

Original Research

Low pressure and standard pressure pneumoperitoneum in laparoscopic cholecystectomy

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ABSTRACT:

Background:Cholecystitis is the medical name for gallbladder inflammation. The present study was conducted to compare low pressure and standard pressure pneumoperitoneum in laparoscopic cholecystectomy. **Materials & Methods:**80 patients undergoing laparoscopic cholecystectomy of both genders were divided into 2 groups of 40 each. Group I patients underwent laparoscopic cholecystectomy with low pressure pneumoperitoneum (7-8 mm Hg) while group II underwent laparoscopic cholecystectomy with standard pressure pneumoperitoneum (12-14 mm Hg). Nausea/vomiting and abdominal pain were noted at 1 hr, 6 hrs, 12 hrs & 24 hrs. **Results:** In group I, males were 17 and females were 23 and in group II, males were 18 and females were 24. Abdominal pain on VAS was 6.5 and 6.4 at 1 hour, 4.2 and 5.3 at 6 hours, 2.7 and 4.3 at 12 hours and 1.1 and 2.8 at 24 hours in group I and II respectively. The difference was significant (P< 0.05). Nausea/vomiting on VAS was 5.4 and 5.6 at 1 hour, 4.3 and 4.9 at 6 hours, 2.8 and 3.5 at 12 hours and 1.2 and 2.6 at 24 hours in group I and II respectively. The difference was significant (P< 0.05). Complications noted were I/O bleeding in 2 patients in group I and 4 patients in group II and I/O bile leak in 5 patients in group I and 7 patients in group II. The difference was significant (P< 0.05). **Conclusion:** Postoperative discomfort is less frequent and less intense when there is low pressure pneumoperitoneum.

Keywords: Cholecystitis, gallbladder, low pressure

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INTRODUCTION

Cholecystitis is the medical name for gallbladder inflammation. Ninety percent of the cases are typically linked to gallstones. In 10% of instances, it might be acalculous, nevertheless. One of the most common surgical emergencies is acute cholecystitis. Early diagnosis, severity evaluation, and the start of the right treatment are crucial for reducing morbidity and death.¹ Gallstones in children have been linked to numerous etiological variables. It is thought that chronic hemolytic disorders are the most frequent cause. Other risk factors include cancer therapy, obesity, congenital malformations in the GB, prolonged use of high-dose ceftriaxone, liver cirrhosis, chronic cholestasis, complete parenteral nutrition, and ileal disorders such as ileal resection, ileal Crohn's disease, and cystic fibrosis.²

Laparoscopic cholecystectomy recovery is contingent upon a number of conditions, including exhaustion, nausea, vomiting, and shoulder tip discomfort in addition to abdominal pain.³ These adverse

consequences are brought on by CO₂ and increased intra-abdominal pressure, which cause diaphragmatic inflammation and peritoneal straining. In light of this, it was believed that lowering intra-abdominal pressure would lessen these side effects.⁴ Pneumoperitoneum is traditionally created at a pressure of about 15 mm Hg. A few trials that used low pressure pneumoperitoneum (less than 12 mm of Hg) demonstrated a reduction in discomfort following surgery.⁵ The present study was conducted to compare low pressure and standard pressure pneumoperitoneum in laparoscopic cholecystectomy.

MATERIALS & METHODS

The present study was conducted on 80 patients undergoing laparoscopic cholecystectomy of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 40 each. Group I patients underwent laparoscopic cholecystectomy

with low pressure pneumoperitoneum (7-8 mm Hg) while group II underwent laparoscopic cholecystectomy with standard pressure pneumoperitoneum (12-14 mm Hg). Post-operative pain and associated problems like nausea and

vomiting were noted at 1hr, 6 hrs, 12hrs & 24hrs. Post-operative pain was assessed using Visual Analogue Scale (VAS) of pain. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	low pressure pneumoperitoneum	standard pressure pneumoperitoneum
M:F	17:23	18:24

Table I shows that in group I, males were 17 and females were 23 and in group II males were 18 and females were 24.

Table II Assessment of abdominal pain (VAS)

Abdominal pain (VAS)	Group I	Group II	P value
1 hour	6.5	6.4	0.05
6 hours	4.2	5.3	
12 hours	2.7	4.3	
24 hours	1.1	2.8	

Table II, graph I shows that abdominal pain on VAS was 6.5 and 6.4 at 1 hour, 4.2 and 5.3 at 6 hours, 2.7 and 4.3 at 12 hours and 1.1 and 2.8 at 24 hours in group I and II respectively. The difference was significant (P< 0.05).

Graph I Assessment of abdominal pain (VAS)

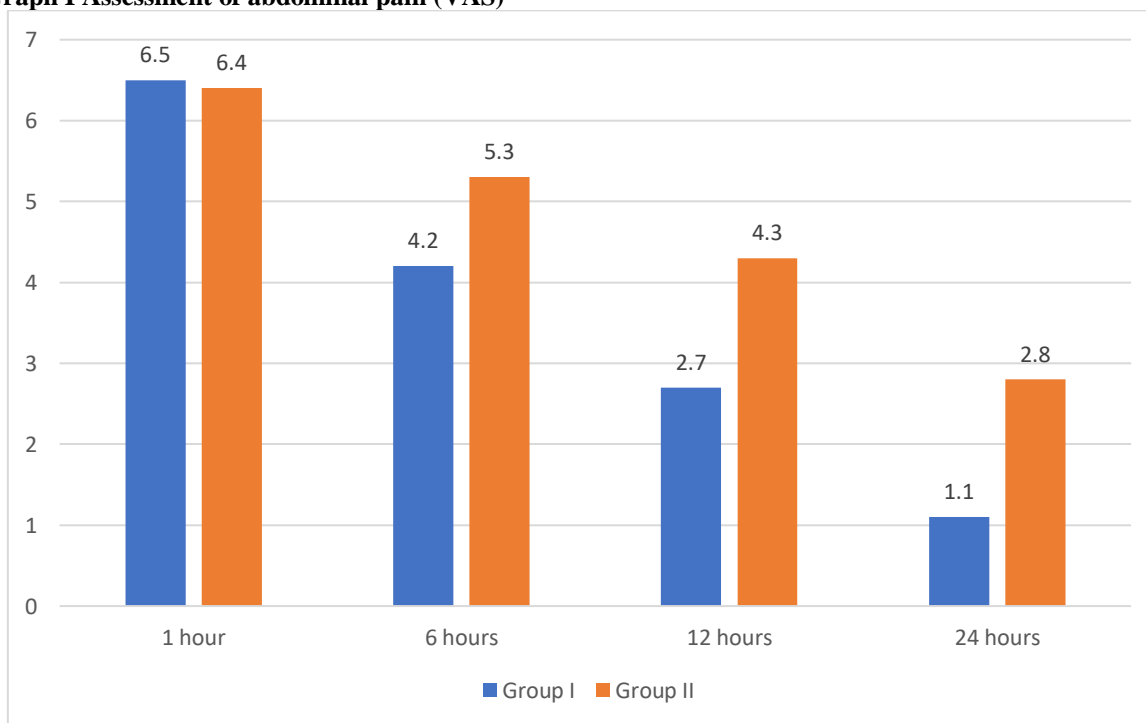


Table III Assessment of Nausea/vomiting(VAS)

Nausea/vomiting (VAS)	Group I	Group II	P value
1 hour	5.4	5.6	0.05
6 hours	4.3	4.9	
12 hours	2.8	3.5	
24 hours	1.2	2.6	

Table III shows that nausea/vomiting on VAS was 5.4 and 5.6 at 1 hour, 4.3 and 4.9 at 6 hours, 2.8 and 3.5 at 12 hours and 1.2 and 2.6 at 24 hours in group I and II respectively. The difference was significant (P< 0.05).

Table IV Assessment of complications

Complications	Group I	Group II	P value
I/O Bleeding	2	4	0.04
I/O Bile Leak	5	7	

Table IV shows that complications noted were I/O bleeding in 2 patients in group I and 4 patients in group II and I/O bile leak in 5 patients in group I and 7 patients in group II. The difference was significant ($P < 0.05$).

DISCUSSION

The common emergency surgical disease known as acute cholecystitis is characterized by gallbladder inflammation brought on by a blockage in the gallbladder neck, which frequently results from cholelithiasis.⁶ Gallstones represent 10-15% of all cases in the general population, making them a common finding. Every year, 1-4% of all cholelithiasis patients exhibit symptoms, and 30% of these individuals go on to develop acute cholecystitis.⁷ On the basis of typical anamnesis, which includes persistent or recurrent right-upper quadrant pain, fever, nausea, and clinical examination findings of tenderness in the right-upper quadrant, positive Murphy sign, elevated laboratory findings for acute inflammation, and ultrasound (US), the diagnosis of acute cholecystitis is confirmed.⁸

One of the main advantages of laparoscopic cholecystectomy is that it avoids making an incision in the upper abdomen, which means less pain and faster recovery after surgery. Even a laparoscopic cholecystectomy, however, can cause pain and discomfort. Following a laparoscopic cholecystectomy, patients typically experience shoulder tip pain and abdominal pain.⁹ Peritoneal stretching, diaphragmatic irritation from high intra-abdominal pressure brought on by pneumoperitoneum, or CO₂ absorption from the peritoneal cavity are some of the possible reasons of this pain. Numerous investigations are conducted to determine the best methods for minimizing the frequency and severity of pain following laparoscopic cholecystectomy.¹⁰ The present study was conducted to compare low pressure and standard pressure pneumoperitoneum in laparoscopic cholecystectomy. We found that in group I, males were 17 and females were 23 and in group II, males were 18 and females were 24. Singla et al¹¹ compared the effect of low pressure and standard pressure pneumoperitoneum in post laparoscopic cholecystectomy pain. This study was done in 100 ASA grade I & II patients. They were divided into two groups -50 each. Group A patients underwent laparoscopic cholecystectomy with low pressure pneumoperitoneum (7-8 mm Hg) while group B underwent laparoscopic cholecystectomy with standard pressure pneumoperitoneum (12-13 mm Hg). Both the groups were compared for pain intensity, analgesic requirement and complications. Post-operative pain score was significantly less in low pressure group as compared to standard pressure group. Number of patients requiring rescue analgesic doses was more in standard pressure group. This was statistically

significant. Also, total analgesic consumption was more in standard pressure group. There was no difference in intraoperative complications.

We found that abdominal pain on VAS was 6.5 and 6.4 at 1 hour, 4.2 and 5.3 at 6 hours, 2.7 and 4.3 at 12 hours and 1.1 and 2.8 at 24 hours in group I and II respectively. We found that nausea/vomiting on VAS was 5.4 and 5.6 at 1 hour, 4.3 and 4.9 at 6 hours, 2.8 and 3.5 at 12 hours and 1.2 and 2.6 at 24 hours in group I and II respectively. Chok et al¹² in their study a total of 40 patients were recruited and 20 of whom were allocated to each arm. Outcome measures included operation time, treatment-related morbidity, mortality, postoperative pain (eg, shoulder-tip pain), consumption of analgesics, and level of satisfaction. All patients in both groups could be discharged on the same day. Patients' demographics and operation time were comparable in both groups. There were no treatment-related morbidity and mortality, nor was there any significant difference in postoperative pain. Less shoulder-tip pain was observed in the LPLC group though without significant difference (5% vs. 20%; $P=0.151$). Three patients in the LPLC group needed higher insufflation pressure (12 mm Hg) because of inadequate exposure and adhesions, and the operations were successful in all of them. Otherwise, no conversion to open procedure was noted in both groups. The consumption of analgesics was minimal and a high level of satisfaction was achieved in both groups of patients.

We found that complications noted were I/O bleeding in 2 patients in group I and 4 patients in group II and I/O bile leak in 5 patients in group I and 7 patients in group II. Guruswamy KS et al¹³ collected data from fifteen randomised trials. They found that intensity of pain was lower in low pressure Group. The analgesic consumption was also lower.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that postoperative discomfort is less frequent and less intense when there is low pressure pneumoperitoneum.

REFERENCES

- Dexter SP, Vucevic M, Gibson J, McMahon MJ. Hemodynamic consequences of high & low pressure capnoperitoneum during laparoscopic cholecystectomy. *Surg Endosc.* 1999;13:376-81.
- Jang SE, Park SW, Lee BS, Shin CM, Lee SH, Kim JW et al. Management for CBD stone-related mild to moderate acute cholangitis: urgent versus elective ERCP. *Dig Dis Sci.* 2013; 58:2082-7.

3. Nuzzo G, Giuliani F, Giovannini I, Ardito F, D'Acapito F, Vellone M, Murazio M, Capelli G. Bile duct injury during laparoscopic cholecystectomy: results of an Italian national survey on 56 591 cholecystectomies. *Archives of Surgery*. 2005 Oct 1;140(10):986-92.
4. Kholdebarin R, Boetto J, Harnish JL, Urbach DR. Risk factors for bile duct injury during laparoscopic cholecystectomy: a case-control study. *Surgical innovation*. 2008 Jun;15(2):114-9.
5. Ingelmo PM, Bucciero M, Somaini M, Sahillioglu E, Garbagnati A, Charton A, et al. Intraperitoneal nebulisation of ropivacaine for pain control after laparoscopic cholecystectomy: a double blind, randomised, placebo controlled trial. *Br J Anaesth*. 2013;110:800-6.
6. Falor AE, de Virgilio C, Stabile BE, Kaji AH, Caton A, Kokubun BA, et al. Early laparoscopic cholecystectomy for mild gallstone pancreatitis: time for a paradigm shift. *Arch Surg*. 2012; 147(11):1031–1035.
7. Edward ND, Barclay K, Catling SJ, Martin DG, Morgan RH. Day care laparoscopy: A survey of post-operative pain and assessment of the value of diclofenac. *Anaesthesia*. 1991; 46: 1077-80.
8. Wallace DH, Serpell MG, Basxter JN, O'Dwyer PJ. Randomized trial of different insufflation pressures for laparoscopic cholecystectomy. *Br J Surg*. 1997; 84: 455-8.
9. Russell RC. General surgery: Biliary surgery. *BMJ (Clinical Research Ed)*. 1993;307(6914):1266-9. Ganapathi AM, Speicher PJ, Englum BR, Perez A, Tyler DS, Zani S. Gangrenous cholecystitis: a contemporary review. *Journal of Surgical Research*. 2015 Jul 1;197(1):18-24.
10. Duca S, Bala O, Al-Hajjar N, Iancu C, Puia IC, Munteanu D, Graur F. Laparoscopic cholecystectomy: incidents and complications. A retrospective analysis of 9542 consecutive laparoscopic operations. *Hpb*. 2003 Aug 1;5(3):152-8.
11. Singla S, Mittal G, Mittal RK. Pain management after laparoscopic cholecystectomy-a randomized prospective trial of low pressure and standard pressure pneumoperitoneum. *Journal of clinical and diagnostic research: JCDR*. 2014 Feb;8(2):92.
12. Chok KS, Yuen WK, Lau H, et al. Prospective randomized trial on low pressure versus standard pressure pneumoperitoneum in outpatient laparoscopic cholecystectomy. *Surg Laparosc Endosc Percutan Tech*. 2006;16:383–386.
13. Gurusamy KS, Samraj K, Davidson BR. Low pressure versus standard pressure pneumoperitoneum in laparoscopic cholecystectomy (Review). *The Cochrane Database of Systemic Reviews*. 2009;2:CD006930.