Drink and injection spiking: how to approach an increase in presentations?

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ABSTRACT

In 2021, there was a significant increase in the number of reported drink spiking incidents across the UK. The new phenomenon of spiking via injection also emerged, which gained significant media attention. Campaigns encouraged potential spiking victims to attend an ED for testing. However, there is limited published research on drink spiking and no published studies on injection spiking. One UK guideline for the management of spiking exists, advising testing 'if clinically indicated' and is likely underused. Therefore, patients are often managed without drug testing, psychological support or a clear onward referral pathway. This practice review will explore the background of spiking, discuss drug testing options and highlight the psychological sequelae of spiking. An example guideline for the management of spiking incidents is attached.

INTRODUCTION

Drink spiking is the act of adding alcohol or drugs to a person's drink without consent. Injection spiking is the act of administering a drug with a needle without consent. Spiking may be done to render someone more susceptible to crimes such as sexual assault or theft.[1]

In 2021, personal accounts of spiking incidents increased substantially in the UK. This resulted in media reports of a 'Spiking Epidemic' and boycotts of nightclubs, including the 'Girls Night In' movement.[2 3] The UK Home Affairs Committee published a report on spiking in April 2022.[4] The inquiry heard the results from a YouGov poll of 1693 adults in which 11% of women and 6% of men reported having been a victim of spiking.[5] It also surveyed 1895 victims, with 553 reporting mental health consequences and 292 physical health consequences of the event.

The Royal College of Emergency Medicine (RCEM) issued a response to this report that recognised spiking 'can cause serious distress and harm to victims and cause lasting damage to their mental, and in some cases, physical health'. RCEM also acknowledged that 'emergency departments are not able to provide forensic medical investigation and we welcome the committee's recognition that alternative environments to allow proper investigation must be made available'.[6] Currently, the only UK guidance on drink and drug spiking is published by The National Poisons Information Service, which advises toxicology screening 'if clinically indicated'.[7] Anecdotally, most EDs manage patients without drug testing, psychological support or a clear onward referral pathway.

In 2021, the novel challenge of injection spiking emerged in the UK, with 499 of the 525 cases reported in the Home Affairs Committee survey occurring that year.[4] Initially reports were limited to the UK, although the topic did appear in discussion of possible causative factors in crowd deaths at a Houston music festival in November 2021.[8] By the summer of 2022 cases of injection spiking were being reported in France, Belgium, The Netherlands and Australia.[9 10]

During this increase in presentations of drink and injection spiking, a discrepancy developed between the expectations of patients and ED management. While awareness campaigns encouraged individuals to attend ED if symptomatic, online articles described individuals' disappointment at how their experience was handled.[11] Box 1 details a real life case (shared with patient consent), of a patient attending an ED with injection spiking in October 2021 and highlights the need for re-evaluation of the appropriate management for these patients.

This article will examine the background and prevalence of spiking, discuss the drugs used and available testing, and explore the potential physical and psychological sequelae for victims. An example guideline for the management of spiking incidents (see online supplemental file 1), and patient-public co-designed information leaflets for drink and injection spiking (see online supplemental files 2 and 3), are attached.

Drink spiking

Drink spiking prevalence data are limited due to under-reporting by victims and lack of confirmatory testing in potential cases. Responses to UK Freedom of Information requests in 2018 demonstrated a 74% increase in suspected spiking incidents reported to London's Metropolitan Police, and 1039 reported nationally, between 2015 and 2017.[12] These data are now 5 years old and the Home Affairs Committee report demonstrates the significant increase in reported cases between 2017 and 2021.[4]

Since 2000, only three published prospective studies have included results of drug testing in patients reporting suspected spiking at ED attendance, two in the UK and one in Australia.[13–15] In a 2004–2005 London-based study of 78 patients reporting suspected drink spiking, unexplained illicit or prescription drugs were found in blood or urine samples of eight participants. Serum ethanol

Box 1 Real life case: patient attending the ED for injection spiking in October 2021. Shared with patient consent

Clinical Case

A 19-year-old woman consumed three gin and tonics over three hours, then proceeded to a nightclub at 23:00 hours with friends. She had one further alcoholic drink and then began to feel unwell and went home at 00.30 hours. She had consumed less alcohol than usual for a night out.

At home she became uncharacteristically hyperactive and aggressive. She went to bed feeling dizzy and nauseated and vomited during the night.

On waking the next morning, she found a bruise and puncture mark on her left lateral thigh (figure 1).

Concerned about possible injection spiking she contacted 111 who advised attending the ED. She was discharged without investigation with advice to contact the police, which she did via the non-emergency number.

The police requested her re-attendance at the ED for testing, but after waiting 2.5 hours the police accompanied her home and conducted a rapid urine drug test, approximately 19 hours after possible exposure (recommended within 12 hours). This test was negative. A urine sample was sent for toxicology screen.

Police made contact 2 days later to arrange further blood tests via the ED or her GP, but this was not possible.

Six weeks later police advised that as they did not have access to CCTV evidence, the urine sample would not be processed, and the case would be closed. She contacted the venue herself to request CCTV evidence, but heard no reply.

To the patient's knowledge at no point was a bloodborne virus risk assessment performed.

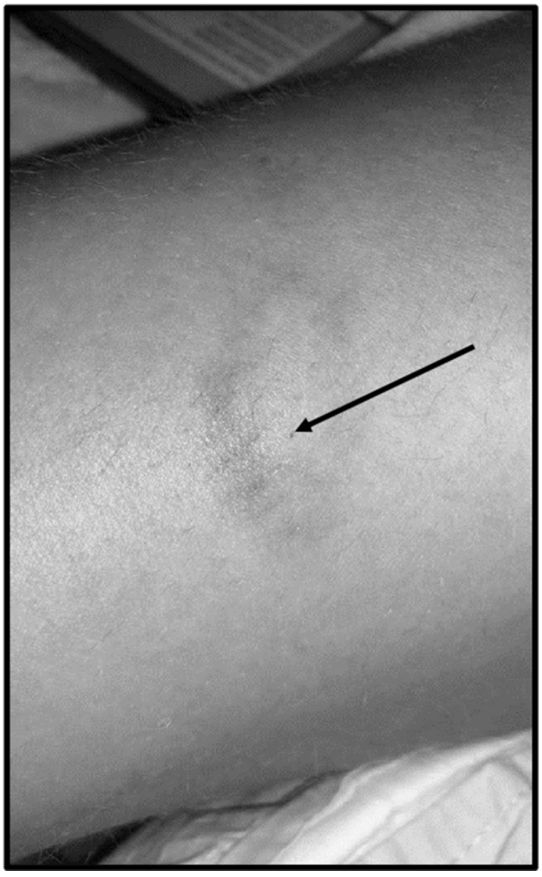

Figure 1 Bruise with puncture mark (indicated by arrow) on patient's left lateral thigh. Shared with patient's consent.

levels consistent with intoxication (considered to be above 1500mg/L) were detected in 47 of the 78 participants, including 3 of those with unexplained drug test results.[13]

A Welsh study enrolled 75 patients with suspected spiking in 2004–2005. 42 urine samples were analysed for drugs of misuse, 34 serum samples for drugs of misuse and 32 serum samples for ethanol. Eight of the urine drug screens were positive. Serum alcohol levels were above 800mg/L in 25 of the participants and >160mg/L in 22 of participants. Only one patient who had a positive drug screen had a serum ethanol level below 800mg/L (two of those with positive drug screens did not also have serum alcohol measured). Whether the positive drug screen results may have been due to personal use was not explored.[14]

In a study of 101 patients who reported suspected spiking conducted in Perth, Australia in 2002–2003, drug screen results and blood ethanol concentrations were reported in 97 patients. Illicit drugs were detected in 27 patients but only four results were unexplained by personal use history. Seventy-four patients had detectable serum ethanol concentrations, with the median being 960mg/L. Five cases of suspected spiking with ethanol were described, with blood ethanol levels not in keeping with reported alcohol consumption.[15]

Two of the above studies explored potential spiking cases by including questions about voluntary drug use and alcohol consumption.[13 15] Among the 175 patients in these studies, 17 (10%) results were identified as consistent with spiking with either drugs (12) or alcohol (5). Among the most commonly implicated drugs were 3–4-methylenedioxymethamphetamine (MDMA) or other amphetamines, detected in six patients. Unexplained gamma-hydroxy-butyrate (GHB) was detected in two patients.

While there has been some exploration of spiking prevalence, existing studies may be confounded by selection bias, additive effects of alcohol consumption, limitations to current drug assays and limited use of qualitative methods to explore cases. Further mixed-methods work is needed that focuses on the identification of the possible drugs involved, includes injection spiking and explores how testing affects patients.

Injection spiking

Spiking via injection appears to be a new phenomenon. Images of puncture wounds in the upper arm, back and thigh have been circulated on social media alongside accounts of apparent unexplained intoxication.[16] The National Police Chiefs' Council recorded 1382 reports between September 2021 and January 2022.[4] There are no published studies that consider the incidence of injection spiking or explore drugs used.

The estimated volume of intramuscular drug required to have a toxic effect is outlined in table 1. While the plausibility of injection spiking might be called into question, there are some agents that require only small volumes to achieve significant effects, particularly when combined with alcohol consumption.

Injection spiking raises issues beyond toxicology. First, this more direct and unavoidable violation of an individual is likely to bring further distress or psychological trauma to a victim, increasing the need for psychological support. Second, the use of a needle necessitates a bloodborne virus (BBV) risk assessment and appropriate management. Accessible guidelines are needed

Table 1 Pharmacological properties of potential spiking drugs

Drug	Solubility	Colour	Odour/taste	Toxic dose	Time to onset
Ethanol	Liquid	Can be colourless	Distinct taste but may be already present in spiked drink	1 g/kg (absolute ethanol) will be variable	Rapidly absorbed
Benzodiazepines	Liquid forms (including diazepam, lorazepam)	Variable: clear, colourless, pale yellow, pink syrup	Can have distinct smell (eg, raspberry smell of diazepam liquid)	Depends on benzodiazepine: alprazolam 0.05 mg/kg, diazepam 0.7 mg/kg, etizolam 0.1 mg/kg, flunitrazepam 0.05 mg/kg, lorazepam 0.2 mg/kg, midazolam 1 mg/kg	Around 1 hour
GHB	Soluble when in GHB form. Analogues such as GBL are liquids	Colourless	Tasteless, may have solvent smell/taste	10 mg/kg	Rapid: 15–60 min
Ketamine	Powder or tablet form is soluble. May be liquid	Colourless	Bitter	Unclear. Clinical trial doses start at 0.5 mg/kg	20–30 min
Amphetamines	Usually a white powder that is soluble in water	Colourless	Bitter	Variable. Lethal dose reported to be 20–25 mg/kg	20–30 min
MDMA	White powder or tablets. Soluble in water	Depends on colour of tablet	Bitter	Around 1 mg/kg	30–60 min
LSD	Usually on paper. Soluble in water	Colourless	Bitter	0.5–2 mcg/kg	30–60 min

Injection Spiking		
Drug	**Volume for intramuscular sedation**	**Time to onset**
Lorazepam	1–2 mL	15–30 min
Haloperidol	1 mL	15–30 min
Ketamine	2–20 mL	5 min

GHB, gamma-hydroxy-butyrate; LSD, lysergic acid diethylamide; MDMA, 3–4-methylenedioxymethamphetamine.

to ensure safe and consistent practice. This is particularly true as presentations are likely to be out of hours, when senior oversight is less readily available.

An example guideline for the management of patients with drink or injection spiking is attached as an online supplement to this article (see online supplemental file 1). It was developed by North Bristol NHS Trust ED in conjunction with the local virology team. The guideline advises that patients attending the ED with evidence of injection should be managed in line with a low-risk community needle stick, such as that incurred from a discarded needle. In most cases this means considering hepatitis B vaccination status, and in the UK managing in line with Public Health England's Green Book advice.[17] The only case for considering HIV post exposure prophylaxis is in the event of a clear history of needle use on another person, known to be HIV-positive or in a high-risk group, immediately preceding the incident.[18] Blood should be sent for storage, to be tested if indicated by follow-up test results. Follow-up HIV, antigen/antibody, hepatitis B surface antigen and hepatitis C antibody tests should be sent at 12 weeks and 24 weeks, arranged by the patient's general practitioner.

Drugs used in spiking

There are three broad categories of commonly used spiking drugs: alcohol, 'date rape drugs' and 'party drugs'.

Alcohol

Alcohol (ethanol) is widely reported as the most commonly used drug for drink spiking. Blood ethanol concentrations associated with significant intoxication are found in over half of patients presenting to the ED concerned about drink spiking.[13–15] Blood ethanol measurement is widely available and has the potential to add to the diagnostic picture in selected patients. While ethanol intoxication is affected by tolerance, concentrations of 1000–2000 mg/L would produce moderate toxicity, 2000–4500 mg/L severe toxicity and >4500 mg/L would be potentially fatal.[19]

Date rape drugs

'Date rape drugs' have been commonly associated with drug-facilitated sexual assault but are also used in spiking without a sexual motive.[20] The most well known are gamma hydroxybutyrate and benzodiazepines, for example, flunitrazepam (Rohypnol/'roofie'). Both are sedatives, which work via their effects on gamma-amniobutyric acid (GABA) receptors. Date rape drugs produce a sedative toxidrome that may be indistinguishable from alcohol intoxication, requiring definitive testing to differentiate between them.

Party drugs

More traditional 'party drugs', for example, amphetamines, 3,4-methylenedioxy-methamphetamine (MDMA), lysergic acid diethylamide (LSD) and ketamine may also be used to spike drinks. Ketamine produces a dissociative toxidrome characterised by impairment of responses to external stimuli and includes out-of-body experiences, de-realisation and de-personalisation. Amphetamines produce stimulant features such as dilated pupils, tachycardia, agitation and fever (quite distinct from ethanol). MDMA can be similar to amphetamines but may present with features of serotonin toxicity such as clonus, fever and agitation. LSD may produce perceptual or psychiatric symptoms.

The psychological sequelae of spiking

The psychological sequelae of physical and sexual assault are well established with clear evidence-based support and pathways in place.[21–23] However, for those who have been spiked without physical evidence of (other forms) assault, there are no guidelines or recommendations to facilitate pathways to care following what is potentially a traumatic event. Symptom-driven intervention and discharge from the ED are standard practice; psychological care does not factor in.

Clear evidence of physical and/or sexual assault is not the only risk factor for distress and trauma in a spiking incident; the psychological impact of sexual harassment and coercion, particularly while intoxicated, should not be underestimated. The absence of a clear memory of an assault neither precludes the possibility that an assault took place, nor does it prevent the possibility of post-traumatic stress disorder (PTSD). Studies demonstrate the link between even minimal delayed recall and the development of PTSD.[24]

The acts of both drink and injection spiking could be classified within the diagnostic statistical manual as traumatic events due to the associated threat of serious injury or sexual violence.[25] The recent emergence of injection spiking unequivocally constitutes physical assault and must be considered through this lens on assessment within the ED. While only a small proportion of those exposed to any traumatic event go on to develop full

PTSD,[26] there are wider psychological implications with long-term effects,[27] particularly for those with an existing history of psychological difficulties or trauma.[28 29]

In the absence of diagnostic certainty, processing of the event is likely to result in misplaced internal attribution, feelings of self-blame, guilt, shame and fear—responses that may form a foundation for the development of longer-term psychological difficulties.[20 30 31] This risk is further complicated by interference with the laying down and consolidation of memories, resulting in fragmented memories often associated with traumatic incidents such as spiking[32] and substance-induced amnesia (or 'blank memories') common to spiking incidents.[33] Incomplete recall is likely to give rise to confusion, fear and difficulties processing and appropriately appraising a traumatic event.

A core component of trauma-focused psychological therapy for PTSD is the development of a coherent narrative of the traumatic experience. This is compromised substantially without diagnostic certainty (both confirmation and medical implications of substance use) and incomplete information,[32 34] aspects which may be vital in mitigating against long-term effects. The complex circumstantial nature of spiking suggests a higher risk of psychological sequelae; while there is currently no evidence to quantify this risk, it must be held in mind that patient recall of assault or evidence of assault should not be the sole determining factors for considering onward referral for psychological input or follow-up.

Simply put, victims of spiking are likely to blame themselves for the unwanted and unpleasant consequences that arise from spiking, and they may do so erroneously and without a coherent understanding of the circumstances.

Drug testing in the ED

It may be argued that testing in most patients won't change the acute management of their physical health, will increase ED costs and result in the need to follow-up patients. However, testing is likely to help address the psychological sequelae described above. In selected patients it will help provide diagnostic certainty and empower them to liaise with the police, contact victim support, alert venues to their experience and raise awareness among peers. It would, however, be important to discuss results with patients in context and recognise that a negative drug screen does not preclude the possibility of a false negative, or spiking with alcohol, which previous evidence suggests is the most commonly used agent. Comparison of blood ethanol levels with patients' reported ethanol intake may help produce a coherent understanding of events and mitigate against psychological harm.

Early index testing of patients presenting with suspected spiking could generate better understanding of the problem on a public health scale. It may help decipher whether the significant increase in the reported cases of drink spiking and the newly reported cases of injection spiking reflect an increase in the administration of illicit drugs, above the rates seen in the studies discussed above, at approximately 10% of patients presenting with suspecting spiking. Testing also provides the potential to develop institutional understanding of drugs being used and facilitates information sharing between EDs, public health bodies and the police. This could potentially enhance police and healthcare responses, particularly to injection spiking, given the current paucity of data.

It is important to note that for forensic purposes the responsibility for testing lies with the police. However, most criminal cases will not proceed without corroborative evidence. This results in samples not being processed and leaves victims (or patients) without a clear pathway to timely testing and distressing uncertainty. For symptomatic patients who present to ED acutely, their care (including any testing) should be managed within the ED. Patients who seek healthcare once physically asymptomatic but who remain at risk of psychological sequelae could be managed in the ED or an alternative community pathway.

Available drug testing

Accuracy of drug testing is limited by two main variables: the quantity at which a drug is detectable in the specimen, and the rate at which it is eliminated from the body. A range of bodily specimens can be tested (breath, hair, saliva, sweat). Due to cost and accuracy, the two most routinely tested are urine and blood. For the best results, blood should be sent within 24 hours and urine within 96 hours, although urine specimens within 24 hours are preferred.[18]

Urine

Urine drug testing is the most widely used. Urine drug analysis demonstrates exposure of the individual to the drug but does not provide information regarding toxicity. Two testing methods are available, enzymatic immunoassay (EI) or gas chromatography (GC).

EI is a quick and cost-effective method to screen for several common drug classes. However urine EI can be significantly affected by both false-negative and false-positive results. False-negative results are common primarily because the range of drugs covered by EI is limited. In a prospective cohort study of 100 trauma patients published in 2022, over half had psychoactive drugs or drug metabolites in their urine that were missed by EI.[35] False-negative results can also occur when the person using the drugs avoids detection by adding interfering substances to or dilutes the urine sample.[36] In emergency settings, this is less of an issue than community monitoring. Clinicians should appreciate that false-positive results with EI are relatively common compared with other drug assays used in therapeutic drug monitoring. For example, prescribed medications such as bupropion, chlorpromazine and trazodone can result in a false-positive amphetamine result on urine EI.[37] The rate of false positives compared with true positives will increase if urine drug screening is applied to patients with low pretest probabilities of having taken drugs of interest. Therefore, it is vital urine EI is used in selected patients and the patient's other medications are recorded. The gold standard assay which can be used to confirm urine EI is GC, also known as mass spectrometry. GC identifies the presence of specific drugs based on their molecular fingerprints. However, it is expensive, has limited availability nationally and a significantly longer wait time for results. It is therefore unlikely to affect ED management but could be used for confirmatory testing.

Blood

Blood is the only biofluid that provides data on toxicity. However, broad drug screens on blood are challenging due to the complexity of the plasma proteome and other components. Therefore, ethanol is the only viable blood drug screen that would provide additional diagnostic information over a urine drug test. As the ethanol level can be quantified, it can be interpreted in conjunction with the patient history.

Patient and public involvement

The concerns and experiences of patients and the wider public are key in considering how best to address spiking on a local and national level. This practice review includes patient and public involvement (PPI) in the form of the case presented and patient coauthorship, which we hope readers will find a valuable insight. The attached supplemental files are a local management guideline (see online supplemental file 1) and patient advice leaflets for drink spiking and injection spiking (see online supplemental files 2 and 3). These were co-designed with a PPI focus group who had significant input into their content and the language used.

CONCLUSION

There is urgent need for research on drink and injection spiking to inform an evidence-based investigative/treatment pathway for patients. While evidence to inform this pathway is currently lacking, an approach that aims to provide diagnostic certainty, addresses psychological sequelae and considers BBV protection is encouraged, as demonstrated in the example guideline attached (see online supplemental file 1). Further research should assess whether this becomes routine practice. The provision of psychological support should be a priority for all patients who have experienced, by definition, a traumatic event.

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