

# The Role of Biliodigestive Derivations in the Treatment of Choledocholithiasis

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**ABSTRACT** The obstructive jaundice is a complex syndrome with both benign etiology (choledocholithiasis, hydatid cyst, chronic pancreatitis) and malignant (cancer of the pancreas, cholangiocarcinoma and gallbladder cancer) and it has a special place in biliopancreatic pathology, with up most importance due to changes in local and general status of the organism, difficult etiologic diagnostic problems for the clinician and whose solution requires teamwork, which involves both the surgeon, gastroenterologist, anesthesiologist etc. The introduction of laparoscopic approach and upper gastrointestinal endoscopy for gallstone disease giving the opportunity to solve choledocholithiasis only by laparoscopic approach or by combining laparoscopic cholecystectomy with extraction of the common bile duct stones using endoscopic retrograde cholangiopancreatography, which greatly restricted the classical surgical indications. In these circumstances, I consider appropriate to review the place and indications of biliodigestive derivations in obstructive jaundice caused by choledocholithiasis.

**KEY WORDS** *choledocholithiasis, biliodigestive derivations, choledochoduodenostomy*

## Introduction

It is the most common, but at the same time the most benign form of obstructive jaundice. Gallstone disease affects priority the age group between 50 and 65 years [1]. Most gallstones are formed in the gall bladder due to supersaturation with cholesterol of bile secreted by the liver (cholesterol stones) or due to infectious factors (pigmented stones). Gallstones can migrate from the gallbladder via the cystic duct, reaching the main biliary duct, where either are spontaneously eliminated or stop on their path to the ampoule of Vater, causing jaundice. In 15% of patients with biliary lithiasis, stones are quartered in the common bile duct [2].

## Aim and method

The aim of this retrospective study was to assess the site and indications of biliary derivations in obstructive jaundice caused by choledocholithiasis. We studied 125 patients with bile duct stones hospitalized and operated in the 1<sup>st</sup> Surgery Department between 2001 and 2008. Data were extracted from several sources: clinical observation sheets, operative protocols, histopathological examination papers.

## Results

The average age of patients was 61.4 years with a range of 23 to 89 years. Analysis of patients according to sex distribution showed predominance of females (64.8%). No significant differences were noted related to the environment of origin of patients included in the study.

The onset was sudden with pain, fever, possibly preceded by shivering, followed by jaundice, the patient presenting to the doctor within 7 days after onset of symptoms (68%). Physical examination did not evidence suggestive signs for the diagnosis. Tenderness located in the right quadrant (33.33%) suggests rather the combination of acute cholecystitis, precursor or concomitant with the migration.

Laboratory explorations are those who have facilitated diagnosis and provided data that imposed therapeutic attitude. Cholestasis syndrome was present in 92 (73.6%) of patients with bile duct stones and elevated leucocytosis were found in 67 (53.6%) of patients, especially in cases of acute edematous pancreatitis, angiocholitis or impacted bile stone at the papilla.

Imagistic explorations completed clinical and laboratory diagnosis. Abdominal ultrasound performed in 118 (94.4%) of patients is the method of choice for detecting gallstones identified using this method at 28.8% of patients with bile duct stones. CT was used in only 12 (9.6%) cases and it is especially indicated in obstructive jaundice with clinical suspicion of malignancy. EUS was used in 12 (9.6%) of patients with bile duct stones and revealed the following suggestive aspects for diagnosis: 7 patients with common bile duct dilatation, presence of stones in main biliary duct - 9 patients or dilated intrahepatic bile ducts - one patient.

In the study group I found migrated stones to 79 (63.2%) patients, primitive (native) lithiasis in 16 (12.8%) cases, mixed stones (native and migrant) to 3 (2.4%) patients and in 5 (4%) cases

we found residual stones in the main bile duct. In 22 patients, laparoscopic exploration of common bile duct showed morphological changes suggesting previous migration of stones (common bile duct passage) that required bile duct exploration.

Choledocholithotomy was performed in 103 (82.4%) cases. In 22 patients intraoperative appearance of the common bile duct (dilated) imposed an exploratory choledochotomy without any identified stones. In 12 patients who had laparoscopic surgery and found with a dilated bile duct we used choledochoscopy followed by transcystic drainage.

In choosing the method of bile duct drainage we used the following criteria:

- Dilated common bile duct, vein-looking, under 15 mm diameter - external biliary drainage Kehr, possibly associated with papilosfincterotomy,
- Dilated common bile duct with thick walls, diameter over 15 mm - biliodigestive derivation.

**Table no.1 Ways of providing biliary drainage in patients with bile duct stones.**

Intervention type	No. patients	%
Choledochotomy + external biliary drainage Kehr	15	12%
Choledocholithotomy + external biliary drainage Kehr	31	24.8%
Choledocholithotomy + external biliary drainage Kehr+ papilosfincterotomy	10	8%
Choledochoduodenostomy	52	41.6%
Roux-en-Y Choledochojejunostomy	4	3.2%
Choledochojejunostomy on omega loop	1	0.8%
Exploratory choledochoscopy + choledocholithotomy + transcystic biliary drainage	12	9.6%

Control cholangiography on the Kehr tube was performed 10-14 days after surgery and in 5 (7.04%) cases showed residual calculi, four of them have been transferred and solved by ERCP and in one case we had to reoperate performing a transduodenal sphincterotomy, extraction of the impacted stone and external biliary drainage Kehr.

Postoperative course was favorable, without registering any anastomotic fistula. In five patients were registered with surgical wound infection.

## Discussion

Choledocholithiasis treatment must achieve the following goals:

- Removing the gallbladder considered the main situs of the lithogenesis process - cholecystectomy,

- Evacuation of all bile duct stones - choledocholithotomy,
- Ensuring an effective biliary drainage.

After cholecystectomy (classical or laparoscopic), corroborating clinical data, imaging and intraoperative findings, the surgeon has to take two important decisions: first indication for exploration of bile duct and the second on how to ensure effective bile flow [3].

Decision of bile duct exploration has taken into account data provided by preoperative clinical and laboratory explorations and those offered by intraoperative exploration (size of stones, common bile duct layout, etc.).

External biliary drainage Kehr (56 patients = 44%) as a decompression method of the common bile duct and as a protective measure for choledochal suture was used in particular for moderate dilatation of common bile duct, with a diameter of less than 15 mm (51 patients - 81%). At 3 patients with main biliary duct over 15 mm with equivalence of cholecystocholedochal fistula we also used external biliary drainage Kehr. There were no common bile duct stenoses after external biliary drainage tube Kehr.

In 10 patients (8%) with primary bile duct stones and stenosis was necessary to associate papilosfincterotomy, protected by external biliary drainage Kehr.

The indications for papilosfincterotomy were as follows:

- Oddi stenosis
- impacted bile stones at the papilla that causes an inflammation, which can develop into a fibrous scar,
- association with acute pancreatitis, especially in cases with relapsing forms,
- if we do not have the certainty to remove all stones. Even after a thorough inspection is likely to remain residual calculi.

Residual lithiasis after choledochal suture protected by an external biliary drainage was present in 5 patients, representing 7.04% of cases, comparable with the data from the literature. Of these, four patients have been transferred and solved by ERCP and one patient was reoperated and performed a transduodenal sphincterotomy after the extraction of the stones and biliary drainage Kehr. In a group of 1050 patients with choledochotomy followed by an external biliary drainage Kehr in 61 patients (5.4%) were found postoperatively residual stones at cholangiography examination [4].

Biliodigestive derivations were used to restore bile flow in 57 (45.6%) cases. The primary objective of these interventions is the creation of a

direct and permanent communication between the biliary and digestive tract [5] and to by-pass the blocked area located more often at the intramural or retroduodenopancreatic common bile duct.

To ensure an effective bile flow and to prevent relapse of lithiasis, biliodigestive anastomosis must meet the following conditions:

- anastomosis mouth width must be large enough (less than 1 cm) to avoid stenosis;
- biliary and digestive tract epithelia must come in intimate contact, while avoiding non-epithelial areas, possible future locations for the development of gallstones; anastomosis must not be in tension;
- the digestive tract beyond the anastomosis has to be free and we have to avoid placing the anastomosis immediately overlying sphincters;
- to be avoided the anastomosis between segments swollen or with sclerosis (as a fistula), cystic duct will not be used as a partner in an anastomosis;
- anastomosis execution must take into account its expected functionality;
- choledochoduodenal anastomosis must have a width equal to the diameter of common bile duct and the portion located beyond the anastomosis must be uninhabited;
- for the common bile duct stenosis will prefer choledochojejunal anastomosis.

We used two basic types of biliodigestive derivations:

- Choledochoduodenostomy practiced in 52 (41.6%) patients was preferred in patients with multiple stones in the bile duct, dilated common bile duct or chronic pancreatitis and especially in elderly patients. Choledochoduodenostomy was found in 88.1% of patients with bile duct diameter over 15 mm. A large duct, measuring larger than 2 cm, is an indication of prolonged obstruction or loss of tone leading to biliary stasis. Biliary stasis results in a potential for primary stones within the duct and, therefore, size alone is a relative indication for this operative procedure. The presence of primary common bile duct stones, numerous bile duct stones (more than 15), or intrahepatic duct stones, especially in any patient who has undergone a previous

choledochotomy, usually requires a choledochoduodenostomy [6,7].

- Choledochojejunostomy was used in five (4%) patients with significant dilatation of the bile duct (more than 25 mm) with native stones. In four patients was used Roux-en-Y choledochojejunostomy and choledochojejunostomy on omega loop was used in 1 patient.

Intraoperative findings can influence the tactics and the surgical technique. Acute pancreatitis is a contraindication to interventions on the papilla and the existences of a low duodenal or jejunal stenosis, a duodenal ulcer have focused on the option for Roux-en-Y choledochojejunostomy [8, 9].

The laparoscopic approach for cholelithiasis was used in 12 cases and we practiced choledochoscopy and extracting the stones using a Dormia basket followed by transcystic drainage. This method has not been used in cases of multiple stones in the common bile duct or when the preoperative explorations have revealed the existence of a stone impacted in the papilla [10, ].

A biliary-enteric bypass is a finesse operation that typically carries high stakes. When required for benign disease, the biliary bypass must perform well over many years or else taxing radiographic or surgical revisions become necessary to protect long-term liver function. Despite competing endoscopic and radiographic modalities, however, biliary bypass is safe, reliable, and effective in maximizing a patient's quality of life.

## Conclusions

Obstructive jaundice remains a matter of great importance in the pathology of hepato-bilio-pancreatic pathology.

Transabdominal ultrasound is the method of choice to detect gallstones and can highlight a series of direct and indirect signs useful in diagnosis and therapeutic indication.

For choledocholithiasis surgery is still the main treatment option and should achieve the following objectives: relief of obstruction, decompression of bile duct and assuring an efficient bile flow.

For main bile duct stones resolved by open surgery, treatment after relief of obstruction of bile duct is today facing external biliary drainage Kehr, bilio-digestive derivations being reserved for cases with dilated common bile duct, especially in the elderly.

Laparoscopic cholecystectomy and restoration of bile flow using ERCP is now the main therapeutic option.

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