Acute acalculous cholecystitis following trauma

P. HERLIN, M. ERICSSON,
T. HOLMIN AND P-E. JÖNSSON

Department of Surgery, University of Lund, S-221 85 Lund, Sweden.

Correspondence to: P-E. Jönsson.

A consecutive series of 11 patients with post-traumatic acute acalculous cholecystitis is reviewed. Three patients had sustained multiple trauma, whereas 6 patients had recently undergone alimentary tract surgery and 2 patients orthopaedic or gynaecological. surgery. All patients were treated by cholecystectomy. Four cases required reoperation because of an abdominal abscess and 2 cases because of a subcutaneous abscess. One patient was re-explored due to haemorrhage from the gallbladder bed, and another patient due to occlusion of the coeliac axis. The mortality rate was 18 per cent. The importance of early diagnosis and surgical intervention with cholecystectomy are emphasized in this rare condition with high morbidity and mortality.

Acute acalculous cholecystitis developing in the postoperative period unrelated to the biliary tract is an established entity. It was first reported in 1844 by Duncan (1), who described a patient with gangrenous cholecystitis after surgery for femoral hernia. Acute acalculous cholecystitis has later been reported mainly after multiple trauma and war injuries (2, 3).

Postoperative and post-traumatic cholecystitis have the same pathological findings and probably a similar aetiology. These cases should therefore be discussed under the same heading of post-traumatic cholecystitis.

In the present study, the experience from 11 consecutive patients is reviewed to determine if an increased awareness and a more aggressive attitude to this complication has changed the prognosis.

Patients and methods

Eleven patients (8 men and 3 women) with post-traumatic acute acalculous cholecystitis treated at the Department of Surgery in Lund from 1977 to March 1981 were studied in a retrospective manner. The median age of the patients was 57 years (range 19–71 years). None had previous history or signs of biliary tract disease. Three of the patients were injured in motor accidents and managed as multiple trauma cases. Six had recently undergone alimentary tract surgery and 2 patients orthopaedic or gynaecological surgery (*Table I*).

Results

All the patients included in the present study had a subsequent cholecystectomy. The time interval between initial trauma and operation and cholecystectomy varied from 9 to 40 days, with a median time of 20 days (*Table II*). Six of 11 patients required additional surgical procedures between the initial surgery and cholecystectomy (*Table III*). In these cases, the elapsed time between the preceding surgical procedure and cholecystectomy varied from 5 to 29 days, with a median time of 11 days. A low systolic blood pressure (80 mmHg or lower) was observed in 4 of 9 cases in connection with the initial surgery. There was no direct involvement of the hepatic vessels in the 9 patients who underwent abdominal operations before cholecystectomy.

Preoperatively (before cholecystectomy), the serum bilirubin and/or serum alkaline phosphatases were elevated in 7 of 11 patients. Chest films showed signs of basal laminar atelectases and right pleural effusion in two patients.

The preoperative diagnosis was acute cholecystitis in 6 patients. This diagnosis was clinical in both the patient operated upon with total hip prosthesis and the patient with acute lymphatic leukaemia. The clinical diagnosis was confirmed in one patient by computerized tomography (CT), demonstrating a dilated gallbladder with a thickened wall. In 3 of the 6 patients the diagnosis was supported by ultrasonography which showed a dilated gallbladder without stones.

Five patients underwent an exploratory laparotomy without suspicion of acute cholecystitis. The preoperative diagnosis was

Table I: *PATIENT DETAILS*

Case	Sex	Age (yr)	Primary disease	Treatment	Type of surgery
1	M	48	Hodgkin's disease	Staging laparotomy	Elective
2	M	19	Multiple trauma	Splenectomy Adrenalectomy	Acute
3	F	71	Intestinal obstruction	Small bowel resection	Acute
4	M	70	Gastric carcinoma	Total gastrectomy	Elective
5	M	44	Intestinal obstruction	Lysis of intestinal adhesions	Acute
6	M	65	Cox arthrosis	Arthroplasty	Elective
7	M	74	Acute pancreatitis	Exploratory laparotomy	Acute
8	F	53	Uterus myoma	Hysterectomy and salpingo-oophorectomy	Elective
9	M	58	Multiple trauma	Enteroraphy	Acute
10	M	57	Multiple trauma	Extension treatment of femoral fracture	Acute
11	F	19	Acute lymphatic leukaemia	Resection of transverse colon	Acute

Table II: *DAYS BETWEEN INITIAL TRAUMA OR OPERATION AND CHOLECYSTECTOMY*

Case	No. of days
1	10
2	20
3	40
4	37
5	24
6	11
7	28
8	9
9	20
10	14
11	20

intra-abdominal abscess in 3 patients and intestinal obstruction in 2.

All of the cholecystectomies were performed by senior surgeons. A greatly distended, gangrenous or phlegmonic gallbladder was found. Dark viscous bile was observed in 10 patients. Normal bile was found only in the patient with a perforated gallbladder. The cystic duct was not dilated in any case. Peroperative cholangiography was performed in 6 of 11

Table III: *ADDITIONAL SURGICAL PROCEDURES BETWEEN INITIAL TRAUMA AND CHOLECYSTECTOMY IN 6 PATIENTS*

Case	Additional surgical procedure
2	Exploratory laparotomy with drainage of an abscess of Douglas
	Exploratory laparotomy
3	Ileostomy and colostomy (anastomotic insufficiency)
	Drainage of intraperitoneal abscess and small bowel resection
4	Subtotal thyroid resection
	Drainage of subphrenic abscess
5	Lysis of intestinal adhesions
7	Tracheostomy
11	Appendectomy
	Resection of perforated transverse colon

Table IV: *REOPERATIONS AND SURVIVAL AFTER CHOLECYSTECTOMY*

Case	Reoperation	Survival
1	0	Yes
2	Drainage of bile abscess	Yes
3	Drainage of bile abscess	Yes
4	Drainage of subcutaneous abscess	Yes
5	0	Yes
6	Drainage of bile abscess	Yes
7	0	No
8	Vascular bypass (occlusion of the coeliac axis)	Yes
9	Haemostasis (bleeding from the gallbladder bed)	No
10	0	Yes
11	Drainage of intra-abdominal abscess	Yes
	Drainage of subcutaneous abscess	

cases. In 5 cases cholangiography was normal. In no case was there any dilatation of the biliary tract. In one patient cholangiography was technically unsatisfactory. Exploration of the common duct in this patient did not reveal a stone or other abnormality. In another case, choledochotomy was performed and a T tube inserted into the common duct for drainage, since the narrow cystic duct was lost in severely inflamed tissue. Cholangiography was considered unwise in the remaining 4 patients because of progressive inflammatory changes secondary to the cholecystitis. Cholangiography is otherwise performed routinely in our department. In no case was there evidence that the acute acalculous cholecystitis was caused by stones, distal obstruction of the common bile duct or any process within the pancreas.

Bile culture was performed in 7 of 11 patients. *Escherichia coli, Bacteroides fragilis* and *Citrobacter*, respectively, were found in 3 of these 7 patients. The remaining 4 patients had sterile bile. Histopathological examination of the gallbladder verified the findings at surgery, with gangrenous cholecystitis in 10 patients and phlegmonic cholecystitis in 1 patient.

Seven patients required reoperation due to complications, and two of these patients died postoperatively (10–38 days) (*Table IV*). Both patients had bactereaemia before cholecystectomy. One of the patients died secondary to complications caused by multiple fistulas and the other patient because of renal and hepatic insufficiency. A total of 5 patients developed intra-abdominal complications directly related to the cholecystectomy.

Discussion

Acute cholecystitis after surgery unrelated to the biliary tract and after multiple trauma injuries differs from ordinary acute cholecystitis. Acalculous cases are more common (46–92 per

cent) compared with ordinary acute cholecystitis (5–10 per cent) (4). The male to female ratio, judged from a review of the literature, was 7 : 1 (4), but there is a preponderance of women in ordinary-acute acalculous cholecystitis.

The mortality rate is 40–70 per cent (5, 6), with a high incidence of gangrenous and perforated gallbladders (60 per cent) (7). There is often a delay in diagnosis, particularly after intra-abdominal surgery, since postoperative abdominal symptoms mask the symptoms of cholecystitis and attention is mostly directed towards complications of the operation. The low mortality in our series can probably be explained by an awareness of acalculous cholecystitis as a possible postoperative complication. However, both of the patients that succumbed had bacteriologically proved septicaemia before cholecystectomy. In our experience, the technical difficulties greatly exceed those in ordinary acute cholecystitis.

The preoperative diagnosis was correct in 6 of 11 patients. Clinical examination yielded the correct preoperative diagnosis in 2 patients. An oral cholecystogram is not adequate for the diagnosis of acute acalculous cholecystitis (8). Intravenous cholangiography may be useful, but impaired liver function and contrast toxicity are limiting factors (9). Ultrasonography seems to be one of the most accurate diagnostic aids (10). Computerized tomography (CT) may be useful in selected cases, especially when intestinal gas renders ultrasonography less suitable. CT can also give valuable information concerning abscess formation around the gallbladder (8). CT demonstrated a thick-walled dilated gallbladder without any abscess in 2 patients. On the basis of our experience, ultrasonic examination can be recommended in cases with suspicion of acute acalculous cholecystitis. CT can be a valuable diagnostic complement.

Cholecystectomy is recommended as the treatment of choice, since cholecystostomy is not sufficient (6) due to the presence of extensive inflammatory changes and thick viscous bile.

The aetiology of this entity has been extensively discussed (4, 6, 11, 12). It appears to be multifactorial, biliary stasis and ischaemia of the gallbladder wall being the most important factors (4). In experimental studies Golden et al. (12) demonstrated that shock with hypotension can cause focal necrosis of the mucosa in the gallbladder. Moreover, local hypotension in the liver and the gallbladder might be sufficient to produce focal gallbladder necroses.

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