The Contribution of Alcohol to Fatal Traumatic Head Injuries in the Forensic Setting

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Abstract

Excessive drinking increases the risk of dying unnaturally. In the Republic of Ireland such deaths are referred to the State Pathologist. Blood alcohol concentration (BAC) is routinely measured. We created a database of cases presenting to the State Pathologist over a nine year period (2000-2008 inclusive) to evaluate the relationship between alcohol and fatal traumatic brain injuries (FTBI). Of a total of 1778 cases, 332 (275 Male [M]; 57 Female [F]) died of head injuries. Fatalities were highest in males aged 36-50 (N=97) and 26-35 (N=73). Assaults (N=147), falls (N=95), road traffic accidents (RTA) (N=50) and suicide (N=15) were the commonest modes of presentation. A positive blood alcohol concentration (BAC) was found in 36% of assaults, 41% of falls and 40% of suicides. In the RTA group BAC was positive in 59% of pedestrians, 33% of drivers and 14% of passengers. Alcohol clearly plays a significant role in FTBI in the forensic setting.

Introduction

The association between alcohol consumption and violence relates to acute intoxication. In a culture where drinking often leads to intoxication one would anticipate an increase in violence. Thus a strong association between alcohol sales and violent behaviour was found in Sweden where explosive drinking is not unusual compared with France, where drinking occurs in the context of dining . In the last decade, alcohol consumption has increased in Ireland with Irish drinkers currently among the highest consumers of alcohol in Europe drinking habits, with six other European countries (known as ECAS countries - Finland, Sweden, Germany, Britain, France and Italy) showed that drinking occasions in Ireland more often involves binge drinking compared with other European countries . Adverse consequences related to single drinking occasions are not uncommon in Ireland previous study we showed that the contribution of alcohol to FTBI in the acute hospital situation was underestimated largely because alcohol was not routinely checked in the Emergency Department (ED). The aim of this study was to ascertain the role of alcohol in FTBIs in the Forensic service where BAC is routinely performed.

Methods

The autopsy records from 2000 up to and including 2008 (N=1778) in the State Department of Forensic Medicine were reviewed for cases coded as traumatic brain injury. A database was then created using Microsoft Access. The gender, age, interval from presentation to death, mechanism of injury, cause of death and blood alcohol concentration (BAC) were all recorded. Interval from presentation to death was specifically examined to ascertain any delay between the incident and subsequent death. Where there was a delay, the BAC at autopsy would be irrelevant whereas the BAC at the time of death is relevant. A study in 2002 comparing Ireland's drinking habits, with six other European countries (known as ECAS countries - Finland, Sweden, Germany, Britain, France and Italy) showed that drinking occasions in Ireland more often involves binge drinking compared with other European countries .

Results

332 cases (275M; 57F) fulfilled the criteria for inclusion.Fatalities were highest in males aged 36-50 years (N=97) and 26-35 (N=73) (Figure 1). The interval between the incident and autopsy was less than 12 hours in 50% of cases (Figure 2). The positive BAC samples ranged from <100 to > 500 mg %. Assaults (147) (128M; 19F) were the commonest mechanism of injury followed by falls. RTAs and suicide (Figure 3). The majority of assaults occurred in males in the age group 26-35. A positive BAC was found in 54/147 (36.7 %) of cases (M50; F4). BAC in the remaining 93 cases was negative in 52/147 (35.54%) and the remainder were not checked as there was either a delay before autopsy or the remains were unsuitable. Blunt force (N=60) (48 M; 12 F) head injury was the commonest mechanism of assault, followed by gun shot wounds (N= 40) (38 M; 2F).

Figure 1: Age at autopsy

Figure 2: Interval before autopsy

Figure 3: Mechanism of injury

Deaths due to falls

Falls (95) (M 72; F23) were the second commonest cause of TBI. The majority of falls occurred in males in the age group 36-50 (Figure 4). A positive BAC was found in 38/95 (40%) (M30; F8). In 37/95 (38%) it was unrecorded and the remaining 20 were negative. RTAs accounted for 50 cases (pedestrians (N=39), passengers (N=7) and drivers (N=4)). A positive BAC was found in 23/50 (46.3%) (22 M; 1 F). In 9 cases (23%) it was not recorded and in 7 (17%) alcohol positive BAC was found in 23/50 (46.3%) (22 M; 1 F). In 9 cases (23%) it was not recorded and in 7 (17)%
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Discussion

The contribution of alcohol to FTBI is underestimated in the acute hospital setting. In this study, 50% of cases came to autopsy less than 12 hours after the incident and as BAC testing is done as a routine, the true contribution of alcohol to unnatural FTBI deaths can be assessed. 11

Alcohol plays a role in violent behaviour but many people drink often and to excess without violent consequences. Its role varies according to the cultural context and social situation involved. Generally both perpetrators and victims are male and the severity of the violence relates to the volume and type of alcohol consumed. 12 13 14

In this study, we are dealing only with victims and the majority are male. A positive BAC was found in 36% of assaults who died of FTBI. One study clearly demonstrates that alcohol plays a significant role in FTBI in the forensic setting. Continued media coverage of the harmful effects of binge drinking together with lack of acceptance of it as the 'norm' may eventually make it unpalatable. Public awareness groups have proved successful in this venture in the USA. 15

Suicide victims were all males, peaking in the middle age (36-50). Older suicides differ from those occurring in a younger age group, as they are less likely to have attempted suicide, previously or have a documented psychiatric history and are more likely to be 'successful'. This success reflects the lethal methods used. Here, guns were the commonest method accounting for 86% of cases. A positive BAC was found in 40% which is higher than studies carried out by Medical Examiners in the US where rates varied between 30 and 38% of cases. 16

In this study clearly demonstrates that alcohol plays a significant role in FTBI in the forensic setting. Continued media coverage of the harmful effects of binge drinking together with lack of acceptance of it as the norm may eventually make it unpalatable. Public awareness groups have proved successful in this venture in the USA. 17

Alcohol related falls are the commonest cause of FTBI and occurred in a younger age group (36-50) than FTBI in the acute hospital setting. A positive BAC was found in 40%; in keeping with previous observations that alcohol-related falls are associated with an increased incidence of head injuries and increased severity of the resultant injury. 18

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References