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Original Article

Comparison of abdominal pain after cholecystectomy from umbilical and subxiphoid ports in patients referred to Afzalipour Medical Education Center, Kerman

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Abstract

Introduction: A consistent concern of surgeons is postoperative pain, whose control both alleviates patient suffering and reduces surgical complications, resulting in a quicker discharge and lower costs. This study aimed to compare abdominal pain (epigastric and right-upper quadrant) and pain at umbilical and subxiphoid ports after laparoscopic cholecystectomy in elective candidates at Afzalipour Medical Education Center, Kerman, Iran.

Methods: In this clinical trial, 76 candidates for elective laparoscopic cholecystectomy were assigned to one of two groups via a simple random allocation method. Gallbladders were removed from the subxiphoid port in the control group and the umbilical port in the case group. Postoperative pain was assessed using the Visual Analogue Scale (VAS), and the analgesic consumption was measured at 6 hours, 24 hours, and two weeks postoperatively. Data were analyzed by SPSS 16 software using independent t-test, chi-square, and repeated measures test.

Results: The mean port site pain score in the control group at 6 hours after surgery was 6.6±2.2, and in the case group, 6.3±1.9, and this difference was not statistically significant (P=0.519). The mean port pain score in the control group at 24 hours after surgery was 5.5±1.6 and in the control group was 4.9±1.1, where the difference was statistically significant (P<0.01). The mean port site pain score in the control group two weeks after surgery was 0.6±4.1, while in the control group, it was 3.0±0.9, where the difference was statistically significant (P<0.01).

Conclusion: The results of our study demonstrated for the first time that there was no significant difference between patients whose gallbladder was removed through the umbilical port and those whose gallbladder was removed through the subxiphoid port concerning abdominal pain (epigastric and RUQ). Nevertheless, the removal of the gallbladder from the umbilical port 24 hours and two weeks after surgery reduced the patient's port pain. This finding was evidenced descriptively by the VAS and quantitatively by the decline in analgesic prescriptions. Moreover, abdominal pain (epigastric and RUQ) was lower in patients with shorter operations.

Keywords: General Surgery, Cholecystectomy, Abdominal Pain

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Introduction

Gallstones are relatively common in human societies, although their prevalence varies from country to country. Gallstones affect 10 to 15 percent of the adult population in western societies (1). Cholecystectomy is the only way to treat gallstones, and prior to 1986, it was performed merely via open surgery. In open cholecystectomy, the gallbladder is removed, and complications caused by the remaining stones do not arise (2). Some of the patient's complications and discomforts following an open cholecystectomy come from abdominal wall damage. In 1987, for the first time, Philip Moore performed this surgery using a laparoscope following video optics technology to reduce these complications. Due to the method's acceptability, it was used quite frequently to the point where most surgeons agreed in 1992 that it was the standard and selective treatment for symptomatic gallstones (3). This procedure has produced favourable outcomes in terms of hospitalization time, treatment costs, and time to return to work (4).

Postoperative pain is one of the most serious side effects of cholecystectomy surgery, but laparoscopic surgery is less painful than open surgery because there are fewer injuries. Although sedation requirements and postoperative pain are lower with this technique than with open cystectomy surgery, postoperative pain is still one of the potential side effects. As such, alleviating or eliminating this pain will improve patient comfort and further the goals of this surgical approach. Additionally, it will shorten the patient's hospital stay and lower the associated expenses and complications (5).

The laparoscopic cholecystectomy, which was initially performed with four trocars, has undergone significant changes in recent years. Despite the fact that reducing the number and size of trocars did not affect the incidence of complications or the length of surgery, it reduced postoperative pain and, consequently, the need for analgesics (6,7).

Currently, three trocars are inserted immediately below the navel, below the xiphoid, and in the right hypochondrium along the anterior axillary line. The surgeon then grasps the gallbladder with a grasper by dissecting the infibular ligament. After identifying the cystic duct and artery, they are clamped and separated. The gallbladder is then dislodged from its bed and removed via an umbilical or subxiphoid trocar. The selection of the trocar through which the gallbladder is extracted poses no technical difficulties; the gallbladder can be extracted through any of these trocars. However, the gallbladder is typically removed through a subxiphoid trocar (8).

Postoperative pain has been one of the constant concerns of surgeons, and pain management after surgery reduces not only patient suffering but also complications, hospital length of stay, and costs. As few studies have been conducted in this area, we decided to conduct a coherent research study and take an effective measure to alleviate pain in these patients.

Materials and Methods

In this clinical trial, the population consisted of 76 candidates for symptomatic gallstone surgery undergoing laparoscopic cholecystectomy who were referred to the Afzalipour Medical Education Center in Kerman. The study protocol was approved by the ethics committee of Kerman University of Medical Sciences (Ethical code:IR.KMU.ACRS.REC.1396.1129) and registered in the Iranian Registry of Clinical Trials with the number IRCT (20170316033099N10). Consent to participate, age between 20 and 60 years, and elective surgery were the inclusion criteria. Exclusion criteria included the use of neuropsychiatric drugs, such as sleeping pills and sedatives; patients treated with antiepileptic drugs; patients treated with analgesics for a long period; patients with bleeding and wound infection after surgery; patients whose surgery did not follow the normal routine, such as those who suffered damage to the bile ducts; patients whose operation was converted to an open procedure for any reason; patients receiving pain medication before surgery; patients who did not respond well to medical treatment due to acute cholecystitis, which had been present for more than 72 hours since the onset of pain, thereby undergoing laparoscopic cholecystectomy.

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The sample size calculation was based on the formula for comparing the means of two independent populations, Siddiqui et al.'s study, and the mean of pain score 24 hours after surgery. As a result, 15 individuals per group were deemed sufficient for the sample. Despite this, the sample size was increased to 20 individuals per group to account for attrition. Consequently, forty patients were included in the study (9).

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}\right)^2 (\delta_1^2 + \delta_2^2)}{(\mu_1 - \mu_2)^2}$$

Patients were informed of the entire study procedure and each step. They were assured that opting out of the program would not impede their treatment process. Using a simple block allocation method and quadruple blocks (ABAB, BABA, AABB, BBAA, ABBA, BAAB), patients were randomly divided into two groups: Group 1(A): The gallbladder was removed from its typical location, the subxiphoid port. The gallbladder was removed from the umbilical port in group 2(B). In order to prevent errors resulting from confounding variables, both groups were identical in terms of age, gender, and medication. The patients and the pain evaluator were unaware of the group assignments (double-blind).

Both groups underwent four-port laparoscopic cephalocystectomy. The removal of the gallbladder from any of the ports posed no remarkable technical problems. Using the VAS scale, postoperative pain was assessed 6 hours, 24 hours, and 14 days after the operation. Thus, a 10-centimeter ruler was provided to the patient, who was instructed to assign a score of 10 for severe pain and 0 for no pain (Fig. 1).

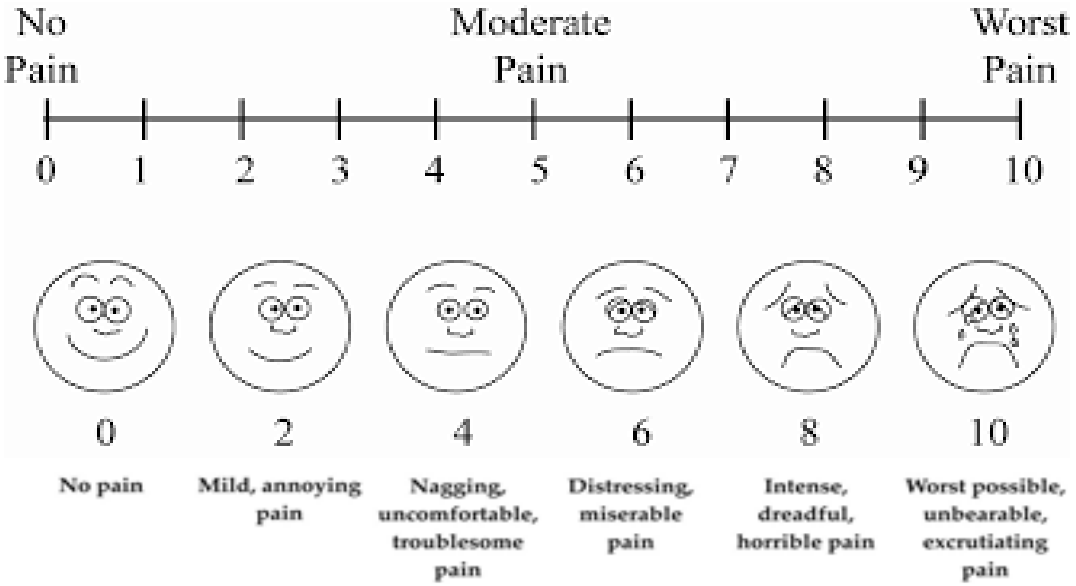

Fig 1. The basis of the VAS criterion

The prescribed analgesic for the patients was pethidine, and its dose as consumed by the patients was recorded during the first 6 hours and 24 hours after the operation. After discharge, the prescribed analgesic was diclofenac suppositories, which were used in case of pain (maximum one every 12 hours). The frequency of its consumption was asked from the patient and recorded during the visit two weeks after the operation. All patients received general anesthesia, and the fascia of the umbilical port region was sutured in all patients.

The data were statistically examined using SPSS 16 software. The centrality and dispersion indices were used to report quantitative data, while frequency distribution and percentage were used to report qualitative data. Using the Kolmogorov-Smirnov test, the data's normality was evaluated. To compare quantitative data between groups, an independent t-test, an examination of repeated values at different test times, and a repeated measures test were used. For qualitative data, the chi-square test was applied.

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Results

Six women (30%) and 14 men (60%) comprised each study group. The mean age and duration of surgery did not differ significantly between the study groups (P>0.05), as shown in Table 1.

The mean pain score in the RUQ region of the two groups examined 6 hours, 24 hours, and 2 weeks after surgery did not differ significantly (P>0.05) (Table 2). According to the findings, the mean pain level decreased significantly at various times in both groups (P<0.001).

Table 1. Comparison of mean age and duration of operation in study groups

Variable	Group 1 Mean ± SD	Group 2 Mean ± SD	Independent *t* test result
Age (years)	46.8 ± 5.0	48.0 ± 3.3	P = 0.380
Duration of surgey (minutes)	55.1 ± 10	59.4 ± 6.5	P = 0.115

Table 2. Comparison of the mean scores of abdominal pain in the RUQ region according to the location of the gallbladder removal

Variable	Group 1 Mean ± SD	Group 2 Mean ± SD	Independent *t* test result
Pain score 6 hours postoperatively	2.2 ± 1.05	1.85 ± 0.74	P=0.383
Pain score 24 hours postoperatively	1.6 ± 0.59	1.15 ± 0.74	P=0.056
Pain score two weeks postoperatively	0.85 ± 0.67	0.95 ± 0.68	P=0.678
Repeated measures test result	P<0.001	P<0.001	

According to the findings of this study (Table 3), there was no statistically significant difference between the mean port site pain scores of the two groups at 6 hours, 24 hours, and two weeks after surgery (P>0.05). Additionally, the mean of pain level decreased significantly at various times (P<0.001).

The Mean amount of analgesics (pethidine) consumed 6 hours after surgery in the two groups did not differ significantly (P=0.334) (Table 4). In addition, the mean amount of analgesics (pethidine) consumed by patients in group 1 during the first 24 hours and two weeks following surgery was significantly higher than in group 2 (P <0.001). Moreover, the mean consumption of analgesics at different times rose significantly (P<0.001).

Table 3. Comparison of the mean port site pain score according to the location of the gallbladder removal

Variable	Group 1 Mean ± SD	Group 2 Mean ± SD	Independent *t* test result
Pain score 6 hours postoperatively	2.2 ± 0.52	1.9 ± 0.78	P=0.289
Pain score 24 hours postoperatively	1.5 ± 0.51	1.1 ± 0.71	P=0.108
Pain score two weeks postoperatively	0.6 ± 0.59	0.9 ± 0.55	P=0.157
Repeated measures test result	P <0.001	P <0.001	

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Table 4. Comparison of the mean analgesic consumption at different times in study groups

Variable	Group 1 Mean ± SD	Group 2 Mean ± SD	Independent *t* test results
hours postoperatively 6	1.3 ± 0.3	1.1 ± 0.4	P = 0.334
hours postoperatively 24	2.8 ± 0.8	1.9 ± 0.6	P <0.001
Two weeks postoperatively	6.7 ± 1.2	4.2 ± 0.9	P <0.001
Repeated measures test result	P <0.001	P <0.001	

Discussion

Laparoscopic gallbladder surgery is now a standard procedure that all surgeons perform daily. In the interim, issues that surgeons had not previously pinpointed may emerge (10,11). For instance, the question of which of the laparoscopic ports is optimal for gallbladder removal. Some studies consider the umbilical port superior (12).

while others find the subxiphoid port quicker and easier (9). However, the assessment of postoperative pain after gallbladder removal through one of these two ports has only recently received attention and is less commonly discussed (13). This study aimed to assess both the pain in the port area and abdominal pain in the RUQ region following surgery in these patients.

Abdominal pain in the RUQ region and the ports were not significantly different between the groups in which the gallbladder was removed from the umbilicus and the group in which it was removed from the subxiphoid region as measured by the VAS. In the study conducted by Siddiqui et al., it was stated that the mean of pain score 6 and 24 hours after surgery was greater in the epigastric region than in the umbilical region, which contradicts the results of our own study (9). Similar results were obtained by Hajong et al. and Shakya et al. where they concluded that umbilical port was better for GB retrieval in terms of postoperative pain (14,15). Among the reasons for this discrepancy might be the difference in the surgeon's level of experience and skill, as well as the difference in the gender distribution of the two groups in the two studies. On the other hand, some studies have not found a significant difference in postoperative pain between the two ports.

Bashir et al. compared the pain experienced by two groups 24 hours after surgery. In the first group, the gallbladder was extracted from the subxiphoid port, whereas in the second group, the gallbladder was extracted from the umbilical port. According to this study, the mean of pain level in the first group was 3.54, and in the second, 3.11. Although the mean of pain score was higher in the first group, this difference was not statistically significant, which is consistent with the findings of this study (13). According to Ahmad et al., the amount of pain in the two investigated groups 24 hours after surgery was not significantly different from one another, which is consistent with the results of our study (the mean pain score in the umbilical group was 3.37 and in the subxiphoid group, it was 3.7) (16).

After the anesthesia wears off, the pain reaches its peak within the first few hours but subsides within two to three days. Some patients experience a relatively painful period soon after surgery, and certain conditions, such as movement, can exacerbate their pain. Visceral, parietal, and tip pain, as well as their intensity and duration, are the three types of pain experienced by surgical patients. Visceral and parietal pains are the most prominent pains experienced by patients one to two days after surgery (9). Six hours after surgery, the doses of analgesics received by the two groups were not significantly different. However, 24 hours and two weeks after surgery, the amount in group 1 was significantly higher than in group 2. According to a study conducted by Siddiqui et al., there was no significant difference between groups 1 and 2 in the mean of number of analgesics injected every 6 hours

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for 24 hours, which is consistent with our findings (9).

The study's small sample size is one of its limitations, and it is suggested that a larger sample size be used for future research.

Conclusion

Abdominal pain (epigastric and RUQ) was not significantly different between patients whose gallbladder was removed from the umbilical port and patients whose gallbladder was removed from the subxiphoid port, according to the results of our study. However, the removal of the gallbladder from the umbilical port within 24 hours and two weeks of surgery resulted in the patient experiencing less port pain. This was confirmed descriptively using the VAS and quantitatively based on fewer analgesics required.

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Conflict of interest

The authors have no conflicts of interest to declare.

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