharjan SK¹, Shrestha BR¹, Shrestha S¹

¹Lecturers, Dept. of Anaesthesiology, Kathmandu Medical College (TH), Sinamangal, KTM

Abstract

Objective: The present study was undertaken to compare the haemodynamic responses with pethidine vs. Butorphanol intraoperatively in open cholecystectomy cases in KMCTH.

Method: In this randomized study, all together 40 patients undergoing routine cholecystectomy surgery were included. Group A received Pethidine 1mg/kg and Group B received Butorphanol 0.04mg/kg intraoperatively. Heart rate and blood pressure were recorded before injection of the drug, after injection, before intubation, after intubation, before skin incision, after incision, before extubation and after extubation Data analysis was done using independent sample “t” test.

Result: Our study showed no statistical significance in haemodynamic responses with either pethidine or Butorphanol in open cholecystectomy cases.

Conclusion: Both drugs appear equally good analgesics in our study.

Key words: analgesics, pethidine, Butorphanol, haemodynamic responses, surgery, cholecystectomy.

Adequate analgesia is one of the important components of balanced anaesthesia, without which, patients experience pain and this finally results haemodynamic alterations in the Perioperative period. Profound haemodynamic changes are not desirable, rather causes deleterious effects in cardiovascular compromised patients.

Pharmacological treatment is commonly used in the multimode of pain management. Opioid remain the mainstay of analgesic medication for the treatment of both acute and chronic pain. There has always been a need of ideal opioid with good analgesic efficacy, negligible side effects and least potential for abuse.

Amongst the available opioid, morphine causes undesirable side effects like nausea, vomiting, itching and fall in blood pressure, liability of drug dependence and abuse property.

Pethidine increases heart rate due to its atropine like action whereas pentazocine limits its use in hypertensive and ischemic heart disease patients due to its sympathetic stimulant action.

Adequate sedation and analgesia during induction helps to blunt the stress response caused by

laryngoscopy and intubation, which means that then after, there will not be a sudden and excessive rise of HR and BP which is a beneficial aspect of anaesthetic practice. Various drugs have been used for this purpose and one of them thought to be useful is Butorphanol Tartrate. Newly launched Butorphanol is a mixed agonist and antagonist non narcotic opioid analgesic which has an agonistic action on κ -receptor and agonist - antagonistic action on μ -receptor. In different clinical trials, its analgesic potency has been found to be 7 times more potent than morphine, 20-40 times more potent than pethidine and 20 times more potent than pentazocine.

This drug can be used intravenously/intramuscularly and intranasally. Onset of action is quick; sedation is achieved within 1-2min. Following IV usage it produces analgesia for 3-4 hrs with a $T_{1/2}$ of 2.1-8.8 hrs. It is metabolized in liver and excreted through kidneys (80%-90%), faeces (10%-20%). Major metabolite of this drug is hydroxybutorphanol. Butorphanol has been found to cause side effects like heavy sedation, to some amount nausea vomiting, dysphoria, and respiratory depression.

Methodology

After obtaining approval from the institutional ethics committee and written informed consent we studied prospectively 40 adults of both sexes ASA I & ASA II aged 20-55years, weighing 35-75 kg's undergoing elective open cholecystectomies. Exclusion criteria were uncontrolled hypertension, diabetes, allergic to drugs, failed intubation at the first attempt, patients requiring vasopressors and Inotropes during operation, very long operations where extra dose of analgesics were required. Patients were allocated randomly into one of the two groups Pethidine or Butorphanol. Group A received injection Pethidine 1 mg/kg and group B received injection Butorphanol 0.04 mg/kg during induction. In both groups General anaesthesia was followed after the additional calculated dose of Sodium Thiopentone and

Succinylcholine, trachea was intubated with a cuffed endotracheal tube. Anaesthesia was then after maintained with Oxygen, Halothane and intermittent positive pressure ventilation and injection Pancuronium. At the end of the procedure trachea was extubated following reversal with Neostigmine and Atropine. Monitors used were HR, ECG, NIBP, SPO₂. HR and BP were recorded just before the injection of drug, 5 minute after the injection, just before intubation, immediately after intubation, just before skin incision, immediately after incision, just before extubation and immediately after extubation. Any side effects observed were also recorded. The results were reported as mean ± (SD). The statistical analysis was done with the help of independent sample "t" test and for all determinants P<0.05 was considered significant.

Results

Patient's characteristics:

Table 1. Patient's age group in the two groups

	Patient's characteristics	
	Group A	Group B
Age (years)	21-55	20-55
Mean	36.5±11.9	30.5±11.28

Table 2. Patient's weight in the two groups

	Group A	Group B
Body weight	35-75	42-72
Mean	53.64±11.1	55.78±7.96

The age and weight in two groups were comparable (table 1 and 2 above).

When heart rate, systolic and diastolic blood pressure of patients in both groups were studied in different time period intraoperatively i.e. before injection of drug, after injection of drug, before intubation, after

intubation, before skin incision, after skin incision, before tracheal extubation and after extubation, statistical analysis revealed no significant differences in Haemodynamic parameters any time during Intraoperative period, P>0.05, as shown in table III below.

Table 3. Haemodynamic changes during Intraoperative periods:

Intraop stages		Basal	After drug	Before intubation	After intubation	Before incision	After incision	Before extubation	After extubation
Haemodynamic									
Heart Rate bpm	Pethidine group	74.8 ± 8.8	87.0 ± 12.9	85.1 ± 12.07	91.3 ± 11.03	91.7 ± 10.7	99.1 ± 12.05	95.61 ± 13.4	93.3 ± 14.6
	Butorphanol group	73.2 ± 9.28	80 ± 5.39	80.06 ± 10.38	80.6 ± 13.4	77.06 ± 9.4	87.0 ± 19.66	90.6 ± 12.23	84.6 ± 12.5
	P value	0.67	0.135	0.234	0.246	0.103	0.106	0.355	0.144
SBP mmHg	Pethidine group	115 ± 14.6	128.9 ± 15.1	133.1 ± 16.9	146.9 ± 18.8	124.3 ± 2.5	128.2 ± 18.2	135.8 ± 11.8	132.9 ± 11.9
	Butorphanol group	117 ± 14.2	120.4 ± 8.9	125.8 ± 10.9	125.6 ± 20.3	118.3 ± 12.9	118.9 ± 12.1	135.4 ± 23.4	129.6 ± 16.0
	P value	0.714	0.134	0.248	0.248	0.265	0.180	0.963	0.569
DBP mmHg	Pethidine group	78 ± 13.2	86.8 ± 12.0	88.6 ± 11.6	102 ± 13.02	95.9 ± 20.3	88.8 ± 12.6	98.1 ± 22.2	85 ± 10.6
	Butorphanol group	79 ± 9.25	78.6 ± 14.2	87 ± 15.8	90.6 ± 17.7	98.06 ± 14.6	97.7 ± 17.0	100.8 ± 18.1	97.5 ± 22.1
	P value	0.817	0.180	0.774	0.97	0.775	0.148	0.747	0.673

One patient was excluded from the study from group A because of Intraoperative excessive bleeding and prolonged operation where extra Pethidine was supplemented.

Discussion

The use of intravenous narcotics in balanced anaesthesia is a well recognized technique in anaesthesia¹. The result from our study showed no statistically significant changes in Haemodynamic parameters when compared intraoperatively between two groups i.e. Pethidine and Butorphanol. In various other studies different results have been obtained when Butorphanol was compared with other analgesics.

A study by Schuring et. al 1976, 1978 showed that in anaesthetized dogs high, approximately equianalgesic IV doses of Butorphanol (0.75 mg/kg and morphine 3mg/kg) both rapidly decreased the mean arterial blood pressure but Morphine produce a mark decrease BP (77% vs. 21%) after 1-2 min of injection. The next study by Del pizzo 1976, revealed no significant differences between Pethidine 80mg and Butorphanol tartrate 2 or 4 mg used as a

preanaesthetic medication 90 minutes before surgery in 63 patients. In this double blind study comparison of intramuscular Butorphanol and Pethidine showed no significant changes in blood pressure, heart rate, respiration intraoperatively and postoperatively as well³.

The study by Foldes et. al. 1975 showed no statistically significant Haemodynamic changes in 10 healthy volunteers receiving 0.03 or 0.06 mg/kg Butorphanol intravenously⁴.

In our study we found no statistically significant differences in heart rate and blood pressure in two groups. However in Butorphanol group 60% (12/20) patients experienced sedation prior to induction and 15% (3/20) had psychomimetic effects in the postoperative period. 25% (5/20). These undesirable effects were lacking in patients receiving Pethidine.

Conclusion

This randomized study of patients undergoing routine open cholecystectomy showed no significant statistical differences in Haemodynamic parameters between two drugs for balanced anaesthesia. Both

drug appeared equally effective analgesics for this type of surgery.

References

1. Dobkin AB, Arandia HY, Byles PH, et al. Butorphanol tartrate: safety and efficacy in balanced anaesthesia. *Can Anaesth Soc J* 1976; 23:601-8
2. Schuring et. al 1976, R.C. Heel, R.N. Brogden, T.M. Speight and G.S. Avery. Butorphanol: A review of its pharmacological properties and therapeutic

efficacy. Australian Drug Information Services, Auckland

3. Del pizzo. A double-blind study of the effects of Butorphanol compared with morphine in balanced anaesthesia. *Can Anaesth Soc J* 1978;25:392-7
4. Foldes 1976, Nagashima et. al. 1976. R.C. Heel, R.N. Brogden, T.M. Speight and G.S. Avery. Butorphanol: A review of its pharmacological properties and therapeutic efficacy. Australian Drug Information Services, Auckland