

Benefit Assessment of Low-Fat Diet in Patients Undergone Laparoscopic Cholecystectomy

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ABSTRACT

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Background and Aims: This Gastrointestinal complications are common after cholecystectomy (open and laparoscopy), including anorexia, heartburn, abdominal pain, nausea, vomiting, flatulence and abdominal distension, and diarrhea. Currently use of low-fat regimen is suggested. The purpose was to determine the benefit of low-fat diet in patients undergone cholecystectomy.

Materials and Methods: In this interventional study that was done as a randomized clinical trial, 80 consecutive patients undergone cholecystectomy in Loghman Hospital in 2019 were enrolled and randomly assigned to receive either low-fat (25%) or routine regimen. After two months, the results were assessed by comparing the responses to a questionnaire including anorexia, heartburn, abdominal pain, nausea, vomiting, flatulence plus abdominal distension, and diarrhea as items, with total score of 21 points.

Results: The results in this study demonstrated that 60% of the patients showed significantly different response according to Chi-Square test ($P=0.041$). Age, sex, and obesity had statistically significant effect on results ($P > 0.05$).

Conclusion: Altogether, according to the obtained results, it may be concluded that low-fat diet consumption is beneficial in patients undergone cholecystectomy and it may be practiced according to the patient's condition and physician's opinion.

INTRODUCTION

Cholecystitis and gallstones are common problems of the biliary tract. The best treatment for them routinely involves surgical removal of the gallbladder, which has been common since 1882 [1-2]. However, the current gold standard treatment for gallstones is laparoscopic cholecystectomy. In other words, laparoscopic cholecystectomy is the superior method in the treatment of symptomatic gallbladder diseases [3]. Several factors such as reduced costs, short hospital stays, fewer complications, and faster resumption of postoperative function have led surgeons and patients to adopt this method [3-1]. According to existing studies, risk of complications in open cholecystectomy surgery is 5 to 17% [1-5], while risk of complications in laparoscopic cholecystectomy surgery is 2 to 10% [1-2]. Some studies have shown that the incidence of gastrointestinal compli-

cations after cholecystectomy is about 10-50% [6-7]. Cholecystectomy surgery is mostly associated with successful outcomes, but sometimes complications such as perforation and bleeding are seen in people undergoing the surgery. The general effort is to improve the results of laparoscopic and open cholecystectomy [8-10]. Gastrointestinal complications after cholecystectomy including anorexia, gastrointestinal upset, abdominal pain, nausea and vomiting, bloating, abdominal distention, and diarrhea, are some of the most common problems after surgery that affect up to 20% of the patients [11-13]. A study in Taiwan found that Taiwanese patients who did not follow the guidelines for maintaining a low-fat diet, experienced more diarrhea [14]. A high-fat diet increases fecal bile acids, and diarrhea caused by an increase in the passage of bile acids into the large intestine [15-16]. Besides, after laparoscopic cholecystectomy, some



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patients reported food intolerance especially after fatty foods use [17-18]. Therefore, due to the importance of this study, we compared consumption of low-fat diet with that of a normal diet for two months after laparoscopic and open cholecystectomy.

MATERIALS and METHODS

This study was conducted by the University Ethics and Research Committee Shahid Beheshti Medical University has been approved and has received the code of ethics at IR.SB-MU.MSP.REC.1398.723. In a randomized clinical trial study, patients who were candidates for cholecystectomy at Loghman Hakim Hospital from April to December 2017 were evaluated based on the patient's history and physical examination, as well as laboratory tests (routine tests plus a complete liver, pancreas, and blood glucose tests). Exclusion criteria at the start of the study were determined: smoking, alcohol consumption, steroidal and non-steroidal analgesics intake, patients with mental disorders, endoscopically proven gastroesophageal reflux disease (GERD), esophagitis, peptic ulcer and other gastric diseases, patients with diabetes, patients over 80 years old, patients with the severe debilitating diseases, liver cirrhosis and liver disease, pancreatitis, appendicitis, history of previous surgery, recent endoscopic retrograde cholangiopancreatography (ERCP), and patients who were unable to answer the questionnaire, also patients who did not want to participate in the study. Endoscopy and ultrasonography on gallbladder and bile ducts were performed for all patients. Patients with bile duct stones were excluded from the study. Also, in endoscopy, if any disorders were present, including biliary gastritis, gastric ulcer, and other endoscopic pathological findings, patients were excluded. Inclusion criteria included abdominal pain suspected of having gallstone confirmed by ultrasonography and patient's consent to participate in the study. Patients completed a questionnaire before cholecystectomy to record age, sex, weight, gastrointestinal symptoms including abdominal pain, nausea, vomiting, belching, food intolerance, and bloating. Also, based on the patient's height and weight, the patients' body mass index (BMI)s were calculated. Then all patients underwent laparoscopic cholecystectomy. After surgery, patients were randomly divided into two groups. To first group was given a low-fat diet (25% fat and the rest being carbohydrates and proteins) (according to the dietary guidelines advisory committee 2020) and second group was advised to eat according to the usual preoperative diet. These regimens were continued for two months. Patients who did not want to follow a diet or did not go back to the clinic for follow-up were excluded from the study. After being two months on diet following the surgery, the patients were questioned again, including age and sex, existing gastrointestinal symptoms (anorexia, gastrointestinal upset, abdominal pain, nausea, vomiting, bloating, abdominal distention, diarrhea, belching after surgery, or none), and diet. Patients who did not follow the diet were excluded from the study. Finally, 80 patients were included in the study. In terms of diet, 40 patients were in

group one with a low-fat diet and 40 patients were in group two with a normal diet. Patients were also divided into two groups based on age: over 50 years old and under 50 years old. Patients were divided into obese ($> 25 \text{ kg/m}^2$) and non-obese ($< 25 \text{ kg/m}^2$) groups based on BMI. The information obtained from their status was analyzed. Patients were not charged and their treatment routine was not changed. Written consent was obtained from all patients and the information of all patients remained confidential.

Statistical analysis

Quantitative data were displayed using standard mean and deviation and qualitative data were displayed with frequency and percentage. Independent t-test, chi-square, and Fisher's exact test were used to compare the variables between the two study groups. Logistic regression was used to control the effect of age in comparing the response variables between study groups. A significance level of 0.05 was considered for all statistical tests. SPSS software version 25 was used for data analysis.

RESULTS

In this study, 80 people were divided into two groups, the case group that received a low-fat diet ($n = 40$) and the control group ($n = 40$). The mean age of patients was 42.24 ± 13.09 years old. The youngest patient was 21 years old and the oldest one was 64 years old. Among the patients, 32 were male (40%) and 48 were female (60%). The mean age of patients in group 1 was statistically significantly higher than the mean age of group 2 (48.48 ± 11.25 years old versus 42 ± 14.10 years old and $p = 0.026$). There was no statistically significant difference in the sex ratio between the two groups ($p = 0.648$). In group 1, 57.7%, and in group 2, 50% of the patients were obese. The ratio of obese people between the two groups was not statistically significantly different ($p = 0.501$). The results of basic comparisons between the two groups are shown in Table 1.

According to the results in Figure 1, the incidence rate of complications in the group that received low-fat diet was significantly lower than the control group (14 patients (35%) among patients that received low-fat diet and 26 patients (65%) in the control group (OR = 0.290; CI 95% (0.116 - 0.727); p -value = 0.007). Also, after adjusting for the effect of age, it was observed that the chance of complications in the group receiving a low-fat diet was 77% lower than the control group (OR = 0.230; 95% CI (0.085 - 0.624); $p = 0.004$).

Anorexia was observed in a significantly smaller proportion of patients in the group that received a low-fat diet (5% vs. 27.5% and $p = 0.006$). After adjusting for the effect of age, it was observed that the chance of anorexia in the group receiving a low-fat diet was 90% lower than the control group (OR = 0.107; 95% CI (0.021 - 0.549); $p = 0.007$). Although nausea and vomiting ($p = 0.074$), GI upset ($p = 0.645$), bloating ($p = 0.508$), diarrhea ($p = 0.346$), and belching ($p = 0.736$) occurred in smaller proportion of patients on a low-fat diet, but with adjusting for the effect

Table 1. Description and comparison of basic characteristics between groups

Patient's characteristics	Group		P value
	Case	Control	
Mean age (SD)	48.48(11.25)	42(14.10)	0.026
Sex			0.684
Man (percent)	15(37.5)	17(42.5)	
Woman (percent)	25(62.5)	23(57.5)	
Obesity (percent)	23(57.7)	20(50)	0.501

Table2. Comparison of disease outcomes by study group

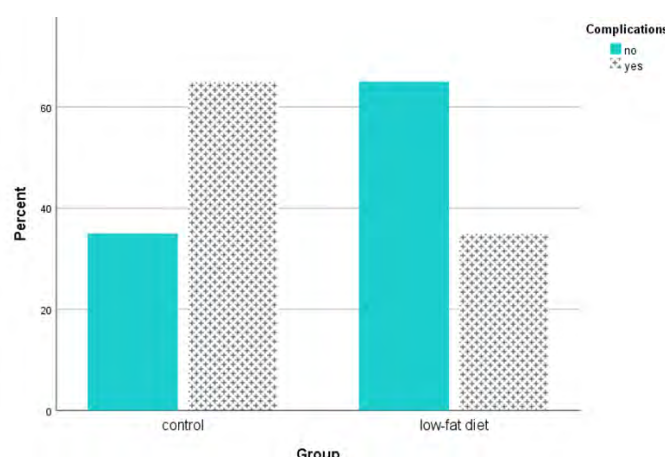
Outcome	Group		P value*	P value**
	Low-fat diet	Control		
Anorexia	2(5)	11(27.5)	0/006	0/007
Nausea and vomiting	3(7.5)	9(22.5)	0/060	0/074
GI upset	6(15)	5(12.5)	0/745	0/645
Bloating	4(10)	5(12.5)	0/999	0/508
Diarrhea	5(12.5)	7(17.5)	0/531	0/346
Belching	5(12.5)	6(15)	0/745	0/736

* Unadjusted P-Value, ** Adjusted P-Value for age

of age, no statistically significant difference in the incidence of these complications was observed between the two groups (Table 2).

DISCUSSION

The incidence rate of complications in the group receiving a low-fat diet was significantly lower than the control group (14 patients (35%) among patients receiving low-fat diet and 26 patients (65%) in the control group). In Kumar et al.'s study in India, it was found that various factors affect the possibility and incidence of gastrointestinal complications after cholecystectomy, and diet may also play a role [19]. In the present study, it was found that a low-fat diet can reduce gastrointestinal complications after cholecystectomy, which confirmed the role of the diet in the study of Kumar et al.'s. After adjusting for the effect of age, it was observed that the chance of complications in the group receiving a low-fat diet was 77% lower than the control group. In Altomare et al.'s review study in Italy, it was found that the type of diet can affect the severity and frequency of gastrointestinal complications after cholecystectomy, especially low-fat diets and it can reduce symptoms in patients after cholecystectomy [20], which is similar to the current study. Anorexia was significantly observed in a smaller proportion of patients in the group receiving a low-fat diet (5% vs. 27.5% and $p = 0.006$). After adjusting for the effect of age, it was observed that the chance of developing anorexia in the group receiving a low-fat diet was 90% lower than the control group. In Blasco et al.'s study it was seen constipation improved after cholecystectomy compared to baseline, whereas diarrhea and bowel urgency got worse. More than 50% of patients experienced a change


Figure 1- Complication rate in study groups

in their bowel habit after surgery, in contrast to current findings that show diarrhea got better after using a low-fat diet [20].

CONCLUSION

Based on the results of this study, it is concluded that consumption of a low-fat diet after cholecystectomy is effective in reducing gastrointestinal complications and can be used depending on the patient's condition and the surgeon's decision.

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