

Comparative Study between Spinal Anaesthesia and Epidural Anaesthesia in Laparoscopic Cholecystectomy

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Abstract: *Background:* To compare spinal anaesthesia and combined epidural anaesthesia in laparoscopic cholecystectomy. *Material and Methods:* 40 patients who are posted for laparoscopic cholecystectomy surgeries are randomized into two groups: Group A and B, both procedures were performed with the use of quincke needle and tuohy needle respectively. *Results:* with respect to hemodynamic parameters, group A had a lower blood pressure, lower pain scores. Group B patient had a increased incidence of nausea and vomiting when compared with group A. *Conclusion:* The results of the present study show both techniques to be safe and efficacious, but group A to have less frequent nausea and vomiting and shorter duration of postoperative pain.

Keywords: Cholecystectomy, Laparoscopy, General anaesthesia, Epidural anaesthesia, spinal anaesthesia

1. Introduction

Laparoscopic cholecystectomy involves change in patients position from Trendelenberg to reverse Trendelenberg position an intraperitoneal CO₂ insufflation. Laparoscopic cholecystectomy has the advantage of short hospital stay, faster recovery, less pain associated with small incision and less postoperative ileus compared with open cholecystectomy. The cardiovascular changes during Laparoscopic cholecystectomy include increase in systemic vascular resistance and mean arterial pressure due to increase in sympathetic output due to CO₂ insufflation and neuroendocrine response to pneumoperitoneum. Patient undergoing Laparoscopic cholecystectomy are at greater risk for PONV due to postoperative pain.

- 2) Both males and females
- 3) Age : 20 – 60 years

Exclusion criteria:

- 1) Patients with history of bleeding disorders or patients on anticoagulant therapy
- 2) Patients refusal
- 3) Patients with history of spine injuries
- 4) Patients with pregnancy

Technique

40 patients who are posted for laparoscopic cholecystectomy surgeries are randomized into 2 groups: Group A (spinal anaesthesia), Group B (epidural anaesthesia), both procedures were performed with the use of quincke needle and tuohy needle respectively.

2. Aims and Objectives of the Study

- 1) To compare spinal and epidural anaesthesia for laparoscopic cholecystectomy.
- 2) Compare the hemodynamics, postoperative pain scoring for first 2 hours and postoperative adverse reaction for first 24 hours

3. Methodology

Source of data: Patients attending out patient department (OPD) at S.V.R.R.G.G.H and those who were admitted in the hospital for cholecystectomy.

Inclusion criteria:

- 1) Elective laparoscopic cholecystectomy surgeries with ASA I & II

Regional Anesthesia

Group A: Patients were placed in sitting or lying position on their left side and spinal anaesthesia was applied in L2-L3 or L1-L2 vertebral space. The dural puncture was performed with quincke needle sized according to patient's age. Depending on the patient size 0.5% hyperbaric bupivacaine (10-20mg) were injected in sub arachnoid space. Patient's positions are changed till adequate level to be obtained

Group B: Patients were placed in sitting or lying position on their left side and epidural anaesthesia was applied in T12-L1 or L1-L2 or L2-L3 vertebral space. The perforation was performed with 16G tuohy needle and position was confirmed by loss of resistance technique. After that injection 0.5% bupivacaine (2ml per segment) was given till T6-T12 segment level obtained.

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The following parameters are assessed:

- 1) HR, BP, O2 SATURATION
- 2) Pain for first 2 postoperative hours by visual analog scale
- 3) Post- Operative complications (first24hours)
 - Pain
 - Hypotension
 - Nausea
 - Vomiting
 - Headache

Statistical Tools to be applied:

Means, standard deviation, percentages, student's t-test and the Fisher's exact test are used for statistical comparisons. P <0.05 was considered significant.

4. Results

Table 1: Comparison of Age distribution

Age	Group A	Group B
<30	4	4
31-40	10	4
>40	6	12
Total	20	20
Mean	36.9	39.35
SD	6.15	8.17
P	0.291 Not significant	

P value was calculated with Student 'T' test. The mean age of patients in both groups are found to be comparable and statistically insignificant.

Table 2: Comparison of Sex Distribution

Sex	Group A	Group B
Male	9	11
Female	11	9
Total	20	20
P	0.752 Not significant	

P value was calculated with Chi Square test. The sex distribution of both the groups are found to be comparable and statistically insignificant

Table 3: Comparison of BMI

BMI	Group A	Group B
<24	6	4
>24	14	16
Total	20	20
Mean	24.27	25.56
SD	1.52	1.59
P	0.561 Not significant	

P value was calculated with Student 'T' test. The weight of the patients in both the groups are compared and found to be statistically insignificant.

Table 4: Comparison of ASA

ASA	Group A	Group B
ASA 1	11	10
2	9	10
Total	20	20
Mean	1.45	1.5
SD	0.51	0.513
P	0.759 Not significant	

The Comparison of ASA of the patients in both the groups are compared and found to be statistically insignificant

Table 5: Comparison of Heart rate

HR	Group A		Group B		P	Significance
	Mean	SD	Mean	SD		
PREOP	77.10	7.71	77.55	6.89	0.847	Not significant
SMIN	75.30	7.75	76.20	8.40	0.727	Not significant
15MIN	69.55	6.89	72.20	7.65	0.257	Not significant
30MIN	72.00	8.50	71.90	7.79	0.969	Not significant
45MIN	70.65	3.24	71.00	5.18	0.799	Not significant
60MIN	74.00	7.61	73.45	8.06	0.826	Not significant
75MIN	79.20	9.91	76.95	8.00	0.434	Not significant
POSTOP	86.80	7.68	86.60	7.57	0.934	Not significant

The Comparison of HEART RATE of the patients in both the groups are compared and found to be statistically insignificant

Table 6: Comparison of Systolic Blood Pressure

Systolic BP	Group A		Group B		P	Significance
	Mean	SD	Mean	SD		
PREOP	124.90	7.12	121.40	9.18	0.186	Not significant
SMIN	115.45	8.61	114.80	9.04	0.817	Not significant
15MIN	106.95	7.89	114.70	11.45	0.017	Significant
30MIN	95.15	9.12	110.70	14.04	<0.001	Significant
45MIN	113.50	10.47	116.75	10.47	0.724	Not significant
60MIN	112.50	7.20	116.20	7.22	0.711	Not significant
75MIN	113.35	6.76	115.20	8.90	0.353	Not significant
POSTOP	125.50	8.21	129.20	8.70	0.569	Not significant

The Comparison of systolic blood pressure of the patients in both the groups are compared and found to be statistically significant in 15 and 30 minutes.

Table 7: Comparison of Diastolic Blood Pressure

Diastolic BP	Group A		Group B		P	Significance
	Mean	SD	Mean	SD		
PREOP	77.45	5.67	78.50	5.38	0.552	Not significant
SMIN	65.30	5.62	71.45	4.48	<0.001	Significant
15MIN	62.95	3.83	72.50	7.85	<0.001	Significant
30MIN	61.75	4.61	68.35	11.56	0.005	Significant
45MIN	68.40	5.40	71.95	5.40	0.652	Not significant
60MIN	72.80	4.35	74.90	5.73	0.453	Not significant
75MIN	73.65	5.40	75.75	5.64	0.676	Not significant
POSTOP	74.95	6.91	76.40	6.57	0.501	Not significant

The Comparison of Diastolic BP of the patients in both the groups are compared and found to be statistically significant in 5, 15, 30 minutes.

Table 8: Comparison of Mean Arterial Blood Pressure

The Comparison of Mean Arterial Blood pressure of the patients in

Map	Group A		Group B		P	Significance
	Mean	SD	Mean	SD		
PREOP	93.27	4.76	92.8	5.55	0.777	Not significant
SMIN	81.8	4.94	86.12	2.69	0.001	Significant
15MIN	77.62	3.34	86.57	7.32	<0.001	Significant
30MIN	72.88	4.51	82.47	8.84	<0.001	Significant
45MIN	83.45	4.01	86.88	5.23	0.025	Not significant
60MIN	86.02	3.23	88.67	4.03	0.027	Not significant
75MIN	86.92	3.14	88.83	5.05	0.158	Not significant
POSTOP	91.8	5.6	94.01	6.77	0.27	Not significant

Both the groups are compared and found to be statistically significant in 5, 15, 30minutes.

Table 9: Comparison of SPO2

SPO2	Group A		Group B		P	Significance
	Mean	SD	Mean	SD		
PREOP	98.65	0.587	98.75	0.55	0.582	Not significant
SMIN	96.8	1.15	97.15	1.23	0.358	Not significant
15MIN	99.45	0.51	99.4	0.503	0.757	Not significant
30MIN	99.15	0.51	99.45	0.51	0.826	Not significant
45MIN	99.25	0.51	99.45	0.51	0.916	Not significant
60MIN	98.9	0.91	98.8	0.894	0.728	Not significant
75MIN	99.05	0.51	99.45	0.51	0.825	Not significant
POSTOP	98.5	1	98.6	0.94	0.746	Not significant

The Comparison of SPO2 of the patients in both the groups are compared and found to be statistically insignificant

Table 10: Comparison of ETCO2

ETCO2	Group A		Group B		P	Significance
	Mean	SD	Mean	SD		
PREOP	39.1	5.03	39.5	5.03	0.956	Not significant
SMIN	39.3	4.55	38.9	4.32	0.804	Not significant
15MIN	40.8	4.92	39.7	5.69	0.498	Not significant
30MIN	40.1	5.3	39.8	4.97	0.831	Not significant
45MIN	39.5	3.41	39.2	3.44	0.783	Not significant
60MIN	39.7	2.98	38.7	3.12	1.000	Not significant
75MIN	40.7	6.04	39.7	6.55	0.619	Not significant
POSTOP	38.7	4.78	39.1	4.56	0.788	Not significant

The Comparison of ETCO2 of the patients in both the groups are compared and found to be statistically insignificant

Table 11: Postoperative Complication

Pain	Group A	Group B
< 2 hrs	2	5
> 2 hrs	12	6
Nausea	2	5
Vomiting	0	1
Hypotension	2	2

Table 12: Surgery time

Surgery time	Group A	Group B
Mean	60.35	59.1
SD	7.71	7.97
p value	0.612 Not significant	

5. Discussion

In the current study showed Systolic and diastolic pressures and heart rate were similar in both groups. These variables have been studied previously in this type of surgery with epidural block and general anesthesia with sevoflurane. Adequate stability was reported in the group treated with epidural block. At this moment the group A maintained the lowest systolic and diastolic pressures and greater stability. This could probably be explained by the inability of the epidural anesthesia to completely attenuate the stress response, especially by the cortisol pathway, due to incomplete block of the phrenic nerves that can transport noxious surgical stimuli to the central nervous system. Another controversial adverse effect in using spinal block is

hypotension. This was found in both groups of the present study and with a frequency similar. As is known, any type of anesthesia can be associated with adverse effects such as nausea and vomiting which is high in Group A.

The only difference found in pain was its duration. It was shorter in the spinal block group and these results are similar to those found in previous studies. Our results were similar to those found in other studies in relation to type of pain. Incision pain was the most frequent. Referred pain was more frequent in the group B and has been related to pneumoperitoneum pressure. Among the contributions of this work are the comparison of two anaesthetic techniques which, according to our knowledge, had not been reported in laparoscopic cholecystectomy, the utilization of anaesthetic medicaments, the evaluation of transoperative hemodynamic characteristics and postoperative adverse reactions to help the physician decide between one procedure and another

6. Conclusion

The results of the present study show both combined techniques (group A and group B) to be safe and efficacious, but show group A to have a faster recovery from anesthesia, less frequent nausea and vomiting and a shorter duration of postoperative pain

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