

# Comparison of Frequency of Shoulder Tip Pain in Patients Undergoing Laparoscopic Cholecystectomy with Low and Standard Pressure Pneumoperitoneum

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## ABSTRACT

**Aim:** To compare postoperative shoulder tip pain in laparoscopic cholecystectomy between low-versus standard-pressure pneumoperitoneum.

**Study Design:** Randomized controlled trial.

**Place of Study and Duration:** Department of Surgery, Allied Hospital, Faisalabad from 01-12-2017 to 01-06-2018.

**Methodology:** This study included 100 patients divided randomly in two equal groups. Patients in group A were subjected to standard pressure cholecystectomy while patients in group B were subjected to low pressure cholecystectomy. The main outcome measure was shoulder tip pain which was compared in two groups in first 4 hours after surgery.

**Results:** In group A, 36% patients had shoulder tip pain, while in group B, 8% patients had shoulder tip pain, with a p-value of 0.001, which is statistically significant.

**Conclusion:** Low pressure laparoscopic cholecystectomy is better than standard pressure cholecystectomy in terms of frequency of post operative shoulder tip pain.

**Keywords:** Laparoscopic cholecystectomy, Standard pressure pneumoperitoneum, Low pressure pneumoperitoneum.

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## INTRODUCTION

Gallstone disease is a major health problem, particularly in developed world. It is also one of the leading causes of digestion-related hospital admissions with high healthcare costs in these countries. In the UK, about 50,000 cholecystectomies are performed each year and more than two times of that number, patients are admitted to hospital with gallstone-related episodes.<sup>1</sup>

In Pakistan prevalence of cholelithiasis is about 10.2%.<sup>2</sup> Laparoscopic cholecystectomy has become the gold standard in the treatment of symptomatic gallstones.

The major advantages of laparoscopic cholecystectomy (LC) include less postoperative pain, short hospitalization, speedy recovery, and better cosmetic results. The general view in the treatment of acute cholecystitis (AC) is to first administer conservative therapy to prevent possible complications associated with inflammation and then after 6 to 8 weeks, to perform laparoscopic cholecystectomy.<sup>3</sup>

Postoperative complications of laparoscopic cholecystectomy include shoulder tip pain, bleeding in the abdominal cavity, bile leak, sub-hepatic collection, surgical site infection, port site hernia, lost gall bladder, injury to the CBD and retained stone in choledochal duct<sup>4</sup>.

Nasajiyani et al conducted a study and found that the frequency of post cholecystectomy pain in patients undergoing laparoscopic cholecystectomy was 12% in low

pressure group vs. 36% in standard pressure P <0.023<sup>5</sup>. Sattar et al conducted a similar study, showing frequency of shoulder tip pain 74.44% in standard pressure group vs. 93.33% in low pressure group p <0.05<sup>6</sup>. There is a conflict in the frequency of shoulder tip pain in patients undergoing laparoscopic cholecystectomy with standard and low pressure pneumoperitoneum among the international vs local study (12% in low pressure group vs. 36% in standard pressure p <0.023)<sup>5</sup> vs. (74.44% in standard pressure group vs. 93.33% in low pressure group p <0.05 while 6.67% in lower pressure group vs 25.56% patients in standard group, experienced shoulder pain p <0.05. So, there was a need to conduct this study in the local population so that the conflict could be resolved.

**Shoulder Tip Pain:** It is labeled when pain at shoulder on visual pain scale (VAS) >3 within first 4 hours of surgery, starting from when patient will be received in recovery room.

**Low Pressure Pneumoperitoneum:** A pressure of 7-10mmHg was created and maintained by the help of insufflator.

**Standard Pressure Pneumoperitoneum:** A pressure of 12-16mmHg was created and maintained by the help of insufflator.

## MATERIAL AND METHODS

It was a randomized controlled trial study, conducted at Department of General Surgery at Allied Hospital, Faisalabad from 01-12-2017 to 01-06-2018. Sample size of 50 in each group was calculated using Epi info<sup>5</sup>. It was non-

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probability, consecutive type of sampling technique. All symptomatic patients having gallstones on ultrasound abdomen were included in the study after obtaining written informed consent.

Patients with history of previous upper abdominal procedures, with acute cholecystitis, choledocholithiasis, having uncontrolled diabetes or hypertension, with ischemic heart disease and pulmonary dysfunction were excluded from the study. Patients with chronic shoulder pain or injury or surgery of the shoulder joint in past 4 weeks were also excluded.

These patients were then randomly divided into two groups labelled as A and B using lottery method. Group A: Standard pressure & Group B: Low pressure. Numerical variables were presented by mean±SD. Categorical variables were presented as frequency and percentage.

**RESULTS**

A total of 100 patients were enrolled for this study. Patients were divided into two groups i.e. Group-A (Standard pressure) and Group-B (Low pressure). In group-A, there were 35(70%) males and 15(30%) females, while in group-B, there were 41(82%) males and 9(18%) females groups respectively. In group-A, 28(56%) patients had duration of surgery <80 minutes, while 22(44%) patients had duration of surgery >80 minutes. In group-B, 25 (50%) patients had duration of surgery <80 minutes, while 25(50%) patients had duration of surgery >80 minutes as well. In group-A, 18(36%) patients had shoulder tip pain, while 4(8%) patients had had shoulder tip pain in group-B patients with a p value of 0.001, which is statistically significant.

Table 1: Sex Distribution of Patients (n=100)

Gender	Group A	Group B
Male	35 (70%)	41 (82%)
Female	15 (30%)	9 (18%)

Table 2: Duration of Surgery (n=100)

Duration (Min)	Group A	Group B
<80 minutes	28 (56%)	25 (50%)
>80 minutes	22 (44%)	25 (50%)

Table 3: Comparison of shoulder tip pain in both groups

Shoulder tip pain	Groups		Total	P value
	Standard Pressure	Low Pressure		
Yes	18(36%)	4(8%)	22 (22%)	0.001
No	32(64%)	46(92%)	78(78%)	

**DISCUSSION**

The advent of laparoscopic cholecystectomy is a milestone achieved in both the treatment of gallstones and in the evolution of minimal access surgery. The aim was to reduce the trauma during access and maintain appropriate exposure of the surgical field during surgery<sup>7</sup>.

The creation of the pneumoperitoneum is the essential component for laparoscopic procedures. To achieve this surgeons have traditionally created a pneumoperitoneum of up to 14-15mmHg by insufflating

carbon dioxide gas into the peritoneal cavity at the time of insertion of ports.

Our study evaluated the pain scores of patients from the two groups of standard and low pressure insufflations. At different time intervals VAS was significantly lower in LPLC as compared to SPLC. VAS was recorded at time interval of 06 & 24 hours post operatively.

Mean VAS in LPLC was 2.84 with minimum of 1.25 and maximum of 4.5. On the other hand in SPLC mean VAS was 3.46 with minimum of 2.0 and maximum of 4.75. The difference of VAS in LPLC & SPLC was statistically significant (P 0.0001).

In another study Gurusamy and Samraj carried out a review of various clinical trials evaluating low pressure and standard pressures and their effects on post operative recovery including postoperative shoulder tip pain. Their cochrane database review reported a lower incidence of shoulder tip pain reported in the low pressure groups<sup>8-9</sup>.

Nasajiyani et al conducted a study and found that the frequency of post Cholecystectomy pain in patients undergoing laparoscopic cholecystectomy was 12% in low pressure group vs. 36% in standard pressure<sup>5</sup>.

**CONCLUSION**

Laparoscopic cholecystectomy using low pressure pneumoperitoneum has significant advantages in terms of less post-operative pain and reduced frequency of shoulder tip pain.

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