

Outcome after cholecystectomy for symptomatic gall stone disease and effect of surgical access: laparoscopic *v* open approach

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Abstract

The pre and postoperative symptoms and outcome after surgery in patients with symptomatic gall stone disease were evaluated by a detailed self administered postal questionnaire. The survey was conducted in two groups: 80 patients treated by laparoscopic cholecystectomy and an age matched cohort of patients who had conventional open cholecystectomy. The overall response rate on which the data were calculated was 76%. Symptomatic benefit ratios accruing from the surgical removal of the gall bladder were calculated. The symptoms that were relieved by cholecystectomy were nausea (0.98), vomiting (0.91), colicky abdominal pain (0.81), and back-pain (0.76). Flatulence, fat intolerance, and nagging abdominal pain were unaffected as shown by a benefit ratio of 0.5 or less. Relief of heartburn (39/49) outweighed the de novo development of this symptom after cholecystectomy (7/49), resulting in a benefit ratio of 0.65. Postcholecystectomy diarrhoea occurred in 21/118 patients (18%); 10 after open cholecystectomy and 11 after laparoscopic cholecystectomy. The type of surgical access did not influence the symptomatic outcome but had a significant bearing on the time to return to work or full activity after surgery (laparoscopic cholecystectomy two weeks, open cholecystectomy eight weeks, $p=0.00001$). In the elderly age group (>60 years), significantly more patients (29/30) regained full activity after laparoscopic cholecystectomy when compared with the open cholecystectomy group (16/22), $p=0.001$. The patient appreciation of a satisfactory cosmetic result was 72% in the open group compared with 100% of patients who were treated by laparoscopic cholecystectomy ($p=0.0017$). Despite the persistence or de novo occurrence of symptoms, 111/117 patients (95%) considered that they had obtained overall symptomatic improvement by their surgical treatment and 110/118 (93%) were pleased with the end result regardless of the access used.

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For over a 100 years cholecystectomy has been the standard treatment for symptomatic cholelithiasis. A large number of patients, however, continue to experience symptoms after cholecystectomy.¹ Some of these symptoms arise de novo after the operation.² Loss of reservoir function of the gall bladder, which results in disturbance of bile metabolism and enterohepatic cycling³⁻⁵ has been suggested as being responsible for some of the symptoms after

cholecystectomy. One of the problems relating to 'postcholecystectomy syndromes,' is the lack of data on the symptom profile of patients with gall stone disease and on the effect of cholecystectomy on the prevalence of these symptoms (persistence and de novo occurrence). Symptom prevalence before and after surgical treatment has been considered by this study, which has also been designed to evaluate the effect of the surgical access, laparoscopic or open, on the clinical and symptomatic outcome after cholecystectomy for symptomatic gall stone disease.

Patients and methods

PATIENTS

The study cohort consisted of 80 patients treated by laparoscopic cholecystectomy and 80 patients treated by open cholecystectomy. The two groups were age and sex matched. The need for an operation in all the patients entered into the study was assessed by symptomatic gall stone disease. The other criterion for inclusion in the study was a normal intraoperative cholangiogram and patients with choledocholithiasis were excluded by this intraoperative investigation. All operations were carried out by one surgical team and all patients received single dose antibiotic prophylaxis with cefuroxime given at the time of induction of anaesthesia. The operations were carried out between January 1990 and December 1992 inclusive.

QUESTIONNAIRE

The symptom profile of the patients in the two groups was evaluated by a standardised self administered postal questionnaire. The 34 item survey examined: demographic details; pre-operative symptoms; postoperative symptomatic improvement; return to work or full activity; delayed healing of and discharge from operation wound(s); postoperative abdominal pain; food tolerance, appetite and body weight; postoperative jaundice or fever; postoperative change in bowel habit, and general appreciation of the surgical intervention. The 34 item questionnaire was sent to the patients in both groups at least six months postoperatively (Table I).

SYMPTOM SPECIFICITY

In an attempt at establishing the relevance of abdominal symptoms to gall stone disease, the benefit ratios of cholecystectomy were calculated. For each symptom, the number of patients who were free of the complaint six or

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more months after operation was divided by the number of patients exhibiting the symptom preoperatively. The numerator of this ratio was derived from the difference between the number of patients with the symptom preoperatively and those exhibiting it after surgery (number with persistence of the symptom + number who developed it de novo after the cholecystectomy). A benefit ratio close to 1.0 was interpreted as evidence for gall stone disease related specificity for the symptom.

ANALYSIS

For statistical analysis, the χ^2 test with Yates's correction and the Mann-Whitney U test were used as appropriate. Differences were considered significant at $p < 0.05$. Unanswered questions were excluded from the final analysis.

Results

POPULATION EVALUATED

The return of completed questionnaires was obtained from 56/80 patients (70%) and 68/80 patients (85%) in the open cholecystectomy and laparoscopic cholecystectomy groups respectively. The two responding groups were comparable for age and sex (Table I). Responders

TABLE I Distribution of patients who answered the questionnaire

Group	Open cholecystectomy	Laparoscopic cholecystectomy
Patients responding		
No (%)	56 (70)	68 (85)
Age (y) median (range)	61.5 (29-87)	62 (32-87)
Sex male	20	26
female	36	42
Period to postoperative assessment (months) median (range)	14 (6-29)	9 (6-30)

TABLE II Preoperative symptoms and signs

Symptom	No	% Patients
Nagging abdominal pain	57	49
Colicky abdominal pain	53	45
Heartburn	49	42
Vomiting	46	39
Backpain	45	39
Nausea	44	38
Fatty food intolerance	43	37
Flatulence	32	27
Jaundice	18	15
Fever	9	8
Others	5	4

TABLE III Preoperative and postoperative abdominal symptoms and benefit ratios (BR)

Symptom	Preoperative occurrence			Postoperative persistence			De novo postoperative			BR
	Total	CC	LC	Total	CC	LC	Total	CC	LC	
Nausea	44	16	18	5	3	2	4	3	1	0.98
Vomiting	46	24	22	4	1	3	2	1	1	0.91
Flatulence	32	11	21	12	4	8	12	8	4	0.25
Fat intolerance	42	16	26	19	3	16	14	9	5	0.17
Heartburn	49	18	31	10	3	7	7	6	1	0.65
Nagging pain	57	24	33	17	9	8	10	5	5	0.52
Colicky pain	53	25	28	4	1	3	6	2	4	0.81
Back pain	45	18	27	9	5	4	2	1	1	0.76

CC=open cholecystectomy; LC=laparoscopic cholecystectomy.

who had laparoscopic cholecystectomy were assessed at a shorter postoperative period (median nine months) than patients who had open cholecystectomy (median 14 months).

PREOPERATIVE SYMPTOMS

Table II shows the abdominal symptoms and signs experienced by the patients preoperatively. No set pattern was seen and the computer spread sheet of the data (MiniTAB) identified 85 different combinations of symptoms, the most frequent being fatty food intolerance and heartburn, and nagging abdominal pain and nausea, both being experienced by 28/117 patients. In the absence of data on the incidence of these symptoms in the general population of this age group, the extremely varied picture showed that actual prevalence of a preoperative symptom or combination of symptoms do not signify a specific association with gall stone disease.

BENEFIT RATIOS

Table III shows the data on pre and postoperative abdominal symptoms and the benefit ratios. There was no difference in the persistence of symptoms or de novo occurrence between each group. The benefit ratios show that the nausea, vomiting, colicky abdominal pain, and back pain are specific to gall stone disease whereas flatulence, fat intolerance, and nagging abdominal pain are not. Heartburn is probably related (ratio of 0.65) and the number of patients who were relieved of this symptom by cholecystectomy ($n=39$) outweighed the number who developed it after cholecystectomy ($n=7$). Overall, postoperative pain (including heartburn) was seen in 51 of 117 patients (27 open cholecystectomy, 37 laparoscopic cholecystectomy) and 22 of these considered that their pain was the same as they had experienced before operation (11 open cholecystectomy, 11 laparoscopic cholecystectomy). In addition, 18 of the 51 patients with pain (11 open cholecystectomy, 7 laparoscopic cholecystectomy) were taking analgesics or antacid drugs on a regular basis.

OVERALL CLINICAL OUTCOME

Despite persistence of symptoms or their de novo occurrence, 49/50 patients (98%) who had an open cholecystectomy and 62/67 patients (92.5%) who had a laparoscopic cholecystectomy, experienced overall symptomatic improvement postoperatively (NS). Furthermore 48/51 (open cholecystectomy) and 62/67 (laparoscopic cholecystectomy) patients were pleased with the end result of the operation.

WOUND COMPLICATIONS

Wound healing problems occurred in 9/115 patients (five open cholecystectomy, four laparoscopic cholecystectomy, NS). In the open cholecystectomy group, 42/54 patients (72%) were pleased with their scar by comparison with 100% of patients treated by laparoscopic cholecystectomy ($p=0.0017$, corrected χ^2 test). Postoperative scar related pain was present in 5/53

TABLE IV Duration (weeks) before return to work or full activity

	Employed group		Unemployed group		Total group	
	Median	Range	Median	Range	Median	Range
CC	8.5 *	4-20	8 **	2-28	8 ***	2-28
LC	2	1-20	3	0.5-16	2	0.5-20

* $p=0.00001$; ** $p=0.00001$; *** $p=0.00001$ (Mann-Whitney U test).
Abbreviations as in Table III.

(9.4%) of patients who had an open cholecystectomy and in 3/65 (4.6%) who had a laparoscopic cholecystectomy (NS). In the open cholecystectomy group, more male patients (5/17) complained of scar pain by comparison with the female patients (0/36) ($p=0.002$, corrected χ^2 test).

JAUNDICE OR FEVER

None of the 117 patients who answered this question developed jaundice postoperatively, although 15 of them (10 open cholecystectomy, five laparoscopic cholecystectomy) were troubled with itching (NS) and nine (five open cholecystectomy, four laparoscopic cholecystectomy) experienced a shivering attack postoperatively (NS).

BOWEL HABITS

Postcholecystectomy diarrhoea occurred in 21/118 patients (17.8%), 10 in the open cholecystectomy and 11 in the laparoscopic cholecystectomy group (NS). After surgery, steatorrhoea was experienced by 18/117 patients (15.4%), 9/50 and 9/67 in the open cholecystectomy and laparoscopic cholecystectomy groups respectively (NS).

RETURN TO WORK OR FULL ACTIVITY

Employed group - 43 patients were employed: 18 (7 male, 11 female) had an open cholecystectomy and 25 (15M, 10F) a laparoscopic cholecystectomy, and 41 returned to the same job postoperatively. Two patients (one open cholecystectomy, one laparoscopic cholecystectomy) stopped working because of postcholecystectomy symptoms: residual abdominal pain and dyspepsia. Regardless of sex, patients who had a laparoscopic cholecystectomy returned earlier to work (median two weeks) than patients who had an open cholecystectomy (median 8.5 weeks) ($p=0.00001$, Mann-Whitney U test) (Table IV).

Unemployed group - 72 patients were not in gainful employment (housewife, retired, or unemployed). Thirty one (9M, 22F) had an open cholecystectomy and 41 (10M, 31F) a laparoscopic cholecystectomy. Whereas 61 (85%) returned to full activity postoperatively, 11 (15%) felt restricted in their physical activity postoperatively, of whom eight (six F >60y and two M <60y) had an open cholecystectomy and three (one F >60y, one F <60y and one M <60y) had a laparoscopic cholecystectomy. In the laparoscopic cholecystectomy group 38/41 patients (93%) regained full activity after surgery

compared with 23/31 patients (74%) who had a conventional cholecystectomy ($p=0.028$, corrected χ^2 test). In the female population, 29/31 patients (94%) who had a laparoscopic cholecystectomy returned to full activity postoperatively as opposed to 16/22 patients (73%) who had an open cholecystectomy ($p=0.039$, corrected χ^2 test). In the age group over 60 years, significantly more patients treated by laparoscopic cholecystectomy (29/30, 97%) regained full activity after surgery when compared with those who had an open cholecystectomy (16/22, 73%) ($p=0.001$, corrected χ^2 test). Regardless of sex, patients who had a laparoscopic cholecystectomy returned earlier to full activity (median three weeks) than patients who had a conventional cholecystectomy (median eight weeks) ($p=0.00001$, Mann-Whitney U test) (Table IV).

Discussion

This study has confirmed that patients with symptomatic gall stone disease exhibit a wide spectrum of symptoms, many of which are not relieved by cholecystectomy. Furthermore, the symptomatic outcome is not influenced by the surgical access used. The benefit ratio analysis used in this survey has identified the following symptoms as being related to gall stone disease: nausea, vomiting, colicky abdominal pain, back pain, and heartburn. In contrast fat intolerance, flatulent dyspepsia, and nagging abdominal pain do not seem to be related to the disease and are not influenced by cholecystectomy. These results are in keeping with the findings of previous reports that a large percentage of patients with gall stone disease have functional motility disturbances of the gastrointestinal tract, the symptoms of which are not changed by cholecystectomy.^{1,2,6,7} One previous study showed that socio-psychological factors seem to play an important part in the development of postcholecystectomy dyspepsia.⁶

The frequent presence of heartburn before cholecystectomy and its relief by this surgical treatment in most patients suggests a causal relation between reflux disease and gall stones. The disappearance of heartburn postoperatively may be a reflection, however, of the natural history of gastro-oesophageal reflux disease. In this study, seven patients developed this symptom for the first time after cholecystectomy. Although this may be because of a change in patients dietary habits after cholecystectomy, there is evidence that the higher oesophageal acid exposure in patients with cholelithiasis may be aggravated by cholecystectomy as a result of a fall in the lower oesophageal sphincter pressure.⁵ The results of this symptomatic survey do not confirm this reported finding as symptomatic relief of heartburn by cholecystectomy outweighed its de novo occurrence postoperatively.

Postcholecystectomy diarrhoea was reported by 18% of the patients regardless of the access used. A similar incidence has been reported previously.⁶ Loose stools, with relapsing bouts of more abundant watery diarrhoea after removal of the gall bladder, can be explained by postoperative disturbance of bile metabolism and changes

in the dynamics of bile release resulting in subclinical fat malabsorption.⁴

Jaundice after cholecystectomy was not encountered in this study. In our institution, routine operative cholangiography is performed in all patients having cholecystectomy, irrespective of access. This results in an incidence of retained or missed common bile duct stones of 1% or less.⁷⁻⁹

Wound healing problems were reported by 7.8% of all the patients studied with no difference between the two groups. The expected wound infection rate for open cholecystectomies reported in published works is around 0.6%.⁹ This low infection rate relates to the state of the wound during the hospital period and ignores wound problems that are experienced by 60% of patients after discharge from hospital.¹⁰ Previous studies have shown that positive cultures of bile and gall bladder wall are associated with an increased incidence of wound infection.¹¹ In laparoscopic cholecystectomy, the gall bladder is extracted through a small incision with frequent spilling of bile or stone fragments in the wound. Infection in the wound where the gall bladder is extracted is thus likely. In addition, the infra-umbilical wound is sufficiently close to the umbilicus to permit the spread of organisms from the umbilicus.

In agreement with previous studies,^{8,12-14} this study confirmed that laparoscopic cholecystectomy is associated with a quicker postoperative recovery and a faster return to work or full activity. In addition, we have found that significantly more elderly patients (>60 years) have regained full activity at six months when the cholecystectomy is performed by the laparoscopic approach. This has important implications for community care of the elderly.

By contrast with one previous report,⁶ 93% of the patients who responded to the survey were pleased with the end result of the procedure,

regardless of the access used and despite the frequent persistence of abdominal symptoms. A similar frequency of overall improvement despite a high number of patients with persistent abdominal pain postcholecystectomy has been reported previously.¹⁵ The same report suggested that patients with biliary colic may have a better symptomatic outlook than those with more prolonged attacks of pain. This is confirmed in this study with a higher benefit ratio for colicky pain by comparison with nagging abdominal pain.

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