



RIGHT SHOULDER TIP PAIN IN STANDARD VS LOW PRESSURE CO₂ PNEUMOPERITONEUM IN LAPAROSCOPIC CHOLECYSTECTOMY- A COMPARITIVE STUDY

General Surgery

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ABSTRACT

Introduction: Aim of the study is to determine the effect of use of carbon dioxide during laparoscopic cholecystectomy leads to postoperative shoulder tip pain. The begining of shoulder pain is commonly assumed to be due to overstretching of the diaphragmatic muscle fibres due to a high carbon dioxide pressure.

Aims: To study the difference between low and standard pressure pneumoperitoneum during Lap. Cholecystectomy and to assess the frequency and intensity of shoulder tip pain in post operative patient in Lap. Cholecystectomy.

Methods: 100 Patients which came for elective cholecystectomy were consider for surgery. The patients were randomly taken and divided in two groups (group A and group B). Low pressure pneumoperitoneum (8 mm Hg) is taken as Group A and in group B , standard pressure pneumoperitoneum (14 mm Hg) was generated during laparoscopic cholecystectomy. Postoperative shoulder tip pain was assessed at different time after operation by the help of Visual Analogue Scale of Pain.

Conclusion: Low pressure laparoscopic cholecystectomy (LPLC) considerably decreases the frequency and intensity of shoulder tip pain post-operatively and decreases the demand for postoperative analgesics, decreases postoperative hospital stay .

KEYWORDS

Shoulder pain , Laparoscopic cholecystectomy , Pneumoperitoneal pressure ,

INTRODUCTION :-

Gold standard management for Gall bladder surgeries is Laparoscopic cholecystectomy with its advantages, such as less postoperative pain and earlier mobilisation, and it is not without its side effects, of which shoulder tip pain is a commonest debilitating symptom [1, 2]. The incidence of pain after Post- laparoscopic Cholecystectomy varies, but is commonly, being experienced in approximately one third of patients following laparoscopic cholecystectomy(3). The pain usually lasts 2 -3 days and is relieved by taking simple analgesics such as paracetamol (4). Stimulation of the sympathetic nervous system by hypercarbia is the reason for shoulder tip pain. [5], the residual pneumoperitoneum after the surgery, and rapid distention of the abdomen by carbon dioxide [2], diaphragmatic irritation, diaphragmatic injury and even shoulder abduction during surgery(6). Collins KM, 1984, however, focussed over diaphragmatic irritation due to CO₂ pneumoperitoneum as a frequent cause of shoulder tip pain(7). A lot of research have been done to decrease the incidence and severity of shoulder tip pain following laparoscopic cholecystectomy. Methods investigated include, low- pressure insufflations(8), slow rate of insufflations (9), no CO₂ insufflation(10,11), use of warmed gas(12), pre-emptive anti- inflammatory medication(13), pre-emptive diaphragmatic local anaesthetic irrigation(14), postoperative sub-diaphragmatic suction(15) and regional anaesthesia to peritoneal surfaces in the operative area(16,17). The current study was conducted to inspect the post operative shoulder tip pain in low pressure versus standard pressure pneumoperitoneum during laparoscopic cholecystectomy.

METHODS AND MATERIALS

The study was conducted in 100 patients came in department for elective cholecystectomy after fulfilling the eligibility criteria and with taking proper consent.

INCLUSION CRITERIA:-

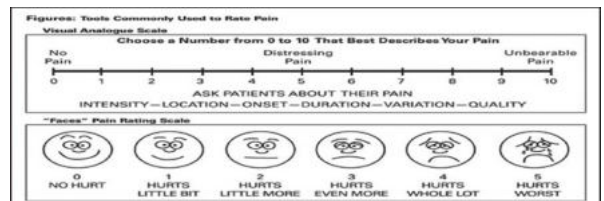
1. Surgeries for gall bladder stone.
2. Patient having normal CBD wall thickness(on pre-operative ultrasound).

EXCLUSION CRITERIA:-

1. Lap to open cholecystectomy conversion.

2. Any complication of gall stone disease, cholecystitis.
3. Choledocholithiasis.
4. Co-existent liver disease.
5. Intraoperative and postoperative complication such as bile duct injury.
6. Diseases like hypertension, coronary artery diseases, diabetes mellitus, COPD, asthma.

100 patients were randomly allocated into two group, group A is of low pressure pneumoperitoneum and group B is of standard pressure pneumoperitoneum having 50 patient in each of the two groups. Postoperative Right shoulder tip pain was assessed after 4, 8 and 24 hrs after operation by the Visual Analogue Scale of Pain (V.A.S.). The pain scale was used with scores ranging from 0 -- no pain to 10 -- agonizing pain which allows patients to mark a point along the scale that best represent their shoulder tip pain at that time to analyse the presence and intensity of shoulder tip pain alone and was not a representation of generalized postoperative discomfort. Analgesic requirements and length of hospital stay of all the patients in the postoperative period was also recorded.



DISCUSSION

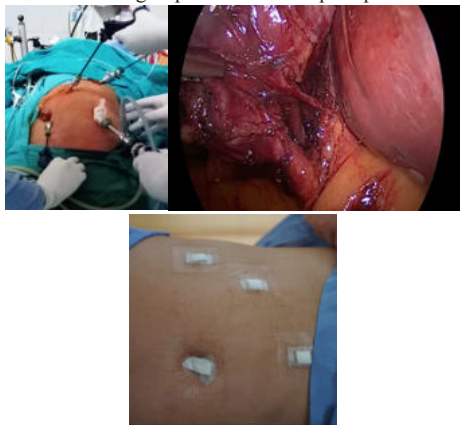
"The higher the pressure, the better the view" used to be the axiom invoked by surgeons who needed adequate exposure for laparoscopic procedures. However, the maintenance of elevated intra abdominal pressure for the duration of the procedure is associated with numerous side effects including post operative shoulder tip pain. Laparoscopic cholecystectomy results in less postoperative pain and reduced analgesic requirement compared to open cholecystectomy. Interestingly, the type of pain after laparoscopic cholecystectomy differs considerably from that seen after open cholecystectomy. Post Laparotomy parietal pain is common (abdominal wall), and visceral

pain is common post laparoscopy. After laparoscopic surgery patient had complain of shoulder tip pain. The incidence varies , according to different laparoscopic surgeries but is common, being experienced in approximately one third of patients following laparoscopic cholecystectomy. The pain usually lasts 2-3 days.

The results of this study show the effectiveness of low pressure pneumoperitoneum during laparoscopic cholecystectomy in reducing both the frequency and severity of pain at shoulder tip.

In our study the incidence of shoulder tip pain after standard pressure laparoscopic cholecystectomy was higher as compared to low pressure laparoscopic cholecystectomy. Out of 50 patients 12 complained of shoulder tip pain after standard pressure laparoscopic cholecystectomy as compared to 4 patients out of 50 in low pressure laparoscopic cholecystectomy. These results are similar with the findings of M Barczynski et al(18). In their study 8 patients (10.81%) out of 74 in the low pressure group complained of shoulder tip pain as compared to 18 patients (24.32%) in the standard pressure laparoscopic cholecystectomy. The shoulder tip pain is 2.2 times less in low pressure as compared to standard pressure during laparoscopic cholecystectomy. The studies done by Sarli L et al, Faisal Bilal Lodhi et al and Sandhu T et al presented similar results(19,20).

In our study the average magnitude of post operative shoulder tip pain at 4, 8 and 24 hours was more after standard pressure laparoscopic cholecystectomy as compared to low pressure laparoscopic cholecystectomy. Esmat et al. (2006) concluded that post operative shoulder tip pain was significantly decreased in low pressure laparoscopic cholecystectomy as compared to standard pressure laparoscopic cholecystectomy. During the course of this study analgesic use(diclofenac) required for shoulder tip pain was less in low pressure laparoscopic cholecystectomy compared to standard pressure laparoscopic cholecystectomy. Also the length of post operative stay in the hospital was decreased in low pressure laparoscopic cholecystectomy as compared to standard pressure laparoscopic cholecystectomy respectively. Due to a less working space in low pressure pneumoperitoneum, the major concern of low intra abdominal pressure would have been the operative time. In our study however the operative time in the two groups were comparable statistically, although the mean operative time in group B was less than group A. In either of the group there was no lap to open conversion .



RESULTS:-

The number of patients with complains of shoulder tip pain at any time during the first 24 h after operation was lesser in group A than in group B. The average severity of post operative shoulder tip pain assessed by visual analogue scoring scale at any time was less in group A as compared to group B . Requirement of analgesia for shoulder tip pain were less in group A as compared to group B. The length of post operative stay in the hospital was less in group A as compare to group B . Return of bowel sound was early in group A as compared to group B. In group A and B mean operative time for male was more as compared to female.

	LPLC (GROUP-A)	SPLC(GROUP-B)
Mean operative time	35min ± 5min	30min ± 5min
Post-op shoulder tip pain	4/50	12/50
Use of analgesia	8%	24%
Hospital stay duration	2 days	4 days

Shoulder tip pain (VAS Scale)	LPLC (GROUP-A)	SPLC(GROUP-B)
4 Hour	1/50	2/50
8 Hour	2/50	6/50
24 Hour	1/50	4/50

MEAN OPERATIVE TIME IN MALE AND FEMALE	LPLC (GROUP-A)		SPLC(GROUP-B)	
	NO OF PATIENTS	AVG.OPERA TIVE TIME	NO OF PATIENTS	AVG.OPE RATIVE TIME
MALE	12	37±2min	23	32±2min
FEMALE	38	34±2min	27	28±2min

Return of bowel sound	LPLC (GROUP-A)	SPLC(GROUP-B)
6 hours	12	8
12 hours	20	11
24 hours	10	17
48 hours	8	14

CONCLUSION:-

In our study we conclude that use low pressure of the pneumoperitoneum is better then standard pressure pneumoperitoneum as it results in significant reduction in both the frequency and the postoperative shoulder tip pain severity and it decreases the use of analgesia , reduces the duration of hospital stay and hence improves the quality of life in the early stage of postoperative rehabilitation. On the basis of these results, the use of low pressure pneumoperitoneum during laparoscopic cholecystectomy is recommended as it has less side effects over standard pressure pneumoperitoneum.

REFERENCES:

- Cunniffe MG, McAnena OJ, Dar MA (1998) A prospective randomized trial of intraoperative bupivacaine irrigation for management of shoulder-tip pain following laparoscopy. *Am J Surg* 176:258-261
- Berberoglu M, Dilek ON, Ercan F (1998) The effect of CO₂ insufflation rate on the postlaparoscopic shoulder pain. *J Laparoendosc Adv Surg Tech A* 8:273-277
- Lepner U, Goroshina J, Samarutel J. Postoperative pain relief after laparoscopic cholecystectomy: a randomised prospective double-blind clinical trial. *Scand J Surg* 2003;92: 121e4.
- Watt-Watson J, Chung F, Chan VW. Pain management following discharge after ambulatory sameday surgery. *J Nurs Manag* 2004;12: 153e61.
- Kanwer DB, Kaman L, Nedounejane M, Medhi B, Verma GR, Bala I (2009) Comparative study of low pressure versus standard pressure pneumoperitoneum in laparoscopic cholecystectomy: a randomised controlled trial. *Trop Gastroenterol* 30(3):171-174
- Kojima Y, Yokota S, Ina H. Shoulder pain after gynaecological laparoscopy caused by arm abduction. *Eur J Anaesthesiol* 2004; 21:578e9.
- Collins KM, Docherty PW, Plantevin OM. Postoperative morbidity following gynaecological outpatient laparoscopy: a reappraisal of the service. *Anaesthesia* 1984;39:819e22.
- Sarli L, Costi R, Sansebastiano G, Trivelli M, Roncoroni L. Prospective randomized trial of low-pressure pneumoperitoneum for reduction of shoulder-tip pain following laparoscopy. *Br J Surg* 2000;87(9):1161e5.
- Berberoglu M, Dilek ON, Ercan F. The effect of CO₂ insufflation rate on the post laparoscopic shoulder pain. *J Laparoendosc Adv Surg Tech A* 1998;8:273e7.
- Koivusalo AM, Kellokumpu I. Gasless laparoscopic cholecystectomy: comparison of postoperative recovery with conventional technique. *Br J Anaesth* 1996;77:576e80.
- Vezakis A, Davides D, Gibson JS. Randomized comparison between low-pressure laparoscopic cholecystectomy and gasless laparoscopic cholecystectomy. *Surg Endosc* 1999;13: 890e3.
- Slim K, Bousquet J, Kwiatkowski F. Effect of CO₂ gas warming on pain after laparoscopic surgery: a randomized double- blind controlled trial. *Surg Endosc* 1999;13:1110e4.
- Phinchantha P, Bunyavehchevin S, Suwajanakorn S. The preemptive analgesic effect of celecoxib for day-case diagnostic laparoscopy. *J Med Assoc Thai* 2004;87:283e8.
- Cunniffe MG, McAnena OJ, Dar MA, Callearly J, Flynn N. A prospective randomized trial of intraoperative bupivacaine irrigation for management of shoulder-tip pain following laparoscopy. *Am J Surg* 1998;176(3):258e61.
- Jorgensen JO, Gillies RB, Hunt DR. A simple and effective way to reduce postoperative pain after laparoscopic cholecystectomy. *Aust NZ J Surg* 1995;65:466e9.
- Johnson N, Onwude JL, Player J. Pain after laparoscopy: an observational study and a randomized trial of local anesthetic. *J Gynecol Surg* 1994;10:129e38.
- Gharabeh KI, Al-Jaberi TM. Bupivacaine instillation into gallbladder bed after laparoscopic cholecystectomy: does it decrease shoulder pain? *J Laparoendosc Adv Surg Tech A* 2000; 10:137e41.
- Barczynski M, Herman RM. A prospective randomized trial on comparison of low-pressure (LP) and standard-pressure (SP) pneumoperitoneum for laparoscopic cholecystectomy. *Surg Endosc* 2003;17(4):533e8.
- Faisal Bilal Lodhi, Riaz Hussain. Laparoscopic cholecystectomy; Low-pressure pneumoperitoneum for shoulder-tip pain. *Prof Med J* 2003;10(4):266e70.
- Sandhu T, Yamada S, Ariyakachon V, Chakrabandhu T, Chongruksut W, Ko-iam W. Low-pressure pneumoperitoneum versus standard pneumoperitoneum in laparoscopic cholecystectomy: a prospective randomized clinical trial. *Surg Endosc* 2009; 23 (5): 1044e7.