Endoscopic management of complications of cholecystectomy before discharge from hospital

Kolesistektomi komplikasyonlarının, hasta hastaneden taburcu edilmeden önce endoskopik metodlarla tedavisi

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ÖZET: *Bu çalışmada, kolesistektomi komplikasyonlarının, hasta taburcu edilmeden önceki devrede endoskopik retrogad tekniklerle tedavisi tartışılmıştır. 1994 yılı içinde bu şekilde 22 hasta sevk edilmiştir. Bunların onbeşi laparoskopik kolesistektomi (LK), yedisi ise açık kolesistektomi (AK) geçirenlerdir. Yirmiiki hastanın, altısında kalkül, dördünde ampulla stenozu, beşinde sistik kanal sızıntısı veya koledok yaralanması olan toplam onbeşinde endoskopik tedavi tek başına küratif olmuş, koledokta kalan kalkülü ve sistik kanal sızıntısı olan bir hasta ise ilave olarak karın-içi bilomalara bağlı olarak gelişen abselerin perkütan drenajını gerektirmiştir. Hepsi LK sonrası, koledokta ciddi yaralanması olan 3 hasta, ve biri LK, biri de AK sonrası, koledok bağlanması olan iki hasta ise sonuçta başarılı olan cerrahi rekonstrüksiyon gerektirmişlerdir. Açık kolesistektomi sonrasında T-tüp yerleştirilmesi hatalı olan bir hasta ise nekrotizan pankreatit sonucu kaybedilmiştir. Laparoskopik veya açık kolesistektomi komplikasyonlarının, hasta taburcu edilmeden önceki devrede endoskopik retrograd yöntemlerle tedavisinin uygun ve başarılı bir yaklaşım olduğu ortaya çıkmaktadır. Bu yaklaşımla sistik kanal sızıntıları ve koledok yaralanmaları açısından, ikinci bir operasyonun, kalküller ve ampuller stenoz açısından da hastaneye tekrarlanan müracaatların ve/veya yatışların önüne geçilebilmektedir.*

Anahtar kelimeler: **Kolesistektomi komplikasyonu, ERCP**

SUMMARY: *In this study, management of complications of cholecystectomy by endoscopic retrograde techniques before discharge was discussed. In a 12 months' period between January and December 1994, 22 such patients were referred. Fifteen after laparoscopic cholecystectomy (LC), and seven after open cholecystectomy (OC). In 15 of 22; 6 with stones, 4 with ampullary stenosis, 5 with cystic duct leak or injury of common bile duct (CBD), endoscopic treatment, only, was curative. A patient with a retained stone and cystic duct leak required percutaneous drainage of intraabdominal abscesses related to bilomas after removal of the stone by endoscopic approach. Three with serious injury of common bile duct, all after LC and 2 with complete ligation, one after LC, and one after OC necessitated laparatomy and reconstruction with successful results. One patient with necrotising pancreatitis related to faulty placement of T-tube after OC died. It appears that endoscopic retrograde procedures are very useful in the management of complications of choleystectomy, either laparoscopic or open, before discharge from hospital and obviates the need for a second operation concerning leaks and injuries and repeated visits and/or admissions concerning stones and ampullary disease.*

Key words: **Cholecystectomy complications, ERCP**

LAPAROSCOPIC cholecystectomy is replacing open cholecystectomy in many parts of the world. The most common complications of LC are biliary leak from a cystic duct stump, injury or accidental ligation of CBD, and retained stone(s). The reported rate of biliary leak or injury is around 1% and the rate of retained stone is around 3% (1-5). The presence of stone(s) or ampullary stenosis (AS) that may not be apparent before operation increases the risk of leakage from cystic duct. Three-10% of LC cases are said to be subject to ERCP before or after operation (6,7). The complications of OC are the same.

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Last decade witnessed an upsurge of LC with a significant drop of OC and a concomitant rise in the number of total cholecystectomies and ERCP's. Cholelithiasis is complicated by choledocal pathology (retained stone, AS or both), in around 10% of the cases (8). In most of these cases, the pathology is apparent before operation on ultrasonography (US) or suggested by biochemical liver function abnormalities and history (9,10). But these may be missed, and the patient may present with symptoms and signs suggesting cholestasis in the postoperative period. Because most of the patients with retained choledocal stone are without symptoms in the immediate postoperative period, and most of the patients without complaint are discharged in the following 24-48 hours, this complication, generally, is not evident

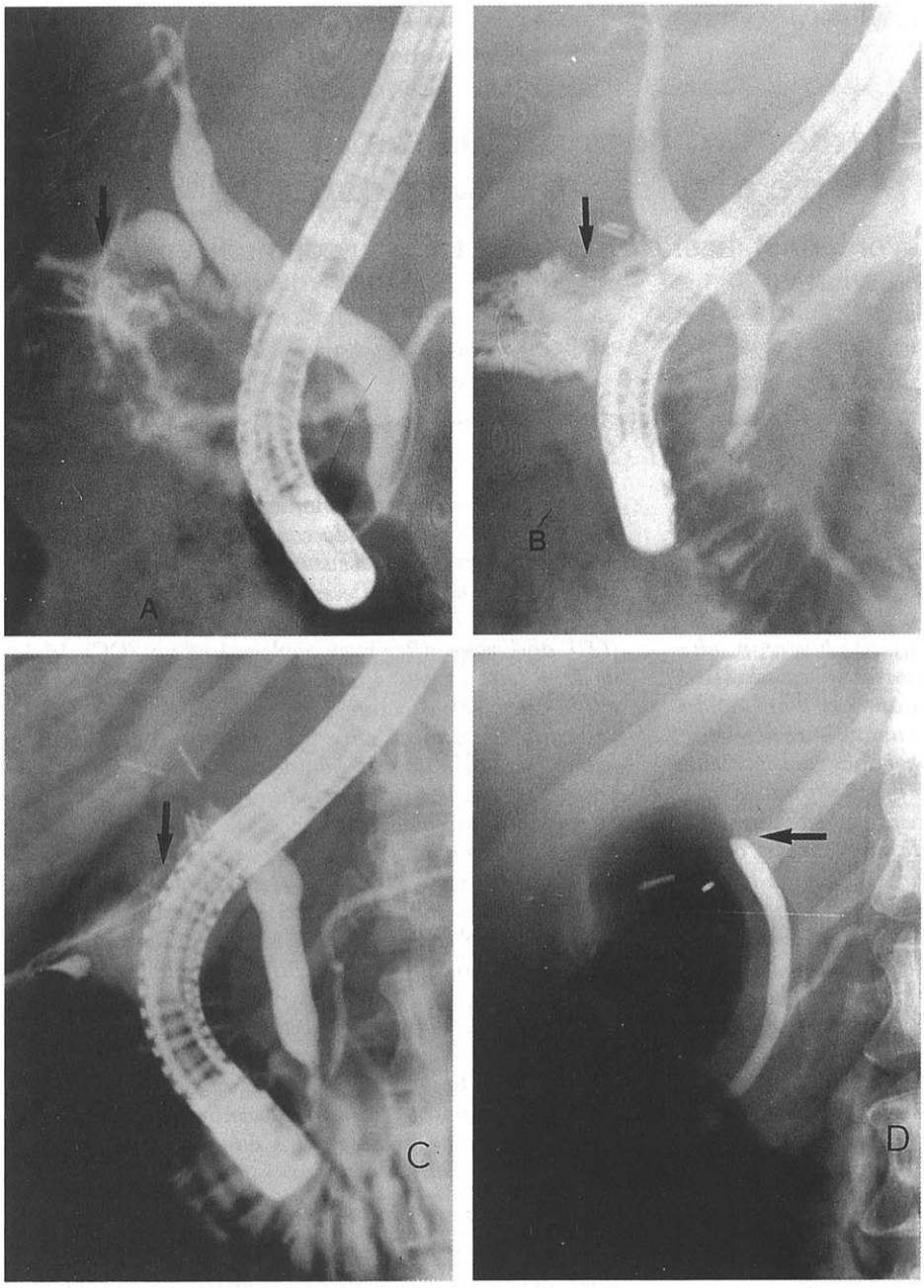

Figure 1A. *Radiograph shows cystic duct leak after LC.* ***B.*** *Retrograde cholangiogram showing moderate choledocal injury. Pooling of contrast below the level of clips.* ***C.*** *Severe injury of CBD: Oozing of contrast below the level of clips. Proximal part of CBD can not be visualized.* ***D.*** *Complete obstruction of CBD. This patient required pre-cutting. While ES was curative for the first two, last two patients required reconstruction.*

in the in-hospital period after LC. Therefore, the leading cause for referral to ERCP in this particular period remains choledocal trauma. Contrary, because a T-tube is placed and a cholangiography is a routine between post-operative 7th and 9th day of OC, most of the retained choldecal stones or AS are defined before discharge. The rate of choledocal injury giving rise to symptoms and signs in the immediate post-operative period of OC is low in comparison to LC.

METHODS

In a year period, 22 patients, 15 after LC and 7

Table 1. *Summary of the results*

Patients	n= 22	Management
After LC:	15	
Stone	3	ES and extraction
Ampullary stenosis	2	ES
Cystic duct leak (CDL)	2	ES
CDL and stone	1	ES and extraction
Mild-moderate injury	3	ES
Severe injury	3	Reoperation
Ligation of CBD	1	Reoperation
After OC:	7	
Stone	3	ES and extraction
Ampullary stenosis	2	ES
Ligation of CBD	1	Reoperation
Necrotising pancreatitis	1	(Died)

See text for details

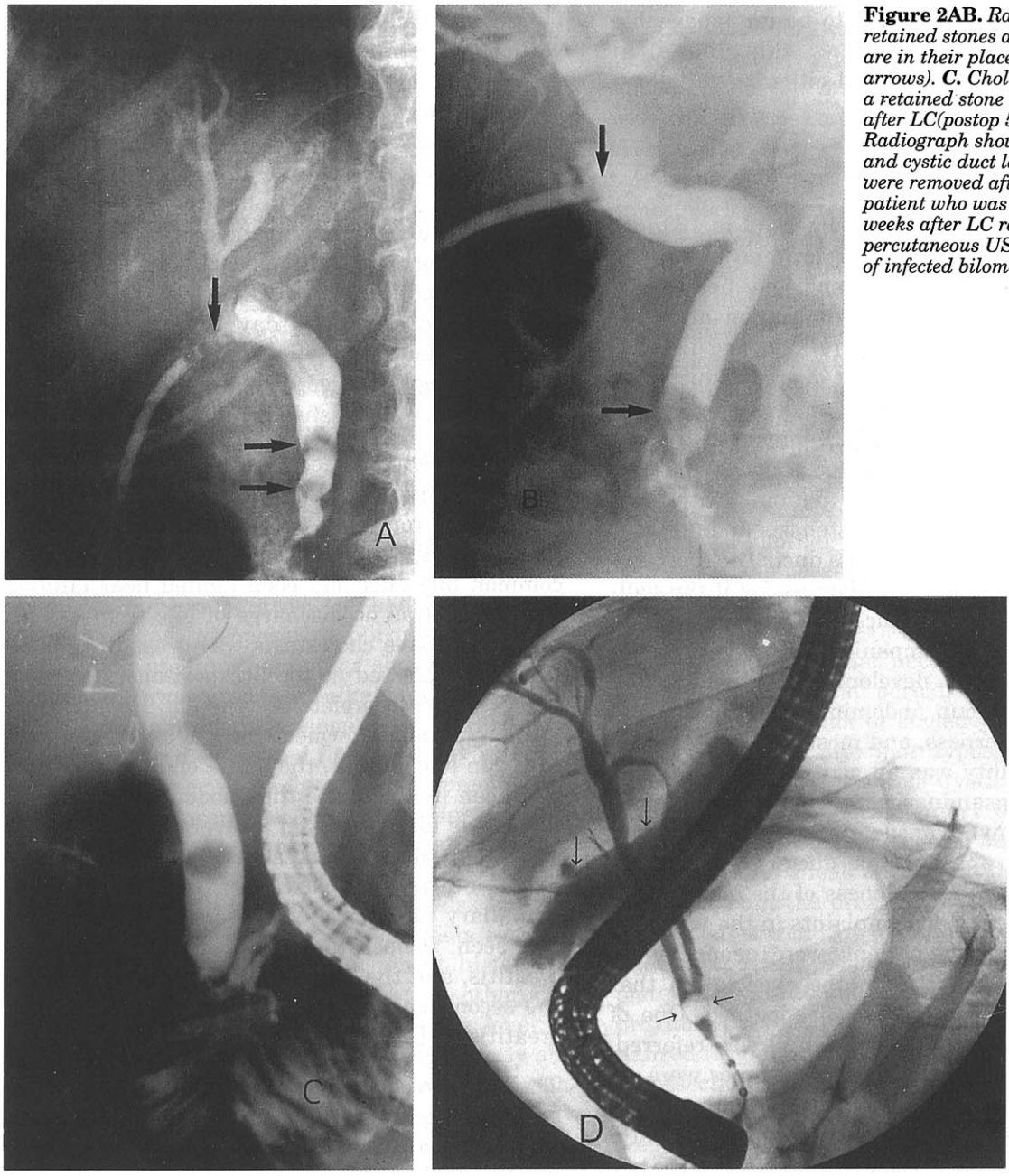

Figure 2AB. *Radiographs show retained stones after OC. T-tubes are in their places (vertical arrows).* ***C.*** *Cholangiogram shows a retained stone measuring 1.2cm after LC(postop 5th day).* ***D.*** *Radiograph shows retained stone and cystic duct leak: All stones were removed after ES. This last patient who was referred two weeks after LC required percutaneous US-guided drainage of infected bilomas as well.*

after OC, (14 female, 8 male median age: 41[25-64] were referred. The interval between the index operation and referral for ERC was 1 to 15 (Mean 5) days in LC group and 7 to 13 (mean 9) days in OC group. The patients in LC group were, reportedly, symptomatic within 24 hours of operation. Endoscopic procedures were performed with a side-viewing Fujinon Duo-XT duodenoscope. Selective cannulation of common bile duct was successful by a standard approach in 19 patients, while pre-cut sphincterotomy by a needle-knife was required in 3(one with impacted stone, one with ampullary stenosis, and one with complete obstruction of common bile duct due to accidental ligation). In this study, the diagnosis of isolated AS was made by the following arbitrary criteria: 1) Firm, fibrotic or erythematous appearance of papilla, 2) Relative resistance of ampullary tissue to cutting, 3) No demonstrable stone or stricture in choledocus, 4) Disappearance of all abnormalities after sphincterotomy. In 15 of 19, ERC was followed by endoscopic sphincterotomy (ES). In 2 of 3, needle-knife sphincterotomy was necessitated before a full sphincterotomy. In the remainders, except one who required pre-cutting for cannulation of CBD, sphincterotomy was not performed, because the diagnosis was either serious injury or complete ligation of common bile

duct (CBD) that considered to be unmanageable by endoscopic approach. In 7 with stone(s) in CBD, removal was successful either with balloon or basket.

RESULTS

Endoscopic intervetion was successful in 16 of 22 patients, while 5 required laparatomy with successful operative correction and one died (Table 1). All the patients with complication after LC were symptomatic in 24 hours following LC. Patients with choledocal injury or cystic duct leak and patient with impacted stone developed severe abdominal pain, nausea, and anorexia in the immediate post-operative period. The symptoms were more insidious in the patients with non-impacted stones, ampullary stenosis and accidental ligation of the common bile duct. The most frequent complaint was described as "as if the gallbladder is still in its place". In the first group, abdominal pain, accompanied by tenderness, fever and leucocytosis, developed in 48 hours, while in the second group abdominal examination did not reveal tenderness, and most prominent laboratory abnormality was an acute rise in the level of serum transaminases, alkalen phosphatase, gamma glutamyl transpeptidase, and bilirubin. Dilation of intrahepatic bile ducts was generally absent, given to the acuteness of the obstruction. Despite appearance of complaints in the very early period, most of the patients were, generally, referred late for ERCP with the expectation that these complaints may have disappeared. One of the patients with stone (impacted) was referred, after 24 hours, the other two with stones were referred in third and fourth post-operative days. One patient with a retained stone in CBD and a cystic duct leak was referred, interestingly, two weeks after operation in a desperate clinical condition (Fig 2D). In two, US revealed the presence of stones, while in the other two, US was negative apart from a mildly dilated common bile duct. The previous US examinations of all four were negative with respect to choledocal stone. The course of two patients with ampullary stenosis were the most insidious and they come for ERCP, following one week and 9 days after the operation. They had not been discharged, because of right hypochondrial pain and fullness and abnormalities in liver enzymes. US revealed dilatation of common bile duct with some abnormalities of ampullary region, reportedly, consistent with an impacted stone, or ampullary stenosis (AS). The patients with choledocal injury or cystic duct leak without stone after LC were referred after a mean period of 5 days after operation. In all but one of them catheters had been introduced into the abdominal cavity via one of the trocar insertion sites and there was a discharge of bile or bilious fluid. The patient with complete ligation of CBD at LC had had an insidious clinical picture with abdominal discomfort and later appearance of cholestatic laboratory abnormalities (Fig 1D). This patient was referred at the 6th day of LC and required precutting for cannulation unrelated to underlying pathology. Choledochojejunostomy was performed with a successful result.

In 5 (three with stones and two with stenosis) of the 7 patients after OC, the diagnosis were evident at the routine T-tube cholangiography, performed, 7 to 9th day after operation. In one, the common bile duct had been ligated near bifurcation, there was no discharge of bile from T-tube, and progressive cholestasis was present, this patient was referred at the 5th post-operative day. ERC revealed complete obstruction. Hepaticojejunostomy was performed with a successful outcome. In one patient, the distal end of the T-tube had been inserted into the duodenum via ampulla, and he had developed a severe clinical picture consistent with pancreatitis in retrospect. In ERCP, 6th post-operative day; severe necrosis of ampullary tissue around the distal end of T-tube was seen. Reoperation revealed necrotising pancreatitis, and the patient died in the 48 hours of the second operation, apparently related to pancreatitis and sepsis.

The patient who had required needle knife sphincterotomy for ampullary stenosis developed a typical picture of pancreatitis immediately after ERC and ES. The response to a conservative treatment was good that led to discharge 48 hours after procedure. No other serious complication of ERCP and/or endoscopic sphincterotomy (ES) was encountered.

DISCUSSION

Laparoscopic cholecystectomy is replacing open cholecystectomy in many parts of the world, especially in developed ones. But its popularity is also in rise in some developing countries as well. Complications of cholecystectomy, generally, requires ERCP in most of the instances. Despite, most of the complications of OC are recognized in the in-hospital period. According to our data, a signifi-

cant number of patients after LC with retained stones come to ERCP after they had been discharged from the hospital. Our series showed: In a year period only around 20% of patients with retained stones after LC are referred to ERCP in the immediate postop period. When the patients with choledocal stones who were admitted after discharge and in the year of LC are questioned retrospectively, most of them had described some form of abdominal distress in the in-hospital period, more than what is expected after an uncomplicated cholecystectomy. Interestingly, a small number of these patients were not referred to ERCP, despite they continued to have cholangitic attacks, in some because US did not reveal stone, and in some, because the surgeon expected spontaneous clearance of stone(s). When these three patients who presented with stones in the in-hospital period after LC were studied retrospectively: In all, preoperative US had not revealed stones. In one, preoperative bilirubin level was slightly elevated and one other showed slight increases in transaminases, alkalen phosphatase, and gamma-glutamyl transpeptidase levels which were considered as related to accompanying cholecystitis. In one, the only available preop liver function tests were serum transaminases and these were slightly elevated. In two patients with stenosis of oddi, pre-operative ultrasonography was unremarkable except cholelithiasis. In one, all of the biochemical liver function tests were in normal range, despite there is recent history of transitory darkening of urine. In the other patient, the only available tests were the level of serum transaminases, and these were slightly abnormal. As it was emphasized in earlier studies, a careful evaluation of history and laboratory findings may decrease the number of missed stones and ampullary stenosis, but probably, at the expense of increase in the number of negative ERCs (9,10). The post-operative courses of the patients with ampullary stenosis were more insidious, and the first complaint was described by the two patients as "as if the diseased gallbladder is still in its place". This was followed by hyperbilirubinemia, not exceeding 4 mg/dl in 5 days. Post-operative US revealed choledocal enlargement without dilatation of intrahepatic bile ducts. In one of these patients, cannulation of choledocus was unsuccessful. Needle-knife sphincterotomy, followed by a standard sphincterotomy resulted with a complete cure. In the other, no difficulty was encountered in cannulation, and sphincterotomy was successful in relieving all abnormalities.

In pure ampullary disease, appearance of an obstructive picture after cholecystectomy deserves consideration. It may, somehow, be explained with the disappearance of the reservoir effect of, even a diseased, gallbladder. Here, it also deserves mention that, some 15% of all sphincterotomies, performed in our unit for a suspected choledocal abnormality before LC, were done for a presumable ampullary stenosis without choledocal stone and resulted with relief of the partial obstruction, validating this diagnosis. It seems likely that pure papillary disease without accompanying choledocal stone is an important cause of morbidity in patients with gallstone disease. In an earlier study, the rate of ampullary stenosis in ERCs performed after LC was 55% (11). In this study, papillary stenosis was associated with another pathology (stone, sludge etc.) in most of the cases. Choledocal injuries or leak necessitating intervention is an infrequent complication of LC(1%) (1-4). In this particular study, 2/3 of the patients that necessitated ERCP after LC in the inhospital period were the patients with any type of leak or choledocal injury. These patients, divided into four types with arbitrary definitions of the author: 1) Cystic duct leak (Fig 1A), 2) Mild to moderate injury of common bile duct: when the contrast injected below the level of injury, there is a leak of contrast into the abdominal cavity, but the proximal part of biliary tree is visualized as well (Fig 1B). 3) Serious injury: The injected contrast, below the level of injury, completely leaks into the abdominal cavity and the proximal part of the biliary system can not be visualized (Fig 1C). This may either be the result of transsection or incomplete laceration of common bile duct. Proximal part may be partly ligated as well which is, generally not possible to define by ERCP. 4) Complete ligation of common bile duct: Injected contrast abruptly cut-off, generally at the level of opening of cystic duct (Fig 1D). There may be or may not be leakage from proximal part that is not possible to define by ERC. We had three patients with cystic duct leak. One had retained choledocal stone as well (Fig 2D). Two without stones were managed with ES alone. These patients were perfectly well in 48 hours following ES. The one with stone and cystic duct leak was referred two weeks after surgery and there were large intraabdominal collections, despite this complication was apparent in 24 hours of LC. The clinical picture was sever with shaking chills, elevation of serum bilirubin to 8 mg/dl, leucocytosis, anemia, albuminemia, and prolongation of pro-

thrombin time. ES with extraction of stone was followed by US-guided percutaneous catheter insertion and drainage of intraabdominal abscess with recovery in one week. We had three patients from the second group (mild to moderate injury), which were managed by ES alone as well. The complication had been suspected at surgery in two. In many centers, naso-biliary drainage (NBD) without ES is preferred over ES in biliary leak and mild injury, because of the inherent early and late complications of ES (11-14). On the other hand NBD may expose the patient to more discomfort and the risk of cholangitis may increase. In another study stenting without sphincterotomy was advocated (15). We had no experience in either. In this study, there were four patients with severe injury, and two with complete ligation. One with complete ligation, required needle-knife sphincterotomy for cannulation. In this case, despite papilla was small and distal common bile duct was narrow, pre-cutting was uncomplicated. These six patients required laparatomy for correction with successful results.

Our study shows that OC with exploration of common bile duct does not guarantee the management of common bile duct stones or other causes (such as ampullary stenosis), but, at least in this particular study, ES does. When we looked for the reasons for preference of OC with duct exploration over LC combined with ES: Three with stones and one with ampullary stenosis with gallstone disease had been operated upon in urgent settings at a time that facilities were available for neither ERCP, nor LC. One patient with ampullary disease had been referred for ERCP previously, because of hyperbilirubunemia and a suspected stone, but we had failed to cannulate. Later, OC with duct exploration was performed and no stone was found in common bile duct. There was no passage of contrast into the duodenum in T-tube cholangiogram at the postop 8th day. Cannulation was again not possible with a standard technique at repeat ERCP. This time pre-cutting was performed, followed by a full sphincterotomy with success.

These data emphasize the value of an emergency ERCP by a skilled endoscopist not hesitant on pre-cutting.

Newly developed techniques as intra-operative cholangiography and laparoscopic sonography associated with LC are out of scope of this study.

In summary, the following conclusions can be drawn from this study:

1. Most, if not all, of the retained stones after LC or OC are manageable by ES. It is preferable to perform it pre-operatively, if it is indicated, because it may be an unpleasant experiment for patients in the post-operative period. The number of pre-operatively missed stones may be decreased by a careful evaluation of history, and laboratory and US findings. Pre-cutting is mandatory, if cannulation is not possible. As it is so called "this technique is safe in the hands of experienced".

2. Ampullary stenosis is an important cause of cholestasis of variable degree in the patients with gallstone disease and ES is a highly effective treatment. Long-term results await consideration.

3. Cystic duct leak and mild to moderate injury of common bile duct are amenable to management by ES alone. Severe injuries can, at least, be diagnosed by ERC. ERC must be performed as soon as this complication is suspected. Preference between ES and NBD or stenting must be individualized considering both, the endoscopist and the patient.

4. Expectant evaluation of complaints of patients after LC before they are discharged, may increase the number of in-hospitally managed retained stones, obviating the need for a second admission. It prevents the development of more serious pictures as well.

5. Facilities for ERC and LC in the urgent settings may further decrease the number of OCs.

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