



No change in the use of alcohol among hip fracture patients over a 12-year period : a prospective study in south-eastern Finland

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Excess alcohol use is a risk factor for hip fractures. The objectives of this study were to analyse serum ethanol levels among hip fracture patients and to compare the results with a similar study conducted 12 years ago in the same two hospitals covering the same geographic area.

A prospective cohort comprising 245 Caucasian hip fracture patients was enrolled in the emergency rooms of two acute hospitals in south-eastern Finland over a 12-month period in 2015-2016. The serum ethanol concentrations (≥ 0.101 g/L) were compared with the corresponding concentrations of a similar cohort analysed in the same two hospitals 12 years previously. Liver enzymes and mean corpuscular volume (MCV) were measured. The patients were asked about their use of alcohol during the 24 h period prior to the fracture.

Of the 245 patients, 70% were women with a mean age of 81 years, whereas the mean age of the men was 78 years. In the total data, 5% of patients had a positive ethanol level. At the time of admission, 10% of the patients reported having used alcohol within the previous 24 h. Both results were in line with the results obtained 12 years ago. For all the tested enzymes except alanine aminotransferase (ALT), differences were recorded between the mean values in alcohol-positive and -negative females and males.

Only 5% of the hip fracture patients had positive serum ethanol concentration on the day of admission to the emergency department. This result was similar to that obtained 12 years earlier.

Keywords : Cohort ; hip fracture ; prospective study ; alcohol use ; ethanol concentration.

INTRODUCTION

Hip fracture is the most severe and economically the most important complication of osteoporosis in elderly people. The direct costs alone from fall-related injuries account for up to 1.5% of care costs in European countries (1).

Hip fracture patients are old (mean age about 80 years), and often burdened with comorbidity.

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They also tend to have a poor nutritional status. Furthermore, these patients are mostly treated with multiple medications, which all increase the risk of falling. Use of alcohol concomitantly with psychoactive medication increases the fall risk even more than psychoactive medication alone, and alcohol has a stronger role (2). Concomitant use of sedative-hypnotic drugs and alcohol among the elderly (60-79 years) during 2012-2015 was reported in Norway by 6 % of respondents (3).

Alcohol consumption and the risk of hip fractures were evaluated in a large meta-analysis that included 3,730,424 study participants and 26,168 hip fracture cases (4). Studies included subjects from the USA, France, Sweden, the Netherlands, Australia, Canada, Denmark, and Japan. Light alcohol consumption (0.01-12.5 g/d) was associated with a lower hip fracture risk, whereas heavy alcohol consumption (≥ 50 g/d) was associated with a higher risk (4). Previous studies have shown a J-shaped or U-shaped relationship between alcohol consumption and the risk of hip fracture (5,6).

As stated in FRAX® (Fracture Risk Assessment Tool), more than two standard units of alcohol daily (one standard unit = 8 g) have been found to produce a significant increase in the risk of hip and other osteoporotic fractures (7).

A recent study from Norway showed that the risk of hip fracture was higher in younger men (30-59 years) drinking at least 14 doses (one dose = 12 g pure alcohol) per week compared to those drinking 1-6 doses per week. A different result was seen in women: the risk of hip fracture in those drinking never/seldom was significantly higher than in women drinking moderately (once a month to 2-3 times per week). In older women (≥ 60 years), the relative risk of hip fracture was higher in the group with no alcohol consumption than in those drinking 1-6 doses per week. Frequently drinking men 60 years and older did not have a higher hip fracture risk than those drinking moderately (8).

In 2003 and 2004, we studied the serum ethanol status in 223 patients with an acute low-energy hip fracture in two hospitals in south-eastern Finland. In that study, 17% of the patients with an acute hip fracture had alcohol in their serum (9). In the present study, our aim was to measure the serum ethanol

levels among low-energy hip fracture patients in the same two hospitals with prospective data collected for one year, and to compare the results with those obtained in the previous study 12 years earlier (9).

MATERIAL AND METHODS

We prospectively registered consecutive patients with a fresh low-energy hip fracture (from a fall at ground level or from a height of less than 1 m) at Päijät-Häme Central Hospital (A), located in the city of Lahti, and at North Kymi Hospital (B), located in the city of Kouvola, in south-eastern Finland (61°N). The fractures were coded for femoral neck fractures (S72.0), trochanteric fractures (S72.1), and subtrochanteric fractures (S72.2). Pathological fractures and high-energy fractures (motor vehicle accidents, falls from greater heights, blunt trauma) were excluded.

The study period in both hospitals was 15 October 2015 to 14 October 2016 (12 months). Hospital A is responsible for an area with 210,000 inhabitants and hospital B for an area with 86,000 inhabitants. The study was approved by the Ethics Committee of Surgery at the Hospital District of Helsinki and Uusimaa in Finland. Written informed consent was obtained from all patients.

The present study is part of a more comprehensive study focusing not only on blood alcohol levels but also on serum vitamin D concentrations (10) and the use of benzodiazepines among hip fracture patients in the emergency room (ER).

Most of the basic data gathering was performed by dedicated nurses trained for this work. They supplemented the questionnaire with data regarding the patients' background: age, gender, date and time of injury, date of admission, height; weight, body mass index (BMI, kg/m²), place of residence, use of medication, and previous fractures.

Place of residence was divided into the categories (i) patient's actual/private home; (ii) residential service home for the elderly or any unit of residence provided by social care; (iii) service home with 24 h staff assistance; and (iv) hospital or other institution. Previous fragility fractures were classified as fracture of the proximal humerus, elbow, wrist, rib, vertebra, pelvis, hip, femur, knee,

tibia, and ankle, or multiple fractures, suffered at the age of 50 or older.

The types of fractures were recorded by two authors of this study (RT, PL). The ASA score (American Society of Anaesthesiologists score) (11) was routinely determined before the hip operation by anesthesiologists in both hospitals. Previous fragility fractures were checked by the two orthopaedic surgeons (P.L. and R.T.) based on the X-rays of the patients.

The patient was asked about his/her use of alcohol during the 24 hours pre-fracture, and the use of calcium and vitamin D supplements. The latter was also checked in the patient's medical records.

Serum samples were collected after arrival at the ER in both hospitals. Serum samples were centrifuged at 2000 g for 10 minutes and frozen as soon as possible. The frozen samples were transferred from hospital B to hospital A, where all the samples were stored at -70°C until analysed in batches.

Ethanol was measured using Ethanol Gen.2 assay (Roche Diagnostics GmbH, Mannheim, Germany). This photometric assay uses an enzymatic method with alcohol dehydrogenase. The measurement range of the test is 0.101-4.98 g/L. All results above the limit of detection (LoD), 0.101 g/L, were considered positive for ethanol. Repeatability of the test is 0.7% (measured using a serum sample with an ethanol concentration of 0.825 g/L) and its intermediate precision is 2.0% (measured using a serum sample with an ethanol concentration of 1.24 g/L).

In our previous study (9), the ethanol concentrations in serum samples were also measured using an enzymatic method with alcohol dehydrogenase (COBAS INTEGRA® Ethanol, Roche Diagnostics GmbH, Mannheim, Germany). The samples were classified based on the raw analysis data from the analyser. Therefore, the ethanol serum levels were classified as negative only if the result was 0.00 g/L. In the previous study ethanol serum levels were classified as 0, <0.49, 0.5–1.0, and >1.0 mg/l. The results of the current assay were classified based on the reported detection limit of the assay (0.101 g/L), similar to the practice with patient samples in a clinical setting.

In order to be able to compare the previous results with the current study, the ethanol results of the previous study population were re-classified. The classification <0.101, 0.101-0.49, 0.5-1.0, and >1.0 g/L was therefore used for both populations in the comparison.

Blood tests for the liver were performed in order to indicate acute disease. Serum GGT (Gamma Glutamyl Transferase) was measured using Gamma Glutamyl Transferase test. The reference ranges for males and females aged 18 years and over are <60 U/L and <40 U/L, respectively. Serum ALT (Alanine Aminotransferase) was measured using Alanine Aminotransferase according to IFCC with pyridoxal phosphate activation assay (Roche Diagnostics GmbH, Mannheim, Germany). The reference ranges for males and females >18 years are <50 U/L and <35 U/L, respectively. Serum ALP (Alkaline Phosphatase) was measured using Alkaline Phosphatase according to IFCC Gen.2 assay (Roche Diagnostics GmbH, Mannheim, Germany). The reference ranges for adults (>18 years) are 35–105 U/L.

The MCV (Mean Corpuscular Volume) of red blood cells was measured from EDTA blood samples using a Sysmex XE-5000 analyser in hospital A or a Sysmex XN series in hospital B. The reference value is < 98.

In addition, the patients' mean 25-hydroxyvitamin D [S-25(OH) D] concentrations were measured using a laboratory method described in an earlier study (10).

Differences between any two groups were tested with the chi-squared test and Wilcoxon rank test. Fisher's exact test was used when appropriate. For differences in the mean values between more than two groups, two-way analysis of variance (ANOVA) was applied. P-values <0.05 were considered statistically significant.

RESULTS

The baseline characteristics of the patients in the two hospitals are shown in Table 1. A total of 245 patients (70% women) with an acute hip fracture were enrolled in the study during the study period: 156/245 (64%) patients in hospital A and

Table 1. — Basic data on the 245 Caucasian hip fracture patients according to hospital

	Hospital A n (%)	Hospital B n (%)	Total n (%)	Statistic
Sex				
Women	106 (68)	65 (73)	171 (70)	
Men	50 (32)	24 (27)	74 (30)	
Total	156 (100)	89 (100)	245 (100)	n.s.
Age distribution, years	n (%)	n (%)	n (%)	
49-59	7 (5)	3 (3)	10 (4)	
60-69	22 (14)	12 (14)	34 (14)	
70-79	38 (24)	20 (23)	58 (24)	
80-89	61 (39)	38 (42)	99 (40)	
90-99	28 (18)	16 (18)	44 (18)	n.s.
Mean age, years (SD)				
Women	80.9 (9.7)	82.0 (9.2)	81.3 (9.5)	
Men	77.3 (11.9)	79.3 (11.8)	78.0 (11.9)	n.s.
Mean BMI, kg/m² (SD)*				
Women	23.8 (4.3)	24.4 (2.7)	24.0 (3.8)	
Men	24.8 (4.6)	23.3 (4.6)	24.4 (4.6)	n.s.
Place of residence	n (%)	n (%)	n (%)	
Actual /privat home	120 (77)	57 (64)	177 (72)	
Residential home	15 (10)	10 (11)	25 (10)	
Service home with 24h assistance	16 (10)	21 (24)	37 (15)	
Hospital or another institution	5 (3)	1 (1)	6 (3)	n.s.
ASA-class	n (%)	n (%)	n (%)	
ASA 1	4 (3)	0	4 (2)	
ASA 2	21 (13)	8 (9)	29 (12)	
ASA 3	96 (62)	50 (56)	146 (59)	
ASA 4	35 (22)	31 (35)	66 (27)	W _x = 2.095, p<0.05
Previous fractures				
1 fracture	41 (26)	27 (30)	68 (28)	
Several fractures	11 (7)	12 (14)	23 (9)	
Unknown	7 (5)	0	7 (3)	n.s.
Type of fracture (ICD-10)	n (%)	n (%)	n (%)	
Femoral neck (S72.0)	96 (61)	47 (53)	143 (59)	
Trochanteric (S72.1)	51 (33)	33 (37)	84 (34)	
Subtrochanteric (S72.2)	9 (6)	9 (10)	18 (7)	n.s.

*BMI was available in 216 patients : 131 in hospital A and 85 in hospital B.

89/245 (36%) patients in hospital B. The flow chart depicting patients is shown in Figure 1. No differences were found in the mean age of women and men between the hospitals. The mean age of women was 81 (SD 9.5) years and of men 78.0 (SD 11.9) years. In general, women were older than men (F-test 5.37, d.f.1;240, p<0.01) (Table 1).

The mean BMI values were similar in women and men : 24.2 kg/m² (SD 4.4) and 24.0 kg/m² (SD 3.5). 37% of the patients (91/245) had sustained a total

of 119 previous fractures, mainly hip (29%), wrist (24%) or vertebra (11%) fractures. Nine per cent of the patients (23/245) had previously sustained several fractures (range : 2-4 fractures), mostly wrist, hip or proximal humerus fractures.

10.2% (25/245) of the patients reported having used alcohol within 24 h before the fracture, and there was a slight majority of men over women ($\chi^2=6.94$, d.f.=2, p<0.05). Most of the patients who reported having used alcohol within 24 h pre-

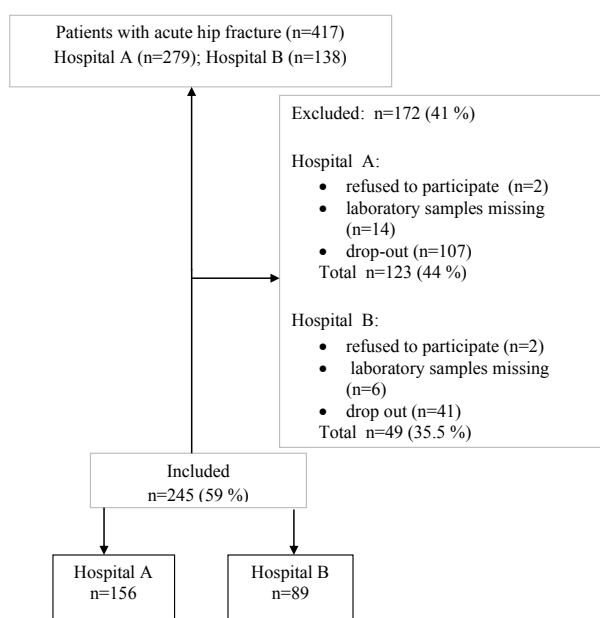


Figure 1. — Flow chart depicting patient collection.

fracture were treated in hospital A (19/25, 76%) (Table 2).

The distribution of serum ethanol concentrations according to hospital is shown in Table 2. In the total data, 13/244 patients (5.3%) had a positive ethanol level : 9 patients in hospital A (5.8%) and 4 patients in hospital B (4.5%) (n.s.) (Table 2).

The mean alcohol concentration of all patients with a positive serum ethanol level was 1.06 g/L and it was higher in men than in women (F-test 6.34, d.f.=1;239, $p<0.01$). Patients with a positive serum ethanol concentration were younger than those who were sober : mean age 68.9 years (SD 8.8) vs. 80.9 years (SD 10.1), respectively (F-test 17.71, d.f. =1; 239, $p<0.001$). Female users were younger than male users : mean age 67.4 years (SD 5.5) vs.71.4 years (SD 13.0), respectively (F-test 5.45, d.f. =1; 239 $p<0.01$).

Table 2. — Reported pre-fracture use of alcohol and alcohol found in serum among men and women according to hospital in the present data (n=245), and reported pre-fracture use of alcohol and serum ethanol level in the present data and in the previous data (n=223)

Pre-fracture use of alcohol in present data	Hospital A	Hospital B	Total n=245	Statistic
Reported	n (%)	n (%)	n (%)	
Women	10/106 (9.4)	2/65 (3.1)	12/171 (7)	
Men	9/50 (18)	4/ 24 (16.6)	13/74 (17.6)	
Total	19/156 (12.2)	6/89 (6.7)	25/245 (10.2)	Fisher's exact= 0.36, n.s.
Alcohol found in serum ^a	n (%)	n (%)	n (%)	
Women	5/106 (4.7)	0/64 (0) ^a	5/170 (2.9)	
Men	4/50 (8)	4/24 (16.6)	8/74 (10.8)	
Total	9/156 (5.8)	4/88 (4.5)	13/244 (5.3)	Fisher's exact=0.10, n.s.
	Present data 2015-2016 (n=245)	Previous data 2003-2004 (n=223)		
Reported	n (%)	n (%)		
Yes	25 (10.2)	25 (11.2)		
No	185 (75.5)	189 (84.8)		
Unknown	35 (14.3)	9 (4.0)		
Total	245 (100)	223 (100)		Wilcoxon=1.51, n.s.
	Present data 2015-2016 (n=244)^a	Previous data 2003-2004 (n=222)^{a,b}		
Serum ethanol level (g/L)	n (%)	n (%)		
0	231 (94.7)	210 (94.6)		
0.10-0.49	2 (0.8)	3 (1.4)		
0.50-1.00	5 (2.0)	4 (1.8)		
>1.00	6 (2.5)	5 (2.2)		
Total	244 (100)	222 (100)		Wilcoxon= 0.01, n.s.

^a one sample missing in hospital B. ^bserum ethanol levels are re-analyzed in accordance with the present classification.

Table 3. — Mean values of liver enzymes and mean cellular volume among patients with negative (A-) and positive (A+) serum ethanol by sex (n=244^a)

Liver enzyme	Females A- (n=162)	Females A+ (n=8)	Males A- (n=69)	Males A+ (n=5)	F-test d.f.=1;239
GGT	32.8 (SD 43.3)	114.8 8 (138.8)	38.6 (54.1)	78.8 (65.2)	19.87, p<0.001
ALT	19.9 (8.6)	22.2 (11.3)	20.5 (9.9)	25.6 (11.5)	n.s.
ALP	75.2 (29.7)	117.6 (109)	76.1 (30.8)	80.4 (34.2)	7.74, p<0.001
MCV	91.4 (6.1)	95.6 (6.1)	92.5 (6.3)	98.8 (9.1)	8.30, p<0.001

GGT : serum Gamma Glutamyl Transferase ; ALT : serum Alanine Aminotransferase ; ALP : serum Alkaline Phosphatase ; MCV : mean cellular volume. ^aone sample missing in hospital B.

No differences were found in the reported pre-fracture use of alcohol and in the distributions of the ethanol serum levels between the present study and the previous study (Table 2).

In the present study the median delay between occurrence of the hip fracture and serum sample collection was in alcohol-positive patients 7.51 hours (range : 81 minutes to 19.25 hours).

Elevated serum GGT (>60 U/L) was found in 29 (11.9%) patients and elevated serum ALP (>105 U/L) in 31 (12.7%) patients. There were two elevated serum ALT enzymes in males (>50 U/L), but none in females (>35 U/L). Increased MCV (>97) of red blood cells was found in 39 patients (15.9%).

Furthermore, serum GGT enzymes were significantly higher in both females and males who had positive serum ethanol concentration than in those with a negative concentration. Similar results were found regarding serum ALP enzymes and MCV of red blood cells (Table 3).

There were no significant differences between patients with positive alcohol concentration and patients who were sober as regards the following variables : place of residence, daily use of vitamin D and calcium, distribution of fracture subtypes, and distribution of ASA classes.

The mean vitamin D concentrations among female and male patients with a positive alcohol concentration differed from each other : 78.1 nmol/L (SD 43) vs. 36.8 nmol/L (SD 35), respectively, whereas the corresponding mean values in sober patients were 75.7 nmol/L (SD 30.6) and 69.1 nmol/L (SD 29.8) (F-test 4.25, d.f.=1; 239, p<0.05).

No differences were found in the mean BMI values between alcohol-positive and -negative

patients or females and males in this sample (>F-test 0.01, d.f.=1; 210, n.s.). The mean number of previous fractures was 2.3 for the patients with a positive serum alcohol and 3.3 for the sober patients (F-test 0.84, d.f.=1;232, n.s.). However, women suffered more previous fractures on average than men in both groups (F-test 4.78, d.f.=1;232, p<0.01)

DISCUSSION

The main results of this study show that the proportion of hip fracture patients (5.3%, 13/244) with a positive serum ethanol concentration was low. Re-analysis of the previous data using the same laboratory test as in this study shows that our present results are in line with our previous results from 2003 to 2004 among the corresponding target group in the same two hospitals (9). In our previous study, the serum levels were originally classified based on the analyser raw data. Therefore, results \geq 0.01 g/L were expressed as alcohol-positive (9) and ethanol in serum was found in 17% of the patients. Based on the new international guidelines, since autumn 2004, the lowest reportable result of patient samples in a clinical setting has been changed in the laboratory and is currently based on the LoD of the assay method (12). The lower detection limit of 0.101 g/L was therefore used for classification of the study samples in the present study, resulting in 5.3% alcohol-positive findings.

It was interesting that the proportion of those who reported having ingested alcohol during the 24 h period before the fracture was almost equal in the previous and the present study (10% and 11%, respectively). In the present study 18 % of men and 7% of women reported alcohol use during the

pre-fracture 24 hours. However, we are aware that alcohol use is often under-reported, and that women appear to under-report their use of alcohol more than men (9). The mean ages of female patients were equal in both studies (2003-2004 : 80.5 years, SD 10 years; present study : 81.3 years, SD 9.5 years), whereas the mean age of the male patients in the study from 2003 to 2004 was lower (73 years (SD 12 years) than in the present study (80.3 years, SD 10.4 years).

Higher alcohol intake appears to be associated with an increased fracture risk among women (13). There are however also some contradictory results. One Danish study indicated that an alcohol intake of fewer than 28 drinks per week (one drink = 12 g pure alcohol) for men and fewer than 14 drinks per week for women was not associated with hip fractures when compared with abstainers (14). The risk of hip fracture was higher among those preferring beer as compared to those preferring other types of alcoholic beverages, and a tendency toward a lower risk of hip fracture was observed among those preferring wine (14).

In a recent Spanish study, the risk of falls and particularly injurious falls in older adults was lower among moderate drinkers or drinkers with the Mediterranean drinking pattern (MDP) than in abstainers (15). MDP was defined as moderate average alcohol consumption (<40 g/day for men and <24 g/day for women) with a preference for wine and for drinking only with meals (15).

According to earlier studies, low alcohol consumption increases bone mineral density (BMD), whereas heavy alcohol consumption had a negative influence on bone health (16,17).

This report was the second study from Finland focusing on the acute use of alcohol that measured the serum ethanol levels among acute low-energy hip fracture patients.

Since our previous study from 2006 (9), there is only one study in PubMed on hip fracture patients and acute alcohol use measured as serum ethanol and in an ER setting (18). In this Norwegian study, serum ethanol was positive in 7.6 % of 250 hip fracture patients (aged ≥ 65 years, mean age 84 years, 76 % females), when admitted to hospital. The lower limit for reporting use of ethanol was the

same as in the present study : 0.1‰ (=0.1 g/L) (18). The result was close to our result.

There are only two studies from Finland on the association between alcohol dependence syndrome and hip fracture (19,20). According to Kosola et al. (19), patients with low-energy femoral neck fracture and documented evidence of alcohol dependence syndrome represented nearly half of all similar patients in the data under 70 years of age (mean age : 64 years, range : 29-94 years). In the study of Tiihonen et al. (20), 8% (39/490) of the low-energy hip fracture patients (mean age : 79 years, SD 12) had a recorded chronic alcohol abuse that was associated with a significantly higher risk of reoperation. One third of them were reoperated because of mechanical failure of prosthesis or osteosynthesis, non-union, periprosthetic fracture, or deep infection (20). Similar results for complication, reoperation and high mortality despite a low mean age (61 years) in alcohol-dependent patients were published from the UK (21).

Since 1968, Finnish drinking habits have been studied at eight-year intervals using interview-based surveys of people aged 15-69 years. The 2016 survey also included people aged 70-79 years. The percentage of people consuming alcohol at least once a week stood at 50% of men and 28% of women in 2016, compared to 58% and 35%, respectively, in 2008. In 2016, as in 1968, 10 per cent of the population ingested about half of all of the alcohol consumed in Finland (22). Another Finnish study showed that in 2016 among elderly females (age group 80-84 years), 40% were drinkers and in males in the same age group 60-65% were drinkers (23). In Finland the mean age of hip fracture patients is about 80 years.

There are conflicting results concerning the possible beneficial effects of minimal alcohol use for bone health and fracture risk (3,15,16). The existence of a J-curve has also been questioned (13). Generally, alcohol use is mentioned as a clear risk factor that should be minimised (24). According to a recent autopsy study from Denmark, chronic alcohol abuse leads to low bone mass in the femoral neck and iliac crest, but not in the lumbar vertebrae. The reason is decreased bone formation without destruction of the trabecular bone structure (25).

In the present study, serum GGT, AST, ALT, ALP activities and mean MCV were compared between patients with serum positive and negative ethanol concentrations. It is known that serum GGT and ALT activities decrease with age (26). However, in our study about 12% of the patients had increased GGT and 13% had increased ALP markers. In 16%, the MCV values were heightened. In patients with positive serum ethanol, GGT, ALP and MCV were all significantly higher than in patients with negative serum ethanol. An increase in serum hepatic enzymes, especially ALP, AST and GGT, is common in adults who are excessive current drinkers (27). According to Neumann and Spies (28), 85%-91% of patients with heightened MCV values and 63%-85% with heightened GGT enzymes were chronic alcohol users. In the present study we neither asked the patients about the average number of drinks they consumed per week during the previous year nor checked the medical reports on chronic alcohol abuse.

In a study by Choi (29), increased serum ALT and GGT activities were also associated with excess body weight in men and women, and ALP in overweight women. In the present study, the mean BMI was similar in both sexes (ca. 24 kg/m²), and no differences were found in the mean BMI values between alcohol-positive and -negative females and males.

STRENGTHS AND LIMITATIONS

The prospective design of the present study is its main strength. All serum ethanol concentrations were analysed in one and the same laboratory using the same method.

One limitation is the missing data. The study was planned to include all consecutive patients with an acute hip fracture. However, the drop-out figure was 44% in hospital A and 35.5% in hospital B. Only a small number of patients did not wish to participate in the study. We found it somewhat difficult to motivate the staff in the ERs of both hospitals to cooperate in the study. It would appear that the busy timetable and occasional backlogs in the ERs were the main reasons for the missing laboratory results and the quite a high number of drop-outs (9).

However, the male to female ratio (30:70) and the mean age of the patients (80 years) in the present data were similar to the corresponding figures in the Finnish National Hip Fracture Register (32:68 and 79 years, respectively) (30). Moreover, the distribution rate of fracture types (femoral neck, trochanteric, and subtrochanteric fractures) was similar to national rates (30). Based on these figures, there does not appear to be any systematic bias in our data. However, the potential influence of the missing data on the results remains unclear (9).

CONCLUSION

The true incidence of acute use of alcohol in patients with an acute hip fracture proved difficult to examine in busy emergency departments. We experienced the same problem in our previous study. However, the results in the two studies were very similar. About 5% of the patients had positive serum ethanol concentrations on the day of admission to the ER for a hip fracture. There is a need for a more reliable study with a minimum of drop-outs.

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