

# Acute Pancreatitis in Patients 70 Years of Age or Older

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## Abstract

**Objective:** To explore the incidence and severity of pancreatitis and to assess the outcome of all measures taken to treat gallstones in following recovery from pancreatitis in patients 70 years of age or older in a community-based setting.

**Methods:** All patients with pancreatitis as diagnosis in Uppsala, Sweden, 2003–2005, were identified retrospectively. Data relevant for assessing etiology and follow-up treatment were extracted from the patients' histories. The electronic patient administrative system was crosschecked to determine mortality within 30 days after admission.

**Result:** Altogether 148 admissions for 119 patients, including 48 men, were registered. On 29 occasions, admission was for relapse after a previous episode. Mortality within 30 days was 4/148 (2.7%). Twenty-two patients with gallstone induced acute pancreatitis underwent cholecystectomy and 27 patients underwent ERC with endoscopic sphincterotomy during follow-up. In a life table analysis, the probability of remaining relapse-free in the absence of cholecystectomy or endoscopic sphincterotomy was estimated to 95% (95% confidence interval [CI] 91%–98%) two weeks after discharge and 92% (CI 88%–97%) eight weeks after discharge.

**Conclusion:** Although pancreatitis in most cases is not a serious condition, it may become life threatening for elderly people. In patients with gallstone induced pancreatitis, accurate timing of cholecystectomy or endoscopic sphincterotomy in the follow-up period is crucial in order to preclude re-admissions for relapses.

**Keywords:** gallstone induced acute pancreatitis, endoscopic sphincterotomy, cholecystectomy, mortality, acute pancreatitis relapses, older, male, female

## Introduction

Acute pancreatitis is in most cases a disease with a relatively benign course, although a small group of patients with acute pancreatitis develop a rapidly progressing disease with risk of serious complications and high mortality. The best way of avoiding multiple organ failure in these cases is to identify patients with severe pancreatitis at an early stage in order to give intensive care treatment from the very start. This is of special importance in older patients (Ross and Forsmark, 2001; Gardner, 2008). Age above 55 years is therefore included as a criterion in both the Glasgow scoring system (Blamey et al. 1984) and the Ranson score system (Ranson et al. 1974). Age is also included as a parameter in the Acute Physiology and Chronic Health Evaluation (APACHE II [Wilson et al. 1990]). All these scoring system have been used to discriminate mild acute pancreatitis from severe acute pancreatitis at an early stage. In the original development of the Glasgow criteria, age above 55 years was found to increase the risks almost twofold of developing severe pancreatitis (Blamey et al. 1984).

It is often more difficult to diagnose pancreatitis in elderly as they tend to present later in the course and have more non-specific symptoms. In addition, more differential diagnoses have to be considered in the elderly as they have more problems with co-morbidity, which may add to the impact of several organ systems often associated with pancreatitis. Early decision regarding admission to intensive care unit is thus crucial for older people with pancreatitis.

As for younger patients, the etiology of pancreatitis varies (e.g. alcohol, infections, gallstone disease, infections, medicaments, hypocalcaemia or hyperlipidemia [Park et al. 1986]). However, the increase in prevalence of gallstones with increasing age makes gallstones more predominant as etiologic factor

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than in the younger population (Birgisson et al. 2002; Appelros and Borgström, 1999).

The aim of the present study was to explore the incidence and severity of pancreatitis in elderly patients in a community-based setting and to assess the outcome of all measures taken to treat gallstones, if this was considered the etiology of the pancreatitis.

## Material and Methods

The study was performed in the county of Uppsala, which had 302,564 citizens in December 2004 (Statistics Sweden, 2008) and has one tertiary referral unit and one community hospital. All emergency admissions were undertaken in one or other of the two units; only in exceptional cases are citizens residing in the area treated at other centers. All patients treated for pancreatitis in the county during 2003 to 2005 were retrospectively identified through the patient administration system. The diagnosis was determined by the surgeon responsible for the discharge. In general, the pancreatitis diagnosis required either a computer tomography or ultrasound showing pancreatitis and/or serum-amylase or serum lipase elevated 4 times higher than the upper reference limit (Karlson BM, 2005), although in a few cases the diagnosis may have been based on more vague criteria. The criteria resembled those suggested by Swaroop (Swaroop et al. 2004)

Etiology was determined from the patient history at discharge. If the etiology could not be identified despite thorough anamnesis and necessary investigations, the pancreatitis was considered as idiopathic. If attempts to reveal the etiology were incomplete, the etiology was considered unclear. From the patient histories, variables for assessing the Glasgow criteria, duration of hospital stay, all interventions taken to preclude relapses and, if applicable, date of relapse were also abstracted. In order to assess the risk of relapses in case no interventions were undertaken, a life-table analysis was performed, with relapse considered as outcome. The period of observation was considered as censored at the date of the intervention undertaken to preclude relapse. The local cholecystectomy register was checked for all events and complications related to subsequent cholecystectomy. Mortality within 30 days of admission was determined by crosschecking with the electronic patient administrative system.

## Results

During 2003–2005, 148 admissions for 119 patients, 71 women and 48 men, were registered during 2003–2005 (Table 1); age ranged from 70–97 years. Of these episodes, 29 were for recurrences. In 75 (50%) of the admissions, pancreatitis was caused by gallstones, in 3 (2%) admissions by alcohol, in 1 (1%) it was caused by a percutaneous biopsy, in 3 (2%) it was caused by a tumor obstructing the pancreatic duct and in 32 (22%) it was considered as idiopathic. In 34 (23%) cases, the cause was unclear. Two patients (1.4%) had at least three positive Glasgow criteria (including age above 55 years). When the radiographic image was considered in combination with Gleason score, 78 (53%) patients were found to have mild, 6 (4%) moderate, 10 (7%) severe non-necrotizing and 5 (3%) severe necrotizing pancreatitis. For 48 (32%) the degree could not be determined from the patient histories. Mean hospital stay for patients 70 years of age or older was 10.5 days (standard deviation [SD] 8.9 days). For patients younger than 70 years, the mean hospital stay was 8.9 days (SD 13.4 days). There was no significant difference in hospital stays between patients younger and older than 70 years.

Six patients 70 years of age or older were treated at the intensive care unit. Two patients had pains necessitating opioid treatment persisting for at least 7 days. Two patients underwent necrosectomy and three patients percutaneous drainage of abscesses. Both patients undergoing necrosectomy subsequently died from the pancreatitis. All three patients that underwent percutaneous drainage survived the acute episode. Twenty-two patients underwent cholecystectomy during the same admission or within 4 weeks after discharge and 27 patients underwent ERC with endoscopic sphincterotomy after the first admission for pancreatitis. Mean time to readmission for those admitted for recurrent pancreatitis was 87 days, standard deviation 167 days. In a life table analysis, the probability of remaining relapse-free in the absence of cholecystectomy or ERC with endoscopic sphincterotomy was estimated to 95% (95% confidence interval [CI] 91%–98%) two weeks after discharge and 92% (CI 88%–97%) 8 weeks after discharge (Fig. 1). Mortality within 30 days for patients 70 years of age or older was 4/148 (2.7%). For patients younger than 70 years, mortality within 30 days was 2/407 (0.5%). The mortality within 30 days was significantly higher for patients

**Table 1.** Background data (148 admissions for 119 patients).

	N	%
Gender		
Men	48	40.3
Women	71	59.7
Etiology		
Gallstone	75	50.7
Other	73	49.3
Positive Glasgow criteria		
Age > 55 years	148	100
White blood cells > $15 \times 10^6/l$	7	
Glucose > 10 mmol/l	1	
Urea > 16 mmol/l	0	
PaO <sub>2</sub> < 60 mmHg	0	
Calcium < 2 mmol/l	0	
Albumin < 32 g/l	0	
Lactate dehydrogenase > 600 units/l	0	
Aspartate/alanine aminotransferase > 100 units/l	1	
Number of positive Glasgow criteria		
1	93	
2	5	
3	2	
Follow-up treatment		
Cholecystectomy	22	14.9
ERC with endoscopic sphincterotomy	27	18.2

older than 70 years than younger patients ( $p = 0.026$ ). Five patients 70 years of age or older died later than 30 days after admission as a direct cause of the pancreatitis.

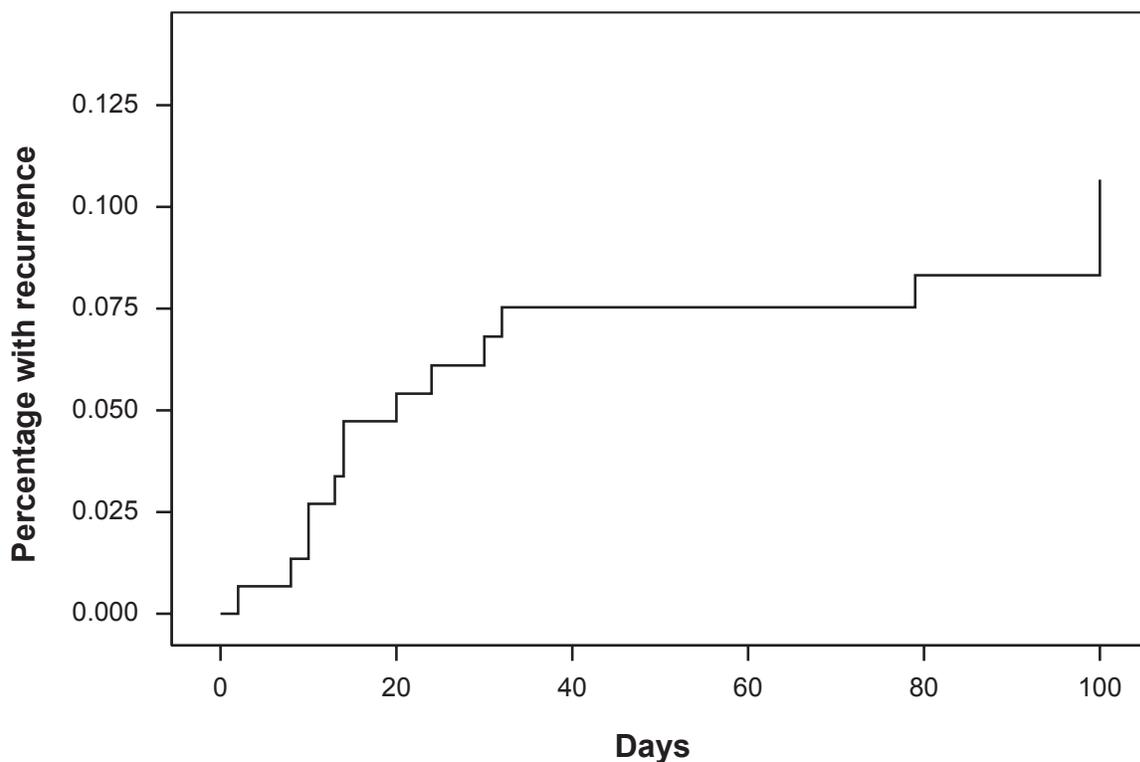
## Discussion

The data presented here show the incidence and severity of acute pancreatitis in a population-based setting, with a mixed rural and urban population. No selection due to referral to tertiary centers has biased the case-mix or the outcome of the treatment. We found that pancreatitis in elderly in most cases is a benign disease, but that it in a small percentage can be a life-threatening disease. Mortality was higher in older patients, but the duration of hospital stay did not differ significantly from younger patients. In patients with gallstone induced acute pancreatitis, accurate timing of

cholecystectomy or endoscopic sphincterotomy in the follow-up period is crucial in order to preclude re-admissions for relapses.

As previously shown (Park et al. 1986), gallstones were the etiology in half of the admissions in this age group. This relatively high percentage of gallstone-induced acute pancreatitis is probably due to an increased prevalence of gallstones in the elderly (Ross et al. 2001). Pancreatitis caused by alcohol gradually decreases after the age of 50.

Six patients required treatment at the intensive care unit. Only three of the patients had three or more positive Glasgow criteria. Whereas pancreatitis in most cases is a benign self-limiting disease, it may turn into a very severe condition. This is of special concern in the elderly. The development of multiple organ system failure is a complication of pancreatitis that has to be diagnosed



**Figure 1.** Life table plot for time to pancreatitis recurrence following discharge after the first episode. Interventions undertaken to preclude recurrence (i.e. ERC with endoscopic sphincterotomy or cholecystectomy) were considered as censored events.

and treated early in order to reduce mortality. In addition, older patients tend to present later in the course of their illness (Lyon and Clark, 2006), which may lead to an aggravation of the pancreatitis before admission. Furthermore, the clinical assessment of an older patient is more difficult as fever and leukocytosis is often absent, despite advanced acute pancreatitis, and the rebound and regarding of the abdomen may be less pronounced (Rothrock et al. 1992; Potts and Vukov, 1999). Amylase as marker for pancreatitis is less specific in the elderly than in younger patients, as an increase of amylase may have other causes, e.g. mesenteric ischemia, peptic ulcer and bowel perforation (Hendrickson and Naparst, 2003). The sensitivity of amylase is also reduced as older patients often seek medical attention at a later stage, when the amylase level is already normalized (Clavien et al. 1989).

Previous studies have shown that age only has a limited impact on the course of acute pancreatitis (Lankisch et al. 1996). We did not find a significant correlation between age and duration of hospitalization, although high age was associated with higher mortality. Whereas age is per se may not be a risk factor in uncomplicated pancreatitis,

it is probably a major risk factor in the subgroup of patients developing signs of multiple organ failure. The more pronounced difference in mortality between those with uncomplicated and severe pancreatitis in older patients than in younger was also found in a retrospective case-control study by Gardner (Gardner et al. 2008). Age above 55 years doubles the risk of multiple organ system failure (Tran et al. 1993). Higher co-morbidity and less reserve capacity for each organ system probably accounts for the greater risk of organ failure in the elderly.

In this study, one in five admissions was for relapse in acute pancreatitis. In unselected populations the most common cause of relapse in acute pancreatitis is alcohol (Appelros and Borgström, 1999). Relapse from gallstone-induced acute pancreatitis is less common, which probably reflects the fact that the etiology in gallstone-induced acute pancreatitis is usually eliminated after an episode of pancreatitis (United Kingdom Guidelines, 2005); however, this depends whether cholecystectomy or endoscopic sphincterotomy is performed without delay after the patient has recovered from the acute pancreatitis. In the case of the elderly, a restrained attitude towards active

surgical or endoscopic interventions may lead to relapses that may be associated with a higher mortality and morbidity than the intervention itself. Endoscopic sphincterotomy is associated with an increased mortality from heart disease in elderly (Hammarström et al. 1995). In the present study, the risk of relapse in the absence of intervention against the gallstones remained small but stable the first months after the acute episode (Fig. 1). The majority of relapses were in patients with gallstone-related acute pancreatitis. The reasons for not undertaking measures to prevent the relapses in these patients varied; for some patients, it was actively decided to not take any further measures after the first episode. In other cases, the relapse occurred before the planned intervention.

The optimal timing of cholecystectomy or endoscopic sphincterotomy after an episode of gallstone-induced acute pancreatitis is an issue of intense debate (Andersson et al. 2004; Hammarström et al. 1999; Nealon et al. 2004; Taylor and Wong, 2004; Larson et al. 2006; Panek et al. 2006). Cholecystectomy during the same period of hospitalization reduces the risk of relapse, but is associated with increased risk of infectious complications. The specific features of elderly make these issues even more pertinent.

The mortality in our cohort was slightly lower than in previous studies on the same age group (Lund et al. 2006). However, as for all other outcome measures, comparison of mortality between different populations has to be done with caution, since the criteria for defining pancreatitis may vary. Local traditions determine the thresholds for the biochemical markers used, and to what extent radiographic imaging is considered a prerequisite for diagnosing pancreatitis. Furthermore, as the variables related to the severity and course of the acute pancreatitis were assembled retrospectively, it cannot be ruled out that some data were not entirely reliable.

In conclusion, acute pancreatitis in elderly may turn into a very serious disease with high morbidity and mortality, although in the majority of cases it is a benign condition. If gallstones are determined as the etiology, cholecystectomy or ERC with endoscopic sphincterotomy should be done within a few weeks to prevent relapses.

## Disclosure

The author reports no conflicts of interest.

## References

- Andersson, R., Andersson, B., Haraldsen, P., Drewsen, G. and Eckerwall, G. 2004. Incidence, management and recurrence rate of acute pancreatitis. *Scand J. Gastroenterol.*, 39:891–4.
- Appelros, S. and Borgström, A. 1999. Incidence, etiology and mortality rate of acute pancreatitis over 10 years in a defined urban population in Sweden. *Br. J. Surg.*, 465–70.
- Birgisson, H., Möller, P.H., Birgisson, S., Thoroddsen, Á, Ásgeirsson, K.S., Sigurjónsson, S.V. and Magnússon, J. 2002. Acute pancreatitis: A prospective study of its incidence, etiology, severity, and mortality in Iceland. *Eur. J. Surg.*, 168:278–82.
- Blamey, S.L., Imrie, C.W., O'Neill, J., Gilmour, W.H. and Carter, D.C. 1984. Prognostic factors in acute pancreatitis. *Gut.*, 25:1340–6.
- Clavien, P.A., Robert, J., Meyer, P., Borst, F., Hauser, H., Herrman, F. et al. 1989. Acute pancreatitis and normoamylasemia, not an uncommon combination. *Ann. Surg.*, 210:614–20.
- Gardner, T.B., Santhi Swaroop, V., Suresh, S.T., Pearson, R.K., Clain, J.E., Topazian, M.D. and Petersen, B.T. 2008. The effect of age on hospital outcomes in severe acute pancreatitis. *Pancreatology*, 8:265–70.
- Hammarström, L.E., Andersson, R., Stridbeck, H. and Ihse, I. 1999. Influence of bile duct stones on patient features and effect of endoscopic sphincterotomy on early outcome of edematous gallstone pancreatitis. *World J. Surg.*, 23:12–7.
- Hammarström, L.E., Holmin, T., Stridbeck, H. and Ihse, I. 1995. Long-term follow-up of a prospective randomised study of endoscopic versus surgical treatment of bile duct calculi in patients with gallbladder in situ. *Br. J. Surg.*, 82:1516–21.
- Hendrickson, M. and Naparst, T.R. 2003. Abdominal surgical emergencies in the elderly. *Emerg. Med. Clin. North Am.*, 21:937–69.
- Karlson, B. M. Local management program for pancreatitis. 2005. Available at: [http://www.akademiska.se/templates/page\\_\\_\\_29650.aspx](http://www.akademiska.se/templates/page___29650.aspx) [Accessed July 2, 2008].
- Lankisch, P.G., Burchard-Reckert, S., Petersen, M. et al. 1996. Etiology and age have only a limited influence on the course of acute pancreatitis. *Pancreas.*, 13:344–9.
- Larson, S.D., Nealon, W.H. and Evers, B.M. 2006. Management of gallstone pancreatitis. *Adv. Surg.*, 40:265–84.
- Lund, H., Tønnesen, H., Tønnesen, M.H. and Olsen, O. 2006. Long-term recurrence and death rates after acute pancreatitis. *Scand J. Gastroenterol.*, 41:234–8.
- Lyon, C. and Clark, D.C. 2006. Diagnosis of acute abdominal pain in older patients. *Am. Fam. Physician.*, 74:1537–44.
- Nealon, W.H., Bawduniak, J. and Walser, E.M. 2004. Appropriate timing of cholecystectomy in patients who present with moderate to severe gallstone-associated acute pancreatitis with peripancreatic fluid collections. *Ann. Surg.*, 239:741–51.
- Panek, J., Karcz, D., Embiasz, K., Budzynski, A. and Zasada, J. 2006. Early endoscopic sphincterotomy and early laparoscopic cholecystectomy in the treatment of severe acute biliary pancreatitis—a preliminary report. *Adv. Med. Sci.*, 51:103–4.
- Park, J., Fromkes, J. and Cooperman, M. 1986. Acute pancreatitis in elderly patients. Pathogenesis and outcome. *Am. J. Surg.*, 152:638–42.
- Potts, FE4th and Vukov, L.F. 1999. Utility of fever and leukocytosis in acute surgical abdomens in octogenarians and beyond. *J. Gerontol A Biol. Sci. Med. Sci.*, 54:M55–58.
- Ranson, J.H.C., Rifkind, K.M., Roses, D.F., Fink, S.D., Eng, K. and Spencer, F.C. 1974. Prognostic signs and the role of operative management in acute pancreatitis. *Surgery, gynecology and obstetrics*, 139:69–81.
- Ross, S.O. and Forsmark, C.E. 2001. Pancreatic and biliary disorders in the elderly. *Gastroenterol. Clin. North Am.*, 30:531–45.
- Rothrock, S.G., Greenfield, R.H. and Falk, J.L. 1992. Acute abdominal emergencies in the elderly: clues to identifying serious illness. Part I—Clinical assessment and diagnostic studies. *Emerg. Med. Reports*, 13:177–84.

- [22] Statistics Sweden. Available at [http://www.scb.se/default\\_\\_\\_2154.asp](http://www.scb.se/default___2154.asp) [accessed February 15, 2008]
- [23] Swaroop, V.S., Chari, S.T. and Clain, J.E. 2004. Severe acute pancreatitis. *JAMA*, 291:2865–8.
- [24] Taylor, E. and Wong, C. 2004. The optimal timing of laparoscopic cholecystectomy in mild gallstone pancreatitis. *Am. Surg.*, 70:971–5.
- [25] Tran, D.D., Cuesta, M.A., Schneider, A.J. and Wesdorp, R.I.C. 1993. Prevalence and prediction of multiple organ system failure and mortality in acute pancreatitis. *J. Crit. Care*, 8:145–53.
- [26] United Kingdom guidelines for the management of acute pancreatitis. *Gut.*, 2005 May;(54 Suppl 3):iii1–9.
- [27] Wilson, C., Heath, D.I. and Imrie, C.W. 1990. Prediction of outcome in acute pancreatitis: a comparative study of APACHE II, clinical assessment and multiple factor scoring systems. *Br. J. Surg.*, 77:1260–4.