



EVALUATION OF POSTOPERATIVE SHOULDER TIP PAIN IN LOW PRESSURE VERSUS STANDARD PRESSURE PNEUMOPERITONEUM DURING LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Introduction:- Insufflation of carbon dioxide during laparoscopic cholecystectomy carries on to postoperative shoulder tip pain. The beginning of shoulder pain is commonly presumed to be due to overstretching of the diaphragmatic muscle fibres due to high carbon dioxide pressure.

Methods:- Patients came and admitted to the surgery department for elective cholecystectomy were enrolled in the study. The patients were randomly divided in two groups (group A and group B). In group A - low-pressure pneumoperitoneum (8 mm Hg) and in group B- standard pressure pneumoperitoneum (14 mm Hg) was created during laparoscopic cholecystectomy. Postoperative shoulder tip pain was evaluated at 4 hours and 24 hours after the operation.

Results:- Fourteen patients or 28 % of patients in group B complained of postoperative shoulder tip pain as collated to only five patients (10%) in group A. The mean intensity of postoperative shoulder tip pain assessed by the visual analogue scoring scale at 4 hours and 24 hours was less in group A as collated to group B. However, statistical significance was seen only at four hours. Analgesic requirements and the mean length of postoperative stay in the hospital were minor in group-A as collated to group B.

Conclusion:- Low-pressure laparoscopic cholecystectomy significantly reduces the frequency and intensity of postoperative shoulder tip pain. Low-pressure laparoscopic cholecystectomy decreases the demand for postoperative analgesics, decreases postoperative hospital stay, and improves the quality of life in the initial stage of postoperative rehabilitation.

KEYWORDS : pneumoperitoneum, laparoscopic cholecystectomy

INTRODUCTION:-

Shoulder pain is a usual complaint following laparoscopic surgery, initially recognized by gynecologists during an early experience with laparoscopic sterilization.^[1] The incidence varies. Still, it is expected, being experienced in approximately one-third of patients following laparoscopic surgery cholecystectomy.^[2] The pain usually lasts 2-3 days and is relieved by simple analgesics such as paracetamol and codeine.^[3] Several causes of shoulder pain following laparoscopic surgery have been suggested, including the effect of CO₂ pneumoperitoneum, peritoneal stretching, diaphragmatic irritation, diaphragmatic injury, and even shoulder abduction surgery.^[4,5] Collins KM, 1984, however, emphasized diaphragmatic irritation due to CO₂ pneumoperitoneum as a frequent cause of shoulder tip pain.^[6] Several studies have looked at methods to reduce the incidence and severity of shoulder tip pain following laparoscopic cholecystectomy. Methods investigated include low-pressure insufflations, slow rate of insufflations, no CO₂ insufflation, use of warmed gas, pre-emptive anti-inflammatory medication, pre-emptive diaphragmatic local anesthetic irrigation, postoperative sub-diaphragmatic suction, and regional anesthesia to peritoneal surfaces in the operative area.^[7,8] The present study evaluated postoperative shoulder tip pain in low pressure versus standard pressure pneumoperitoneum during laparoscopic cholecystectomy.

METHODS:-

This study was performed from Oct 2019 to Oct 2020. Patients came and admitted to the surgery department for elective cholecystectomy were enrolled in the study.

A total number of 100 patients were enrolled in this study and were randomly allocated to one of the two groups. In group A, low-pressure pneumoperitoneum (8 mm Hg) and in group B, standard pressure pneumoperitoneum (14 mm Hg) was created during laparoscopic cholecystectomy. Postoperative shoulder tip pain was assessed at 4 hours and 24 hours after operation by the Visual Analogue Scale of Pain (V.A.S.). The pain scale, with scores ranging from 0 (no pain) to 10 (unbearable pain), was used, allowing patients to mark a point with the scale that best represented their shoulder tip

pain at that time. Patients were aware that the scale served to analyze the presence and intensity of shoulder tip pain alone and could not represent generalized postoperative discomfort. Analgesic requirements of all the patients in the postoperative period and length of hospital stay were also recorded.

RESULTS AND DISCUSSION:-

The number of patients that complained of shoulder tip pain presenting at any the first 24 hours after the operation was lower in group A than in group B. In group A, 5 out of 50 patients complained of shoulder tip pain in the postoperative time while as in group B, 14 out of 50 patients complained of shoulder tip pain (Table 1). The difference between the two was statistically important (p ¼ 0.001). The mean vigor of postoperative shoulder tip pain evaluated by the visual analogue scoring scale at any time was less in group A, as compared to group B (Table 2). The mean vigor of postoperative shoulder tip pain at 4 hours was 4.2 ± 0.45 in group A and 4.43 ± 1.4 in group B. The mean vigor of postoperative shoulder tip pain at 8 hours was 2.2 ± 1.1 in group A and 3.5 ± 0.76 in group B. The mean intensity of postoperative shoulder tip pain at 24 hours was 0.2 ± 0.45 in group A and 0.64 ± 0.74 in group B (Table 2).

Table-1

Some patients with post operative shoulder tip pain in each group.			
Group	Group A (n=50)	Group B (n=50)	P- value
Post operative shoulder tip pin	5(10 %)	14(28 %)	(p=0.001)

Table 2- Mean scores of postoperative shoulder tip pain on V.A.S.

Time after surgery	Group A		Group B		P- value
	mean	Standard deviation	mean	Standard deviation	
4 hours	4.2	0.45	4.43	1.4	0.039
8 hours	2.2	1.1	3.5	0.76	0.762
24 hours	0.2	0.45	0.64	0.74	0.068

The difference between the two is, however, statistically

unimportant ($p \geq 0.156$). The postoperative stay in the hospital was 1.1 ± 0.45 and 1.21 ± 0.36 in group A and group B, respectively (Table 3). However, these differences between the two groups did not reach statistical importance ($p \geq 0.589$). The mean operative period in group A is 34.38 ± 5.26 minutes, and the mean operative time in group B is 31.52 ± 4.68 minutes (Table 4). Thus, the mean operative time in group A Low-pressure laparoscopic cholecystectomy was more as collated to group B (SPLC). Still, the difference between the mean operative times of the two groups was statistically unimportant ($p \geq 0.396$).

Table 3 - Length of postoperative hospital stay (days).

Group	Group - A (n=5)	Group- B (n=14)
Postoperative hospital stay (Mean)	1.1	1.21
Standard deviation	0.45	0.36

Table 4 - Distribution of mean operative time in two Groups.

Group A			Group B		
No. of patients	Mean (minutes) X1	S.D.	No. of patients	Mean (minutes) X2	S.D.
50	34.38	5.31	50	31.52	4.72

The mean operative time in group A was more as compared to group B but the difference between the mean operative times of the two groups was statistically insignificant ($p < 0.05$).

In this study, the frequency of shoulder tip pain after standard pressure laparoscopic cholecystectomy was significantly higher than low-pressure laparoscopic cholecystectomy. The incidence of shoulder tip pain was 2.8 times lower after low-pressure laparoscopic cholecystectomy than standard pressure laparoscopic cholecystectomy ($p < 0.05$). These results are consistent with the findings of M Barczynski et al.

Esmat et al. (2006) concluded that postoperative shoulder tip pain was significantly less in low-pressure laparoscopic cholecystectomy as compared to standard pressure laparoscopic cholecystectomy. The mean postoperative pain scores at 6 hours, 12 hours, and 24 hours were 3.0, 3.9, 2.5 and 2.0, 3.0, 1.29 after standard pressure laparoscopic cholecystectomy and low-pressure laparoscopic cholecystectomy. In our study, the analgesic (diclofenac) requirements for shoulder tip pain were less in low-pressure laparoscopic cholecystectomy than standard pressure laparoscopic cholecystectomy. The mean number of analgesic injections was 2.2 ± 0.45 in low-pressure laparoscopic cholecystectomy and 2.71 ± 0.5 in standard pressure laparoscopic cholecystectomy. The difference between the two is, however, statistically insignificant ($p \geq 0.156$). In this study, however, the operative time in the two groups was comparable statistically, although the mean operative time in group B was less than group A. There were no conversions to open surgery in either group.

CONCLUSION:-

Following initial studies, we conclude that the use of simple expedient of reducing the pressure of the pneumoperitoneum to 8mmHg results in a critical reduction in both the frequency and the severity of postoperative shoulder tip pain. Based on these results, the widespread use of low-pressure pneumoperitoneum during laparoscopic cholecystectomy is recommended.

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