

Acute Cholecystitis – Update 2006

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This update is based on a systematic literature search in Medline. The search strategy is available from the authors on request.

Definition

Acute cholecystitis is defined as an acute inflammation of the gallbladder wall. Gallstone cholecystitis is differentiated from acalculous cholecystitis on the basis of its aetiology, when bile outflow is obstructed by gallstones or biliary sludge.

Epidemiology and Clinical Course

Epidemiology

Epidemiological data are reported in a recent review [13] and are therefore based on previous studies. Gallstone cholecystitis is the most common form since it is reported in 90% of cases of acute cholecystitis [7], women up to 50 years old are 3 times more likely to develop an acute gallstone cholecystitis than men [7] and 10–30% of patients with acute cholecystitis develop severe complications such as gangrene, empyema or perforation [3, 8, 18]. A more recent retrospective study [10] confirmed results of previous retrospective or prospective studies [3, 6, 12] for which severe acute cholecystitis was observed more frequently in male and old patients, with reported odds ratios of 1.76 ($P=0.029$) for the former and 2.24 ($P=0.004$) for the latter. A Canadian study [17] reported an 18% reduction in the rate of acute cholecystitis after the introduction of laparoscopic cholecystectomy in 1991. The average annual rate of acute cholecystitis per 100,000 population was reported to be 109 (95% confidence interval 107–110) in the period 1988–1991 and 88 (87–89) in the period 1992–2000. The interpretation of the authors is that this highly significant reduction may be explained by an increase of 35% of elective cholecystectomies after the introduction of laparoscopy. However, the postlaparoscopic period is about 3 times longer than the prelaparoscopic one and since a greater number of elective cholecystectomies were performed in the early laparoscopic period,

a division of the latter into another two 4-year periods for final comparison would have given a more precise measure of the effects registered.

Clinical Course

The clinical course of acute cholecystitis may be explained by its pathogenesis. There have been no new data since those reported in the review by Indar and Beckingham [7]. Increase in the intraluminal pressure and distension of the gallbladder wall due to bile obstruction outflow stimulates synthesis of prostaglandins, the mediators of the inflammatory response. Intraluminal pressure may rise up to a value above the arterial perfusion pressure of the gallbladder wall, with ischemia, necrosis and possible perforation as a result. The percentage of patients which develop such complications and therefore need urgent surgical intervention is reported to be 20% [7]. Another possible evolution of the cholecystitis is secondary bacterial infection, with enteric bacteria observed in about 20% of cases, with possible empyema formation as a result [7].

Diagnostics

There are no new data available on the diagnosis of cholecystitis other than those in one retrospective study [2] published with the aim to predict bile infection. However, no clinical, biological nor radiological parameters alone or in combination reached statistical significance, neither by univariate analysis nor by multivariate logistic regression.

Operative Versus Conservative Treatment

No new data have been found, neither for observation versus cholecystectomy after conservative treatment nor for medical treatment versus cholecystostomy in critically ill patients. Sooner or later, a surgical intervention is indicated in patients with acute cholecystitis.

Choice of Surgical Approach and Procedure

Open Versus Laparoscopic Cholecystectomy

Two meta-analyses on timing, one randomized controlled trial (RCT) and two retrospective studies on cholecystostomy and one prospective study on the effect of conversion in gangrenous cholecystitis have recently been published, but no new data have been found on laparoscopic versus open cholecystectomy.

Early Versus Delayed Cholecystectomy

One of the meta-analyses [9] published is not a high-quality study since at least six of the criteria of the QUORUM checklist [5] for quality assessment of meta-analysis of RCT were not fulfilled. Some are of minor importance, but a selection bias by including a nonrandomized study and not other RCTs published at the time of the research and a lack of quality assessment of the studies included make the results uncertain and conclusions have to be drawn with caution. The other meta-analysis [14] was conducted following the criteria of the QUORUM checklist [5], but either laparoscopic or open cholecystectomies were analysed, including study from 1970 to 2003, a period of time during which peri- and postoperative care have changed. Only absolute risk by calculation of the risk difference was reported and data on laparoscopy may be extracted from a table but little information is available.

Cholecystostomy

A randomized clinical trial [1] compared two treatment regimens: cholecystostomy followed by early laparoscopic cholecystectomy (PCLC group) versus medical treatment followed by delayed laparoscopic cholecystectomy (DLC group) in high-risk patients. This was a medium-quality study, since six patients were excluded from the analysis in the PCLC group, thus violating the intention-to-treat principle. Patients were excluded because they failed to reach an APACHE II score of less than 12 within 120 h, which was required for surgery. Three patients were excluded from the DLC group, one patient died from multiple organ failure and the other two refused surgery. Definition of the risk is mainly based on the APACHE II score and therefore it is determined either by the comorbidity conditions or by the severity of the cholecystitis; however, associated diseases with an ASA score greater than 3 were reported in the majority of patients in both groups. Symptom relief time was significantly shorter in the PCLC group, being achieved within 24 h in all included patients compared with the 48–72 h in the DLC group ($P=0.001$). Two patients in the DLC group experienced mild pancreatitis during the waiting period and this was taken into account in the mean hospital stay. The results of the laparoscopic cholecystectomies do not show differences in conversion rate (6.5% in the PCLC group versus 13.4% in the DLC group with $P=0.42$) and in postoperative hospital stay (1.58, standard deviation 0.72 in the PCLC group versus 1.66, standard deviation 0.72, in the DLC group, with $P=1$). Two results favoured the PCLC group: total hospital stay, with 5.3 days versus 15.2 days ($P=0.001$), and total cost, with US \$ 2,612 versus 3735 ($P=0.001$). Two retrospective uncontrolled studies were found on gallbladder aspiration [15] and the use of cholecystostomy [16] in high-risk patients, but no critical evaluation of these approaches was reported.

Conversion for Gangrenous Cholecystitis

In a prospective study on gangrenous cholecystitis [4], early conversion after initial visualization of the gallbladder, intermediate conversion after an initial attempt at dissection or late conversion after a protracted attempt at dissection do not influence significantly morbidity nor hospital stay, but just operative time from 1.8 to 2.1 and 2.7 h, respectively ($P < 0.01$).

Technical Aspects of Surgery

No new data are available other than those from a prospective study that reports aspiration of distended gallbladder with a Veress needle, but no critical evaluation of this technique was performed [11].

Peri- and Postoperative Care

No new data are available.

References

1. Akyürek N, Salman B, Yüksel O, Tezcaner T, Irkörücü O, Yücel C, Oktar S, Tatlicioglu E (2005) Management of acute calculous cholecystitis in high-risk patients: percutaneous cholecystostomy followed by early laparoscopic cholecystectomy. *Surg Laparosc Endosc Percutan Tech* 15(6):315–320
2. Beardsley SL, Shlansky-Goldberg RD, Patel A, Freiman DB, Soulen MC, Stavropoulos SW, Clark TW (2005) Predicting infected bile among patients undergoing percutaneous cholecystostomy. *Cardiovasc Intervent Radiol* 28(3):319–325
3. Bedirli A, Sakrak O, Sozuer EM, Kerek M, Guler I (2001) Factors effecting the complications in the natural history of acute cholecystitis. *Hepatogastroenterology* 48(41):1275–1278
4. Bingener J, Stefanidis D, Richards ML, Schwesinger WH, Sirinek KR (2005) Early conversion for gangrenous cholecystitis: impact on outcome. *Surg Endosc* 19(8):1139–1141
5. Clarke M (2000) The QUORUM statement. *Lancet* 355(9205):756–757
6. Eldar S, Sabo E, Nash E, Abrahamson J, Matter I (1997) Laparoscopic cholecystectomy for acute cholecystitis: prospective trial. *World J Surg* 21:540–545
7. Indar AA, Beckingham IJ (2002) Acute cholecystitis. *BMJ* 325:639–643
8. Kiviluoto T, Siren J, Luukkonen P, Kivilaakso E (1998) Randomised trial of laparoscopic versus open cholecystectomy for acute and gangrenous cholecystitis. *Lancet* 351(9099):321–325
9. Lau H, Lo CY, Patil NG, Yuen WK (2005) Early versus delayed-interval laparoscopic cholecystectomy for acute cholecystitis: a metaanalysis. *Surg Endosc* (in press). Epub 2005 Oct 24
10. Lee HK, Han HS, Min SK, Lee JH (2005) Sex-based analysis of the outcome of laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 92(4):463–466
11. Lee KT, Shan YS, Wang ST, Lin PW (2005) Verres needle decompression of distended gallbladder to facilitate laparoscopic cholecystectomy in acute cholecystitis: a prospective study. *Hepatogastroenterology* 52(65):1388–1392
12. Merriam LT, Kanaan SA, Dawes LG, Angelos P, Prystowsky JB, Rege RV, Joehl RJ (1999) Gangrenous cholecystitis: analysis of risk factors and experience with laparoscopic cholecystectomy. *Surgery* 126:680–685

13. Shamiyeh A, Wayand W (2005) Current status of laparoscopic therapy of cholelithiasis and common bile duct stones. *Dig Dis* 23(2):119–126
14. Shikata S, Noguchi Y, Fukui T (2005) Early versus delayed cholecystectomy for acute cholecystitis: a meta-analysis of randomized controlled trials. *Surg Today* 35(7):553–560
15. Tazawa J, Sanada K, Sakai Y, Yamane M, Kusano F, Nagayama K, Ito K, Takiguchi N, Hiranuma S, Maeda M (2005) Gallbladder aspiration for acute cholecystitis in average-surgical-risk patients. *Int J Clin Pract* 59(1):21–24
16. Teoh WM, Cade RJ, Banting SW, Mackay S, Hassen AS (2005) Percutaneous cholecystostomy in the management of acute cholecystitis. *ANZ J Surg* 75(6):396–398
17. Urbach DR, Stukel TA (2005) Rate of elective cholecystectomy and the incidence of severe gallstone disease. *CMAJ* 172(8):1015–1019
18. Wilson RG, Macintyre IM, Nixon SJ, Saunders JH, Varma JS, King PM (1992) Laparoscopic cholecystectomy as a safe and effective treatment for severe acute cholecystitis. *BMJ* 305(6850):394–396