Treatment of choledocholithiasis : Therapeutic ERCP versus peroperative extraction during laparoscopic cholecystectomy

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Abstract

Limitation for preoperative ERCP / ES before laparoscopic cholecystectomy in patients scheduled for laparoscopic cholecystectomy are (1) Additional invasiveness of endoscopic procedures in patients supposed to be fitted for surgery, (2) A high rate of useless procedures due to the low predictive value of suspicion criteria for common bile duct stones (CBDS), (3) an inability to detect and treat all patients with CBDS, and (4) so far, an absence of demonstration of the superiority of this split therapeutic approach versus a one stage surgical treatment.

Published series of CBDS extraction during laparoscopic cholecystectomy have included more than 2000 patients. Results and complications of this one stage laparoscopic approach compares favourably to the conventional open surgical treatment. In one randomized trial endoscopy plus laparoscopy was not demonstrated superior to laparoscopy alone.

Intraoperative diagnosis and treatment of CBDS during laparoscopic cholecystectomy is the most cost efficient approach for patients with or without preoperative suspicion of CBDS, provide they are fitted for surgery. (Acta gastroenterol. belg., **2000**, 63, **301-303**).

Key words : biliary lithiasis, laparoscopy, treatment.

Before the widespread acceptance of laparoscopic cholecystectomy, three randomized trials had demonstrated that preoperative endoscopic retrograde cholangiography and endoscopic sphincterotomy for stone removal followed by open cholecystectomy was not superior to open cholecystectomy, cholangiography, and when required, common duct exploration in patients fit for surgery (1-3). In multivariate analysis, preoperative endoscopic retrograde cholangiography was an independent pejorative risk factor in patients with choledocholithiasis fit for surgery but patients unfit for surgery could be treated exclusively by endoscopic sphincterotomy without further surgery (4).

With the advent of laparoscopic cholecystectomy and the theoretical technical constraints for intraoperative cholangiography, preoperative endoscopic retrograde cholangiography and sphincterotomy was presented as an alternative for the diagnosis and treatment of common bile duct stones before performing laparoscopic cholecystectomy in patients with suspected choledocholithiasis. Positive predictive values of tests used to detect choledocholithiasis are low and unwarranted endoscopic retrograde cholangiography will be carried out in 38 to 76 per cent of patients (5,6). On the other hand, 25 to 30% of patients with common bile duct stones do not have any suspicion criteria (7,8).

Successful clearance of the common bile duct is achieved at the time of initial endoscopic sphincterotomy in 65 to 85 per cent of patients. The remaining patients may pass calculi spontaneously after endoscopic sphincterotomy or require two or more attempts at active extraction after a period of temporary biliary drainage. Endoscopic sphincterotomy for the treatment of common bile duct stones is, in experienced hands, associated with a 30-day mortality of 0.5-3.7 per cent, with immediate major complications in 2.5 to 11 per cent of patients, some of them requiring emergency surgery, and with long term complications in about 10 per cent of patients. Higher rates might occur in less experienced hands, when the diameter of the common bile duct is less than 10mm or when patients are tallied prospectively (9). These substantial risks of morbidity and mortality exceed those of surgical common bile duct exploration in young and/or low-risk patients.

If the presence of common bile duct stones is to be investigated in all patients with symptomatic cholecystolithiasis, routine intraoperative cholangiography remains the most efficient diagnostic approach. Ten to 18% per cent of patients undergoing cholecystectomy with intraoperative cholangiography for symptomatic or complicated gallstones will have choledocholithiasis (10-12). Intraoperative cholangiography discloses the presence of unsuspected choledocholithiasis in 4 per cent of patients, *i.e.* 25 to 33 per cent of those with choledocholithiasis. Additional advantages favouring routine use of intraoperative cholangiography are anatomic ductal clarification and prevention of main biliary duct injuries (13). As further experience is gained, the one-stage treatment combining routine intraoperative cholangiography and laparoscopic common bile duct exploration should arise as the procedure of choice for choledocholithiasis.

Laparoscopic treatment of common bile duct stones is performed either by the transcystic approach or through choledochotomy, according to anatomical conditions and stone characteristics. High quality fluoroscopic cholangiography is mandatory and cholangioscopy

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should always be available. Results of laparoscopic treatment of choledocholithiasis are reported in table 1. Overall 68% of successful laparoscopic treatments were performed by the transcystic approach and 31% through choledochotomy. Postoperative morbidity of transcystic and choledochotomy extraction were in a 5 to 10% and a 5 to 18% range, respectively. Higher morbidity of choledochotomy might be biased by a patient selection.

Specific complications of transcystic extraction are cystic duct avulsion or perforation, and CBD perforation with the Dormia basket. Specific complications of choledochotomy are the T-tube dislodgment and, in case of primary choledochotomy suture, biliary leaks. The rates of infra-hepatic biliary collections are not different between the two techniques. Overall the reoperation rate was in a 0 to 2.5% rate. Percutaneously treated infra-hepatic biloma are not considered as reoperations. Postoperative mortality in 2,340 laparoscopically treated patients was 0.6% (extremes 0 - 4%). Postoperative hospital stay seemed more related to the country or to social conditions than to the technique itself. The transcystic technique and the choledochotomy with primary closure are associated with the shortest postoperative hospital stay. The rate of retained stones is in a 3 to 5% range.

The one-step laparoscopic treatment of common bile duct stones was compared to preoperative retrograde cholangiography followed by laparoscopic cholecystectomy in one prospective randomized study (table 2). Among 78 patients with common bile duct stones randomized for a preoperative sphincterotomy, a total clearance was achieved after the first procedure in 55 (70%), 7 patients required a second procedure, 10 had a laparoscopic extraction after failed endoscopic extraction and 6 required an open procedure. Sixty eight of 82 patients (83%) randomized for a laparoscopic extraction had a complete common bile duct clearance at the time of laparoscopic cholecystectomy,16 patients required a conversion to laparotomy but only 8 of them for failure of laparoscopic common bile duct extraction (14).

The progressive evolution towards a wider diffusion of laparoscopic techniques for the treatment of common bile duct stones among the surgical community and the evolution of social security systems towards reimbursment per pathology instead of remuneration for every medical deed may have a foreseeable impact on the current therapeutic liberties to multiply preoperative diagnostic tests without superiority over peroperative diagnosis and this may put an end to ongoing controversies concerning sequential treatment modalities versus single stage laparoscopic diagnostic and treatment of common bile duct stones.

Table 1. — **Results of laparoscopic treatment of choledocholithiasis**

Author (ref)	year	Total attempts	Transcystic extraction		Choledochotomy		Successes		Deaths	
			N	%	N	%	N	%	N	%
Petelin (15)	1991	22	20	91	1	5	19	86.4	0	0
Shapiro (16)	1991	16	15	94	1	6	16	100	0	0
Hunter (17)	1992	20	20	100	0	0	17	85	0	0
Roush (18)	1992	55	32	100	0	0	19	59	0	0
Petelin (19)	1993	77	75	97	2	3	74	96.1	1	1.3
Fielding (20)	1993	21	20	95	1	5	17	81	0	0
Fletcher (21)	1993	12	12	100	0	0	8	66.7	0	0
DePaula (22)	1994	119	107	90	12	10	108	90.8	1	0.8
Phillips (23)	1994	120	111	93	9	8	112	93.3	1	0.8
Dion (24)	1994	59	18	31	41	69	52	88.1	0	0
Ferzli (25)	1994	24	13	54	11	46	24	100	0	0
Berci (26)	1994	226	188	83	38	17	203	90	1	0,4
Phillips (27)	1995	129	123	95	6	5	116	90	1	0.8
Rhodes (28)	1995	114	79	70	35	30	108	95	0	0
Stoker (29)	1995	64	33	51	27	42	55	86	0	0
Huang (30)	1996	40	0	0	40	100	35	88	0	0
Carroll (31)	1996	133	123	93	10	7	121	91	1	0.7
Khoo (32)	1996	51	33	66	17	33	38	75	0	0
Gigot (33)	1997	92	76	83	30	33	76	82	2	2
Millat (34)	1997	236	116	49	92	39	208	88	1	0.4
Franklin (35)	1998	148	0	0	148	100	140	95	0	0
De Paula (36)	1998	181	147	81	34	19	?	?	0	0
Paganini (37)	1998	161	107	66	50	31	149	92	1	0.6
Berthou (38)	1998	220	112	51	108	49	210	95	4	0,9
Total	2340	1580	68	713	31	1925	89	14	0,6	

Table 2. — **Results of a prospective randomised trial (14) comparing a single step laparoscopic treatment with endoscopic retrograde cholangiography and eventually sphincterotomy (ERC/SE) followed by laparoscopic cholecystectomy in patients with a preoperative suspicion of choledocholithiasis**

	Laparoscopy	ERC/ES + laparoscopy
Number of patients	101	105
Withdrawn	2	2
Number of patients with CBD stones	82 (81%)	78 (74%)
Successful extractions (first procedure)	68 (83%)	55 (70%)
Extractions after a second endoscopy	–	7
Laparoscopic extraction of CBDS	–	10
Laparoscopic cholecystectomy	17	87
Technical failures	14 (17%)	16 (20%)
Conversions to open surgery		
for CBDS extraction	8	5
for other raisons	8	3
Complications	10 (10%)	13 (12,4%)
Deaths	0	1
Median hospital stay (days)	6,5	9,5

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