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Determining Homicide in Fatal Instances of GHB Toxicity, Implications for Criminal Investigations

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Abstract

Following a high profile case of a serial killer who murdered his victims by administering lethal doses of gamma-hydroxybutyrate (GHB), and the failure of police to link the victims and cause of death, the difficulties in determining GHB as a homicidal weapon are analyzed. Results of that analysis underscore the need for police understanding, and comprehensive detailing, of the background and circumstances of GHB-related deaths to direct and supplement autopsy examination.

Keywords: Gamma-hydroxybutyrate; GHB; Homicide; Post-Mortem Drug Analysis; Toxicity; Homicide Investigation

Introduction

The recent case of a serial killer in London who was able to kill four men with gamma-hydroxybutyrate (GHB) in the course of satisfying his homophilic desires [1,2]. demonstrates the difficulty in determining a death as homicide when the cause is GHB toxicity. The behavior of the killer and failure in refining his modus operandi, as related to body disposal, ensured his capture rather than any investigation being launched based on the cause of death of his first victims. Indeed, even after three victims had been found and the Metropolitan Police were advised by external agencies that a serial killer may be operating, targeting gay men, the deaths remained unconnected [2]. Such was the ignorance of police to recreational GHB use amongst some homosexual men that any investigation into the deaths was stalled; as a result of that case the Metropolitan police are re-examining 58 other deaths in the capital that have been associated with GHB [2]. Owing to complications in determining the ingestion of GHB over its natural production, post-mortem, police awareness of gamma-hydroxybutyrate usage and the circumstances of a fatality can be crucial in determining death as a result of GHB overdose which, beyond that one high profile case, has been linked with facilitating sexual assault more widely [3-6].

Indeed, it was the intention to sexually assault, and rape, which led to the deaths of four men. However, it is not only the failings of a police investigation that can fail to determine GHB toxicity as the cause of death, inherent difficulties in differentiating endogenous and exogenous levels of gamma-hydroxybutyrate during post-mortem examination, and the effect of natural production of the substance owing to incorrect storage of samples can also act as significant barriers in accurately determining GHB as the cause of death. This paper begins by introducing gamma-hydroxybutyrate, its uses and its prevalence, before providing an overview of a recent case to demonstrate the homicidal use to which the drug can be put. The paper then documents the difficulties in determining GHB's relation to cause of death in post-mortem examination and the consequent need for police understanding of the part GHB can play in unexplained deaths and potential homicides. Finally, the paper concludes with some implications of the research findings and provides direction for future research.

GHB

Gamma-aminobutyric acid (GABA) was first discovered in 1956 as the predominant inhibitory central nervous system (CNS) neurotransmitter [5]. That discovery instigated researchers to try and find a GABA analog that would cross the blood-brain barrier for possible therapeutic use; it was during that search that gamma-hydroxybutyric acid was found in the brain and subsequently synthesized in the laboratory in 1964 [5]. Whilst its original medical use was as an an aesthetic, owing to the adverse effects of GHB that use has steadily discontinued, although in the context of medicine it still has a use in the treatment of narcolepsy [3,4]. Internationally, GHB is licensed as a medicine in France and Germany as a surgical an aesthetic, in Austria and Italy as a treatment for alcohol withdrawal symptoms and in the Netherlands for opiate addiction [7]. The

mechanism action of gamma-hydroxybutyrate is similar to that observed with benzodiazepines, barbiturates, and ethanol [8]. Administered exogenously it quickly overcomes the blood-brain barrier and readily enters the central nervous system [4]. overdoses of which provoke CNS and respiratory depression [5,6].

High doses of GHB act as an an aesthetic rapidly producing unconsciousness which can lead to coma and then death [4,9,10]. Despite the adverse effects GHB can present, also including agitation, bradycardia, hypothermia, and hypotension [6]. misuse of gamma-hydroxybutyrate has been increasing since the 1990s and has been implicated in a growing number of deaths in the USA, Canada, Australia and Europe [9]. In the UK, from 1995 to September 2013, 159 GHB associated fatalities were recorded, although the findings are regarded as an underestimation [11]. Moreover, instances of misuse and resulting harm are increasing: a 2010 reveals GHB as the most commonly presented drug in emergency admissions at a London hospital [12]. From 2011 to 2015, 61 GHB associated deaths were recorded in the capital, with a 119% increase between 2014 and 2015. However, the numbers likely underestimate the prevalence of the problem [9]. The rise in use is likely attributed to the increased availability of the drug through various websites and mobile applications, and ignorance of the adverse effects of the drug [9]. Whilst death can result from the administration of GHB, in isolation [13]. that risk of death increases with the variance in the street quality of the drug and ignorance in dosage levels [4]. Overwhelmingly, misuse of gamma-hydroxybutyrate is thought to be concentrated amongst homosexual men [9,14]. There are strong links between GHB misuse and the gay community with regard to its role in chemsex [9].

Chemsex is a specific form of recreational drug use in which GHB is consumed to enhance and prolong sexual sessions [9]. Of the 61 GHB related deaths reported by Hockenhull, Murphy and Paterson, all but one were male and chemsex was particularly noted in 25% of case histories [9]. Of those presenting to an HIV inpatient service, with an association of recreational drug use, between April 2015 and March 2016, all were male and 94.7% were men who have sex with men [15]. Such is the concentration of the chemsex phenomenon and use of GHB within the gay community that health professionals have called for targeted harm reduction campaigns similar to those which have previously proven successful with regard to HIV transmission[16]. In light of so many men using GHB as an aid to sexual activity there have even been calls for the phenomenon to become a public health priority [17]. particularly given concomitant issues with HIV infection and the transmission of other sexually transmitted infections [18]. The majority of homosexual men who take GHB to enhance sexual experiences are repeat users [19]. which problematizes investigation in the event of death. Repeated exposure to GHB complicates determining toxicity as the cause of death; gamma-hydroxybutyrate concentrations in recreational users may overlap with concentrations found in GHB-related fatalities [10]. and the common presentation of GHB toxicity to hospitals is of a male with a clear history of ingestion [5].

a. GHB as a Homicidal Agent

In November 2016 a jury sitting at the Central Criminal Court in London returned guilty verdicts against a serial killer and rapist charged with four counts of murder; ten counts of administering a substance with intent; four counts of rape; and four counts of assault by penetration. The killer would, most frequently, use dating websites and applications to meet young men and invite them to his home on the understanding of a sexual encounter. Once there he would surreptitiously administer GHB, in its liquid form, either by adulterating a drink or applying it to the anus of a victim under the guise that he was applying lubricant in preparation for sex. The killer's aim was to render the men unconscious and rape them whilst in a comatose state [2]. Four men died as a result of that administration.

The killer was in fact linked to the death of the first victim. Following the death of the first victim, which he claimed was accidental, the killer moved the body to the street and alerted the emergency services, claiming to have found the man outside his address; a rouse which was uncovered after the police traced online contact between the two arranging to meet for sex. The acceptability, availability, and prevalence of GHB usage among some homosexual men ensured that victims could easily be found. So, undeterred by the death of the first victim and police knowledge of his involvement, on three more occasions he administered a lethal dose of GHB to young men; all three of those victims were left in the same spot, in a churchyard, close to his home. Despite the death of all victims being due to GHB toxicity, and were discovered in the same location, police failed to link the cases. Such failure was despite the police being advised by different agencies that a serial killer was at large and targeting gay men [2]. Subsequently, it has been claimed that the ignorance of the police towards homosexual subcultures, and the use of GHB, particularly in the context of 'chemsex', facilitated the killings. Indeed, the Independent Police Complaints Commission are now investigating police handling of the case; ten police officers have been issued misconduct notices whilst another seven officers have been served with gross misconduct notices on suspicion of homophobic conduct [2]. In the wake of the case, 58 GHB-related deaths are currently being re-examined.

b. Forensic Investigation and GHB

Underestimation of the usage and prevalence of GHB, and its role in fatalities, is likely because GHB has often not been included in routine analysis [13]. The situation is complicated further considering GHB's dual nature, as an endogenous and exogenous compound, which can cause interpretive problems at autopsy [20,21]. Indeed, because endogenous GHB levels rise after death [13,21,22]. it has been found in post-mortem biological fluids, on some occasions in lethal amounts, even

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when there has been no suspicion of its prior consumption [20,21]. [23-25]. thus presenting the possibility of confounding forensic investigations [26]. Because of the significant amount of post-mortem production of GHB in blood, using such samples alone can fail to clarify GHB toxicity as the cause of death [10], particularly if there is a survival time between ingestion and death [23]. Distinguishing between ante-mortem consumption and post-mortem production of GHB is particularly problematic if the specimen analyzed is cardiac blood [8]. As GHB is highly soluble in water, as well as a lack of binding to plasma proteins, concentrations in whole blood are lower than in plasma or serum, as a result of differences in water content [8]. As such, blood samples are unreliable indicators of death due to overdose of gamma-hydroxybutyrate. However, the presence of GHB in post-mortem blood samples has also been observed in other biological fluids such as urine, although in smaller quantities [23-25]. Moreover, because GHB intoxication can cause urinary incontinence the absence of a urine sample can be a common situation [23].

An alternative sampling site is the vitreous humour, located between the retina and lens of the eye, an isolated matrix which is able to resist putrefaction longer than other fluids, such as blood [21]. Extraction from the vitreous humour has a proven success in determining death by GHB toxicity, such as in the case of a 6 year old girl [3]. However, sample storage must always be considered in determining and interpreting GHB concentrations in post-mortem samples [7, 27]. particularly when not stored in a preservative such as sodium fluoride [3]. a recommended means of preservation, particularly when there has been an extended post-mortem interval [20]. Freezing samples presents another alternative in preservation, the importance of which is highlighted by the finding that particular bacterial agents such as C. aminobutyric and P. aeruginosa have been linked with the post-mortem production of GHB [28]. Owing to post-mortem difficulties in specifying GHB toxicity as the cause of death there is significant weight to the assertion that the circumstances of death, and accompanying police reports, are essential in conclusively determining death as a result of GHB overdose [8]. It is noted, for example, that the literature contains cases where GHB toxicity would have been difficult to determine if other sources of information were not available to supplement autopsy findings [3].

Determining GHB Homicide: Considerations and Implications

Owing to the prevalence of GHB in homosexual subcultures, death resulting from GHB toxicity is encountered by forensic pathologists and investigators on an increasingly regular basis. However, because of that prevalence it can be difficult to determine self-administration over the administration by a third party. The rationale for self-administration lies in the effect of the drug and its relationship to sexual stimulation. Indeed, chemsex sessions are attended by increasing numbers of gay men, sessions that involve the voluntary consumption of GHB [14]. It is then extremely difficult to prove the administration by a third party. Even evidence of a sexual assault may not be enough to prove ulterior doping by another person; representative samples of homosexual men who engage in chemsex report that the line of consent often becomes blurred; sexual assault and rape can take place following voluntary consumption of gamma-hydroxybutyrate [14]. Of course, homicidal intent may not always be present, even in the minority of cases, but the administration of GHB by another person that results in death is still an unlawful killing that necessitates police investigation. As a start, in the investigation of GHB-related deaths, knowledge of the victim's drug history is essential, levels of consumption, frequency of consumption, and manner of consumption, particularly as a history of consumption can impact upon autopsy results [10]. Yet, even more so, it is vital for police to understand the nature and dynamics of chemsex and its associated behaviors. It is worthy to note, in that vein, that since the failures of the Metropolitan Police have been publicized frontline officers have been offered training to better understand chemsex crime [29].

More widely, the cooperation of the homosexual community and those who attend chemsex sessions is vital in the investigation of GHB-related death. That cooperation, however, can only begin when relations between the police and the community are fortified; investigators need to break through subcultures to open up a dialogue with the homosexual community [30]. Moreover, failing to heed the advice of the community and its representatives can hinder investigation, as with the case that resulted in the deaths of four men[31]. Mistrust of the police, by the gay community, will only hamper investigation and possibly lead to the omission of vital supplementary evidence to aid autopsy examination. Indeed, as noted by others, police investigation can be essential in substantiating post-mortem findings of death due to GHB toxicity [3,8]. At autopsy, in contrast to other drugs, blood samples are not enough, alone, to determine GHB as the cause of death, urine and particularly vitreous fluid also need to be tested, although results must be interpreted with caution owing to case history, post-mortem interval and storage [10]. Future research, it is recommended, should focus on the prevalence of GHB misuse within homosexual subcultures, and more widely. With regard to GHB administered by another person, resulting in death, future research should aim to correlate both police and medical information, as should happen with the Metropolitan's police reinvestigation of 58 GHB related deaths in London.

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