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Postcholecystectomy Syndrome - Diagnosis and Therapeutic Strategy

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ABSTRACT

Background: Postcholecystectomy syndrome (PCS) is defined as a complex of heterogeneous symptoms consisting of: pain in the right upper quadrant and the epigastrium, dyspepsia which repeat or persist after cholecystectomy. The increased number of laparoscopic cholecystectomies worldwide led to an increased number of patients with PCS, which requires a new approach to this problem. The most frequent biliary manifestations of PCS are: bile duct injuries (BDI) and bilomas, or choledocholithiasis, subtotal cholecystectomy and ductus cysticus remnant.
Methods: Retrospective cohort study of patients in the period 2011-2022 operated in our surgical department with gallstone disease (GSD) and its complications. The aim of the study is to, analyze and apply modern diagnostic and therapeutic strategies and methods of treatment in patients with postcholecystectomy syndrome in order to optimize the final results and reduce complications and mortality rate in these patients.
Results: For the period 2011-2022 in Second Department of Surgery were operated 1532 patients with gallstone disease and its complications. The patients with PCS are 262 and all were admitted in emergency. The symptoms were as follows: pain in the epigastrium and right upper quadrant and jaundice. From them 190 operated, 72 treated conservatively. The imaging methods we applied were US, CT and MRI. The reasons for PCS were BDI-75; residual choledocholithiasis – 64; stenosing papillitis – 12; pyogenic liver abscess – 5; remnant cystic duct – 4.
Conclusions: Laparoscopic cholecystectomy has become the gold standard in the treatment of gallstone disease and gave the beginning of the laparoscopic era. This changed and expanded the concept of PCS, which now includes complications due to laparoscopic cholecystectomy. Diagnosis and treatment of PCS requires an interdisciplinary approach and should be performed in centers specialized in treatment of biliary pathology.
Key words: gallstone disease, postcholecystectomy syndrome, laparoscopic cholecystectomy, iatrogenic bile duct injuries

INTRODUCTION

Gallstone disease (GSD) affects between 5% and 25% of Western civilization and 10-15% of the Chinese population (1-3). Between 2-4% of them develop symptoms annually. 13%- 15% will have symptoms in their lifetime (3-5).

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Approximately 66,600 cholecystectomies are performed annually in the UK and more than 800,000 in the USA at an estimated cost of 9.9 billion dollars, which makes GSD the most expensive and most common disease of gastrointestinal tract (1,3). Since the 1990s, laparoscopic cholecystectomy has replaced "open" cholecystectomy and its frequency rate is increased, probably due to its relatively performing on time. In 1912 Flörcken first described stones in ductus cysticus remnant. Postcholecystectomic syndrome (PCS) was described by Womack and Crider in 1947. In 1950, Pribram was the first who proposed the name postcholecystectomy syndrome (PCS), which includes symptoms of biliary colic and/or persistent right upper quadrant pain with or without dyspeptic symptoms that remain the same before cholecystectomy. A significant number of patients who underwent cholecystectomy for symptomatic GSD reported symptoms even after surgery (6). Despite the large number of cholecystectomies performed worldwide, a 100% curative effect is still not recorded, and it is possible that the same symptoms which persisted before surgery or newer symptoms appear after cholecystectomy (7,8). The term postcholecystectomy syndrome (PCS) has expanded over the years and now includes both biliary and non-biliary symptoms, making it not entirely correct. As risk factors can be divided into two main groups: PCS due to biliary tract: residual choledocholithiasis, ductus cysticus remnant, BDI, disfunction of sphincter of Oddi, scattered stones in the abdomen during the LC, biloma, biliary dyskinesia, postoperative strictures, cholangitis and liver abscess. The symptoms that manifest outside the biliary system can be: chronic gastritis, peptic ulcer disease of the duodenum, duodenal reflux, reflux esophagitis, chronic pancreatitis, diarrhea malignant diseases of GIT.

Aim

To survey, analyze and apply in clinical practice a modern diagnostic and therapeutic strategy and treatment methods in patients with PCS in order to optimize outcomes, reduce complications and mortality rate in operated patients.

MATERIAL AND METHODS

A retrospective analysis of 1532 patients with GBD and its complications for the period 2011-2022, operated in the Second department of Abdominal Surgery of St. Marina hospital Varna was performed. From them 1073 women and 459 men in ratio 2.33:1. The gender distribution is presented in *fig. 1*.

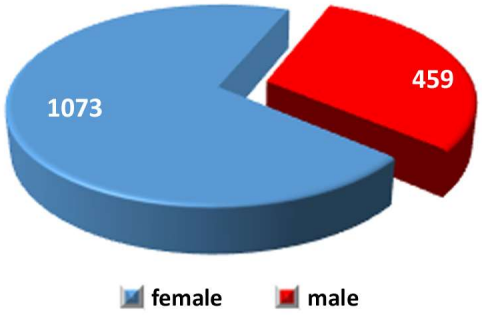

Figure 1 - Gender distribution

RESULTS

In 262 (17.1 %) patients PCS was found. In 190 (72.5%) patients an operative procedure was made, 72 were treated conservatively (*figs. 2, 3*).

The operations that were made are shown on *fig. 4.*

The types of imaging studies that were performed on patients with PCS are demonstrated in *fig. 5*.

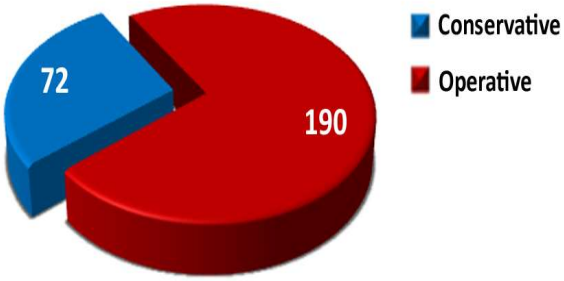

Figure 2 - Treatment of patients with PCS – operative and conservative

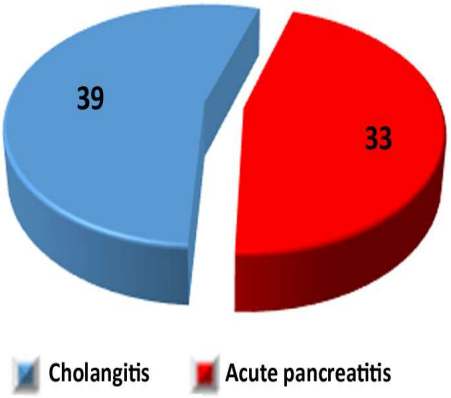

Figure 3 - Conservative treatment

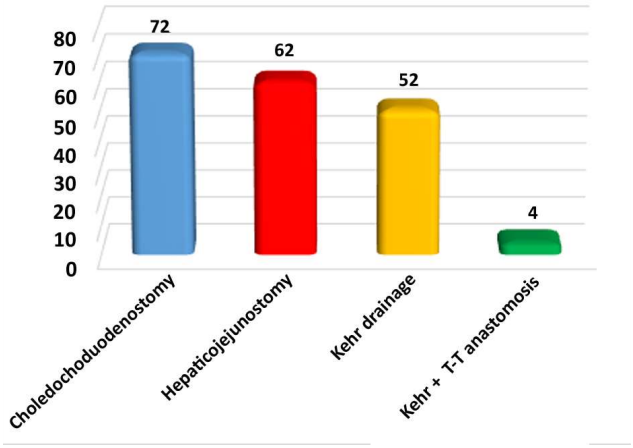

Figure 4 – Types of operations in patients with PCS

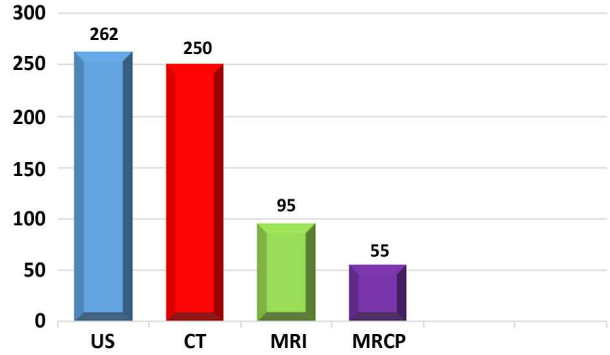

Figure 5 – Imaging methods. They are more than the number of patients, because we performed more than procedure in one patient

The etiological causes for surgical intervention in patients with PCS are shown in *fig. 6*.

The following surgical interventions in patients with BDI were performed *fig. 7*.

Statistical analysis

Microsoft Excel 2019 and SPSS (Statistical Package for Social Science) v16.0 software products were applied in connection with data processing.

DISCUSSION

Postcholecystectomy syndrome can be considered through the prism of time and can be broadly divided into two main periods: before and after the laparoscopic era.

Before the laparoscopic era, the main symptoms of PCS were: pain in the right upper quadrant with irradiation to the right shoulder or scapula; nausea, vomiting, jaundice, pruritus, fever with chills/Charcot's triad/, abdominal pain. Hellstrom et al. reported the following symptoms after 121 cholecystectomies: 37/30%/ of patients with abdominal pain, 9/7.5%/p. with residual calculosis, and 2/1.5%/p. had acute pancreatitis (9). Doubilet et al. in 253 patients followed up - 101 /40%/ reported intermittent or constant symptomatology, 78 pts /31%/ - severe post-prandial pain, from 5 min to 2 h and irradiation to the back. In 24pts/10%/ pain lasted from 2 to 24h in upper left quadrant and towards shoulders, and in 2p/0.8/ acute pancreatitis (10).

Laparoscopic cholecystectomy has become gold standard for the treatment of symptomatic GBD. The number of cholecystectomies also increased

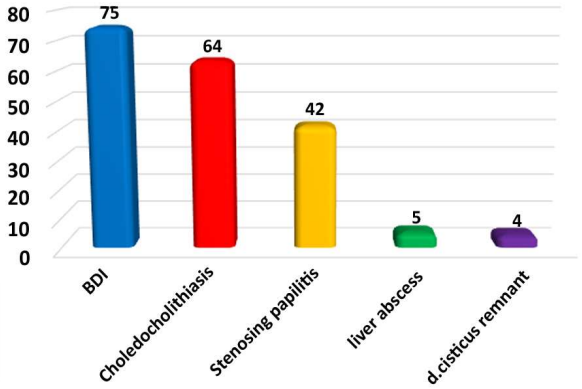

Figure 6 - Etiology of PCS

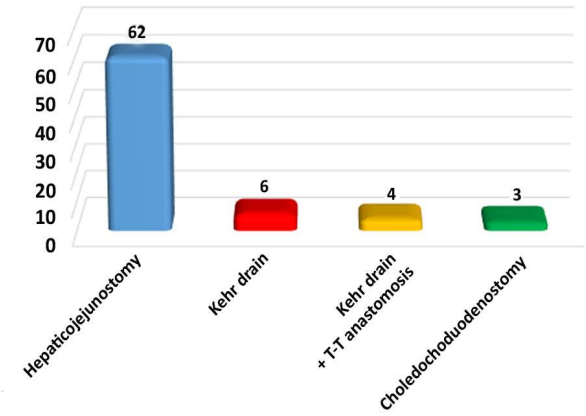

Figure 7 - Operations in patients with BDI

significantly. As a result, there has also been an increase in the number of patients with PCS, which requires review and a new look at this problem (11).

In addition to all known causes of PCS, nowadays we

can also add BDI, which from 0.1 - 0.2% in open cholecystectomy, in LC increased-up to 0.4-0.7%.

They are considered a significant surgical problem that needs medical and financial resources and need of surgical treatment in specialized biliary surgery centers. Causes for BDI are mainly:

- Insufficient qualification of the operational team;
- Anatomical variations of the biliary tract;
- Poor identification of the Calot triangle;
- Local intraoperative bleeding;
- Emergency laparoscopic interventions;
- Insufficient preoperative diagnostics.

The type of BDI in open and laparoscopic cholecystectomy differs in the place of injury. While in open they tend to be distal with involvement of the common bile ducts, in LC they are proximal with involvement mainly of the right hepatic duct.

Various studies have shown that about 90% of BDI are not recognized intraoperatively. When in doubt, conversion and reconstructive surgery should be performed at the time. They often manifest during the early operative period clinically with nonspecific symptoms such as: nausea, vomiting, high temperature and right subcostal pain. Patients may later develop a clinical presentation of biliary peritonitis or jaundice. (12,13) In our study only four of the patients (5,3%) with BDI were diagnosed during the laparoscopic cholecystectomy and conversion was made in our department. A T- tube (Kehr drainage) with T-T anastomosis of the common bile duct was performed. The rest - 71 patients (96,4%) underwent LC in other hospitals. They were admitted in emergency 10 - 20 days after the operation. The symptoms of the patients were: bile leakage, biliary peritonitis and jaundice. We performed the operation after contrast enhanced CT scan with, or without pigtail drainage of the abdomen, or MRCP in cases with jaundice. This led to indirect conclusion that the operative team that performed LC is not well prepared for all of risks which the laparoscopic cholecystectomy hides.

Incomplete removal of the gallbladder - subtotal cholecystectomy. Its incidence in open cholecystectomy is very low (14-16). During the laparoscopic era, there have been isolated publications about subtotal cholecystectomy. However, the incidence of subtotal cholecystectomy has not been studied completely. Some authors report that this incidence is higher than that of open cholecystectomy (17,18). Greenfield et al. reported over 13.3% in LC (19). The reasons for this are: poor visualization, adhesions, severe inflammatory changes, risk of BDI, congenital anatomical features. In most cases, the stones remain or form in the rest of the gallbladder and become clinically apparent after surgery. Choubey. Walsh and Palanivelu reported about onset of symptoms for an average of 4.1 years (6 months to 12 years) (14). Unfortunately, there is no safest technique for subtotal cholecystectomy and the debate is still open (20). We found two patients with subtotal cholecystectomy which were admitted in our department a years after the operations with medical documentation for previous cholecystectomy. The CT scan showed presence of gallbladder. During the operation we removed the rest of the gallbladder with cystic duct resection close to common bile duct.

Unrecognized stones in d. cysticus during LC are another cause for the development of PCS. During cholecystectomy d. cysticus is ligated as close to the gallbladder as possible. This avoids possible BDI, but on the other hand it is a prerequisite to "miss" stones in the residual part of d. cysticus. This partly explains the development of PCS after LC. Residual lithiasis is difficult to identify and requires specific surgical interventions. According to Walsh and Beyer (21) the frequency rate of residual calculosis in cystic duct is about 14.7% and is still not being discussed in world literature. This may be due to the fact that: only 50% of patients have a "long" cystic duct. Therefore, the stones in it can be identified intraoperatively and removed; about 60% of them are small enough in size and can pass into the common bile duct and from there into the GIT. Often, the calculosis of d. cysticus is also associated with choledocholithiasis in about 35-40 % of cases. After endoscopic sphincterotomy, their evacuation is also facilitated. Many surgical centers recommend intraoperative cholangiography or endoscopic choledochotomy as the stones can be visualized and removed. Other complications associated with d. cysticus remnant may be: bile leakage; fistula; dilatation; neurogenic pain.

The treatment of PCS is mainly determined by its causes and can be divided into three main groups: conservative - in cholangitis or pancreatitis; minimally invasive procedures - ERCP, laparoscopy, papillotomy; and open surgical interventions, which include exploration of the ERCP followed by Kehr drainage or biliodigestive anastomosis choledochoduodenal anastomosis or hepatojejunoanastomosis.

CONCLUSION

Despite being known for a long time, PCS – is once again turning into an actual problem, as the main place is occupied by the correct /exact/ preoperative diagnosis and indications for surgical treatment - open

or laparoscopic cholecystectomy. Clinical symptoms can be divided into early and late. Treatment requires an individualized multidisciplinary approach and a team of interventional radiologists, endoscopists, gastroenterologists and surgeons in specialized hepatobiliary centers.

Author's contributions

All authors contribute in all sections of the paper.

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Conflict of interest

The authors declare that they have no commercial associations that might pose a conflict of interest in connection with the submitted article. The authors have no conflicts of interest to disclose.

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