Systematic review of cholecystostomy as a treatment option in acute cholecystitis
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CRD summary
Due to the limitations of the data, this review was unable to make any definitive conclusions about the effectiveness of percutaneous cholecystostomy for treatment of acute cholecystitis in the elderly. Despite methodological shortcomings in the review methods, this finding appears likely to be reliable given the lack of controlled studies and the poor quality data.

Authors' objectives
To determine whether percutaneous cholecystostomy (PC) was effective as a treatment for acute cholecystitis in the elderly.

Searching
PubMed, CINAHL, EMBASE and The Cochrane Library were searched for papers written in English or Swedish up to April 2007 using the search term cholecystostomy. Related articles functions of databases and reference lists of retrieved articles were used to screen for further articles. Data about cholecystectomy came from a search of PubMed for studies that assessed mortality after acute cholecystectomy in patients aged at least 60 years plus data from the Swedish Cholecystectomy register.

Study selection
Studies of at least six patients with acute cholecystitis treated with percutaneous ultrasound-guided or computed tomography-guided cholecystostomy were eligible for inclusion in the review. Eligible studies had to report at least two of the outcomes: procedure attempted; complications; mortality; therapeutic effects; and frequency of surgical intervention and/or perioperative mortality. Case reports, reviews, methodological papers and papers that described laparoscopic or open cholecystostomy procedures were excluded. Studies that assessed PC for gallstone extraction, crushing or dissolution were excluded, as were studies carried out in the same hospital with overlapping time periods (to avoid the duplication).

Some patients in the included studies received more than one PC. Mean age of included participants ranged from 52 to 85 years (mean 68.1 years). Seventy-nine percent of the included studies reported whether patients had gallstones. Mean percentage of patients with gallstones was 69% (range 0% to 100%). Most studies were carried out in Europe or USA. Studies were published between 1984 and 2005.

The authors did not state how papers were selected for review.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Total numbers of patients and the number experiencing outcomes were extracted.

The authors did not state how data were extracted for the review.

Methods of synthesis
Studies were grouped by outcome and (where possible) mean numbers of events (reported as percentage incidence rates) were compared between PC and acute cholecystectomy using Fisher's exact test (p value of less than 0.05 was considered significant).

Results of the review
Fifty-three studies (n=1,918 with PC) were included in the review: 12 prospective studies and 41 retrospective studies.
No controlled studies were identified. Sample sizes ranged from six to 185 patients.

Some attempts to place a PC failed. Nearly all studies reported the rate of technically successful PC placement. Overall success rate of 98.9%. Treatment success was reported in 85.6% of patients with acute cholecystitis. A total of 40% of patients treated with PC were later cholecystectomised (mortality rate 1.96%). The mortality rate associated with PC was 0.36%. Overall 30-day mortality rates of 15.4 % in patients treated with PC and 4.5% patients with acute cholecystectomy (p< 0.001).

**Authors’ conclusions**
Due to limitations of data no definitive conclusions could be made about the effectiveness of percutaneous cholecystostomy (PC) for treatment of acute cholecystitis in the elderly.

**CRD commentary**
This review answered a clearly defined research question. The criterion for study design was broadly defined. Searches for relevant studies were carried out in a number of databases, but relevant studies may have been missed by limiting inclusion to studies written in Swedish or English. It appeared that only one keyword was used to search for studies and this may not have been sufficient to detect all of the relevant literature. It was unclear whether unpublished studies were eligible for inclusion. It appeared that all of the included studies were published, which suggested that there may have been a risk of publication bias. The risk of reviewer error and bias was unclear as the reviewers did not state how studies were selected for inclusion and how data were extracted. The reliability of the data was also unclear as the authors did not report an assessment of the risk of bias within studies. The risk is likely to be high given the types of study designs included and the lack of control groups. Some study details were reported; further details of the types of patients included would have been helpful in order to assess the likely level of heterogeneity. Given that studies spanned a wide range of publication dates, it was likely that techniques and patient populations varied between the studies. The crude method of summing data and calculating a mean overall outcome value failed to take into account any differences between studies. Overall, despite the methodological shortcomings of the review methods, the authors' finding that no definitive conclusions could be made appeared likely to be reliable given the lack of controlled studies and the poor quality data.

**Implications of the review for practice and research**
**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that large multicentre randomised controlled trials that assessed mortality after percutaneous cholecystectomy compared with acute cholecystectomy in elderly septic patients diagnosed with acute cholecystitis using ultrasonography were required.

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