

Alcohol-Related Fracture Admissions: A Retrospective Observational Study

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ABSTRACT

Introduction: In April 2011 the NI public health agency estimated that alcohol misuse generates overall annual healthcare costs of £122.2m. There is currently a paucity of data regarding the burden of alcohol-related fractures on the provinces Trauma and Orthopaedic service.

Patients and Methods: A retrospective review of 104 patients over a 12 month period was performed. Data collected using the Fractures Outcomes and Research Database included: age, gender, smoking status, weekly alcohol intake, mechanism of injury and subsequent treatment.

Results: Alcohol related fractures accounted for 6.1% of all acute fractures admissions in the 12 month period. 73% were male, with a bimodal age distribution. The majority of patients were classed as social drinkers; however a significant proportion (23.1%) were alcohol dependent. 62.5% of patients were smokers at the time of admission. 95% of patients suffered a single injury which was commonly secondary to a simple mechanical fall (53.8%). The majority of patients sustained lower limb injuries, with 30.8% of these being ankle fractures.

Conclusion: In conclusion, our study has identified that alcohol-related trauma creates a significant financial burden on the NHS. It is likely that the incidence of alcohol related fracture is higher than documented in this study. We advocate the assessment of patients using the AUDIT-C score to assess for at risk drinking behaviour in those presenting with an alcohol related fracture.

Keywords: Alcohol, abuse, trauma, fracture, AUDIT-C

INTRODUCTION

In recent years it has been acknowledged that the United Kingdom has moved to a culture of 'binge drinking', defined as more than eight units of alcohol for males and more than six units for females in one sitting¹. The National Health Service (NHS) defines hazardous alcohol consumption as more than 21 units per week for men and more than 14 units for women¹. Health problems associated with alcohol misuse include liver disease, reduced fertility, high blood pressure, and an increased risk of malignancy and cardiovascular disease¹.

Northern Ireland (NI), like the rest of the UK, has seen a dramatic increase in both the number of people drinking alcohol and the number of people drinking in excess of the recommended daily limit². Alcohol consumption in NI has increased at a much greater pace than that of the rest of the UK². Several contributory factors have been suggested, for example, easy access to cheap alcohol, changes in licensing laws and the psychological after-effects of the peace process².

In April 2011, the NI Public Health Agency estimated that alcohol misuse generates overall social costs of approximately £679.8m per annum. This figure includes

overall annual healthcare costs of £122.2m. Specifically, acute hospitalization days cost £65.6m whilst outpatient hospital visits accounted for £5.2m of the annual expenditure. This is in contrast to the approximate figure of £400,000 spent on alcohol-related health promotion³. A recent survey into adult drinking patterns in NI commissioned by the Department of Health, Social Services and Public Safety³ found that approximately 74% of adults drink alcohol and that younger adults (18 to 29 years) are more likely to binge drink than older adults (54% versus 16%). Three in every ten individuals (30%) admitted to binge drinking in the survey. The proportion of those who drank alcohol within the province varied regionally (Southern Health and Social Care Trust, 68%; Western Health and Social Care Trust, 78%)³.

Studies have shown that patients with an elevated blood alcohol level become increasingly un-coordinated with ataxia resulting in falls^{4,5}. Hingston et al have shown that blood alcohol concentrations over 1 g/l results in significant

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swaying, decreased attention, visual acuity, and adaptation to brightness and glare⁶.

Whilst the socioeconomic cost of excess alcohol consumption has been well documented there is a paucity of published literature specifically dealing with alcohol-related fracture episodes and its potential cost to the health care system. We present and discuss the findings of a retrospective, observational study reviewing alcohol-related fracture admissions to our Trauma and Orthopaedic unit.

PATIENTS AND METHODS

All patients admitted to the Trauma and Orthopaedic Unit have a detailed dataset regarding their admission entered into the Fracture Outcomes and Research Database (FORD) by a specialist nurse practitioner. Using this database we retrospectively identified those patients admitted with an

alcohol-related fracture or musculoskeletal injury to the unit over a 12-month period. Patients were included if they had a documented history of alcohol ingestion at the time of injury or a raised blood alcohol level on admission.

For all those patients identified, their case notes were reviewed and the following information was recorded: age, gender, day of admission, weekly alcohol consumption, smoking status, mechanism of injury, injury or injuries sustained, open or closed injury, operative intervention, time from injury to definitive care and length of stay. On the basis of the information volunteered by the patient, drinking habit is classified on admissions as follows: alcohol-dependent, regular alcohol intake and social or occasional alcohol intake. The senior author (NWT) reviewed all of the radiographs in this study.

RESULTS

We identified 104 patients admitted to the Trauma and Orthopaedic unit with a musculoskeletal injury related to excessive alcohol ingestion over the selected 12-month period. This figure represented 6.1% of the total number of admissions during the study period. Seventy-six patients were male (73%). Age ranged from 14 to 84 years (males, mean age 43 years; females, mean age 47 years). (Figure 1)

Seventy-two patients (69.2%) were classified as being regular alcohol drinkers and five patients (4.8%) were classified as social or occasional alcohol drinkers. Twenty-four patients (23.1%) had documented evidence of having alcohol dependence syndrome (19 males versus 5 females). In this cohort, 17 (71%) of the injuries were to the lower limb and six (25%) to the upper limb. 18 (75%) of the 24 patients sustained their fracture resulting from a simple mechanical fall. The injuries sustained within the alcohol dependent group included; nine hip fractures (37.5%), three humeral fractures (12.5%) and three tibial fractures (12.5%) including one compound injury.

86 patients (82.3%) required operative intervention. Of those not requiring surgery, four patients underwent closed

reduction of a dislocated joint in the Accident and Emergency Department and were subsequently admitted for observation, this included two dislocated total hip replacements. Two patients had to be admitted as their cervical spine could not be cleared clinically due to the level of alcohol intoxication. One patient had a cervical spine fracture and was transferred to the regional spinal unit. Three patients had lumbar spine wedge fractures and four patients had ankle fractures, which were also all treated conservatively.

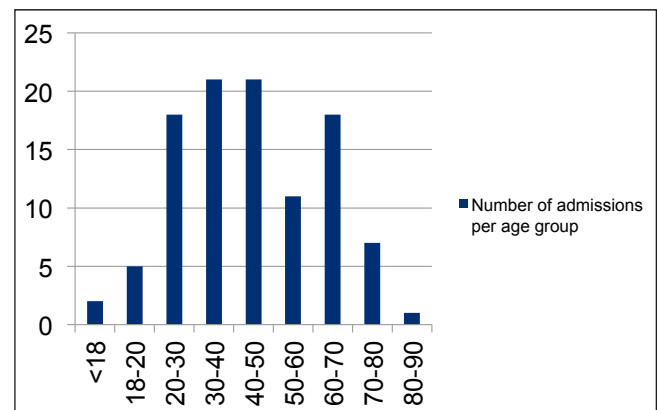


Fig 1. This graph illustrates the age distribution of patients admitted with alcohol related fractures.

The most common mechanism of injury was a simple mechanical fall (53.8%). Six patients (5.8%) sustained an open injury (three tibial shaft fractures, one distal humeral fracture, one olecranon fracture and one extensor tendon injury). The most common injuries were as follows: ankle fracture (30.8%), femoral neck fracture (14.4%), distal tibial fracture (7.7%), tibial shaft fracture (5.7%) and distal radial fracture (3.8%). (Figure 2)

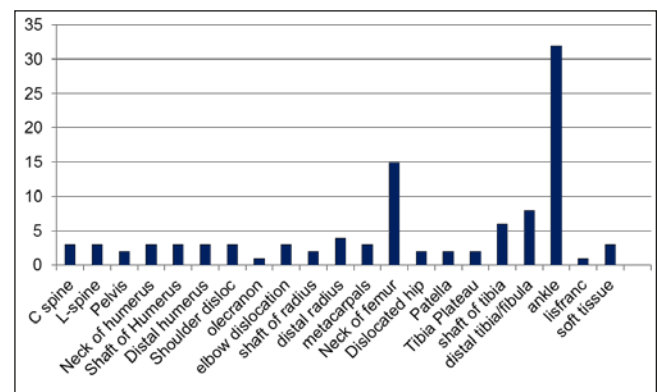


Fig 2. This graph shows the various levels at which an injury was sustained. The lower limb was most commonly injured, especially the ankle.

Saturday and Sunday were the most common days for admission (26 admissions each day) with the weekend (Friday to Sunday) accounting for 58.6% of all admissions. Of those who were alcohol dependent 66% of the injuries were sustained midweek. (Figure 3). Length of stay ranged from one to 27 days (average, 4.5 days). The total bed cost for the 104 patients was estimated at £317,050.

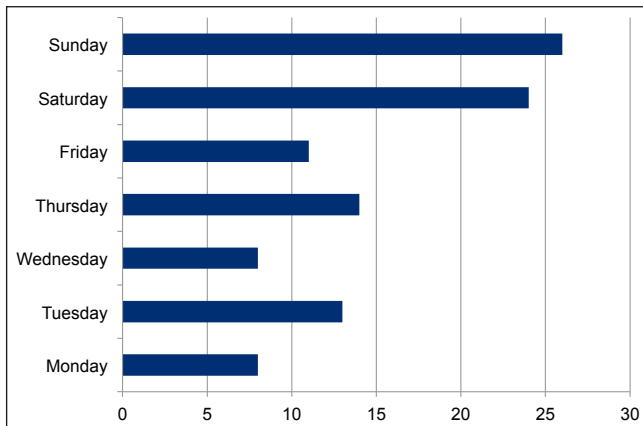


Fig 3. This graph highlights that alcohol related injury was more prevalent on Saturdays and Sundays in comparison with the rest of the week.

DISCUSSION

The aim of our study was to determine the extent of orthopaedic injuries due to alcohol intake. These made up approximately 6% of admissions to the unit. Given the retrospective nature of the study and the fact that we were relying on either medical or nursing staff to document excess alcohol ingestion as a contributing factor, this figure is probably an underestimate. Furthermore, our study did not include patients whose injury was sustained as the result of another individual's drinking episode.

Adult drinking patterns surveyed in 2011 in Northern Ireland suggested there was a difference in the prevalence of binge drinking between males (35%) and females (25%)³. 73% of admissions in our study were male. This is significantly higher than the male cohort admitted with fractures without alcohol (55.3%). This may reflect male drinking behaviour and boisterous activity whilst under the influence of alcohol. 19 of the 24 patients with alcohol dependence were male. This is in keeping with previous studies suggesting that men are admitted more frequently with alcohol related morbidity⁷. 23% of patients admitted were alcohol dependent and in this group hip fractures were the most common injury. Several studies have shown that alcohol-related disease significantly increases the risk of hip fractures (2.33 - 2.6 times higher than that of the general population)^{8,9}. Kanis et al found that alcohol intake greater than 2 units per day was associated with a significant increase in osteoporotic and hip fracture risk. We would therefore advocate that these patients should be targeted for hip fracture prevention programs as suggested in the literature^{11,12}.

The majority of admissions (78 patients) occurred towards the later half of the week (Thursday to Sunday), reflecting days when most people attend social events or are not working. Hospitals continue to operate with reduced staffing levels and theatre capacity at weekends which may result in increased burden on staff and resources. Patients who were admitted with alcohol related injuries had a longer mean stay than those of the general population (4.59 days vs. 3.78 days) This impacts on the total cost of the inpatient stay and discharge

planning, without taking into account outpatient follow-up.

NICE guidelines recommend that NHS professionals who come into contact with patients who may be at risk of harmful alcohol intake should regularly carry out alcohol screening as an integral part of their practice. They advise the use of AUDIT (Alcohol Use Disorders Identification Test) or an abbreviated version, AUDIT-C, in order to offer intervention to the patient or make a referral to a liaison team¹³. Several large papers have shown that AUDIT-C is a quick and effective screening tool for hazardous drinking behaviour (sensitivity 51-97% specificity 70-97%)^{14,15}. We have now introduced that process into our unit.

Approximately 60% of patients sustained their injury secondary to a simple mechanical fall which likely explains why the majority of patients presented with an isolated injury (95%). This is a similar finding to previous studies¹⁸. In our study 58.6% of patient's sustained trauma to the lower limb, most commonly affecting the ankle. This suggests stumbling, falls, and inversion injuries may be a result of alcohol suppressing basic reflexes resulting in injury. Several studies found that the lower limb is particularly vulnerable to injury in intoxicated patients^{18,19}. Johnston et al showed that injured patients with a blood alcohol level of 2–2.5g/L comprised mostly severe lower limb fractures requiring admission for open reduction internal fixation¹⁹.

In conclusion, our study has identified that alcohol-related trauma creates a significant financial burden on the NHS. It is likely that the incidence of alcohol related fracture is higher than documented in this study and we intend to evaluate the problem in a prospective manner using blood alcohol levels, liver function tests and AUDIT-C scores. Our study highlights the need for further health promotion regarding alcohol related fractures and the risk of alcohol related osteoporosis. Medical officers need to be aware of the subtle signs of alcohol misuse and how to adequately screen for alcohol intake using tools like the AUDIT-C questionnaire.

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