Pain after Laparoscopic Cholecystectomy

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ABSTRACT

Background and Objectives: Although laparoscopic cholecystectomy results in less pain than open cholecystectomy, it is not a pain free procedure. A clinical trial was designed to assess pain after LC in terms of types of pain, intensity and factors that may influence it.
Methods: A prospective study on pain was performed on all patients undergoing the operation over the period of 1.5 year (n = 150). Pain was measured by a five point verbal rating scale (VRS).
Results: Pain was the most frequent symptom, after the operation. The main type of postoperative pain was intra-abdominal 72%, followed by incisional 60% and shoulder pain 10%.The mean level of pain was 2.12 VRS points 8 h after the operation and declined to 1.01 points next day. In 54 patients (36%) the intensity of pain was higher than 2 VRS points. Female sex was the only predictor of pain intensity.
Conclusions: Laparoscopic cholecystectomy did cause significant postoperative pain in one-third of our patients only up to the first postoperative day. As predictors for high intensity of pain were not identified clearly, pain should be monitored and multimodal analgesics should be delivered accordingly.
Key words: Laparoscopic cholecystectomy (LC), postoperative pain, Verbal Rating Scale (VRS).
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INTRODUCTION:

Laparoscopic cholecystectomy (LC) has emerged over the open procedure as the gold standard for surgical treatment of symptomatic gallstones [1,2]. The eminence of LC reflects advantages in surgical morbidity, systemic complications, quality of life, and postoperative pain [3]. However, postoperative pain management remains an important issue, and it is evident that clinical practice with regard to its management differs between centers, with local policies not always reflecting best evidence-based practice [4]. Furthermore, the management of pain following LC has implications beyond patient comfort [5,6]. Pain can result in increased postoperative morbidity and may also prolong the hospital stay — issues that have health economic as well as quality-of life implications, as this procedure can often be conducted on a day-case basis [7,8] . The pattern of pain after LC is complex and probably does not resemble pain after other (laparoscopic) operations, it is therefore important to characterize pain into its different components after LC, and to analyze the effects of analgesic intervention on the different components to reduce the overall pain. A prospective study was carried out for patients undergoing uncomplicated LC, to characterize postoperative pain by its different pain components, individual pain intensity, and time course. The preoperative and intra-operative factors were investigated, for their possible influence on postoperative pain.

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PATIENTS AND METHODS :

The study enrolled 150 patients (aged between 19-76 years), mean age 49.5 years, with uncomplicated symptomatic gall stone admitted for elective LC in Rizgary Teaching Hospital and Hawler Private Hospital from Jan 2007 to Aug 2008. Patients were admitted to the hospital a day before the operation. History was taken, physical examination done, all patients had diagnostic abdominal ultrasound prior to operation, hematological and biochemical investigations (including liver function tests), radiological examination (chest X-ray) and ECG were performed. Exclusion criteria included; patients with acute cholecystitis, choledocholithiasis and need for common bile duct exploration, acute pancreatitis, previous major upper abdominal surgeries, conversion to open cholecystectomy, age below 18 years, pregnancy and lactation, American Society of Anesthesiology (ASA) grade 3 and more, a history of severe systemic disease and chronic pain diseases other than gallstone disease were excluded from the study. Operations were performed after an overnight fasting. All laparoscopic cholecystectomies were performed according to the standard four – ports technique under general anesthesia following a strict protocol. All patients were given a single prophylactic parenteral third generation cephalosporin 1g with the induction of anesthesia. Anesthesia was induced intravenously by fentanyl 50µg and thiopentone 5mg/kg intravenously (i.v.), pancurium 0.1mg/kg (i.v.) or atracurium 0.5mg/kg (i.v.) to facilitate tracheal intubation. After tracheal intubation the patients were put on mechanical ventilation and anesthesia was maintained by 1.5% halothane in oxygen. Ventilation was adjusted to maintain an end-tidal CO2 pressure below 38 mmHg. In each case a gastric tube was inserted for the duration of the procedure and removed after termination of the operation. At the end of the operation, antagonism of muscle (i.v.). Before extubation of the trachea, the gastric tube was again suctioned and then removed. All patients received a dose of analgesia in the form of tramadol 100mg once they reached the surgical word. Rescue analgesia (intramuscular tramadol 100 mg), rescue antiemetic (intramuscular metoclopramide 10 mg) was administered if the patient complained from moderate, severe or intractable pain (i.e. visual rating scale was high, or patient had complained of vomiting respectively. Postoperatively, pain was assessed by Verbal Rating Scale (VRS) as follows (0=absent, 1=mild, 2=moderate, 3=severe and 4 = intractable pain) at 4, 8, 12 and 24 hours postoperatively. Before surgery, all patients were instructed to use a Verbal Rating Scale (VRS), to register the following three pain components retrospectively as :

1. Intra-abdominal pain was defined as pain inside the abdomen, which may be deep, dull, and more difficult to localize.
2. Incisional pain was defined as a superficial pain, wound pain, or pain located in the abdominal wall.
3. Shoulder-Tip pain was defined as a sensation of pain in the shoulder.

Patients were divided into two groups: Group A: whose VRS pain scores were more than 2 points. Group B: whose VRS pain scores were less than 2 points. All data were collected and analyzed by using SPSS (Statistical Package for Social Science) version (15.0. The mean postoperative VRS scores for the two groups were compared at different time's using Student's t test. The VRS score was expressed as mean ± standard deviation. Univariate analysis was done on different pre-operative and intra-operative factors for estimating predictors of severe pain. Results were considered significant when *p* value was less than 0.05, and highly significant when it was less than 0.01.

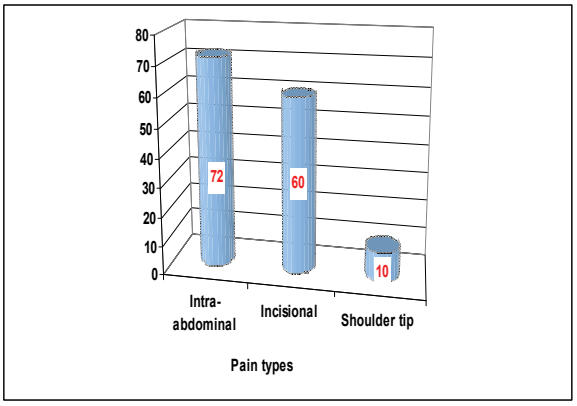
RESULTS:

One hundred and fifty patients were enrolled in the study, 99 patients were discharged after 24 h postoperatively, in 36 (36.6%) of whom; the main reason for delay in discharge was postoperative pain (Table 1).

Table (1): data from 150 patients undergoing elective LC

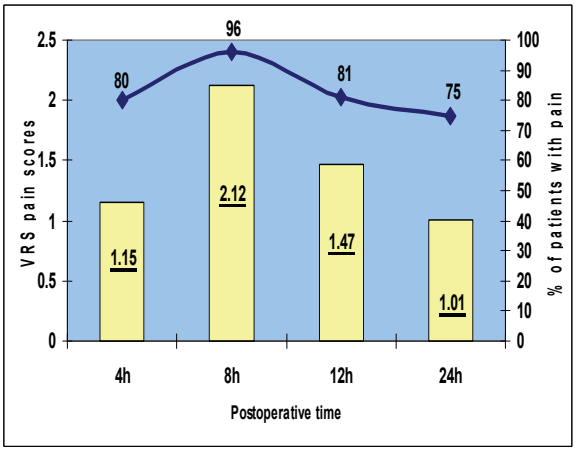
	n=150
Clinical data	
Sex ratio (F:M)	128:22
ASA (I:II)	119:31
Mean age (years)	49.2(19-76)
Mean weight (Kg)	67(48-120)
Operative data	
Duration of surgery (min)	30(13-59)
Intra-operative bleeding	2
Bile leak from gall bladder	6
Consultant surgeon vs. resident in surgery	131 vs. 19
Stone spillage	3
Postoperative hospital stay	
Hospital stay in days	1(0-4)
Discharge within less than 24h	51
Discharge after 24h	99
Pain	36
Others	63

The main type of postoperative pain was intra-abdominal 72%, while incisional pain accounted for 60% and shoulder pain only for 10% (Figure 1).



Figure(1): Types of postoperative pain.

Mean VRS pain scores and the percent of patients who had pain peaked at 8h postoperatively (95%), 75% of our patients had pain after 24h but in most of them the pain was mild (Figure 2).



Figure(2): Mean postoperative VRS pain scores.

Fifty four (36%) patients had VRS pain scores more than 2 (group A) and 96(64%) patients (group B) less than 2, predictor analysis was done, and a significant difference was found in female patients, while other preoperative factors showed no significant difference, only intra-operative bleeding was significant as a predictor for high pain scores, though clinically it was irrelevant since we had only 2 patients with intra-operative bleeding, one in each group.

Table (2): Result of univariate analysis of pain score >2 VRS scores (group A) vs. pain VRS scores <2 (group B)

	Group		*P* value
	A	**B**	
	n=54	n=96	
Clinical data			
Sex ratio (F:M)	50:4	78:18	0.011
ASA (I:II)	43:11	76:20	NS
Age(mean)	49	48	NS
Obesity (% over normal weight)	45	45	NS
Operative data			
Duration of surgery (mean)	30	30	NS
Intra-operative bleeding	1	1	0.018
Bile leak from gall bladder	2	4	NS
Consultant surgeon vs. resident in surgery	47 vs. 7	84 vs.12	NS
Stone spillage	1	2	NS

DISCUSSION:

The laparoscopic approach causes less morbidity and mortality than open cholecystectomy. It also offers shorter duration of admission, and less intense pain [9,10]. However, patients may experience significant abdominal disturbances and pain particularly during the first 24 hours postoperatively [11)].Pain is responsible for overnight stay on the day of operation in 26%–41% of patients [12, 4]. In our study 36.4 % of patients remained in hospital beyond 24h because of pain. Pain after LC involves three different components with different intensity, time course and patho-physiological mechanisms. These are the deep intra-abdominal pain (results from visceral manipulation), incisional pain and shoulder-tip pain (presumably referred intra-abdominal pain) [13]. In our study the overall incidence of intra-abdominal pain was 72% which was the main pain experienced by shoulder-tip pain 10%. Similar results were obtained by Bisgaard et al, Joris et al, and Lepner et al [6,14,15]. Although postoperative pain is felt at multiple sites, the most common location of the pain was in the right upper quadrant, followed by the trocar site, and the shoulder, whereas the visceral and parietal pain tends to decrease in 24h, the shoulder pain may become more prominent later [16]. Pain scores assessed by VRS at 4, 8, 12 and 24 hours post operatively were 1.15, 2.12, 1.47 and 1.01 respectively. In our study, we noticed that intra-abdominal pain at 4 hours postoperatively was present in 80% of our patients and at 8hours 96% had intra -abdominal pain. This pattern of pain may be attributed to the effects of the anesthetic drugs and the usage of intramuscular tramadol (100 mg) in the recovery period. The pain scores were gradually decreased 81%. Although the incidence of pain was still high (75%) at the 24 hours scores, but

were mostly mild (VRS was 1 point). It seems that incisional pain was mild and did not contribute substantially to the VRS score (60%).The commonest site for the incisional pain noticed by our patients was in the epigastric port site, this is in contrast with other studies [4,14], where the site of maximum pain was at the umbilical port site (the site from which the gall bladder was retrieved) , this could be explained by the fact that we retrieved all the gall bladders through the epigastric port. The overall incidence of shoulder-tip pain was 10%. The proposed mechanism of shoulder-tip pain seems to be due to diaphragmatic stretching with phrenic nerve neuropraxia possibly due to the increased concavity of the diaphragm induced by the pneumoperitoneum and reference of pain from the traumatized area [17,18]. Almost all patients in our study did not express shoulder-tip pain before the 24 hours readings. Other studies found that shoulder -tip pain was present earlier than the 24 hours scores [19,20], but similar to our study, they found that the maximum intensity of pain was still recorded at the first 24 hours. In agreement with other authors, female patients had a significantly higher intensity of pain than male patients [21,22] .This was the only predictor for high intensity of pain, duration of operation was not a predictor, Jackson et al found that the amount of residual correlated with the post operative pain [23,24]. Surprisingly, intra-operative bile spillage proved to be associated with more rapid resolution of the pneumoperitoneum [25], in our study, however, we did not observe any improvement in postoperative pain for these patients, similar results were observed by Pappas et al [26]. It may be concluded that pain is mainly caused by the operative trauma itself. The operative blood loss in our series was associated with a lower postoperative pain level, but since we had only two patients, one in each group, this observation was considered irrelevant. We conclude that LC did not cause relevant postoperative pain problems in more than two-thirds of our third of patients perceived a relevant intensity of pain. As we were not able to find predictors for high intensity of pain (apart from female sex), monitoring of pain is mandatory particularly in the first 24h after the operation. It is likely that optimum analgesia after LC will require the combination of several methods that affect various mechanisms of pain development, thus resulting in a synergistic reduction of pain.

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