Indian Journal of Clinical Anaesthesia 2021;8(1):92–95

Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Clinical Anaesthesia

Journal homepage: www.ijca.in

Original Research Article

A comparison of hemodynamic profile of intraperitoneal instillation of ropivacaine versus bupivacaine in laparoscopic surgeries

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ARTICLE INFO

Article history:
Received 25-08-2020
Accepted 09-10-2020
Available online 15-03-2021

Keywords:
Haemodynamic
Laproscopic
Blood pressure
Heart Rate

ABSTRACT

Background: Inadequate pain relief in the postoperative phase is a well-known problem world-wide. Aside from the suffering caused by insufficient pain relief, this is an issue with potential adverse physiological and psychological consequences for patients in addition to financial draw backs for caregivers. Poorly managed pain may interfere with postoperative complications, cause patient suffering and prolong recovery. Patients may anticipate future medical interventions with greater anxiety if pain has not been managed effectively in the past.
Objective: To assess postoperative hemodynamics of intra peritoneal instillation of Ropivacaine and bupivacaine in Laparoscopic surgeries.
Materials and Methods: The present study was conducted at Sri Manakula Vinayagar Medical College and Hospital, Pondicherry in the Department of Anaesthesia. The double blinded randomized experimental study was conducted from October 2017 to May 2019.The sample size of 50 study subjects was selected using the mean pain score at 3.6 with 80% power and 95% confidence interval. In each of the group 25 study subjects were allotted based on randomization. All patients were instilled with 30 ml of solution in a standardized manner by the operating surgeon under vision before removal of trocar at the end of the surgical procedure. Group R received 30 ml (0.2%) ropivacaine and group B received 30 ml (0.25%) bupivacaine. The drugs were prepared and given to the investigator who was blind to the identity of drugs.
Results: The heart rate was found to be comparable between two groups at 10 min, 30 Min, 60 Min, 120 Min, 4 Hrs, 8 Hrs, 12 Hrs and at 24 hrs and the p value was found to be non-significant. The Systolic Blood pressure was found to be statistically significant between the two groups at 10 Min, 30 Min, 60 Min, 120 Min, 4 hrs, 8 Hrs and 12 hrs. Whereas at 24 hrs the difference of Systolic Blood Pressure was found to be non-significant.
Conclusion: Heart rate was similar in both the study groups at various time intervals. Systolic blood pressure and diastolic blood pressure was significantly high among patients in Bupivacaine group measures in most of the time intervals, while mean blood pressure differences were inconsistent over the follow up period.

1. Introduction

"The pain of surgery was torturous" said by Celsus in the pre anesthetic era. Pain is a Greek word derived from the name POINE, the Greek Goddess of revenge.

The International Association for the Study of Pain (IASP) defines Pain as ”an unpleasant sensory and emotional/affective and cognitive experience that is associated with actual or potential tissue damage or is described in terms of such damage”.[1] McCaffery defined pain as “what the patient says it is, and exists whenever the patient says it does”. International Association for the Study

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https://doi.org/10.18231/j.ijca.2021.017

of pain has defined pain as an "unpleasant sensory and emotional experience associated with actual or potential tissue damage. Pain is always underestimated and under treated. Pain relief is an important goal of Anesthesia. Any degree of pain is significant to a patient. It is argued that any amount of reduction in the pain is beneficial, when the treatment is not associated with any adverse effect. It makes a difference in duration of hospital stay and time of ambulation.

The highest achievable standard of health is enshrined in the 1948 Universal Declaration of Human Rights as a fundamental right of every human being (WHO, 2002). Post-operative Pain relief is part of that basic human right to health.[2]

Inadequate pain relief in the postoperative phase is a well-known problem world-wide. Aside from the suffering caused by insufficient pain relief, this is an issue with potential adverse physiological and psychological consequences for patients in addition to financial draw backs for caregivers.[3,4] Poorly managed pain may interfere with postoperative complications, cause patient suffering and prolong recovery.[3,4] Patients may anticipate future medical interventions with greater anxiety if pain has not been managed effectively in the past.[5] There are a number of risk factors for chronic pain after surgery and one of the most striking predictor is indeed the severity of acute postoperative pain.[6,7]

2. Objective

To assess postoperative hemodynamics of intra peritoneal instillation of Ropivacaine and bupivacaine in Laparoscopic surgeries.

3. Materials and Methods

A double blinded randomized experimental study was conducted at Sri Manakula Vinayagar Medical College and Hospital, Pondicherry in the Department of Anaesthesia from October 2017 to May 2019.

A total of 100 Study subjects aged between 20 to 65 years of age of either sex, ASA risk I and II, undergoing laparoscopic surgeries under general anaesthesia comprised the study population.

Sample size was calculated to be 50 (25 in each group) using Open Epi software version 3.03, taking into consideration mean pain score of 3.6 with SD 2.5 in one group and mean 2.0 with SD 2.5 based on previous study with 80% power and 95% confidence interval.

All patients posted for surgery during the study period fulfilling the eligibility criteria were included. Patients were divided into two groups of 25 each, irrespective of age and gender for the proposed surgery by Randomization chart.

3.1. Inclusion criteria

1. Age 18-60 years.
2. ASA I and II.
3. Both Genders.
4. Patient's undergoing laparoscopic surgeries (with incision to closure time > 30 Mins).

3.2. Exclusion criteria

1. Paediatric age group < 18yrs
2. ASA III and IV
3. Patients with known allergy to drugs to be used
4. Renal dysfunction
5. Patients unable to comprehend VAS Score

All patients were instilled with 30 ml of solution in a standardized manner by the operating surgeon under vision before removal of trocar at the end of the surgical procedure. Group R received 30 ml (0.2%) ropivacaine and group B received 30 ml (0.25%) bupivacaine. The drugs were prepared and given to the investigator who was blind to the identity of drugs.

Means and proportions were calculated for continuous and categorical data respectively. Difference in proportions were tested using chi square test. Tests of normality were carried out for continuous variables and Mann Whitney U test was carried out to test statistical difference in means between the study groups. A p value <0.05 was considered statistically significant. Data entry was done using MS Excel 2013 and data analysis was carried out using SPSS version 23.0

4. Results

A total of 50 study subjects were selected and 25 subjects were selected in each group by random allocating.

Both the study groups were comparable in terms of Age, Gender, BMI and ASA with no significant difference was observed between the groups.

The heart rate was found to be comparable between two groups at 10 min, 30 Min, 60 Min, 120 Min, 4 Hrs, 8 Hrs, 12 Hrs and at 24 hrs and the p value was found to be non-significant with p value more than 0.05 at all the time intervals.

The Systolic Blood pressure was found to be statistically significant between the two groups at 10 Min, 30 Min, 60 Min, 120 Min, 4 hrs, 8 Hrs and 12 hrs. Whereas at 24 hrs the difference of Systolic Blood Pressure was found to be non-significant.

The Diastolic Blood pressure was found to be statistically significant between the two groups at 10 Min, 30 Min, 60 Min, 120 Min, 4 hrs and 12 hrs, whereas at 8 hrs and 24 hrs the difference of Diastolic Blood Pressure was found to be non-significant.

Table 1: Socio Profile of study subjects.

		Study Group		P Value
		Ropivacaine n (%)	Bupivacaine n (%)	
Age Group	18-30	13(52.0)	9(36.0)	0.476
	31-45	7(28.0)	8(32.0)	
	46-65	5(20.0)	8(32.0)	
Gender	Male	4(16.0)	6(24.0)	0.480
	Female	21(84.0)	19(76.0)	
ASA	1	19(76.0)	21(84.0)	0.480
	2	6(24.0)	4(16.0)	
BMI	Normal	22(88.0)	17(68.0)	0.088
	Overweight and Obese	3(12.0)	8(32.0)	

Table 2: Distribution of study groups based on Heart Rate at various intervals

Heart Rate	Ropivacaine (n=25)		Bupivacaine (n=25)		p value*
	Median	IQR	Median	IQR	
10 Min	78	72-82	78	75-80	0.775
30 Min	76	72-81.5	76	72-80	0.822
60 Min	74	69.5-82.5	74	72-79.5	0.719
120 Min	76	70.5-82.5	78	73-83	0.312
4 Hrs.	76	74-87	78	76-82	0.364
8 Hrs.	79	72-85.5	80	76-86	0.412
12 Hrs.	80	71.5-84.5	79	76-82	0.756
24 Hrs.	79	75-83	78	76-81	0.718

*Mann Whitney u test was applied for comparison of means

Table 3: Distribution of study groups based on SBP at various intervals

SBP	Ropivacaine (n=25)		Bupivacaine (n=25)		p value*
	Median	IQR	Median	IQR	
10 Min	120	110-126	128	120-130	0.014
30 Min	118	114-124	124	117.5-129	0.048
60 Min	118	110-124	126	120-130	0.003
120 Min	120	114-127	128	124-130	0.002
4 Hrs.	124	118-128	130	124-135	0.002
8 Hrs.	124	120-130	128	124-138	0.062
12 Hrs.	124	119-128	130	124-134	0.005
24 Hrs.	126	122-134	128	124-130	0.859

*Mann Whitney U test was applied for comparison of means

Table 4: Distribution of study groups based on DBP at various intervals

SBP	Ropivacaine (n=25)		Bupivacaine (n=25)		p value*
	Median	IQR	Median	IQR	
10 Min	70	70-77	76	70-79	0.032
30 Min	72	68-77	76	72-80	0.093
60 Min	74	69-78	76	73-80	0.034
120 Min	74	69-78	78	74-80	0.010
4 Hrs.	74	70-80	80	77-82	0.005
8 Hrs.	78	71-80	80	76-80	0.175
12 Hrs.	78	72-80	80	78-82	0.023
24 Hrs.	80	78-82	80	78-80	0.612

*Mann Whitney U test was applied for comparison of means

5. Discussion

The present study was carried out as an attempt to compare the postoperative analgesic effects of intraperitoneal instillation of Ropivacaine and Bupivacaine in laparoscopic surgeries. The study was carried out as a double blind randomised control experiment among 50 Adult patients (20–65 years) of either sex, ASA risk I and II, undergoing laparoscopic surgeries under general anaesthesia. The study groups were comparable in terms of baseline characteristics like age, gender, MMS, ASA, BMI classification and duration of surgery. Heart rate was similar in both the study groups at various time intervals. However, systolic blood pressure and diastolic blood pressure was significantly high among patients in Bupivacaine group measures in most of the time intervals.

Meena RK et al.[8] noted in the study that HR, SBP and DBP were comparatively lower in Group-R than in Group-B. The VAS score was significantly lower in Group-R from postoperative 5th hr. to 12th hr. Rescue analgesia was given when VAS was > 40. VRS score was significantly lower in Group-R from postoperative 7th hr., showing longer duration of analgesia in this group. The rescue analgesia requirement was also less in Group-R. A comparable result was noted in the present study also, where lower VAS scores were noted from 8 hours and after, in patients who received Ropivacaine.

Babu R et al.[9] study reported revealed that the age and sex distribution of both the groups was similar. The heart rate, systolic & diastolic blood pressure, mean blood pressure and mean trend of SpO2 in both groups remained similar over the periods.

Porika S et al.[10] study findings reported that there was no significant difference in age and weight between the two groups. Intraoperatively statistically significant differences were observed SBP - At 15 and 30 min post nebulization and at extubation. No significant differences were observed with respect to DBP and HR. Postoperatively DBP and HR differences were found to be statistically significant at 4th post-operative hour. There were no statistically significant differences in SBP and MAP between both the groups.

6. Conclusion

The study groups were comparable in terms of baseline characteristics like age, gender, MMS, ASA, BMI classification and duration of surgery. Heart rate was similar in both the study groups at various time intervals. Systolic blood pressure and diastolic blood pressure was significantly high among patients in Bupivacaine group measures in most of the time intervals, while mean blood pressure differences were inconsistent over the follow up period.

7. Source of Funding

None.

8. Conflict of Interest

The authors declare that there is no conflict of interest

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Cite this article: Piriya K S, Ramya N, Balasubramanian S, Vigneswaran J, Kumar K S, Anand B S S. A comparison of hemodynamic profile of intraperitoneal instillation of ropivacaine versus bupivacaine in laparoscopic surgeries. *Indian J Clin Anaesth* 2021;8(1):92-95.