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Mirizzi Syndrome: Prediction of Preoperative Diagnosis

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Abstract **Relevance.** Mirizzi syndrome often manifests itself in an acute form; however, the chronic form is an equally or even more common form of manifestation. Although the clinical manifestations of Mirizzi syndrome are nonspecific, the most common form of clinical manifestations of Mirizzi syndrome is mechanical jaundice (60-100%), accompanied by abdominal pain in the upper right quadrant of the abdomen (50-100%) and fever in a patient with known or suspected cholelithiasis. **The purpose of the study.** Improving the results of diagnosis of Mirizzi syndrome by introducing modern research methods. **Research materials.** The work is based on the evaluation of the results of surgical treatment of 62 patients with cholelithiasis complicated by Mirizzi syndrome who were hospitalized in surgical departments of the Republican Specialized Scientific and Practical Center for Emergency Medical Care of the Samarkand branch for the period from 2016 to 2021. **The results of the study.** When examining patients with MS before surgery, 7 patients were faced with the fact that in the presence of signs indicating this complication of the cholelithiasis, they were not taken into account by diagnostic doctors and surgeons and the appropriate diagnosis was not made before surgery. It was considered necessary to identify the most important signs in relation to the diagnosis of MS, to calculate their informativeness. **Conclusions.** Conclusions. In the diagnosis of MS MRCPG turned out to be non-invasive, the effectiveness was 77.8%, i.e. higher than ERCPG and ultrasound. MRCPG is a method with greater resolution in the diagnosis of Mirizzi syndrome and allowing to determine the morphological type of this pathology with high diagnostic sensitivity.

Keywords Mirizzi syndrome, Classification, Diagnosis, Computed tomography, Retrograde cholangiopancreatography, Cholecystectomy, Drainage of the common hepatic duct

1. Introduction

Kehr [1] and Ruge [2] were the first to describe this condition in the early 1900s, although the term “Mirizzi Syndrome” was not adopted until after the work of Mirizzi [3] in 1948. This syndrome is an uncommon complication of chronic gallstone disease. Pathophysiologically, this condition involves extrinsic compression of the bile duct by pressure applied upon it indirectly by an impacted stone in the infundibulum or neck of the gallbladder. In turn, the resulting chronic inflammation and ulceration form varying degrees of cholecystobiliary fistula. Furthermore, cholecystoenteric fistula may also occur [4–7].

Mirizzi syndrome (MS) often manifests itself in an acute form; however, the chronic form is an equally or even more common form of manifestation [5]. Although the clinical manifestations of Mirizzi syndrome are nonspecific, the most common form of clinical manifestations of Mirizzi syndrome is mechanical jaundice (60-100%), accompanied by abdominal pain in the upper right quadrant of the abdomen (50-100%) and fever in a patient with known or suspected cholelithiasis [8,10]. Sometimes a previous recent jaundice may be detected. Often, patients with Mirizzi syndrome are treated against the background of acute cholecystitis, acute cholangitis or acute pancreatitis [8]. Mirizzi syndrome in gallstone intestinal obstruction has recently been described and confirmed as another clinical manifestation that surgeons should keep in mind [9].

Preoperative diagnosis of Mirizzi syndrome followed by thoughtful surgical planning is of paramount importance [6]. The frequency of damage to the bile ducts in patients operated with Mirizzi syndrome without preoperative diagnosis can reach 17% [14]. Preoperative diagnosis of Mirizzi syndrome is complex and can be performed only in 8-62.5% of patients [6,9]. If a preoperative diagnosis is not made, it is necessary to identify during surgery and proper treatment. Inadequate recognition of this condition leads to high preoperative morbidity and mortality [12]. The diagnosis of Mirizzi syndrome is based on previously described clinical characteristics and a high index of suspicion or surgical intuition, which can be supplemented with radiological images and endoscopic procedures.

The conducted analysis of the literature indicates that at

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the present time the diagnosis of MS belongs to one of the urgent and still unresolved problems of modern healthcare. In this regard, there is a need to revise the criteria for the radicality of surgical intervention in MS, depending on the informativeness of non-invasive medical imaging methods, which allow at the preoperative stage to assess the features of the clinical course of the disease and identify signs of aggression of the disease, and therefore, optimization of the diagnostic algorithm becomes especially relevant in order to choose the most radical tactics of surgical treatment in each case.

The aim of the study was to improve the results of the diagnosis of Mirizzi syndrome by introducing modern research methods.

2. Research Material

The work is based on the evaluation of the results of surgical treatment of 62 patients with cholelithiasis complicated by Mirizzi syndrome who were hospitalized in surgical departments of the Republican Specialized Scientific and Practical Center for Emergency Medical Care of the Samarkand branch (RSPCEMCSB) for the period from 2016 to 2021.

3. The Results of the Study

When examining patients with MS before surgery, 7 patients were faced with the fact that in the presence of signs indicating this complication of the gastrointestinal tract, they were not taken into account by diagnostic doctors and surgeons and the appropriate diagnosis was not made before surgery. It was considered necessary to identify the most important signs in relation to the diagnosis of MS, to calculate their informativeness.

Table 1. The scoring system for predicting Mirizzi syndrome in patients with cholelithiasis

№	Signs of Mirizzi syndrome	Points	Number of patients
Clinical and anamnestic data (n=62)			
1.	Feeling of discomfort in the right hypochondrium for more than a month	1	52 (83,9%)
2.	The first attack of hepatic colic	1	8 (12,9%)
3.	The duration of cholelithiasis is more than 10 years	2	38 (61,3%)
4.	Bouts of pain up to 3-4 times a year	3	28 (45,2%)
5.	Periodic yellowing of the skin or darkening of the color of urine in the anamnesis	4	57 (91,9%)
6.	Periodic chills	5	28 (45,2%)
Sonographic signs (n=62)			
7.	Uniform expansion of the choledochus throughout	1	3 (4,8%)
8.	A large concretion in the upper third of the choledochus	1	4 (6,4%)
9.	Non-functioning (disabled) gallbladder	2	9 (14,5%)
10.	A large concretion in the neck of the bladder or in the cystic duct	3	14 (22,6%)
11.	Expansion of the intrahepatic ducts with a normal diameter of the distal choledochus	4	19 (30,6%)
12.	Shrunken gallbladder	5	27 (43,5%)
Signs detected by ERCPG (n=40)			
13.	Smooth contours of the walls of the choledochus	1	7 (17,5%)
14.	The presence of a pathological junction between the gallbladder and the common bile duct	2	12 (30,0%)
15.	Narrowing (stricture) of the hepaticocholedoch in the area of the confluence of the cystic duct	3	19 (47,5%)
16.	Expansion of the proximal sections of the external bile ducts	4	23 (57,5%)
17.	Compression of the choledochus from the outside in the upper third	5	31 (77,5%)
Signs detected by MRCPG (n=38)			
18.	The smoothness of the contours of the wall of the choledochus at the level of his judgment	1	10 (26,3%)
19.	Uniform expansion of the choledochus throughout	1	15 (39,5%)
20.	Non-functioning (disabled) gallbladder	2	12 (31,6%)
21.	The presence of concretions in the cystic duct	3	21 (55,3%)
22.	Expansion of the proximal sections of the choledochus in the presence of the normal size of its distal section	4	29 (76,3%)
23.	The presence of a filling defect in the proximal sections of the choledochus	4	21 (55,3%)
24.	Choledochal filling defect, common with the gallbladder	5	36 (94,7%)
25.	Expansion of hepaticocholedoch in its proximal parts	5	34 (89,5%)

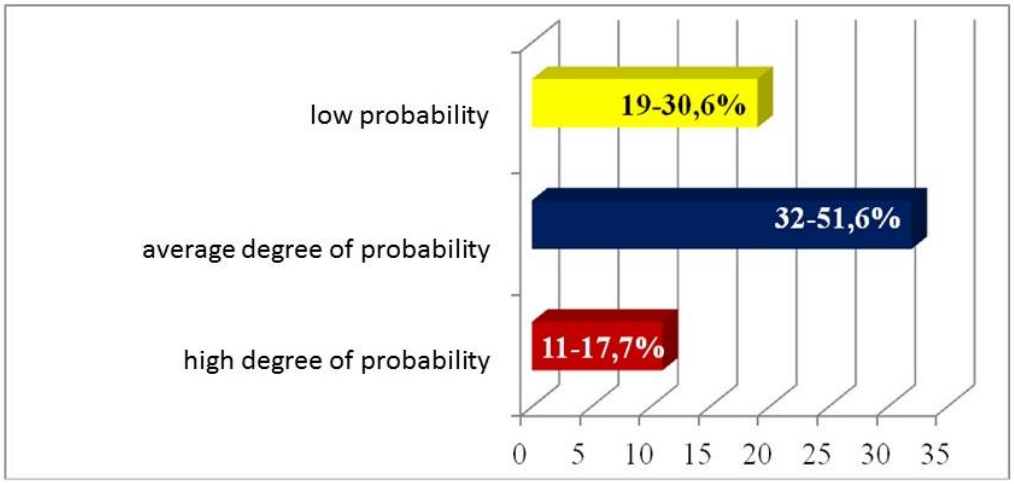

Figure 1. Distribution of patients in the main group according to the degree of probability of Mirizzi syndrome

We evaluated the informativeness of each feature when MS. To do this, they were grouped together:

1. Clinical and anamnestic;
2. Sonographic;
3. ERCPG information;
4. MRCPG information.

Among the anamnestic data, the most informative signs were such as a history of cholelithiasis for more than 7 years, bouts of pain up to 3-4 times a year, periodic yellowing of the skin or darkening of the color of urine, a feeling of discomfort in the right hypochondrium for several months, periodic chills.

In this connection, based on a review of the literature and our own experience, we have developed a program for scoring the prediction of Mirizzi syndrome in patients with cholelithiasis (Table 1).

Informative sonographic signs indicating a high risk of MS in the patient include a shrunken gallbladder, expansion of the intrahepatic ducts with a normal diameter of the distal part of the choledochus, a large concretion in the cystic duct, a large concretion in the upper third of the choledochus.

Endoscopic retrograde cholangiopancreatography (ERCPG) was performed in 48 (77.4%) patients who, according to sonography, were suspected of MS. Four patients failed to cannulate the large duodenal papilla (LDP) due to the presence of a parapapillary diverticulum in two patients and the lack of expression of the longitudinal fold in the other two. In four more patients, only the Virsung duct was contrasted and the study was discontinued. Thus, only 40 (83.3%) patients managed to perform ERCPG.

The diagnosis of MS according to the ERCPG was based on the following signs: expansion of the proximal parts of the external bile ducts, the presence of a pathological junction between the gallbladder and the common bile duct, compression of the choledochus from the outside in the upper third, smooth contours of the walls of the choledochus, narrowing (stricture) of the hepaticocholedochus in the confluence of the cystic duct.

Three patients had shingles in the upper abdomen and a rise in blood amylase to 940 and 1250 units/ l (N 0-220 units/l). After conservative treatment, the pain syndrome was stopped, the amylase level returned to normal. Our data coincide with the data of the world literature, when conducting a study by R.E. England and D.F. Martin [15], 4 (16%) of 25 patients after endoscopic interventions with MS noted the development of acute cholecystitis, bronchopneumonia, liver abscesses.

The most informative differential diagnostic signs in MRCPG are: narrowing of the hepaticocholedochus in its proximal sections, smoothness of the contours of the wall of the choledochus at the level of its narrowing, the presence of an extended cystic duct containing concretions, a defect in the filling of the choledochus, common with the gallbladder, expansion of the proximal sections of the choledochus in the presence of the normal size of its distal section.

Thus, based on a retrospective and comparative analysis of clinical and instrumental research methods, we identified a group of patients with low, medium and high probability of cholelithiasis complicated by Mirizzi syndrome.

19 (30.6%) patients with a score of 4 to 10 were assigned to the low probability group, 32 (51.6%) patients with a total score of 11 to 20 were assigned to the medium probability group, and 11 (17.7%) patients with more than 20 points were assigned to the high probability MS group (Fig. 1).

At the preoperative stage, the tactics of examination and management of surgical patients can be considered successful if it allows not only to identify, but also to reduce the perioperative (early) risk of developing biliary complications. Thus, the information obtained using various methods, according to this program, has both diagnostic and prognostic value.

4. Conclusions

Thus, the information content of ERCPG is higher (58.3%) than ultrasound (43.6%). However, the danger of causing an increase in intra-flow pressure with the introduction of a contrast agent is probably often the reason for the absence of

an image of the cholecystocholedocheal fistula and gallbladder. After endoscopic interventions with MS, signs of pancreatitis are possible. In the diagnosis of MS MRCPG turned out to be non-invasive, the effectiveness was 77.8%, i.e. higher than ERCPG and ultrasound. MRCPG is a method that has a higher resolution in the diagnosis of Mirizzi syndrome and allows determining the morphological type of this pathology with high diagnostic sensitivity.

Conflict of Interest

The authors declare no conflicts of interest or special funding for the current study.

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