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ORIGINAL ARTICLE

Survey of the management of acute pancreatitis in surgical departments in Sweden

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Abstract

Objective. Several international guidelines concerning the treatment of acute pancreatitis has been published during the last decades. However, Scandinavian guidelines are still lacking. The aim of the present study is to identify current treatment strategies for acute pancreatitis in Sweden and to evaluate if there is a need for improvement and the role of guidelines. **Material and methods.** A questionnaire was e-mailed to the surgical departments at all Swedish hospitals ($n = 58$) managing patients with acute pancreatitis. Comparisons were made both between university and non-university hospitals, and between hospitals with more versus less than 150,000 persons in the primary catchment population. **Results.** Fifty-one hospitals responded (88%). In median, 65 (12–200) patients with acute pancreatitis are treated yearly at each hospital. Of 51 hospitals, 18 perform a severity classification, with APACHE II being the most commonly used. A majority are of the opinion that a scoring system is not better than the judgment of a senior consultant. In severe acute pancreatitis, 29/48 routinely administer antibiotics, 29/48 use enteral nutrition, and 25/49 have a standardized follow-up plan. The majority considered administration of intravenous fluids as the most important treatment in severe acute pancreatitis. After mild gallstone-induced acute pancreatitis, the corresponding response was cholecystectomy, especially at larger hospitals ($p = 0.002$). Of 47, 42 are interested in developing a Scandinavian quality register. **Conclusions.** The results from this first Swedish national survey provide an insight into current traditions of treatment of acute pancreatitis and points, for example, at the lack of early severity stratification. A majority of hospitals are interested in developing a quality register in acute pancreatitis.

Key Words: acute pancreatitis, guidelines, quality register, severity classification, treatment

Introduction

The incidence of patients with acute pancreatitis is 30–35 per 100,000 an year in Sweden [1]. Since 1994, several guidelines, set by international associations and national societies, for the management of patients with acute pancreatitis have been published [2]. It is believed that clinical guidelines will provide a framework for clinicians to follow, to enable standardization of practice, and thereby help to reduce inappropriate variations, provide a rational basis for referral, and help to reduce uncertainty in the management [3].

The successful introduction of guidelines, however, depends on a variety factors, including methods of development and implementation [4]. Efforts to validate the impact of guidelines on clinical practice have been performed with different results [5–7].

Still, generally accepted Scandinavian guidelines are lacking, and several of the international guidelines used, like UK Guidelines from 2005 [8] and IAP guidelines from 2002 [9], need a revision, as novel scientific information appear, requiring continuous update and revision of recommendations. It must also be recognized that any specific guideline that is not founded upon the

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highest level of evidence, for example, randomized controlled trials, may ultimately prove to be wrong. The most recently published guideline at the moment is the Japanese guidelines for the management of acute pancreatitis, first published in 2006 and revised in 2010 [10], whereas both the UK and German guidelines are under revision (personal communication).

The present survey aimed to investigate the current management and handling of acute pancreatitis in Sweden, with special reference to evaluate and discuss the role of guidelines and to document where there are – and not are – consensus regarding management.

Material and methods

A questionnaire was designed specifically to obtain information on treatment and management of patients with acute pancreatitis in Swedish hospitals. The questionnaire was e-mailed in the late spring 2008 to all head surgeons at all hospitals in Sweden (population just over 9 millions) that possibly could take care of patients with acute pancreatitis ($n = 63$ hospitals). A questionnaire concerning the treatment of pancreatic pseudocysts was sent out at the same time [11]. When no response was obtained following the initial mailing, reminders were sent out by e-mail or ordinary mail, and occasionally, the responsible surgeons were also reminded by phone. In a few cases, with no established contact with the head surgeon, a member from the Swedish Society for Upper Abdominal Surgery working at that particular hospital was contacted and asked to complete the questionnaire.

University and non-university hospitals, as well as hospitals with 150,000 persons or more versus less in their primary catchment area were compared.

Statistical analysis

The replies were compiled on a computer database for analysis. Values are given as median and range for continuous variables. For categorical data, absolute numbers in addition to percentages are given. Categorical variables were analyzed by χ^2 -test, except when expected frequencies were less than 5, in which case the Fisher's exact test was used. The analysis is based on available data. A probability level less than 0.05 was considered significant. Statistical analyses were performed with Intercooled Stata version 10.1, 2008 statistical package for Mac OS X (Stata Corporation, College Station, Texas, USA).

Results

Five hospitals were excluded because they no longer treat patients with acute pancreatitis. Fifty-one out of

the remaining fifty-eight hospitals (88%) treating acute pancreatitis in Sweden answered the questionnaire. Nine were university hospitals with a primary catchment area of in median 290,000 persons (150,000–360,000) and 42 non-university hospitals with in median 120,000 persons (23,000–580,000) per hospital. In total, 24 non-university hospitals just had a primary catchment area of less than 150,000 persons. The hospitals treated in median 65 patients (33–86) with acute pancreatitis yearly. Just over half of the hospitals responded that they had local written guidelines concerning the management of acute pancreatitis (56%). Only 4/49 (8%) of the hospitals answered that they sometimes refer patients with severe disease. Necrosectomy was performed at 29/51 (57%) of the hospitals, in median two times yearly (1–2.5), more often performed at university hospitals ($p = 0.01$), but still also in every second non-university hospital.

Early severity stratification was as common in any hospital category, but was performed only at 18/51 hospitals (35%). Seven institutions used two or more scores, and in summary, 10 used APACHE (Acute Physiology and Chronic Health Evaluation) II [12], 5 Ranson score [13], 4 Glasgow severity score [14], and 2 SOFA (sepsis-related organ failure assessment) score [15]. Balthazar score [16] and MEWS (modified early warning score) [17] was not a given choice in the survey, but was used in one and two hospitals, respectively (Figure 1). The latter score is not validated for acute pancreatitis. The Atlanta classification system [18] was used in only five hospitals, and only at large hospitals ($p = 0.025$). More than half of the responding hospitals (56%) were of the opinion that a scoring system is not better than the judgment of a senior consultant.

Patients with severe acute pancreatitis were followed daily with CRP, temperature, urinary output, and the amount of administered fluid at all hospitals. Other regimes were also similar between different categories of hospitals (Table I), except that in non-university hospitals, it was more common to follow the levels of calcium ($p = 0.023$). Treatment with pancreatic enzyme supplements after discharge was more common in larger hospitals and university hospitals ($p = 0.025$). Twenty-nine out of forty-nine (59%) hospitals administered prophylactic antibiotics to patients with severe disease. However, also in mild acute pancreatitis, two non-university hospitals administered antibiotics to the patients (2/49, 4%).

Patients with mild acute pancreatitis underwent computed tomography (CT) at 8/49 hospitals and in severe disease almost all (49/51, 96%) were subjected to CT. The timing for the first CT is presented in Figure 2.

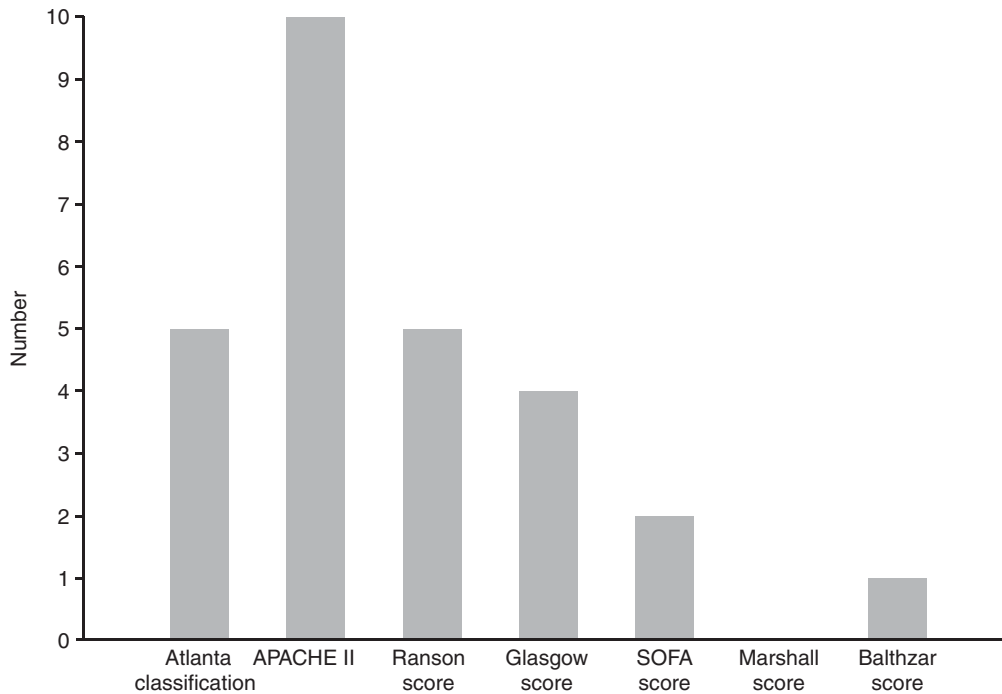


Figure 1. The use of different severity scoring models in acute pancreatitis in Swedish hospitals.

The indication and timing for endoscopic retrograde cholangiopancreatography (ERCP) varied, but was most often performed due to cholangitis and suspicion of stones in the common bile duct. For patients with biliary stones and not eligible for

surgery, ERCP with sphincterotomy was also mentioned as a treatment of choice. The timing for ERCP varied extensively from “as soon as possible” (the most common answer in non-university hospitals; 43%) to “not until the acute pancreatitis episode

Table I. Traditions of treatment and follow-up for patients with severe acute pancreatitis at university and non-university hospitals.

| Variable | Number (N) | Non-university hospital <i>n</i> = 42, <i>N</i> (%) | University hospital <i>n</i> = 9, <i>N</i> (%) | Difference between groups |
|------------------------------|------------|---|--|---------------------------|
| CRP | 51 | 42 (100) | 9 (100) | |
| Pancreatic amylase | 51 | 34 (81) | 6 (67) | <i>p</i> = 0.34 |
| Calcium | 51 | 34 (81) | 4 (44) | <i>p</i> = 0.023 |
| Urine measure | 50 | 42 (100) | 9 (100) | |
| Blood pressure | 50 | 39 (95) | 9 (100) | <i>p</i> = 0.50 |
| Temperature | 50 | 42 (100) | 9 (100) | |
| Monitoring respiration* | 51 | 39 (93) | 9 (100) | <i>p</i> = 0.41 |
| Ultrasound | 48 | 36 (90) | 8 (100) | <i>p</i> = 0.35 |
| Computed tomography | 51 | 40 (95) | 9 (100) | <i>p</i> = 0.50 |
| Antibiotics | 49 | 22 (55) | 7 (78) | <i>p</i> = 0.21 |
| Thrombosis prophylaxis | 51 | 38 (90) | 8 (89) | <i>p</i> = 0.88 |
| Fasting | 50 | 38 (93) | 9 (100) | <i>p</i> = 0.40 |
| Fluid | 51 | 42 (100) | 9 (100) | |
| Ventricular tube | 47 | 22 (56) | 7 (88) | <i>p</i> = 0.099 |
| Enteral nutrition | 49 | 22 (55) | 7 (78) | <i>p</i> = 0.21 |
| Parenteral nutrition | 51 | 98 (41) | 9 (100) | <i>p</i> = 0.64 |
| Referral to other hospital | 49 | 4 (10) | 0 | <i>p</i> = 0.32 |
| Scheduled follow-up plan | 50 | 20 (49) | 6 (67) | <i>p</i> = 0.33 |
| Pancreatic enzyme supplement | 50 | 7 (17) | 4 (44) | <i>p</i> = 0.073 |
| Interest in quality register | 47 | 33 (87) | 9 (100) | <i>p</i> = 0.25 |

Abbreviation: CRP = C-reactive protein.

N is the number of non-missing values.

*Saturation and/or respiratory rate.

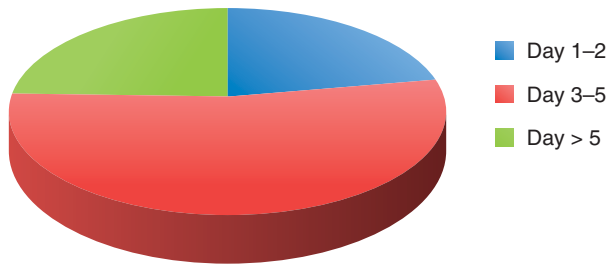


Figure 2. The timing of the first computed tomography in severe acute pancreatitis patients.

had subsided.” In total, 17/41 (41%) of responding hospitals preferred magnetic resonance cholangio-pancreatography (MRCP) before ERCP if the resource was available. This was more often expressed at smaller and non-university hospitals ($p = 0.009$ and $p = 0.036$, respectively).

The criteria for administration of total parental nutrition (TPN) and enteral nutrition (EN) varied extensively. Slightly more than half of patients with severe disease received enteral nutrition (29/49; 59%). Criteria for allowing start of eating and eventually discharge were divergent.

On the open question concerning which three measures that were the most important ones influencing the outcome in severe acute pancreatitis, the majority of hospitals mentioned administration of intravenous fluids (40/47), with no difference between types of hospitals. On the corresponding question, but concerning patients with mild acute pancreatitis, the dominating answer was to perform cholecystectomy in case of biliary pancreatitis (19/42), more commonly emphasized at larger hospitals (15 vs. 4; $p = 0.002$).

Of 47 hospitals, 42 (89%) were interested in the development of a Scandinavian quality register for acute pancreatitis patients, see Figure 3 for details.

Discussion

The current survey aimed to investigate the care of acute pancreatitis patients in Sweden, with special emphasis of where there is consensus or not, and to discuss the possible role of guidelines. Only a few significant differences in treating acute pancreatitis patients between different hospital categories were found. However, there is place for improvement regarding a number of factors, including early severity classification, the use of antibiotics, the present use of CT also in mild cases, early cholecystectomies, the limited use of enteral nutrition, and lack of standardization of treatment. Slightly more than half of the hospitals had local written guidelines for the management of acute pancreatitis patients, and the treatment showed wide variations. The frequency of

acute pancreatitis, and the still substantial associated morbidity and mortality, thus warrants improved management.

Current guidelines for acute pancreatitis care

Loveday et al. [19] identified 29 independent guidelines for the treatment of acute pancreatitis. The guidelines ranged widely in quality, and guidelines developed by professional bodies, and those with tables, a recommendation summary, evidence grading, and audit goals were regarded to be of higher quality. In Sweden, the first attempt to form national guidelines for the management of patients with acute pancreatitis was published in 2000 [20] but never gained wide acceptance. Contrary, the guidelines commissioned by the British Society of Gastroenterology in 1998, revised in 2005, have gained awareness also outside the UK [8].

Results from the present survey in relation to current recommendations

Early severity stratification with a validated scoring system was performed by approximately one-third of the hospitals in the present survey. This low figure corresponds to observations made in a German survey [21], in spite of national guidelines emphasizing the importance of severity stratification. An obvious problem is that an uncriticized, an “ideal,” prognostic system or marker does though not exist and many scoring systems are time-consuming and impossible to evaluate during the first 48 h. The Atlanta classification from 1993 is probably the most widely used and of many still considered as the “golden standard,” and used, for example, by UK guidelines [8], although suffering from several drawbacks, including, for example, the lack of clear distinction between predicted and actual severity of severe disease. Probably the Atlanta classification is better suited to be used in retrospective settings – for scientific purposes – than to classify the patients prospectively. The rather

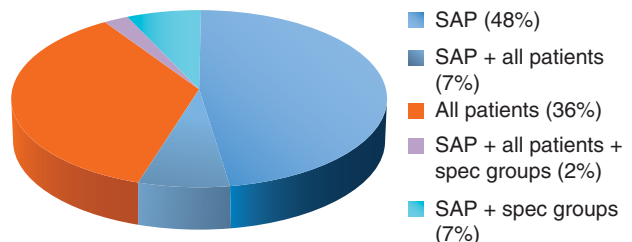


Figure 3. The detailed answer concerning the interest in a Scandinavian quality register for acute pancreatitis. SAP = severe acute pancreatitis, All patients = mild + severe acute pancreatitis during a limited time period, Spec groups = special groups.

frequently used APACHE II is not specific for acute pancreatitis, but represents a generic score for all critically ill patients. New more specific scoring systems, possible to be used early on, are continuing to be reported, but still needs to be validated [22,23].

An interesting finding in our study is that slightly more than half of the representatives of the hospitals had the opinion that a senior consultant better predicted the outcome than the scores. A senior consultant can probably in seconds integrate a lot of data and compare with earlier cases, but is probably also biased of some extraordinary cases. This should be compared with the often time-consuming and impractical use of scores, which always is unbiased but always without possibilities of including hues of the disease and the patients. If the consultant is as good as – or better than – the severity scores are badly investigated, it should be an interesting field to explore in the future.

The majority of hospitals administered prophylactic antibiotics in patients with severe disease. However, it is well documented that the use of prophylactic antibiotics has no place in mild acute pancreatitis and also in patients with severe acute pancreatitis, the recommendation as of today is that antibiotic prophylaxis is not indicated, not reducing mortality, and not protecting against infected necrosis or the need for surgical intervention [24,25]. Antibiotics should however be used as treatment, but only where an infection has been proven.

Most patients with mild acute pancreatitis do not need to undergo CT. In severe cases, early CT is warranted only when differential diagnostic difficulties exist. Indicators of severity on CT are not present until after 2–3 days or even more [16]. Over half of the hospitals in the present study, however, used CT within the first 3–5 days, which might indicate a not updated knowledge. The UK guidelines [8] recommend CT days 6–10 after admission in patients with persisting organ failure, signs of sepsis, or clinical deterioration.

UK guidelines concluded, based on three randomized trials, that urgent therapeutic ERCP should be performed in severe disease or when cholangitis, jaundice, or a dilated common bile duct is present, and that the procedure is best carried out within 72 h after the onset of pain [8]. This recommendation has nowadays been challenged [26–28] and the role of early ERCP in biliary pancreatitis is still not settled. Even in the present study, the indication and timing for ERCP varied, but was most often due to cholangitis and suspicion of stones in the common bile duct, in line with a recent Dutch study [29]. In a prospective multicenter study, early ERCP was associated with a reduced risk of clinically relevant complications

in patients with predicted severe acute biliary pancreatitis if cholestasis was present [30]. MRCP can be an alternative providing a safer and less invasive way to screen for bile duct stones. However, the different use of MRCP might indicate that the availability of this technique is still limited.

The criteria for administration of TPN and enteral nutrition varied extensively. About half of the patients with severe disease received enteral nutrition in this survey. The traditional concept “put the pancreas at rest” has been abandoned, and enteral nutrition should be considered the standard of care for patients with acute pancreatitis requiring nutritional support. A recent Cochrane review concludes that there are significant benefits favoring enteral over parenteral nutrition by decreasing mortality, multiple organ failure, systematic infection, and operative interventions. In addition, there is a trend toward a decreased length of hospital stay and less local septic complications [31].

The majority of hospitals presented the administration of intravenous fluids as one of the key elements influencing outcome in severe acute pancreatitis. Not controversially, fluids should be administered and well monitored to balance the massive interstitial fluid loss that occurs during the early and profound inflammatory phase [28,32,33].

In biliary pancreatitis, definitive management of gallstones should, in mild cases, be performed already during the initial hospital admission or within the next 2 weeks in order to prevent recurrence of pancreatitis [34,35]. For unfit patients, ERCP and endoscopic sphincterotomy (EST) may be sufficient treatment.

Quality registry

Our survey showed a great interest for a quality register for acute pancreatitis. The study may be biased because physicians with an interest in acute pancreatitis were most likely overrepresented. A quality register would give us important information on present care and potentially provide us with information to optimize treatment in the future, based on best available evidence.

The role of guidelines and compliance to guidelines

Indeed clinical judgment is the physicians' most important quality. Management based on studies with the highest level of evidence and guidelines, continuously updated, to reflect current evidence-based knowledge is though desirable. Structured care has to be provided, and guidelines – particularly those published for a defined geographical population, improve quality, safety, and outcome – give the

basis for comparisons and prospective studies. This is part of the reason why we advocate Scandinavian guidelines.

There are several surveys investigating the compliance to guidelines for the treatment of acute pancreatitis. Toh et al. [6] found that the management was suboptimal when compared with the evidence-based UK guidelines, particularly objective assessment of severity, the use of CT in severe cases, and shortcomings in the management of mild and severe acute pancreatitis. Aly et al. [36] showed that hepatobiliary and pancreatic (HPB) specialists practice more in line with the UK guidelines, but a difficulty remained in achieving implementation of the guidelines in non-specialist practice. In Germany, a survey of practicing gastroenterologists demonstrated that despite adequate awareness of the German published guidelines for the management of acute pancreatitis, the compliance with the 10 main aspects of clinical care was variable, ranging from 23% to 97% [21]. In a survey by Foitzik et al. [37], only 11% indicated that they strictly followed the IAP guidelines, and 27% suggested that their treatment differed substantially from guideline recommendations. Pezzilli et al. [38] evaluated the compliance to the Italian guidelines and indicated a lack of compliance with regard to the indications for interventional endoscopy and surgery. Compliance regarding severity stratification was, however, adequate. In New Zealand, a study showed reasonable compliance with published guidelines and also some progress in the management of gallstone acute pancreatitis [39].

In a Japanese survey from 2010, a change in the management of acute pancreatitis before and after the publication of evidence-based guidelines in 2003 was observed [40]. In France, a recent survey, sent to gastroenterology units before and after the publication of the French guidelines, noticed major changes in the treatment of acute pancreatitis after introduction of the guidelines [7].

We believe one should not hesitate to develop also Scandinavian guidelines, despite several surveys showing problems of the adherence to existing guidelines. The successful introduction of guidelines depends on many factors, including that all clinicians must be aware of an attempt to implement these before any improvement occur [41]. Al-Haddad and Raimondo [42] suggest that each consensus management guideline also should be accompanied by a proposed plan for application and enforcement.

Summary

In conclusion, this survey demonstrates the lack of early severity stratification and also a difference in

standard care among Swedish hospitals. However, there is an interest for a Scandinavian quality register. To provide the best outcome for patients and to minimize healthcare cost and productivity losses, we believe that standardization of treatment is desirable. Scandinavian guidelines based on best possible evidence for the treatment of acute pancreatitis would therefore be of benefit and also hopefully increasing emphasis and awareness among physicians, thereby standardizing management and improving outcome.

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