





Mortality and recurrence risk after a first episode of acute pancreatitis in the elderly: population-based study

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Background

Improved standard of living and advances in medical care have increased longevity in Sweden and the rest of the Western world. Increased longevity has led to an increase in the proportion of the population older than 80 years. At the same time, the incidence of first-time acute pancreatitis among those aged at least 80 years has increased^{1–4}.

Gallstone disease and alcohol are the main causes of acute pancreatitis in the adult population^{1,5}. In the elderly, however, gallstone disease is the most common aetiology^{2,6–9}. In biliary acute pancreatitis, cholecystectomy or endoscopic retrograde cholangiopancreatography (ERCP) is recommended to prevent recurrent episodes of acute pancreatitis. However, there is a risk of serious adverse events from these interventions in elderly patients with high co-morbidity. Several studies^{10–12} have shown that the co-morbidity level influences outcome in acute pancreatitis.

Whether age itself is a risk factor in acute pancreatitis is debated. Many studies of elderly patients with acute pancreatitis have been conducted over the past decade. However, it is difficult to draw any definite conclusions from these because different cut-off values have been used for age. Studies have come to divergent conclusions, some^{7,13,14} that age is an independent risk factor and others¹⁵ that it is not.

The objective of the present study was to evaluate the mortality of patients aged 80 years or more treated for acute pancreatitis, as well as mortality related to interventions aimed at preventing recurrent biliary pancreatitis. A second aim was to explore the risk of recurrent pancreatitis in elderly patients who had undergone ERCP or cholecystectomy.

Methods

The study cohort comprised all patients aged at least 80 years diagnosed with acute pancreatitis in Sweden between 2007 and 2019. Data were retrieved from the Swedish Patient Register¹⁶, searching for patients with discharge diagnoses including the ICD-10 code for acute pancreatitis (K85.N). The report has been structured according to STROBE guidelines. Where the same

patient was admitted more than once, the first admission was considered the index episode. The cohort was cross-matched with the Swedish Register for Gallstone Surgery and ERCP (GallRiks), a nationwide register for quality assurance of gallstone surgery¹⁷. Data on incidence were retrieved from Statistics Sweden¹⁸. The Charlson Co-morbidity Index (CCI)¹⁹ score was determined from diagnoses assigned on admission, and outpatient visit before and on the first admission for acute pancreatitis.

The standardized mortality ratio (SMR) is defined as the ratio between the observed mortality within 30 days and the expected mortality determined from population data on mortality adjusted for age and sex. Expected mortality was determined from mortality rates in Sweden in 2012 (SCB Statistics Sweden)¹⁸. SMR was analysed according to date of admission with acute pancreatitis, date of cholecystectomy, and date of first ERCP undertaken, stratified by CCI score.

Results

During the study interval, 23 792 admissions for acute pancreatitis in 9941 patients aged 80 years or older were registered. These included 5580 women (56.1 per cent) and 4361 men (43.9 per cent). During the same interval, a total of 39 240 patients were treated for acute pancreatitis in the entire Swedish population, implying that the study cohort represented 25.3 per cent of all patients with acute pancreatitis in the population during this time.

The mean incidence of admission for acute pancreatitis in patients aged at least 80 years was 182.3 per 100 000 per year¹⁶. In the study cohort, 46.5 per cent of patients were aged 80–84 years, 34 per cent were aged 85–89 years, and 19.4 per cent were aged 90 years or older. There were 2325 (23.4 per cent), 2034 (20.5 per cent), 1177 (11.8 per cent), 723 (7.3 per cent), and 3682 (37.0 per cent) patients with CCI scores of 0, 1, 2, 3 and 4 or more respectively. Altogether 266 patients (2.7 per cent) underwent cholecystectomy and 1979 (19.9 per cent) had ERCP within 30 days after admission. [Figure 1](#) shows the incidence rates of

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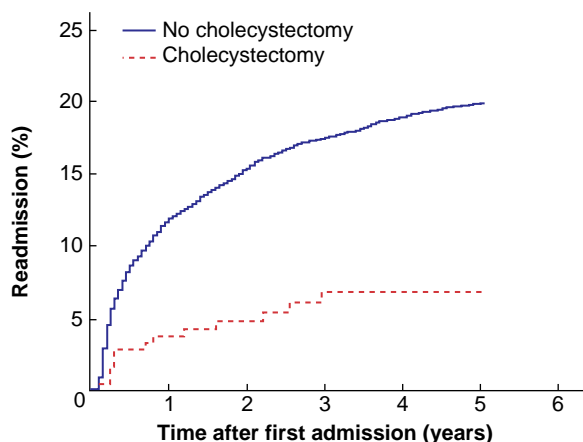
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readmission for acute pancreatitis among patients who had undergone cholecystectomy or ERCP *versus* those who had not.

The SMR after admission for acute pancreatitis stratified by CCI score is shown in Fig. 2. SMRs after ERCP were 3.8, 3.4, 5.9, 9.7, and 5.4 (Fig. S2).

Five-year overall survival according to CCI is presented in Fig. S3.

a Cholecystectomy *versus* no cholecystectomy



b ERCP *versus* no ERCP

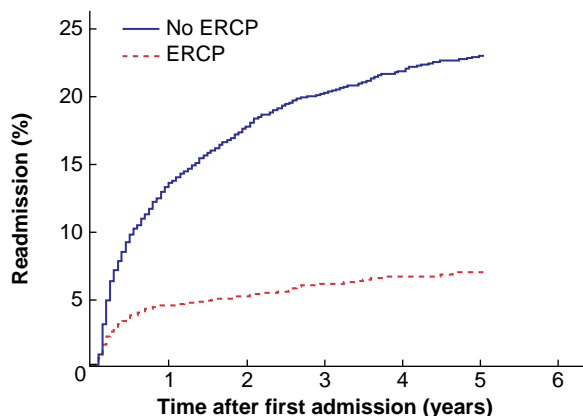


Fig. 1 Incidence rates of readmissions for acute pancreatitis in patients with or without cholecystectomy or endoscopic retrograde cholangiopancreatography

a With *versus* without cholecystectomy, and **b** with *versus* without endoscopic retrograde cholangiopancreatography (ERCP).

Discussion

The present study of elderly patients treated for acute pancreatitis in Sweden shows the outcome of standard acute pancreatitis management in the community at large. The results may serve as a basis for decision-making when balancing the risks associated with interventions aimed at preventing recurrent acute pancreatitis against the risks of conservative treatment of acute pancreatitis. Although this is a purely observational study, it reflects the safety and potential benefits of management of acute pancreatitis in elderly and frail patients. This is important because, as far as the authors know, no evidence derived from a large RCT on the subject is available.

The SMR was higher in women, as was also observed in a Danish population-based cohort study by Knudsen *et al.*¹². This could be explained by a combination of lower expected mortality and higher observed mortality in women. There could also be unknown confounders causing women to have a higher SMR.

In this study cohort, only 266 patients (2.7 per cent) underwent cholecystectomy within 30 days after admission for acute pancreatitis. Despite this small figure, it was apparent that cholecystectomy greatly reduced the risk of recurrent acute pancreatitis, particularly in patients with a CCI score of 1 or less, where excess mortality was reduced from 8–12 to 1.2–1.3. Although not as effective in reducing the recurrence rate, ERCP was associated with a lower mortality rate than conservative treatment.

These results support International Association of Pancreatology guidelines that cholecystectomy is the most effective way of reducing mortality and preventing recurrent episodes of biliary acute pancreatitis, even among patients aged at least 80 years with a CCI score of no more than 1, and that ERCP is the second-best alternative. The differences in recurrence rate and SMR between cholecystectomy and ERCP were, however, relatively small.

There are limitations to this study. It was assumed that gallstones were the predominant aetiology in the cohort, but it cannot be ruled out that the acute pancreatitis had other

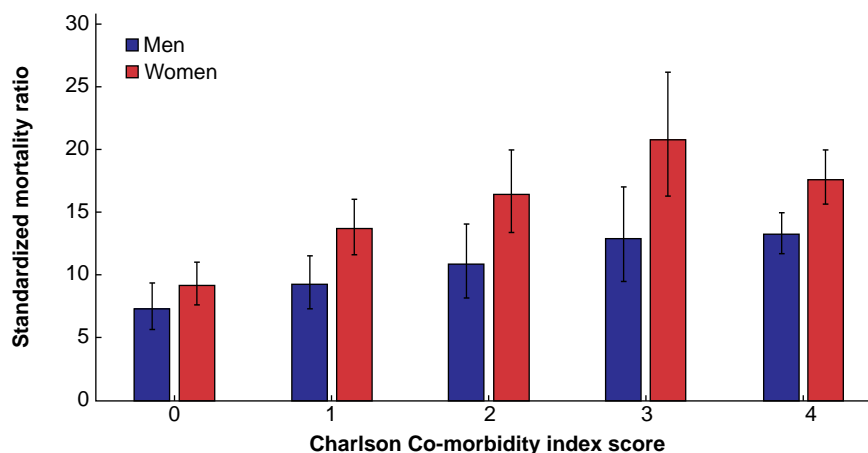


Fig. 2 Standardized mortality ratio after admission for acute pancreatitis stratified by Charlson Co-morbidity Index score

aetiologies. However, the effectiveness of cholecystectomy and ERCP would have been more pronounced if all aetiologies other than gallstones had been excluded. The study was purely observational, which may be a source of bias. Treatment decisions may have been based on factors that it was not possible to adjust for. Even though the CCI is one of the most commonly used scoring systems for co-morbidity in research, it may not always capture the true burden of co-morbidity²⁰.

Given the high mortality risk of acute pancreatitis *per se*, as well as the non-negligible risks of interventions available, it is imperative to involve the patient and next of kin in the decision-making process. The decision to carry out cholecystectomy or ERCP after an episode of acute pancreatitis requires a delicate trade-off between the potential benefit of preventing new episodes of acute pancreatitis and the risk of complications related to the procedure itself.

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Disclosure

The authors declare no conflict of interest.

Supplementary material

Supplementary material is available at BJS online.

Data availability

Data are available on request from the corresponding author.

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