Mirizzi Syndrome: an unexpected problem of cholelithiasis. Our experience with 27 cases
Michael Safioleas*1, Michael Stamatakos1, Panagiotis Safioleas1, Anastasios Smyrnis1, Constantinos Revenas2 and Constantinos Safioleas1

Address: 12nd Department of Propaedeutic Surgery, Medical School, University of Athens, Laiko General Hospital, Athens, Greece and 2Department of Radiology, Laiko Hospital, Athens, Greece

Email: Michael Safioleas* - stamatakosmih@yahoo.gr; Michael Stamatakos - stamatakosmih@yahoo.gr; Panagiotis Safioleas - panossaioleas@yahoo.gr; Anastasios Smyrnis - mstama@med.uoa.gr; Constantinos Revenas - mstama@med.uoa.gr; Constantinos Safioleas - panossaioleas@yahoo.gr

* Corresponding author

Abstract
Purpose: Mirizzi syndrome is a rare complication of long standing cholelithiasis. The purpose of this study is to retrospectively estimate the diagnostic and treatment methods applied in patients with Mirizzi syndrome.

Materials and methods: Our experience with 27 cases with Mirizzi syndrome is presented. They were diagnosed either by imaging techniques, or during surgical operation. All of the patients were managed surgically.

Results: 8 patients were diagnosed preoperatively and the rest intraoperatively. Morbidity rate after surgery was 18.5%, and mortality rate was zero. The patients presented free of symptoms three months after surgery during the follow-up.

Conclusion: Mirizzi syndrome is rarely diagnosed preoperatively and US proved inadequate for this purpose. Surgery is the only therapy and usually provides additionally definitive diagnosis.

Introduction
Mirizzi syndrome is an unusual complication of gallstone disease and occurs in approximately 1% of all patients with cholelithiasis [1]. The syndrome was first described in 1948 and is characterized by impaction of stones in the cystic duct or neck of the gallbladder, resulting in mechanical obstruction of the common hepatic duct and frequent clinical presentation of intermittent or constant jaundice [2]. The majority of cases are not identified preoperatively, despite the availability of modern imaging techniques.

Thus a constant vigilance during intraoperative dissection of Calot's triangle is required in order to avoid injury of the bile duct.

Patients-methods and results
This is a retrospective study of 27 consecutive patients with Mirizzi syndrome in the last 20 years (1986–2005), treated at the 2nd Department of Propaedeutic Surgery, Medical School, University of Athens. A total of 2,978 cholecystectomies were performed during this period. Among the 27 patients with Mirizzi syndrome, 21 patients (77.7%) had type I disease, 5 patients (18.5%) had type II
Mirizzi syndrome and cholecystobiliary fistula was presented. Type I lesions are those with external compression of the common bile duct; in type II lesions a cholecystobiliary fistula is present with erosion of less than one third of the circumference of the bile duct; in type III lesions, the fistula involves up to two thirds of the duct circumference; and in type IV there is complete destruction of the bile duct [4].

Therefore, Mirizzi syndrome and cholecystobiliary fistula appear to be different, evolving stages of the same pathological condition; thus, it is reasonable that Lubbers proposes that the term Mirizzi syndrome could not be abandoned, as it is only the first stage of a more complete process [5].

Nevertheless, gallstone erosion into the common duct is a rare complication of cholelithiasis and is mainly the result

Table 1: Diagnostic value of the non invasive imaging techniques used in our patients with Mirizzi Syndrome.

<table>
<thead>
<tr>
<th>TECHNIQUE</th>
<th>Nº PATIENTS</th>
<th>DIAGNOSTIC</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>27</td>
<td>8</td>
<td>29.6</td>
</tr>
<tr>
<td>CT SCAN</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ERCP</td>
<td>11</td>
<td>6</td>
<td>54.5</td>
</tr>
<tr>
<td>MRCP</td>
<td>2</td>
<td>1</td>
<td>50</td>
</tr>
</tbody>
</table>
of the long-standing gallstone disease. Cholecysto-choledochal fistula is an important complication of Mirizzi syndrome but it occurs only in 1% of all biliary operations [1,4]. Clinical diagnosis of Mirizzi syndrome is difficult, since there are no pathognomonic patterns in presentation. Blood investigations are not very helpful. Diagnostically, ultrasound is the first screening method but may miss the presence of Mirizzi syndrome, as CT can also do. ERCP is able to confirm the diagnosis in 50% of cases. MRCP can be as good as ERCP in diagnosis and its ability to delineate details of biliary strictures, but its disadvantage compared to ERCP is its inability to confirm the presence of fistula and offer therapeutic stenting [6]. On the other hand, T2 sections can differentiate a neoplastic mass from an inflammatory one, which U/S or CT scan may not be capable of doing.

The association of Mirizzi syndrome and gallbladder carcinoma is also of interest; in such cases it is obvious that complex surgical procedures should be avoided [7,8]. However, despite all these modern diagnostic modalities, it is possible for the problem to become apparent only during operation [9]. Intraoperatively, the presence of Mirizzi syndrome can be suggested by the finding of intense adhesions between the gallbladder and the common hepatic duct in the area of Calot’s triangle [10].

In fact, surgery is the treatment of choice for patients with diagnosis of Mirizzi syndrome. The surgical strategy includes complete removal of the gallbladder or partial cholecystectomy for MS type I, while various surgical approaches have been used for MS type II, where cholecystobiliary fistula is present and requires treatment.

The following approach is rather more accepted for type II. After the gallstone has been removed and partial cholecystectomy has been performed, the remaining gallbladder is used for choledochoplasty. A T-tube is introduced into the common hepatic duct above the repair site. Furthermore, in our department, in order to close the hole in the common bile duct, we have used, besides the gallbladder cuff, a pedicled graft of the round ligament of the liver [11,12]. Recently we have performed a Roux-en-Y cholecysto-choledochal-jejunostomy with favorable outcome in a patient with MS type II/III based on operative findings [13].

In our opinion, an 8–15 mm cuff of the gallbladder or round ligament is sufficient in order to close the defect in the common bile duct.

The role of laparoscopic approach in the treatment of Mirizzi syndrome remains controversial. Some authors consider the condition unsuitable for laparoscopic surgery.
since the inflammatory tissue in the area of Calot's triangle offers a high operative risk in dissection [6,14,15]. Other authors propose laparoscopic surgery in the treatment of Mirizzi syndrome [16-18]. We consider that in presence of cholecystocholedochal fistula conventional laparotomy is mandatory. Even in type I Mirizzi syndrome, laparoscopic surgery is not always feasible. Thus, in our series three operations with initial access by laparoscopy were converted to laparotomy due to major technical difficulties.

In high-risk patients suffering from MS, biliary drainage by endoscopic sphincterotomy and placement of a stent in the choledochal duct has been carried out [19]. Moreover placement of a nasobiliary catheter in conjunction with cholangioscopy for electrohydraulic lithotripsy has been reported [20,21].

Although the diagnostic imaging techniques have been perfected, preoperative diagnosis of MS is not an easy affair and continues to be a challenge for the surgeon. Therefore, even intraoperative precautions recognition of the condition and application of the appropriate surgical method according to the characteristics of each case will lead to successful treatment. In conclusion, it is important to identify patients with Mirizzi syndrome preoperatively but it seems even more important to consider its diagnosis during surgical dissection.

**Abbreviations**

U/S: Ultrasonography; ERCP: Endoscopic retrograde cholangiopancreatography; MRCP: Magnetic resonance cholangiopancreatography; PC: Percutaneous cholangiography; MS: Mirizzi Syndrome; CT: Computed tomography

**Competing interests**
The authors declare that they have no competing interests.

**Authors' contributions**
M. Safi Surgeon who performed the operation and edited a part of the manuscript.

MS Ta who performed the operation and prepared the draft.

PS Literature search, revision of bibliography.

AS Surgeon who contributed to the performance of the operation.

CR Radiologist who made the diagnosis of the laboratory findings.

CS Literature search, revision of bibliography.

All authors have read and approved the final manuscript.

**References**