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CLINICAL AND DIAGNOSTIC ASPECTS OF THE TREATMENT OF PATIENTS WITH MIRIZZI SYNDROME

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Introduction. Mirizzi syndrome (MS) is a rare but clinically significant complication of gallstone disease that complicates diagnosis and increases the risk of iatrogenic bile-duct injury.

Aim. Improving treatment for patients with MS by retrospectively analyzing diagnostic approaches and surgical outcomes in patients treated in 2014–2024.

Materials and methods. We reviewed 1189 records of patients with gallstone cholecystitis; MS was identified in 72 cases (6.05 %). Patients were classified by Csendes (1989): type I 58(80.55 %), type II 11(15.27 %), type III 2(2.77 %), type IV 1(1.38 %). Ultrasound was mandatory for all patients; MRCP (31; 43.05 %), MSCT (6; 8.33 %) and ERCP (1; 1.38 %) were used for diagnostic clarification and operative planning.

Results and Discussion. Ultrasound enabled initial suspicion (dilated cystic duct with a stone in 48; 66.66 %) but was insufficient for accurate typing. ERCP was complicated by post-procedural pancreatitis in one case. Type I MS was managed with laparoscopic cholecystectomy, whereas types II–IV required open reconstructive biliary procedures. Postoperative complications occurred in 28 patients (38.88 %); no deaths were recorded.

Conclusions. MS management should be type-guided. Routine ultrasound should be complemented – particularly by MRCP – to improve preoperative classification and support safer, individualized surgery.

Keywords: Mirizzi syndrome, laparoscopy, cholecystectomy, diagnostics, complications.

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КЛІНІКО-ДІАГНОСТИЧНІ АСПЕКТИ ЛІКУВАННЯ ПАЦІЄНТІВ ІЗ СИНДРОМОМ МІРІЗЗІ
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Вступ. Синдром Міріззі – рідкісне ускладнення ЖКХ, що ускладнює діагностику та підвищує ризик ушкодження жовчних проток.

Мета – оцінити діагностику й результати хірургії за наявності СМ (2014–2024). Матеріали та методи: проведено ретроспективний аналіз 1189 випадків ЖКХ; СМ виявлено у 72(6.05 %), типування за Csendes.

Результати та обговорення. УЗД – базовий метод; для уточнення використовували МРХПГ 43,05 %, МСКТ 8,33 %, ЕРХПГ 1,38 %. у разі I типу переважала ЛХЕ, у разі II–IV – відкриті реконструктивні втручання. Ускладнення – 38,88 %, летальності не було.

Висновки. Тактика має залежати від типу; УЗД слід доповнювати насамперед МРХПГ для безпечного планування операції.

Ключові слова: синдром Міріззі, лапароскопія, холецистектомія, жовчнокам'яна хвороба.

Introduction

Mirizzi syndrome (MS) is a rare yet complex complication of gallstone disease (GSD), characterized by compression of the common bile duct or common hepatic duct by a gallstone impacted in the gallbladder neck or cystic duct. Prolonged chronic inflammation may lead to the formation of cholecystocholedochal fistulas and severe structural damage to the bile ducts, complicating both diagnosis and surgical treatment.

The reported incidence of MS varies widely – from 0.25 % to 6 % [1–4] among all patients with GSD. Despite its relative rarity, this condition is clinically significant due to the diagnostic complexity and the substantial risk of iatrogenic injury to the biliary tree during surgical procedures. To this day, Mirizzi syndrome remains a challenge for surgeons worldwide, particularly in emergency and urgent settings [1; 5–9].

The primary method of the initial diagnosis of Mirizzi syndrome (MS) is ultrasound (US), which has high sensitivity for detecting concrements, but relatively low specificity with regard to the syndrome itself. Modern imaging methods, such as magnetic resonance cholangiopancreatography (MRCP), multislice computed tomography (MSCT), and endoscopic retrograde

cholangiopancreatography (ERCP), make it possible to improve the accuracy of diagnosis; however, during ERCP complications may arise, such as pancreatitis, bleeding, perforation, and cholangitis; also, these methods are not always available in urgent care settings [4–7; 10]. Despite all the proposed methods of preoperative examination, MS may be diagnosed only during surgical intervention, which significantly increases the risks of iatrogenic injuries of the common bile duct (choledochus), especially in the presence of an infiltrate in the area of the gallbladder neck [4–11].

The treatment of Mirizzi syndrome depends on the type of pathology and may vary from laparoscopic cholecystectomy in type I (A. Csendes classification (1989)) to complex open surgical interventions with reconstructive manipulations on the bile ducts in more complex types of the syndrome. That is why the determination of a clear algorithm for diagnosis and for choosing the optimal type of surgical intervention is a relevant task of modern abdominal surgery.

The aim of this work is a retrospective analysis of the results of diagnosis and surgical treatment of patients with Mirizzi syndrome for the period from 2014 to 2024, which will make it possible to determine the main trends, the features of treatment, and to formulate recommendations regarding the improvement of approaches to this complex surgical problem.

Materials and Methods

A retrospective analysis was conducted of 1189 medical records of patients with gallstone cholecystitis who were treated at the "ORCMC" of the Department of Surgery of Odesa National Medical University during the period from 2014 to 2024. Among the total number of examined patients, Mirizzi syndrome (MS) was diagnosed in 72 cases, which amounted to 6.05 %. Of these, there were 51 women (70.84 %) and 21 men (29.16 %). The patients' ages ranged from 25 to 92 years.

All patients with Mirizzi syndrome were classified according to the A. Csendes classification (1989), which includes four types of the syndrome. The distribution of cases was as follows: MS type I – 58 patients (80.55 %), type II – 11 patients (15.27 %), type III – 2 patients (2.77 %), type IV – 1 patient (1.38 %).

The mandatory primary diagnostic method for all patients was abdominal ultrasound (US), which allowed the initial suspicion of MS. To clarify the diagnosis, determine the syndrome type, and plan the surgical treatment strategy, additional instrumental methods were used, such as magnetic resonance cholangiopancreatography (MRCP) – in 31 patients (43.05 %), multislice computed tomography (MSCT) – in 6(8.33 %), and endoscopic retrograde cholangiopancreatography (ERCP) – in 1 patient (1.38 %). All patients underwent a standard diagnostic set of examinations, which included complete blood count and biochemical blood tests, urinalysis, determination of blood group and syphilis screening, as well as testing for hepatitis and tumor markers.

Evaluation of treatment outcomes was carried out based on the analysis of postoperative complications (early bile leakage, formation of biliary fistulas, and others) and the overall effectiveness of the diagnostic-and-treatment strategy.

Data sources included medical records, imaging reports (US/MRCP/MSCT/ERCP), operative notes, and postoperative course documentation; key variables were age, sex, Csendes type, imaging performed and main findings, surgical approach and procedural details, postoperative complications, and mortality. Data were entered into a structured database, de-identified, stored on a password-protected device, and access was restricted to the research team. Statistical analysis was descriptive only: categorical variables were reported as n (%), continuous variables as mean ± SD (if approximately normal) or median (IQR) (if skewed), presented overall and, when relevant, stratified by Csendes type. The study was a retrospective chart review with no impact on patient management; all extracted data were anonymized/de-identified prior to analysis, and all included medical records contained signed consent for personal data processing and consent for surgical treatment.

Data extraction form (per patient): each patient was assigned a unique Study ID and no direct identifiers (full name, address, phone number) were recorded; files were stored separately and securely. Collected variables included Study ID (unique anonymized code; text, e.g., MS-001; source: study database), admission date (index; YYYY-MM-DD; chart), age (years; integer; chart), sex (F/M; chart), MS confirmation (yes/no; chart/operative note), Csendes type (I/II/III/IV; operative note/imaging), US performed (yes/no; imaging), US findings (free text; imaging), MRCP performed (yes/no; imaging), MRCP findings (free text; imaging), MSCT performed (yes/no; imaging), MSCT findings (free text; imaging), ERCP performed (yes/no; procedure), ERCP findings (free text; imaging), surgical approach (Lap/Open/Conv; operative note), postoperative complications (yes/no; chart), complication details (free text; chart), and mortality (yes/no; chart).

Research results and their discussion

During the retrospective analysis, Mirizzi syndrome (MS) was diagnosed in 72 patients, accounting for 6.05 % of all cases of gallstone cholecystitis. Of these, 51 were women (70.84 %) and 21 were men (29.16 %). The patients' ages ranged from 25 to 92 years.

The distribution of patients by MS type (according to the A. Csendes classification) showed a predominance of type I, which was observed in 58 patients (80.55 %). Type II MS was diagnosed in 11 patients (15.27 %), type III in 2 patients (2.77 %) and type IV in 1 patient (1.38 %) (Figure 1).

The primary method of initial diagnosis of Mirizzi syndrome (MS) was ultrasound (US), which made it possible to suspect the syndrome in all patients, namely a dilated cystic duct with a stone – 48 patients (66.66 %). However, the specificity of US for establishing the type of the syndrome and assessing the extent of involvement was insufficient. The additional use of magnetic resonance cholangiopancreatography (MRCP) made it possible to clarify the type and degree of involvement in 31 patients (43.05 %). Multislice computed tomography (MSCT) was effective in refining the diagnosis in 6 cases (8.33 %), and endoscopic retrograde cholangiopancreatography (ERCP) was used in 1 patient (1.38 %) and was accompanied by the development of acute post-procedural pancreatitis.

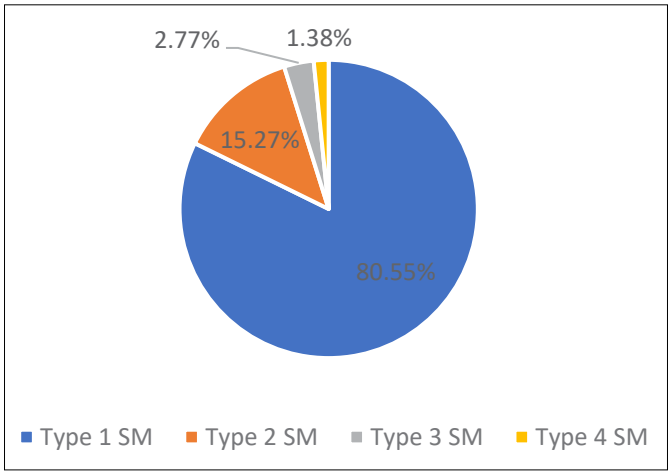

Fig. 1. Types of Mirizzi Syndrome

In two patients, contraindications to performing ERCP were identified in the form of parapapillary diverticula, and in one more patient repeated attempt to catheterize the papilla of Vater were unsuccessful.

Analyzing the surgical tactics, it was established that in type I Mirizzi syndrome laparoscopic cholecystectomy (LC) was the procedure of choice. Contraindications to LC in type I MS included a dense inflammatory infiltrate in the area of Calot's triangle and the inability to clearly visualize the anatomical structures, as well as the generally accepted contraindications to performing laparoscopic interventions. Laparoscopic cholecystectomy was performed in 58 patients (80.55 %). In patients with type II MS, open procedures were predominantly carried out: open (laparotomic) cholecystectomy with repair (plastic) of the common bile duct over a Kehr T-tube in 7 cases (9.72 %); external drainage of the common bile duct according to Vishnevsky in 2 cases (2.77 %); subtotal cholecystectomy with drainage of the gallbladder remnant in 2 patients (2.77 %); and, in patients with types III and IV MS, open cholecystectomy with the creation of a hepaticojejunostomy on a defunctionalized Roux-en-Y loop was performed in 3 patients (4.16 %) (Table 1).

Postoperative complications were observed in 28 patients (38.88 %), and there were no fatal cases. In 3 patients with type II MS, the complications were represented by bile leakage after subtotal cholecystectomy, in one patient with type I MS, after the laparoscopic cholecystectomy, experienced early bile leakage through the drain originating from the ducts of Luschka (4; 5.55 %), the formation of a postoperative biliary fistula after laparotomic cholecystectomy – in 2 patients (2.77 %). In addition, among patients with type II MS, incisional seromas were also observed in 4 patients (5.55 %) and postoperative right-sided pneumonia in 2 patients (2.77 %).

Analyzing the treatment outcomes of patients with MS who underwent laparoscopic surgery, the following complications were identified: lower-extremity deep vein thrombosis in 7 patients (9.72 %); superficial thrombophlebitis of the lower extremities in 5 patients (6.94 %); postoperative right-sided pneumonia in 2 patients (2.77 %); Cardiac rhythm disturbances in 2 patients (2.77 %); subsegmental pulmonary embolism (SSPE) in 1 patient (1.38 %) (Figure 2).

Pathogenetically justified conservative therapy allowed successful resolution of these complications in all patients. Such a number of complications may be due to the high comorbidity index in these patients, particularly involving the cardiopulmonary system. In such patients, the negative effects of high-pressure carboperitoneum during laparoscopic interventions become clinically significant.

The obtained results emphasize the necessity of the comprehensive use of modern diagnostic methods to determine the type of Mirizzi syndrome, which makes it possible to choose the optimal method of surgical intervention and to minimize the number of conversions, as well as to reduce the risk of intra- and postoperative complications. In our opinion, the widespread introduction into practical activity of MRCP with 3D reconstruction of the biliary tree can improve the preoperative diagnosis of MS without exposing patients to the risk of periprocedural complications as during ERCP.

Table 1

Surgical Treatment Methods for Mirizzi Syndrome

MS Type	Operation procedure	Number of Patients (n)	Percentage (%)
Type I	Laparoscopic cholecystectomy	58	80.55 %
Type II	Open cholecystectomy with bile duct reconstruction (Kehr drainage)	7	9.72 %
	External drainage of the common bile duct (Vishnevsky technique)	2	2.77 %
	Subtotal cholecystectomy with drainage of the gallbladder remnant	2	2.77 %
Type III–IV	Cholecystectomy with the creation of hepaticojejunostomy on a defunctionalized Roux-en-Y loop	3	4.16 %
Total		72	100 %

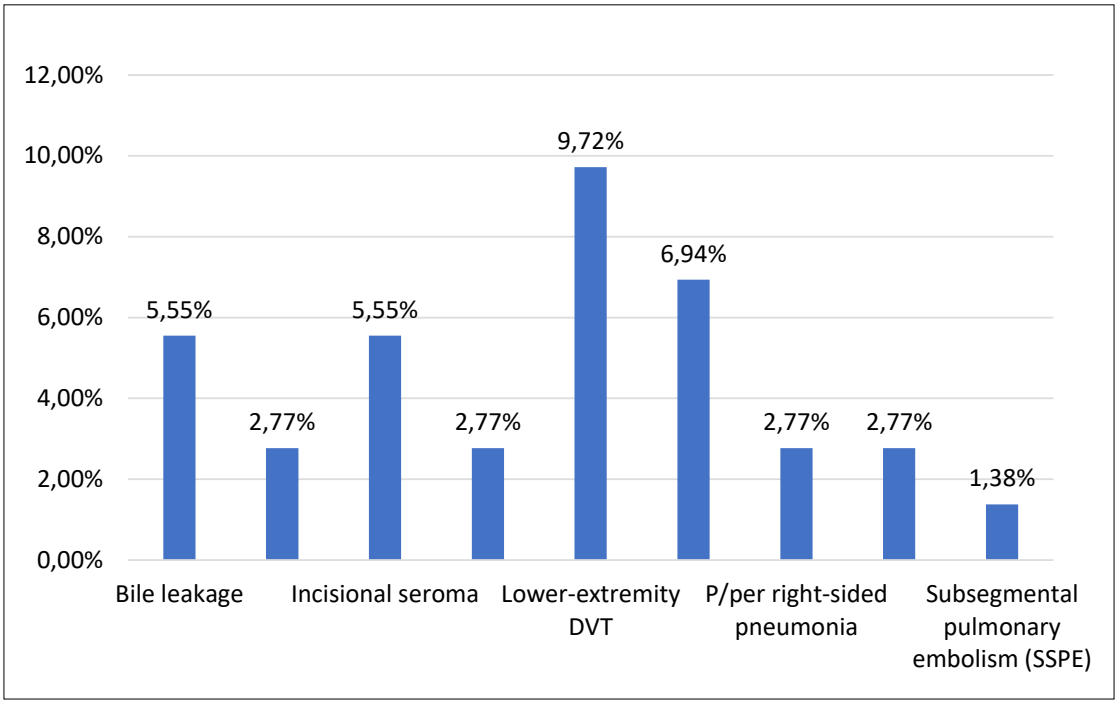

Fig. 2. Postoperative complications with Mirizzi Syndrom

In urgent conditions, given the lack of time for a full preoperative examination, clear visualization of the biliary and vascular structures has primary importance. The use of such novel techniques as fluorescent laparoscopy and the development of new methods for identifying the anatomical structures of Calot's triangle will make it possible to significantly increase the proportion of laparoscopic interventions in MS, preventing the risk of injury to the bile ducts and the hepatic artery. The development and application of gasless technologies for endovideosurgical interventions, taking into account the predominantly advanced age and severe polymorbid background in patients with acute cholecystitis complicated by MS, will make it possible to expand the group of patients operated on using laparoscopic methods.

Conclusions

1. Mirizzi syndrome is a rare but clinically significant complication of gallstone cholecystitis, detected in 6.05 % of the examined patients over the period from 2014 to 2024. The disease predominantly occurs in women.
2. The most common was type I MS (80.55 %), which in most cases is effectively treated with laparoscopic cholecystectomy. In more complex types (II, III, and IV), open surgical interventions with reconstructive procedures on the bile ducts predominate.
3. The primary method of initial diagnosis of Mirizzi syndrome remains ultrasound, however it requires mandatory supplementation with modern diagnostic methods (especially MRCP), which allow high-accuracy determination of the syndrome type and selection of an adequate treatment strategy.
4. Careful preoperative planning, with the use of modern diagnostic methods and the correct choice of surgical tactics, makes it possible to significantly reduce the risk of postoperative complications and to ensure successful treatment outcomes for patients with Mirizzi syndrome.

Thus, the results obtained underscore the importance of a multidisciplinary approach to the management of patients with Mirizzi syndrome and the need for further refinement of diagnostic and therapeutic algorithms for this challenging patient group.

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