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Article

The Intensity of Brief Interventions in Patients with Acute Alcoholic Pancreatitis Should be Increased, Especially in Young Patients with Heavy Alcohol Consumption

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Abstract

Aims: After the first acute alcoholic pancreatitis (AAP), active repeated brief interventions (BIs) have been shown to protect against recurrent acute pancreatitis (RAP). However, in daily hospital practice the treatment of alcohol problems varies. Our aim was to study BIs performed in the clinic during AAP and whether this prevents from future RAP episodes.

Methods: Data on all patients discharged between 10/2010 and 10/2012 with acute pancreatitis as the primary diagnosis were obtained from the hospital database. Patients with the first attack of AAP were included in the study. Documented BIs during hospitalization for AAP and RAP and the development of RAP and chronic pancreatitis during median (range) follow-up of 4.2 (0.2–6.1) years were analyzed. Patients were also contacted with a mailed questionnaire.

Results: A total of 74 patients with first AAP during the study period were included. Of these, 32% developed RAP during follow-up. Of the patients, 72% received a documented BI during initial hospitalization, with no difference between patients who later did or did not develop RAP (71 vs. 72%; ns). Younger age (OR = 0.96, 95% CI = 0.92–1.00) and higher AUDIT points ($P = 0.044$; OR = 5.6; 95% CI = 1.02–30.9 for ≥20 AUDIT points) were associated with RAP. AUDIT test had 70% sensitivity and 71% specificity at a cut-off value of 20 points for predicting RAP.

Conclusions: Only 72% of the patients received a documented BI during the initial hospitalization for AAP. The in-hospital BI as such did not prevent the development of RAP. Young patients with AUDIT points ≥20 are especially at high risk for developing RAP and should be included in a more intense follow-up care program to maximize prevention.

Short summary: During hospitalization for acute alcoholic pancreatitis (AAP), one third of the patients did not receive brief interventions (BIs). The in-hospital BI by itself was not sufficient enough to prevent disease recurrence in follow-up of 4 years. Young age and higher AUDIT-points were significant risk factors for recurrent attacks of AAP.

INTRODUCTION

Acute alcoholic pancreatitis (AAP) progresses to recurrent acute pancreatitis (RAP) in 33–48% of patients (Appelros and Borgström, 1999; Pelli *et al.*, 2000; Gullo *et al.*, 2002a, 2002b; Gislason *et al.*, 2004; Lund *et al.*, 2006; Lankisch *et al.*, 2009; Takeyama, 2009; Yadav *et al.*, 2012) and RAP predisposes to chronic pancreatitis (CP) and pancreatic dysfunction (Lankisch *et al.*, 2009; Nikkola *et al.*, 2017). Abstinence from alcohol after first AAP protects against RAP even in long-term follow-up, but is infrequently achieved (Nikkola *et al.*, 2013). There are numerous guidelines on the treatment of pancreatitis, but none include specific recommendations for treating the problem itself: heavy alcohol consumption and alcohol dependency. In Finland a randomized prospective study showed that repeated brief interventions at 6-month intervals reduced the recurrence of AAP by 50% in 2-year follow-up compared to a single intervention during hospitalization (Nordback *et al.*, 2009).

Treating patients with alcohol-related illnesses can be frustrating. Still, most (96%) patients who have recovered from AAP are willing to stop or moderate their drinking and about 40% of them succeed (Lappalainen-Lehto *et al.*, 2013).

Brief interventions (BIs) seem to reduce patients' alcohol consumption in both hospital and general practice settings (Kaner *et al.*, 2007; McQueen *et al.*, 2011).

Our aim was to study number of BIs AAP patients receive during their first hospitalization and during subsequent hospitalizations for RAP. We aimed to study if BIs reduce the development of RAP and how potential RAP patients could be identified early and guided to appropriate follow-up care.

MATERIALS AND METHODS

This study was conducted in southern Finland in Pirkanmaa Hospital District (over 520,000 inhabitants). All ICD-10 codes for acute pancreatitis (AP) (K85) from 2 years (October 25th 2010 to October 25th 2012) were obtained from hospital registry databases and etiologies of pancreatitis were assessed. Patients suffering their first attack of AAP during the study period and discharged from hospital were included in the study. Hospital records were analyzed to study the development of RAP and CP. We excluded from the study those patients who had been operated on in the course of their first AAP and also those transferred to other hospitals or facilities for treatment or aftercare (and hence unable to receive BIs in the study hospital). Most patients were treated in Tampere University Hospital, a tertiary referral center, but the hospital district also included two smaller area hospitals (Vammala and Valkeakoski hospitals).

Diagnosis of AP and RAP was confirmed when the patient had at least two of the three following features: (a) typical pain associated with AP, (b) serum lipase or amylase levels three times above the normal range and (c) typical imaging findings associated with AP in abdominal imaging (contrast enhanced computed tomography (CECT), magnetic resonance imaging (MRI) or transabdominal ultrasonography). Severity of AP was assessed using the updated Atlanta criteria (Banks *et al.*, 2013). Alcohol etiology was suspected and determined when a patient reported previous alcohol consumption (or alcohol consumption was otherwise evident) and other possible etiologies were excluded with imaging studies and laboratory tests. If exclusion of other etiologies was lacking and alcohol use was not verified, AP was categorized as 'not further specified'.

The number of documented BIs provided during hospitalization was analyzed from patient files. Provided BIs were recorded in electronic medical records. BIs were recommended to be provided according to hospital care pathway protocol following national and international guidelines and their previous versions (Connor *et al.*, 2015; Working group appointed by the Finnish Medical Society Duodecim and the Finnish Society of Addiction Medicine, 2015). They ideally consisted of short motivational talks (usually 5–20 min), including advice, feedback on personal risks, information and material on the harmful effects of drinking, information of alcohol support services and encouragement for the patients to set goals to reduce their alcohol consumption. Patients' own responsibility and autonomy to make decisions was emphasized. We ascertained whether BIs were provided by a doctor, nurse or social worker. Alcohol Use Disorders Identification Test (AUDIT) points (Saunders *et al.*, 1993) were also studied if they had been registered. Patients' discharge papers were analyzed for any means of recommendations for substance abuse, counseling or follow-up visits.

A study questionnaire was sent to patients with a valid Finnish mail address. Patients were asked about BIs during initial hospitalization, their goals regarding alcohol consumption after hospital discharge, information received on AAP during initial hospitalization, help received on reducing substance abuse, follow-up visits and use of substance abuse treatment services.

Statistical methods

In univariate analysis Fisher's exact test, χ^2 test, Student's *t*-test and binary logistic regression analysis were used for bivariate comparisons. McNemar's test was used to compare RAP patients' BIs during initial and first RAP hospitalization. A receiver operating characteristic (ROC) analysis was performed to calculate the area under the curve (AUC) for the AUDIT test to predict RAP. Sensitivity and specificity were determined using the Youden index. Kaplan–Meier methodology was used to calculate cumulative incidences and the log-rank test to calculate risk between groups. *P*-values < 0.05 were considered statistically significant. Statistical testing was performed using SPSS (version 21, IBM Corporation, Armonk, NY, USA).

Ethical aspects

This study was approved by the ethics committee of the University of Tampere (R13167). All patients approved participation by providing written informed consent.

RESULTS

First AAP during the study period was diagnosed in 92 patients. Of these, 18 were excluded (3 died during the initial hospitalization, 10 were transferred for treatment or aftercare to another hospital and 5 had surgical necrosectomy). Thus 74 patients who were treated for the whole time in the study hospitals and discharged from there were included in the final study population (Fig. 1). Of these patients 95% were male, and median age (range) at the initial hospitalization was 48 (20–70) years. More specific demographics of patients during initial hospitalization are described in Table 1.

Development of RAP and CP was studied in February 2016 (median (range) follow-up 4.2 (0.2–6.1 years)). RAP developed in 32% of patients (24/74). First RAP episode developed in a median (range) of 13.2 (2.0–52.3) months after the initial AAP and patients with RAP had a mean of 1.8 (±0.9, range: 1–4) recurrent attacks (50% had only one recurrence). CP was diagnosed in 9% (7/74) of the patients. All patients who developed CP had suffered at least one

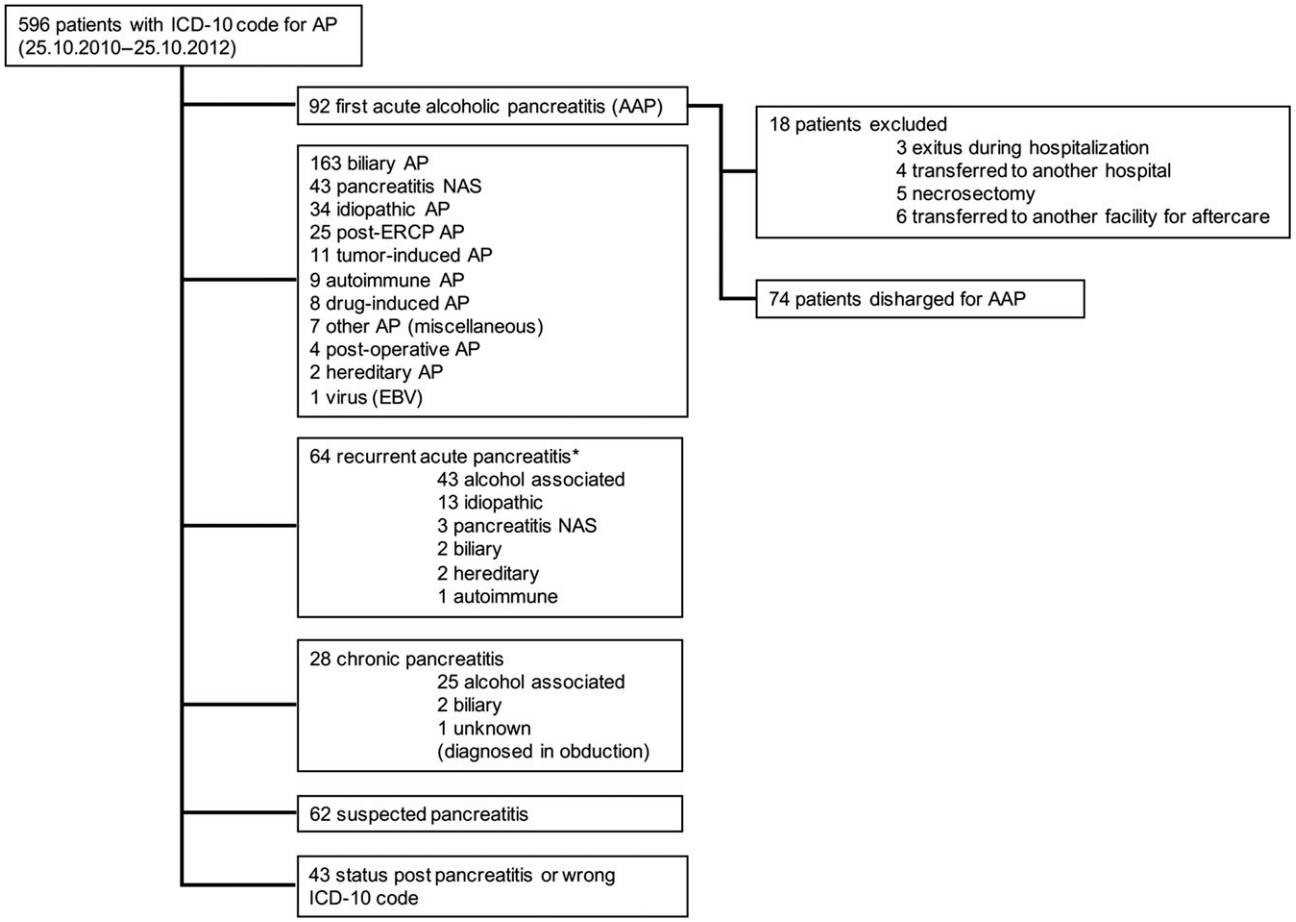

Fig. 1. Flowchart of patient selection. *First AP diagnosed prior to 25.10.2010. AP, acute pancreatitis; NAS, non-alliter specificatus (not further specified).

Table 1. Demographic characteristics of patients at the time of hospitalization for first AAP

All patients, $n = 74$	n	%
Male	70	94.6
Age at entry in years, median (range)	48	(20–70)
Smokers	36	48.6
AUDIT points, median (range)	19	(5–38)
Severity[a]		
Mild	48	64.9
Moderate	22	29.7
Severe	4	5.4
Hospital stay in days, median (range)	6	(2–49)
Needed ICU treatment	3	4.1
Needed surgery	0	

Data given in numbers (%) or median (range).
ICU, intensive care unit.
[a]According to the revised Atlanta criteria (Banks *et al.*, 2013).

previous RAP episode compared to non-RAP patients ($P < 0.001$). Nine patients died during follow-up (12%).

Brief interventions

During the initial hospitalization a BI against heavy alcohol consumption given by doctor, nurse or social worker was documented in 72% of patients' patient files, and 34% of patients received BIs from two or more health care professionals. AUDIT points were documented in 37% of patients' patient files and abstinence was recommended in 37% of patients' discharge papers. Two patients (3%) were referred to a psychiatrist during the initial hospitalization. The number of BIs given by different health care professionals is shown in Table 2.

There was no significant difference in BIs performed during the initial hospitalization for AAP in patients who did or did not later develop RAP (71 vs. 72%, $P = 0.92$, Table 2). Development of RAP in patients who received BIs during initial hospitalization compared to patients who did not receive BIs is presented in Fig. 2. BIs were provided by doctors slightly more often to those AAP patients who later developed RAP compared to non-RAP patients (42 vs. 28%, $P = 0.29$, Table 2). Patients who later developed RAP after first AAP were more often referred to local affiliations for substance abuse counseling (50 vs. 30%, $P = 0.094$, Table 2).

During the first RAP hospitalization fewer patients received multiple BIs than during the initial hospitalization of these patients (8 vs. 42%, $P = 0.039$, Table 3). There was also a trend for fewer documented BIs given by doctors during the first RAP hospitalization than during the initial hospitalization of these patients (17 vs. 42%, $P = 0.11$, Table 3).

Study questionnaire

The initial study questionnaire letter was sent in May 2015 to 64 patients and 11 patients responded. A second questionnaire sent

Table 2. Brief interventions during initial hospitalization of AAP for all patients and for the patients who did or did not develop RAP and comparison between non-RAP and RAP patients

	All patients, $n = 74$		non-RAP patients, $n = 50$		RAP patients, $n = 24$		*P*-value
	n	%	*n*	%	*n*	%	
AUDIT points registered	27	36.5	17	34.0	10	41.7	0.61
Brief intervention against substance abuse given by							
Doctor	24	32.4	14	28.0	10	41.7	0.29
Nurse	33	44.6	23	46.0	10	41.7	0.81
Social worker	24	32.4	15	30.0	9	37.5	0.60
Any	53	71.6	36	72.0	17	70.8	0.92
Multiple[a]	25	33.8	15	30.0	10	41.7	0.43
Abstinence mentioned in discharge papers	27	36.5	18	36.0	9	37.5	0.90
Counseling for substance abuse recommended	27	36.5	15	30.0	12	50.0	0.094
Social worker recommended but patient refused	7	9.5	4	8.0	3	12.5	0.68

[a]Brief interventions from two or three different groups (doctor, nurse, social worker).

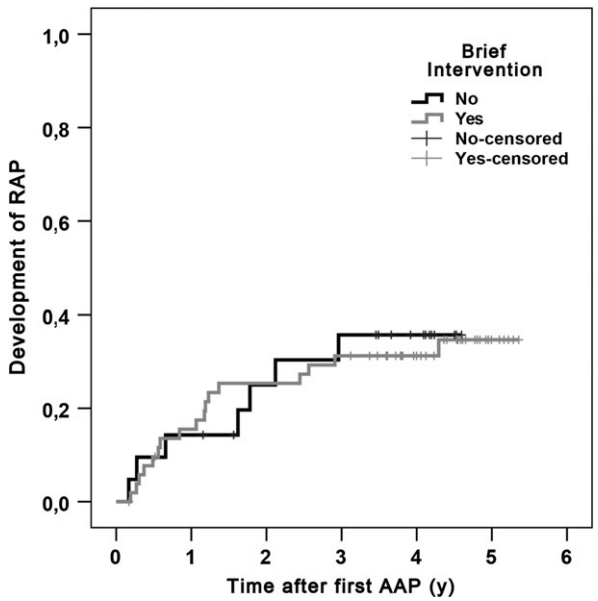

Fig. 2. Development of RAP in patients who did or did not receive BI during first hospitalization of AAP (log-rank: $P = 0.88$).

September 2015 to the 53 non-respondents yielded six more responses, and hence a total response rate of 27% (17 out of 64 patients). Among the responders 35% (6/17) developed RAP.

Overall, 16 out of the 17 respondents had received BIs (12 from doctors, 12 from nurses and 1 from social workers) during the initial hospitalization and 12 patients felt they had received enough information on pancreatitis during their initial hospitalization. Half of the patients (9/17) reported having a goal for abstinence after initial AAP and the rest were aiming at drinking in moderation. Eleven reported that they had succeeded in their goal and four reported they had partly succeeded. Nine patients felt they had received enough help in reducing alcohol consumption while the rest did not. Six patients had used substance abuse services, and five of them had benefited from these. The AUDIT test was completed by 16 out of 17 responders and the median (range) AUDIT points were 15 (0–36). Patient-reported BIs or goals for reduction of alcohol consumption were not statistically associated with lower risk for RAP.

Predictors for RAP

Higher AUDIT points ($P = 0.044$; OR = 5.6 95% CI = 1.02–30.9 for ≥20 AUDIT points) and younger age (OR = 0.96, 95% CI = 0.92–1.00) were significantly associated with the development of RAP (Table 4). ROC curve for AUDIT test to predict RAP had an AUC of 0.73. Sensitivity and specificity were 70.0 and 70.6%, respectively, at a cut-off level of 20 points (Fig. 3).

Pseudocyst diagnosed after initial AAP was associated with RAP but was not a statistically significant risk factor (25 vs. 8%, $P = 0.056$). Smoking, duration of initial hospitalization and severity of the initial AAP were not predictors for RAP or CP (Table 4).

DISCUSSION

BIs are reported to be effective in reducing alcohol consumption. We aimed to study the number of BIs given to AAP patients during hospitalization and if BIs prevent the development of RAP. During initial hospitalization for AAP, 72% of patients received a documented BI and only 37% of the patients' discharge papers included recommendations to reduce alcohol consumption. RAP developed in 32% of patients during follow-up and in-hospital BIs were not found to suffice in reducing disease recurrence.

The development of RAP in AAP patients can be reduced with repeated BIs (Nordback *et al.*, 2009). In two Cochrane meta-analyses, BIs have been demonstrated to be helpful in reducing alcohol consumption in heavy alcohol users, at least for a year (Kaner *et al.*, 2007; McQueen *et al.*, 2011) and BIs for trauma patients in the emergency department is cost-effective and reduces recurrent admissions (Gentilello *et al.*, 2005). According to a large meta-analysis, the results on the efficacy of BIs given in emergency departments, have yielded varying results but are generally favorable (Schmidt *et al.*, 2016). Extended length of BI does not seem to significantly improve the outcome (Kaner *et al.*, 2007). Multidisciplinary management can reduce alcohol addiction and the need for pain medication CP (Lang *et al.*, 2012).

In the present study our results concur with those of Beagon *et al.* (2015), who studied BIs provided by hospitals' social workers and found that these were not sufficient to prevent RAP in follow-up. These findings also concur with those of a recent systematic review and meta-analysis where BIs of more than one session compared to a single intervention might be needed to reduce patients' alcohol consumption (Mdege *et al.*, 2013).

Table 3. Actions taken concerning treatment of alcohol problem during initial hospitalization of AAP and during hospitalization for first RAP episode

	Initial hospitalization (only RAP patients), $n = 24$		First RAP hospitalization, $n = 24$		*P*-value
	n	%	*n*	%	
AUDIT points registered	10	41.7	7	29.2	0.61
Brief intervention against substance abuse given by					
Doctor	10	41.7	4	16.7	0.11
Nurse	10	41.7	9	37.5	1.0
Social worker	9	37.5	6	25.0	0.51
Any	17	70.8	17	70.8	1.0
Multiple[a]	10	41.7	2	8.3	0.039
Abstinence mentioned in discharge papers	9	37.5	11	45.8	0.73
Counseling for substance abuse recommended	12	50.0	8	33.3	0.29
Social worker recommended but patient refused	3	12.5	6	25.0	0.51

[a]Brief interventions from two or three different groups (doctor, nurse, social worker).

Table 4. Risk factors for RAP after first AAP

	RAP, $n = 24$	non-RAP, $n = 50$	OR	95% CI	*P*-value
Severity of initial AAP					
Mild (%)	16 (66.7)	32 (64.0)	Ref		
Non-mild (%)	8 (33.3)	18 (36.0)	1.13	0.40–3.14	0.82
Smoking (%)	13 (54.2)	23 (46.0)	1.39	0.52–3.68	0.51
Pseudocyst (%)	6 (25.0)	4 (8.0)	3.8	0.97–15.2	0.056
Duration of hospitalization, days, mean (SD)	8.5 (9.3)	7.5 (4.6)	1.02	0.95 – 1.10	0.53
AUDIT points ≥20 (%)	7 (70.0)	5 (29.4)	5.6	1.02–30.9	0.048
Age, years, mean (SD)	41.4 (10.6)	47.6 (12.6)	0.96	0.92–1.00	0.045

CI, confidence interval; non-mild, moderately severe and severe acute alcoholic pancreatitis combined; OR, odds ratio.

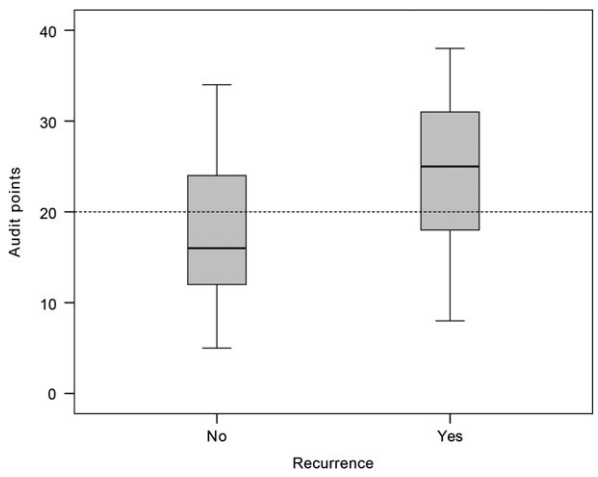

Fig. 3. Box-plot diagram of distribution of patients' AUDIT points in patients with no recurrent attacks of alcoholic pancreatitis ($n = 17$) vs. patients with recurrent attacks ($n = 10$). Higher AUDIT points are associated with recurrence ($P = 0.044$). At a cut-off level of 20 points sensitivity and specificity were 70.0 and 70.6%, respectively (AUC = 0.73).

Attitudes and number of BIs provided for AAP patients may not greatly differ between facilities, nations, or worldwide. Beagon *et al.* (2015) found that only 56% of AAP patients were referred to social workers for BI and 31% received documented BI, while hospital policy was to refer all AAP patients to social workers. In a study by Bertilsson *et al.* (2015), only 20% of patients with AAP were offered counseling for heavy alcohol consumption during their initial hospitalization. Hospital personnel treating AAP patients may have different policies for intervening in patients' alcohol consumption. Some probably think that a serious illness alone suffices to scare the patient and stop drinking, and that it is not wise to admonish the patient too much. Some probably perceive that the somatic treatment involves such challenges that it is not the doctor's responsibility to address the alcohol problem. And of course there is a time constraint on medical specialists treating AAP patients as regards offering BIs.

During hospitalization for first RAP significantly fewer patients received multiple BIs compared to these patients' hospitalization for first AAP (42 vs. 8%, $P = 0.039$). This probably reflects hospital personnel's frustration regarding patients with continuous alcohol consumption even though they have suffered a serious illness. After continuous drinking problems causing hospital visits, these patients may become stigmatized as alcoholics and deemed 'lost causes'. Even though this may in part be true, there is a need to change this attitude and focus on setting up appropriate care pathways for these patients.

Previously young age, continuous alcohol dependency (Pelli *et al.*, 2000, 2008), pseudocysts (Pelli *et al.*, 2009) and smoking (Bertilsson *et al.*, 2015; Ahmed Ali *et al.*, 2016) have been associated with the development of RAP. Genetic predisposition probably also plays a role in progression (Whitcomb *et al.*, 2012). In our study young age was a significant risk factor for progression to RAP and higher AUDIT points were also associated with RAP. Pseudocysts

were associated with developing RAP, probably by pressure-related effects on pancreas, but in this study was not found to be a statistically significant risk factor. We found that a cut-off level of 20 points on the AUDIT test had 70% specificity and 71% sensitivity for predicting RAP, thus favoring the use of AUDIT points in individualized discharge planning.

This work was a retrospective descriptive follow-up study, which entails some limitations. BIs may be provided more frequently for patients with obvious drinking problems and alcohol dependency, and thus probably at higher risk for RAP. Also, since the number of BIs in the whole study population was studied from patient records (except for the study questionnaire), BIs by doctors (for only 32% of patients during the initial hospitalization) are probably underestimated. Nurses record most of their interaction with patients in the electronic medical records, likewise all important points doctors have discussed with them and patients during the ward rounds. The study questionnaires showed that 71% of the patients in this subgroup had received BIs from a doctor during the initial hospitalization. On the other hand, since abstinence was mentioned in only 37% of discharge papers, it seems that intervening in alcohol problems in AAP patients may often be neglected. Since this is a retrospective study the quality of BIs cannot be addressed. BI in this study mainly meant motivational talks focusing on behavioral modification. In our hospital district health care professionals treating AAP patients are not routinely trained to perform BIs (except for social workers) and the quality of BIs may thus be inconsistent.

The strength of this retrospective study is that the etiology of pancreatitis was well documented and evaluated from hospital patient files to obtain reliable results instead of relying solely on ICD-10 coding. We also chose to include only patients suffering their first attack. We had comprehensive follow-up data in the patients' medical records, thus the development of RAP and CP could be reliably assessed.

Prevention of RAP serves to decrease severe morbidity and reduce health care costs. Future studies should also investigate if AAP patients benefit from drug therapy along with counseling in the treatment of alcohol problems. Genetic testing will also afford new insights in future as to which patients are at the greatest risk of developing RAP.

Treating patients with substance abuse problems can be challenging and frustrating, and patients may exhibit poor compliance with treatment, although patients hospitalized due to alcohol-associated diseases are usually motivated to reduce drinking (Lau *et al.*, 2010). Many AAP patients continue to consume alcohol and progression to RAP is common. Nevertheless, a serious illness like AAP can serve as a leverage to recognize harmful alcohol consumption and change direction in these patients, as previously studied (Lappalainen-Lehto *et al.*, 2013). In order to prevent development of RAP, more attention should be paid to organizing efficacious post-discharge follow-up treatment for alcohol problems in patients with AAP. We developed a care pathway protocol for AAP patients in our hospital district in 2010. This includes BIs, AUDIT test, in-hospital social worker visits and follow-up visits together with laboratory tests in primary health care (3, 6, 12 months and annually thereafter). In this study we discovered that this was not sufficiently utilized, and none of the patients were recommended for primary health care physician visits.

Guidelines for the treatment of AAP should include recommendation for AUDIT test in all patients and emphasize the importance of abstinence and repeated BIs, especially in patients with scores indicating to heavy alcohol consumption and in young patients. Patients' discharge papers should always include recommendations for abstinence and ways to seek substance abuse treatment or visit a primary care physician. Follow-up visits to primary health care after discharge would probably yield good results and cost-effectiveness as described before (O'Donnell *et al.*, 2014). If possible, appointments should be prearranged. General practitioners should be made aware of the importance of BIs in AAP patients. Since smoking is a risk factor for RAP and CP (Yadav *et al.*, 2009, 2012; Sadr-Azodi *et al.*, 2012), cessation of smoking should also be encouraged.

In conclusion, only 72% of the patients received a documented BI during the initial hospitalization of AAP. The in-hospital BI as such did not prevent the development of RAP. Young patients especially, with AUDIT points of 20 or over, are at high risk for developing RAP and should be included in a more intense follow-up treatment program with repeated BIs, which has earlier been shown to protect against RAP (Nordback *et al.*, 2009).

AUTHORS' CONTRIBUTION

J.N, J.L. and J.S.: study design, data collection and analysis, writing and revising the article, H.H.: data analysis and revising the article. All authors approved the final version of the article.

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CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

Ahmed Ali U, Issa Y, Hagenaars JC, *et al.* (2016) Risk of recurrent pancreatitis and progression to chronic pancreatitis after a first episode of acute pancreatitis. *Clin Gastroenterol Hepatol* **14**:738–46.

Appelros S, Borgström A. (1999) Incidence, aetiology and mortality rate of acute pancreatitis over 10 years in a defined urban population in Sweden. *Br J Surg* **86**:465–70.

Banks PA, Bollen TL, Dervenis C, *et al.* (2013) Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus. *Gut* **62**:102–11.

Beagon C, Bhatt NR, Donnelly SM, *et al.* (2015) The impact of social work intervention in alcohol-induced pancreatitis in Ireland: a single-center experience. *Alcohol Alcohol* **50**:438–43.

Bertilsson S, Swärd P, Kalaitzakis E. (2015) Factors that affect disease progression after first attack of acute pancreatitis. *Clin Gastroenterol Hepatol* **13**:1662–9.

Connor JP, Haber PS, Hall WD. (2015) Alcohol use disorders. *Lancet* **24**: 149–54.

Gentilello LM, Ebel BE, Wickizer TM, *et al.* (2005) Alcohol interventions for trauma patients treated in emergency departments and hospitals. *Ann Surg* **241**:541–50.

Gislason H, Horn A, Hoem D, *et al.* (2004) Acute pancreatitis in Bergen, Norway: a study on incidence, etiology and severity. *Scand J Gastroenterol* **93**:29–33.

Gullo L, Migliori M, Oláh A, *et al.* (2002a) Acute pancreatitis in five European countries: etiology and mortality. *Pancreas* **24**:223–7.

Gullo L, Migliori M, Pezzilli R, *et al.* (2002b) An update on recurrent acute pancreatitis: data from five European countries. *Am J Gastroenterol* **97**: 1959–62.

Kaner EFS, Beyer F, Dickinson HO, *et al.* (2007) Effectiveness of brief alcohol interventions in primary care populations. *Cochrane Database Syst Rev*: CD004148.

Lang MB, Segersvard R, Grundsten M, *et al.* (2012) Management of alcohol use disorders in patients with chronic pancreatitis. *JOP* **13**:654–59.

Lankisch PG, Breuer N, Bruns A, *et al.* (2009) Natural history of acute pancreatitis: a long-term population-based study. *Am J Gastroenterol* **104**: 2797–805.

Lappalainen-Lehto R, Koistinen N, Aalto M, *et al.* (2013) Goal-related outcome after acute alcohol-pancreatitis—a two-year follow-up study. *Addict Behav* **38**:2805–9.

Lau K, Freyer-Adam J, Gaertner B, *et al.* (2010) Motivation to change risky drinking and motivation to seek help for alcohol risk drinking among general hospital inpatients with problem drinking and alcohol-related diseases. *Gen Hosp Psychiatry* **32**:86–93.

Lund H, Tønnesen H, Tønnesen MH, *et al.* (2006) Long-term recurrence and death rates after acute pancreatitis. *Scand J Gastroenterol* **41**:234–8.

McQueen J, Howe TE, Allan L, *et al.* (2011) Brief interventions for heavy alcohol users admitted to general hospital wards. *Cochrane Database Syst Rev*: CD005191.

Mdege ND, Fayter D, Watson JM, *et al.* (2013) Interventions for reducing alcohol consumption among general hospital inpatient heavy alcohol users: a systematic review. *Drug Alcohol Depend* **131**:1–22.

Nikkola J, Laukkarinen J, Lahtela J, *et al.* (2017) The long-term prospective follow-up of pancreatic function after the first episode of acute alcoholic pancreatitis: recurrence predisposes one to pancreatic dysfunction and pancreatogenic diabetes. *J Clin Gastroenterol* **51**:183–90.

Nikkola J, Raty S, Laukkarinen J, *et al.* (2013) Abstinence after first acute alcohol-associated pancreatitis protects against recurrent pancreatitis and minimizes the risk of pancreatic dysfunction. *Alcohol Alcohol* **48**: 483–6.

Nordback I, Pelli H, Lappalainen–Lehto R, *et al.* (2009) The recurrence of acute alcohol-associated pancreatitis can be reduced: a randomized controlled trial. *Gastroenterology* **136**:848–55.

O'Donnell A, Anderson P, Newbury-Birch D, *et al.* (2014) The impact of brief alcohol interventions in primary healthcare: a systematic review of reviews. *Alcohol Alcohol* **49**:66–78.

Pelli H, Lappalainen-Lehto R, Piironen A, *et al.* (2009) Pancreatic damage after the first episode of acute alcoholic pancreatitis and its association with the later recurrence rate. *Pancreatology* **9**:245–51.

Pelli H, Lappalainen-Lehto R, Piironen A, *et al.* (2008) Risk factors for recurrent acute alcohol-associated pancreatitis: a prospective analysis. *Scand J Gastroenterol* **43**:614–21.

Pelli H, Sand J, Laippala P, *et al.* (2000) Long-term follow-up after the first episode of acute alcoholic pancreatitis: time course and risk factors for recurrence. *Scand J Gastroenterol* **35**:552–5.

Sadr-Azodi O, Andren-Sandberg Å, Orsini N, *et al.* (2012) Cigarette smoking, smoking cessation and acute pancreatitis: a prospective population-based study. *Gut* **61**:262–7.

Saunders JB, Aasland OG, Babor TF, *et al.* (1993) Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption —II. *Addiction* **88**:791–804.

Schmidt CS, Schulte B, Seo H-N, *et al.* (2016) Meta-analysis on the effectiveness of alcohol screening with brief interventions for patients in emergency care settings. *Addiction* **111**:783–94.

Takeyama Y. (2009) Long-term prognosis of acute pancreatitis in Japan. *Clin Gastroenterol Hepatol* **7**:1–7.

Whitcomb DC, LaRusch J, Krasinskas AM, *et al.* (2012) Common genetic variants in the CLDN2 and PRSS1-PRSS2 loci alter risk for alcohol-related and sporadic pancreatitis. *Nat Genet* **44**:1349–54.

Working group appointed by the Finnish Medical Society Duodecim and the Finnish Society of Addiction Medicine. (2015) *Treatment of Alcohol Abuse—Current Care Guideline [online]*. English abstract available at http://www.kaypahoito.fi/web/english/guidelineabstracts/guideline?id=ccs00005 (8 March 2017, date last accessed).

Yadav D, Hawes RH, Brand RE, *et al.* (2009) Alcohol consumption, cigarette smoking, and the risk of recurrent acute and chronic pancreatitis. *Arch Intern Med* **169**:1035–45.

Yadav D, O'Connell M, Papachristou GI. (2012) Natural history following the first attack of acute pancreatitis. *Am J Gastroenterol* **107**:1096–103.