Laparoscopic cholecystectomy: Low pressure vs standard pressure pneumoperitoneum

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Abstract

Background: Laparoscopic cholecystectomy is quite common surgery performed now a days.
Objective: To compare the surgical outcomes in using low pressure vs standard pressure pneumo-peritoneum for laparoscopic cholecystectomy.
Methodology: Study Design: Comparative cross sectional study. Settings: Department of Surgery, Sheikh Zayed Hospital, Rahim Yar Khan. Duration of Study: January to October 2018. Total 70 cases (35 in each group) were selected non-probability, consecutive sampling irrespective of gender and age more than 20 years undergoing laparoscopic cholecystectomy. These cases were divided into two groups. The cases in group A underwent low pressure and in group B, standard pressure of pneumo-peritoneum was employed. The surgery was done according to the set protocol of cholecystectomy and post operatively these cases were assessed on the basis of pain on VAS (Visual Analogue Score) and operative time counted from incision to closure in minutes. Data was analyzed by SPSS 23.
Results: In this study, out of total 70 cases; 35 were divided in each group. The mean age was 51.47±7.39 vs 50.23±8.18 years and mean duration of symptoms was 6.12±2.39 vs 7.11±4.29 months in group A and B respectively with p= 0.91 and 0.78. There were 16 (45.71%) males in group A and 15 (4.86%) in group B with p= 0.67. Mean operative time was 63.19±11.89 vs 74.77±10.59 minutes and pain on VAS was 1.49±0.37 vs 3.11±1.07 in group A and B respectively with p values of 0.03 and 0.001.
Conclusion: Low pressure pneumo-peritoneum cholecystectomy is better than standard pressure both in terms operative time and post operative pain.

Key Word: LPLC, SPLC, Operative time, VAS.

Introduction

Gall stones are common and usually diagnosed on incidental findings on ultrasonography (USG), if not symptomatic.[1] The most common presentation is Cholecystitis which is a common presentation to surgical out-patient emergencies and clinics.[2] Their number is on the rise in the recent times due to changing life styles and also increased detection rate due to extensive usage of ultrasonography.[1-3]
The cardinal symptoms acute Cholecystitis include, fever, nausea, vomiting, upper abdominal tenderness especially in right hypochondrium and bloating.[4,5] However, severity and clinical presentation may vary according to the severity of the disease and co-morbid conditions. Surgical removal of the gall bladder (Cholecystectomy) is the ultimate treatment if symptoms persist and can be done conventionally by open surgical technique and now preferable with Laparoscopic cholecystectomy (LC).[6,7] There are always extensive changes in trends in surgical modalities and techniques to avoid serious complications and carry out a surgery with ease of convenience, better efficacy results and minimal to none complication rate.[4-6] Laparoscopic cholecystectomy is considered as gold standard technique for non-complicated Cholecystitis or cholilithiasis cases.[8,9]
Pneumo-peritoneum is created for Laparoscopic cholecystectomy to create a clear visual filed for better operative need and to avoid the injury to the surrounding viscera. It is created by insufflations of carbon dioxide; though there are number of others agents as well that are used for this purpose.[9,10]
Different pressures are being used for this. One is called as standard pressure, using a pressure of 12 to 15 mm Hg. The other recently trending is low pressure pneumo-peritoneum where this pressure is reduced to 7 to 9 mm Hg each carrying its own benefits and risks.[10-12]
Post operative pain and the time taken for cholecystectomy are the major outcome concerns and data was scarce in comparison of these two modalities, hence this study was planned, to compare the surgical outcomes in using low pressure vs standard pressure pneumo-peritoneum for laparoscopic cholecystectomy.

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Methodology

This was a comparative cross sectional study, which was carried out at Department of Surgery, Sheikh Zayed Hospital, Rahim Yar Khan, during January to October 2018. Total 70 cases (35 in each group) were selected non-probability consecutive sampling irrespective of gender and age more than 20 years undergoing laparoscopic cholecystectomy. These cases were divided into two groups by sealed envelop method labelled as A or B. The cases in group A underwent low pressure (7-9 mm Hg) and in group B, standard pressure of pneumo-peritoneum (12-15 mmHg) was employed. The surgery was done according to the set protocol of cholecystectomy and post operatively these cases assessed on the basis of pain on Visual analogue scale (VAS) done at 6 hours and operative time counted from incision to closure in minutes. The data was assessed on SPSS-Version-23. Chi square test was used to compare qualitative data and independent sample t test for quantitative data and post stratification. p value equal or less than 0.05 was taken as significant.

Results

In this study, out of total 70 cases; 35 were divided in each group. The mean age was 51.47±7.39 vs 50.23±8.18 years and mean duration of symptoms was 6.12±2.39 vs 7.11±4.29 months in group A and B respectively (Table I) with p= 0.91 and 0.78. There were 16 (45.71%) males in group A and 15 (4.86%) in group B with p= 0.67 as shown in table I. Regarding outcome comparison mean operative time was 63.19±11.89 vs 74.77±10.59 minutes and pain on VAS was 1.49±0.37 vs 3.11±1.07 in group A and B respectively with p values of 0.03 and 0.001 as shown in table II.

Table I: Study variables in both groups.

	Group A	Group B	p
Age (years)	51.47±7.39	50.23±8.18	0.91
Weight (kg)	78.34±11.49	77.13±10.89	0.88
Duration of symptoms (months)	6.12±2.39	7.11±4.29	0.78
Males	16 (45.71%)	15 (42.86%)	0.67
Females	19 (54.29%)	20 (57.14%)	

Table II: Outcome variables in both groups.

Variables	Group A	Group B	p value
Operative time	63.19±11.89	74.77±10.59	0.03
Pain (VAS score)	1.49±0.37	3.11±1.07	0.001

Discussion

Laparoscopic procedures are considered as the gold standard techniques in the recent times due to avoidance of large surgical scars and scar associated morbidities and mortality. However, they carry their own benefits and side effect profiles and pose a concern for selecting a more suitable technique. Laparoscopic cholecystectomy is one of the most commonly carried out procedure and post operative pain is one concern. Standard pressure pneumo-peritoneum carries this in higher number of cases, that's why an entity of low pressure pneumo-peritoneum was introduced to minimise this risk.[13-15]

In our study, regarding outcome comparison in these two groups, mean operative time was 63.19±11.89 vs 74.77±10.59 minutes and pain on VAS was 1.49±0.37 vs 3.11±1.07 in group A (Low pressure pneumoperitoneum) and B (Standard pressure pneumo-peritoneum) respectively with p values of 0.03 and 0.001.

The studies done in the past have variable kind of results where at some points low pressure have shown lesser degree of complications rate and on the other hand vice versa was seen.[16-20] Sandhu et al in their study compared these two techniques and it was assessed on the basis of surgeon's convenience and it was found that low pressure pneumo-peritoneum was slightly better in terms of visual surgical field during cholecystectomy.[18]

Sattar Z et al, also compared these two pressure techniques and it was found that post operative shoulder tip pain was lesser in standard pressure group and was noted in 74.44% in contrast to 93.33% cases treated with low pressure and these were not much difference in terms of mean per operative time, which was 35.4±8.95 vs 37.4±7.89 minutes and regarding pain it was 3.46±0.74 vs 2.84±0.75 in standard vs low pressure pneumo-peritoneum.[19]

Mahajan S et al, also did not find much difference in both groups and mean per-operative time was 63.17±7.7 in low vs 62±9.4 minutes in standard pressure and when at 24 hours, they assessed for pain on VAS, it was seen that mild pain (score on VAS 1-3) was observed in 2.5% of the cases with standard and only 1% in low pressure group with p values <0.05.[20]

Conclusion

Low pressure pneumo-peritoneum cholecystectomy is better than standard pressure both in terms operative time and post operative pain.

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