

# Changes in the Occurrence of Abdominal Complaints in Surgically Treated Patients due to Cholecystolithiasis

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## Abstract

**Introduction:** The post cholecystectomy syndrome is defined as the maintenance or the occurrence of digestive tract symptoms after cholecystectomy due to extra hepatic biliary duct disorders. The introduction of a laparoscopic approach has revolutionized the procedure in the treatment of cholecystolithiasis. Laparoscopic cholecystectomy is less invasive for patients as compared to the classic surgical procedure.

**Aim:** Determination of the frequency and the intensity of abdominal symptoms occurring after laparoscopic surgery and classic cholecystectomy related to the post cholecystectomy syndrome.

**Material and methods:** The study group consisted of 105 patients of the Clinical Department of Surgery of the Regional Specialist Hospital in Tychy, Poland. Patients were divided into two groups: patients who underwent laparoscopic (n=83) or classic (n=22) cholecystectomy. The assessments were performed preoperatively, 1 month and 6 months postoperatively, using the "Gastric Symptom Questionnaire". The results were compared using statistical methods.

**Results:** The symptoms of the syndrome were observed in 32 (30.5%) patients from the study group. Symptoms related to the post cholecystectomy syndrome included abdominal pain, flatulence, nausea, vomiting, movement difficulties, loss of appetite or diarrhea. These symptoms occurred more frequently after classic cholecystectomy as compared to the laparoscopic approach, 1 month and 6 months after cholecystectomy.

**Conclusions:** The post cholecystectomy syndrome may occur in 1/3 of patients after cholecystectomy. The symptoms occur less frequently in laparoscopically treated patients. In a large number of patients the syndrome may be related to the treatment method.

**Keywords:** Post cholecystectomy syndrome; Cholecystolithiasis; Laparoscopic cholecystectomy; Classic cholecystectomy

## Introduction

Cholecystolithiasis is one of the most frequent abdominal diseases requiring surgical treatment. A constant increase in the incidence has been observed in affluent countries within the last 50 years. About 30 million patients are affected and about 750,000 cholecystectomies are performed annually in the USA [1-4]. The main symptom of cholecystolithiasis is paroxysmal epigastric pain known as the biliary or hepatic colic [3] with frequent nausea and vomiting. Ultrasonography is the basic diagnostic method of cholecystolithiasis and it also provides the data on the number, dimension and location of calculi [4].

For two decades tremendous development of low-invasive surgery has been observed in treatment of cholecystolithiasis, and laparoscopic cholecystectomy in particular. Despite a dominating role of laparoscopic cholecystectomy a number of studies have recently been reported on a significant and at least comparable usefulness of minicholecystectomy in treatment of gall bladder diseases and biliary ducts in the course of cholecystolithiasis. The post cholecystectomy syndrome (PCS) is defined as the maintenance or the occurrence of at least three digestive tract symptoms after cholecystectomy due to extra hepatic biliary duct disorders [5]. Symptoms are noted in 5-30% of patients undergoing cholecystectomy and include abdominal pain, colic, dyspeptic symptoms, constipation, diarrhoea, abdominal fullness, flatulence, intestinal gases, nausea or fat food intolerance [6]. The early and late PCS are distinguished after laparoscopic cholecystectomy [3,7].

The prevalence of the PCS syndrome is not clearly defined. However, this problem is significant considering a frequent detection of

cholecystolithiasis among the worldwide population, including Polish population [8] and consequently frequent cholecystectomy.

## Aims of the Study

1. The determination of the frequency and the intensity of abdominal symptoms after cholecystectomy.
2. The assessment of PCS symptoms in the examined period (starting from eligibility for surgery, the postoperative period to 6 months postoperatively).

## Material and Methods

The study group comprised 105 post cholecystectomy patients. The patient characteristics are shown in Table 1. The patients were hospitalized at the Clinical Department of Surgery of the Regional Specialist Hospital in Tychy, Poland. Patients operated on due to cholecystolithiasis, choledocholithiasis and patients with surgical complications such as

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(acute or chronic) cholecystitis and biliary acute pancreatitis were enrolled in the study. Metabolic disorders (hypercholesterolemia, obesity, diabetes) were not the exclusion criteria. We excluded from the study patients with chronic diseases (e.g. gastric and intestinal diseases, diseases of the skeletal-muscular system, psychiatric diseases, gallbladder neoplasms, other neoplastic conditions) and pregnant women. Patient assessments were done preoperatively, 1 month and 6 months postoperatively. The data obtained from the Gastric Symptom Questionnaire (Table 2) were compared and evaluated using statistical methods.

## Results

The PCS syndrome was observed in 30.5% of the study patients. Abdominal pain as the main symptom of cholelithiasis occurred preoperatively in 81.8% patients treated by open cholecystectomy and in 69.9% of laparoscopically treated patients. One month postoperatively this symptom was reported by 50.0% of patients treated with open cholecystectomy and 45.8% of laparoscopically treated patients, respectively. No statistically significant change was found in the examined period ( $p>0.05$ ). A statistically significant less frequent occurrence of abdominal pain was reported in laparoscopically treated patients as compared to open cholecystectomy 6 months postoperatively ( $p<0.05$ ). Only 15.7% laparoscopically treated patients reported pain 6 months postoperatively. However, in the group with classic cholecystectomy the percentage of patients was as high as 36.4% (Figure 1). The pain intensity was statistically significantly different in both groups and was lower in the case of the laparoscopic procedure. On examination abdominal pain assessed as severe or very severe was reported by 21.9% patients before cholecystectomy. However, 1 month and 6 months postoperatively a decrease in the intensity of abdominal pain was observed. Pain of severe intensity was not reported in laparoscopically treated patients 6 months postoperatively ( $p<0.001$ ), whereas in patients who underwent classic cholecystectomy severe pain occurred in 18.2% patients.

In our questionnaire the pain was divided into the following types: continuous, paroxysmal, colic or twisting. Before cholecystectomy the occurrence of continuous pain (28.6%) and paroxysmal (22.8%) pain was mainly observed and colic pain was less frequently reported (16.2%). One month postoperatively the occurrence of continuous (25.7%) and paroxysmal (18.1%) pain was less frequently observed. However, continuous pain almost subsided 6 months postoperatively. Paroxysmal pain was reported in 10.5% of patients treated by cholecystectomy. No statistically significant differences were found between the methods ( $p>0.05$ ).

Epigastric pain was the most frequently reported preoperative pain (58.1%). Epigastric pain subsided in patients (17.1%) 1 month postoperatively. However, it was reported in the region of the operative wound (31.4%). Epigastric pain was only sometimes observed 6 months postoperatively (8.6%) and in the region of the wound. It was statistically more frequent in the case of classic cholecystectomy compared to the laparoscopic procedure (18.2%; 4.9%, respectively). Pain location was similar in the examined periods ( $p>0.05$ ). Before cholecystectomy pain occurred irrespective of the time of the day (25.7%). However, it was less frequently reported after (fatty) meals (14.3%). In some cases pain was reported all the time (11.4%) or patients did not report pain

(27.6%). We observed a decrease in pain intensity irrespective of the time of the day and after meal consumption 1 month postoperatively (22.8%, 6.7%, respectively). Continuous pain was reported more frequently (14.3%). Pain occurred only after the consumption of fatty food 6 months postoperatively (10.4%). No statistically significant differences were found between the study groups ( $p>0.05$ ). The analysis of answers given by the patients concerning the postoperative sensation of epigastric pressure did not show differences for the two study groups. No statistically significant difference was found ( $p>0.05$ ).

The frequency of the sensation related to food regurgitation was noted in 41% of the study patients (reported as "sometimes"). Significant improvement was observed 6 months postoperatively since only 29.5% reported a discomfort related to food regurgitation. No statistically significant differences were found in the occurrence of this symptom in the study groups ( $p>0.05$ ). In the whole group of laparoscopically operated patients we observed a statistically significant lower percentage of patients with the sensation of food regurgitation preoperatively as compared to 1 month ( $p<0.001$ ) and 6 months ( $p<0.05$ ) postoperatively.

The frequency of abdominal flatulence in the examined periods in the groups of patients who underwent open or laparoscopic cholecystectomy was similar and the differences were not statistically significant. Preoperative abdominal flatulence was reported as "quite often" by 31.4% of the study patients. However, only 7.6% patients reported flatulence 6 months postoperatively. In both groups a statistically significant lower percentage of patients were reported preoperatively and 1 month and 6 months after cholecystectomy (Figure 2). The sensation of postprandial fullness was not reported preoperatively only by 15.2% of the study patients. It was reported by 33.3% patients 1 month postoperatively and by 35.2% patients 6 months postoperatively. A statistically significant lower percentage of postprandial fullness was reported in both groups after the surgical procedure. No statistically significant differences were found between the groups ( $p>0.05$ ) in the examined periods.

The frequency of constipation was similar for both groups of patients in the examined periods. A statistically significant lower percentage of patients complaining of constipation were found in both groups 1 month postoperatively as compared to the preoperative condition. However, in the group of patients who underwent open cholecystectomy a statistically significantly fewer patients complained of constipation 1 month and 6 months postoperatively (Figure 3). Prior to surgical procedure the frequency of eructation was similar in both groups. One and 6 months postoperatively a statistically significant difference was observed in the frequency of eructation in the group with open cholecystectomy ( $p<0.05$ ) (Figure 4).

Nausea and vomiting were reported with a similar frequency in both groups in the examined periods. However, the intensity of these symptoms decreased statistically significantly in two groups postoperatively (Figure 5).

The prevalence of diarrhea in both groups was similar in the examined periods. No statistically significant difference was found between the study groups ( $p>0.05$ ).

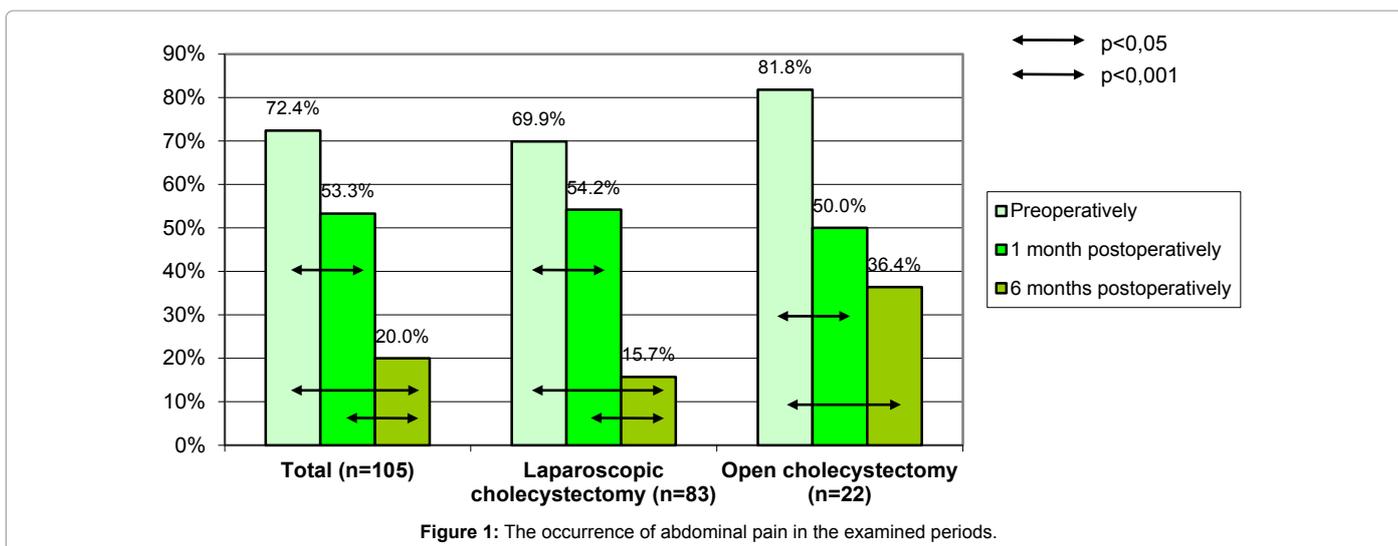
Malaise was reported by a similar number of patients (80%) in

Table I: Patient characteristics.

		Total (n=105)		Laparoscopic cholecystectomy (n=83)		Open cholecystectomy (n=22)	
		N	%	N	%	N	%
Sex	Female	77	72.7%	61	73.5%	16	72.7%
	Male	28	26.3%	22	26.5%	6	27.3%
Age [years]		56.8 ± 11.8		55.9 ± 12.5		60.5 ± 8.7	
Coexisting Diseases	YES	67	63.8%	55	66.3%	12	54.5%

Table II: Gastric symptom questionnaire.

<b>1. Do you feel abdominal pain?</b>					
Yes			No		
If "No", go to question 6					
<b>2. What is the pain intensity like?</b>					
Very weak	Weak	Severe	Very severe	Unbearable	
<b>3. What is the pain like?</b>					
Continuous	Paroxysmal	Colic		Twisting	
<b>4. Where is the pain located?</b>					
Epigastrium	Wound area	Shoulders or clavicle area		Radiating to the back	Other
<b>5. When does the pain occur?</b>					
Irrespective of time of the day	After fat meals	Permanently	After a meal	Paroxysmal waking at night	Other
<b>6. How often does the pressure sensation in the epigastrium occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>7. How often does the sensation of food regurgitation occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>8. How often does abdominal flatulence occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>9. How often does postprandial abdominal fullness occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>10. How often does constipation occurs?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>11. How often does eructation occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>12. How often does nausea or vomiting occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>13. How often does diarrhoea occur?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>14. How often do you complain of malaise?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>15. Do you suffer from the loss of appetite?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>16. How often do you experience breathing difficulties or dyspnea?</b>					
Never	Sometimes	Quite often	Very often	All the time	
<b>17. Do you experience movement-related difficulties?</b>					
Never	Sometimes	Quite often	Very often	All the time	



both groups in the examined periods. One month postoperatively a statistically significant decrease in the frequency of malaise was reported. It was reported by 59.1% of patients who underwent open cholecystectomy as compared to 67.7% of laparoscopically treated patients. No improvement in malaise was reported 6 months postoperatively.

In the whole study group, a statistically significant decrease in loss of appetite was observed 6 months postoperatively (21.9%) as compared to the occurrence of this symptom preoperatively (41.9%) and 1 month postoperatively (39.1%). Six months postoperatively only a statistically significant decrease was observed in the group of patients who underwent open cholecystectomy ( $p < 0.05$ ) compared to the symptom occurrence prior cholecystectomy.

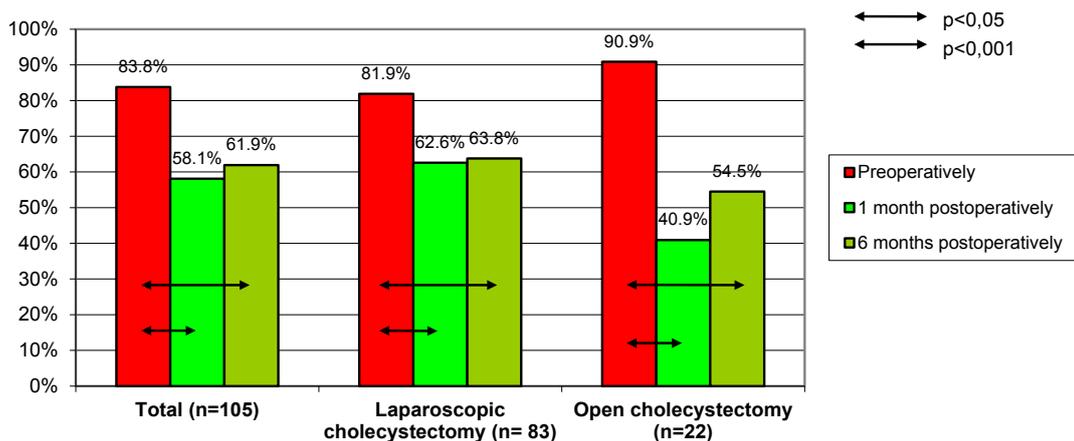


Figure 2: Comparison of abdominal flatulence in the examined periods.

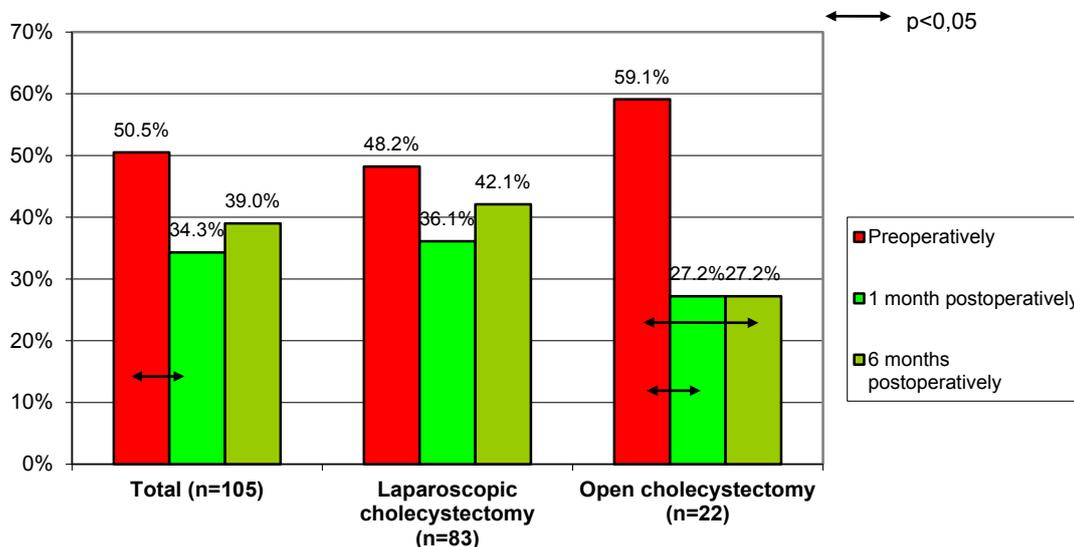


Figure 3: Comparison of the occurrence of constipation in the examined periods.

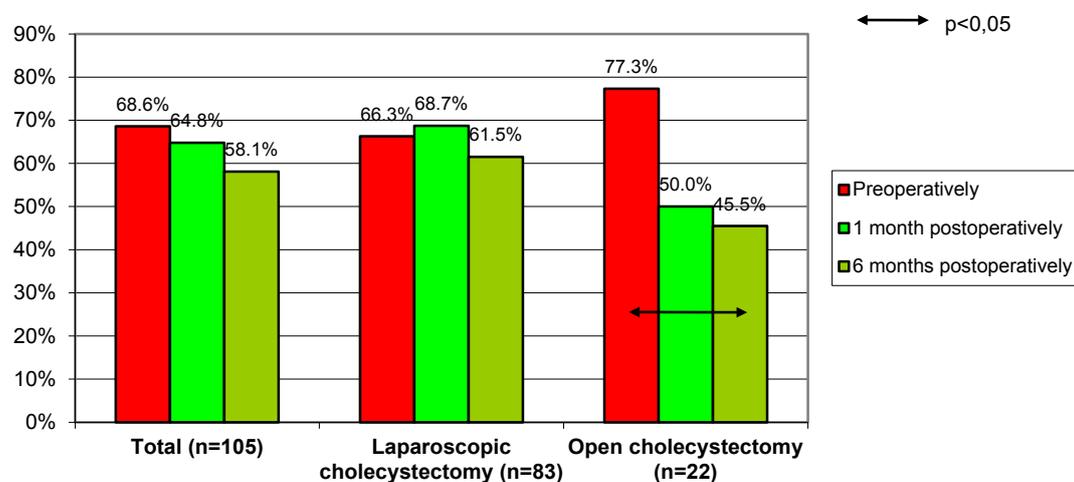
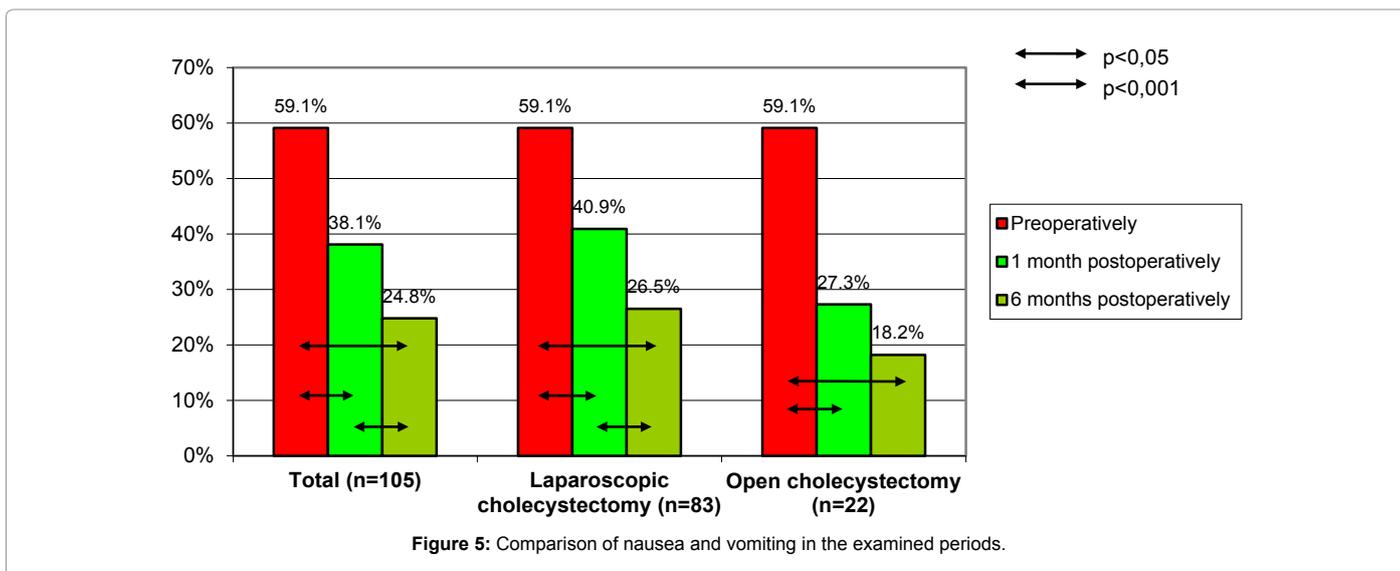


Figure 4: Comparison of the occurrence of eructation in the examined periods.



The prevalence of breathing difficulties and dyspnea was similar for both groups in the examined periods. No statistically significant differences were observed in the occurrence of these symptoms in the study groups in the examined periods.

The most significant movement-related difficulties were noted in patients who underwent classic cholecystectomy. Six months postoperatively movement-related difficulties were reported by 40.9% patients who underwent classic cholecystectomy as compared to 27.7% laparoscopically treated patients. These differences were statistically significant. Additionally, a statistically significant difference was found between patient condition assessed preoperatively and 1 month postoperatively in the group of patients who underwent laparoscopy ( $p < 0.05$ ).

## Discussion

Currently, a variety of therapeutic methods are available in the treatment of cholecystolithiasis. However, open and laparoscopic cholecystectomies play a crucial role. The proper and complete therapeutic result with the simultaneous limitation of the risk occurrence is possible due to surgical procedure combined with supplementary and adjuvant methods [4,9]. Laparoscopic cholecystectomy is very common, i.e., over 500,000 surgical procedures are performed annually in Europe. The laparoscopic approach, introduced in 1990 resulted in a significant decrease in the number of patients undergoing open cholecystectomy [6]. The laparoscopic approach has gained approval of both physicians and patients since its introduction. Initially, it was applied cautiously and patients were selected very precisely. Over time, however, laparoscopy was performed in patients who were previously not eligible for laparoscopy (elderly patients, patients with co-morbidities, patients with acute cholecystitis) [10]. Both the extension of indications and a new laparoscopic approach have increased the number of laparoscopic procedures. Laparoscopic cholecystectomy became the "gold standard" among surgeons and was accepted by patients. One of the advantages of laparoscopic cholecystectomy is less extensive postoperative trauma, and consequently a lower number of postoperative complications, less frequent occurrence of the PCS syndrome and a decrease in treatment costs due to shorter hospitalization and post-surgical rehabilitation period [11,12]. It is estimated that currently 86% of cholecystectomies are performed using laparoscopy. This percentage is still increasing especially in terms of the treatment of cholecystolithiasis and acute cholecystitis.

The prevalence of the PCS syndrome is estimated at 5-30%. The main symptoms of this syndrome include abdominal pain, colic,

dyspeptic symptoms, constipation, diarrhea, abdominal fullness, flatulence, nausea or fat food intolerance [3]. The symptoms of the syndrome were reported in 32 patients (30.5%) in the study group, which is higher compared to the data reported in the literature. Abdominal pain and the occurrence of the two above symptoms were sufficient for the diagnosis of the syndrome. The literature data confirm that the symptoms of the PCS syndrome were less frequently reported 6 months postoperatively in laparoscopically treated patients as compared to classic cholecystectomy. It may result from longer convalescence after classic cholecystectomy. Other authors demonstrated different results, e.g. Terlecka showed that there were no visible differences in the health status of patients inquired about abdominal pain and the type of pain 6 months after open or laparoscopic procedure.

Topçu demonstrated that patients most often reported abdominal pain within the operated region, abdominal flatulence, dyspeptic complaints, diarrhea or constipation. Patients required proper diet. Sexual disorders and significant body mass loss were observed. Clinical digestive symptoms were similar in the two study groups at the one-year follow-up.

## Conclusions

1. PCS may occur in 1/3 of patients after cholecystectomy.
2. PCS symptoms occur less frequently in laparoscopically treated patients.
3. In a large percentage of patients PCS may be related to the treatment method.

## Conflict of Interest

Authors have no conflict of interests to declare.

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