Tidsskriftet Tidsskrift for Den norske legeforening

Intoxication cases in the Emergency Department at a Norwegian University Hospital 2019–20

SHORT REPORT

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Background

Acute intoxication is a common chief complaint in emergency medicine, but there is a lack of up-to-date studies from the emergency departments in Norway on the incidence and prevalence of various toxic substances. The aim of this study was to survey acute intoxications at the emergency department of St Olav's Hospital, Trondheim.

Material and method

In this review of patient records, we used data from the emergency department at St Olav's Hospital in Trondheim in the period 1 January 2019–31 December 2020. All cases with 'acute intoxication' as the reason for the emergency department visit were included.

Results

In a patient population of 836 unique patients, there were a total of 1423 intoxications, of which 168/836 patients (20.0 %) had more than one intoxication episode in the period. The median age was 31 years (interquartile range 22–47), and 395/836 (47.2 %) of the patients were women. Combined drug intoxication constituted 666/1423 (46.8 %) of the cases, and the most frequent intoxications were from ethanol: 802/1423 (56.4 %); benzodiazepines 314/1423 (24.0 %); and opioids 243/1423 (17.1 %). Altogether, 1146/1423 (80.5 %) incidents resulted in hospital admission. There were no deaths during their hospital stay.

Interpretation

Emergency departments must be prepared to manage patients who have taken various poisoning agents. The antidotes must be available, and it must be possible to perform interventions.

Main findings

The emergency department in Trondheim dealt with 1423 case of acute intoxication in 2019–20.

Of 836 unique patients, 668 (80 %) had experienced one episode of acute intoxication, while 30 (3.6 %) had experienced more than five.

The most common poisoning agents were ethanol (802; 56.4 %), benzodiazepines (341; 24.0 %) and opioids (243; 17.1 %), and combined drug intoxication made up 666/1423 (46.8 %) of the cases.

A total of 1146/1423 (80.5 %) cases of intoxication resulted in admission to a medical, psychiatric or drug dependence unit, and no patients died during their hospital stay.

Ingestion of or exposure to toxic quantities of intoxicants, medications or other substances can cause acute intoxication. Ethanol has previously been the most common cause of acute intoxication referrals to hospitals in Norway, followed by benzodiazepines and paracetamol (1–3). The use of poisoning agents varies, both geographically and over time, reflecting trends in substance and medication use. Treating patients with acute intoxication in the emergency department can be clinically challenging (2), as anamnestic information is often sparse and toxicology takes time (1, 2, 4). Previous studies have mapped acute intoxication at a national level in Norway (3, 5) and in the Oslo region (2), but there are no up-to-date studies (2, 3, 5). The aim of this study was to survey acute intoxications at the emergency department of St Olav's Hospital in Trondheim.

Material and method

St Olav's Hospital in Trondheim is a university hospital that serves as a local hospital for a population of around 300 000 and as a regional hospital for around 700 000 (6). The emergency department deals with over 30 000 cases annually (7).

Patient population and data collection

The data were obtained from the emergency department's logistics system *Akuttdatabasen* (version 1.5.5., HelseVest IKT) and supplemented with data from the hospital's record system (DocuLive electronic patient records). Cases assessed in the emergency department as having intoxication – according to the Rapid Emergency Triage and Treatment System (RETTS) (8) – as the reason for contact, and/or results for the search terms 'intoxication', 'intox', 'substance use' or 'overdose' in the free text fields in *Akuttdatabasen,* were selected for inclusion in a manual review of records. Only cases that the review confirmed to be acute intoxication were included in the study.

Ethics

The study was approved by the hospital's data protection officer (ESA no. 16/9114), and the Regional Committee for Medical and Health Research Ethics (REK) considered it to be a quality assurance study (2016/1813/REK Central).

Results

A total of 1423 cases with acute intoxication as the reason for contact were identified at the emergency department of St Olav's Hospital in Trondheim in the period 1 January 2019–31 December 2020. This accounted for 2.7 % of 52 398 total cases. The patient population consisted of 836 unique patients, of whom 168 (20.1 %) had more than one acute intoxication episode during the period, with 30 of these having more than five. Women comprised 395/836 (47.2 %) of the patients and accounted for 660/1423 (46.4 %) of the cases. The median age of the patient population was 31 years (interquartile range 22–47), as recorded at the first event for patients who had experienced more than one event.

A total of 1146/1423 (80.5 %) of the cases resulted in admission to a medical, psychiatric or drug dependence unit. In 254/1 146 (22.2 %) of these cases, the patient was admitted to an intensive care unit (ICU) or high dependency unit (HDU). In 152/1423 (10.7 %) of the cases, the patient's treatment was concluded in the emergency department and they were sent home, and in 122/1423 (8.6 %) of the cases, the patient discharged themself contrary to medical advice. Discharge information was missing for three patients (0.2 %). None of the patients died during their hospital stay. Table 1 shows the distribution of patients admitted to the different hospital departments.

Table 1

Management, interventions and treatment of intoxication at the emergency department of St Olav's Hospital, Trondheim, 1.1.2019–31.12.2020.

Intoxications 2019–20	n (%) N = 1 423
Admissions to medical departments	1 085 (76.2)
Medical ward	414 (29.1)
Observation unit	415 (29.2)
ICU/HDU	254 (17.8)
Other	2 (0.1)
Admissions to psychiatric unit	40 (2.8)
Admissions to drug-related unit	21 (1.5)
Treatment concluded in the emergency department	152 (10.7)
Discharged themselves contrary to medical advice	122 (8.6)
Other/unknown	3 (0.2)
Antidote (one or more) administered	286 (20.1)
Naloxone	119 (8.4)
Flumazenil	117 (8.2)
N-acetylcysteine	102 (7.2)
Activated charcoal administered	54 (3.8)
Gastric lavage	42 (3.0)
Intubation	34 (2.4)
Cardiopulmonary resuscitation (CPR)	2 (0.1)
Haemodialysis	5 (0.4)

Antidote was administered in 286/1423 (20.1 %) cases, with more than one antidote given in 64/286 (22.3 %) of these cases (Table 1). A multidisciplinary medical emergency team consisting of emergency doctors, anaesthetists and nurses was mobilised in 69/1423 (4.8 %) of the cases. Intoxication with ethanol were the most common (802/1423; 56.4 %), followed by benzodiazepines (341/1423; 24.0 %) and opioids (243/1423; 17.1 %). Heroin intoxication accounted for 48/243 (19.8 %) of the opioid intoxication. Combined drug intoxication made up 666/1423 (46.8 %) of the cases. Table 2 shows the gender distribution of the use of poisoning agents.

Table 2

Poisoning agents used in acute intoxication events at the emergency department in Trondheim in the period 1 January 2019–31 December 2020, by gender. The cumulative percentage of poisoning agents is > 100 % as some cases involve combined drug intoxication.

Poisoning agents n (%)	Women (n = 660)	Men (n = 763)	Total (N = 1423)
Ethanol	308 (46.7)	494 (64.7)	802 (56.4)
Benzodiazepines	181 (27.4)	160 (21.0)	341 (24.0)
Opioids	92 (13.9)	151 (19.8)	243 (17.1)
Paracetamol	128 (19.4)	27 (3.5)	155 (10.9)
Antipsychotics	125 (18.9)	28 (3.7)	153 (10.8)
Amphetamine/methamphetamine	35 (5.3)	69 (9.0)	104 (7.3)
Z-hypnotics	73 (11.1)	25 (3.3)	98 (6.9)
Antidepressants	60 (9.1)	9 (1.2)	69 (4.8)
Cannabis	25 (3.8)	38 (5.0)	63 (4.4)
GHB (gamma hydroxybutyrate)	17 (2.6)	36 (4.7)	53 (3.7)
Antiepileptic drugs	30 (4.5)	19 (2.5)	49 (3.4)
Non-steroidal anti-inflammatory drugs (NSAIDs)	40 (6.1)	9 (1.2)	49 (3.4)
Antihistamines	33 (5.0)	6 (0.8)	39 (2.7)
Cocaine	6 (0.9)	20 (2.6)	26 (1.8)
3.4-methyl enedioxy methamphetamine (MDMA)	5 (0.8)	14 (1.8)	19 (1.3)
Methylphenidate	10 (1.5)	5 (0.7)	15 (1.1)
Other[1]	108 (16.4)	95 (12.5)	203 (14.3)

[1] Other intoxicants and medications, including LSD (lysergic acid diethylamide), lithium, insulin, ethylene glycol, new psychoactive substances (NPS), anticoagulants and carbon monoxide (CO).

Discussion

A large variation in poisoning agents was observed in the review of patient records from the emergency department in Trondheim, and almost half of the cases involved combined drug intoxication. As in other comparable studies, the use of ethanol was most common in intoxications, followed by benzodiazepines. Our findings showed higher proportions of ethanol, benzodiazepine and opioid intoxication than a study from Oslo with data from 2008–09 (2), while GHB cases made up a smaller proportion. The proportion of paracetamol intoxications was similar in both studies, but our study showed a higher

proportion of opioid intoxication than paracetamol intoxication (1–3). The A&E clinic in Oslo deals with a large number of intoxications, especially substance-related intoxications, which are referred to hospitals elsewhere in the country (9). This may explain the differences compared to our study.

The age and gender distribution in our study was comparable to previous findings (2), and there were apparent gender disparities in the use of substances and medications. Intoxication with ethanol, opioids, amphetamine/methamphetamine and GHB was more common among men, while women were more likely to use benzodiazepines and medication, which is consistent with previous findings (2, 3).

The Oslo study reported a higher usage of antidotes, charcoal and gastric lavage. The proportion of patients who underwent haemodialysis in our study was similar to that in Oslo, but fewer of our patients required intensive care (2). Previous studies have reported mortality rates of 0.5–1.1 % (1, 2, 5), while in our study, no deaths occurred during the hospital stay.

The study is a retrospective review of activity data, based on cases identified as acute intoxication in an emergency department and registered in *Akuttdatabasen*. This allowed us to examine a large number of real patient events over a two-year period. Combined with a manual review of patient records, this provided a comprehensive and broad insight into cases and the patient population. Events that were not identified or registered in the emergency department for various reasons are not included in the study. Although the number of such events is assumed to be low, their exclusion could be obscuring systematic weaknesses in the source data. Patients receiving care from the ambulance service, a primary care overdose team, an A&E clinic or other external entity were also excluded. Although we assume that the most critically ill patients are sent to the emergency department, we do not know the composition of the rest of the population. The results are based on a manual review and interpretation of patient records in which the quality of documentation varied. Data from 2020 were impacted by the COVID-19 pandemic. We were unable to determine whether this had an effect on the incidence of acute intoxication or the treatment of these in the health service.

Conclusion

The most common causes of intoxication were ethanol, benzodiazepines and opioids, and nearly half of the cases were a result of combined drug intoxication. Emergency departments need to be prepared to provide treatment for a wide range of poisoning agents that can potentially be dangerous and present clinical challenges. Antidotes must be available, and it must be possible to carry out relevant interventions. Most patients needed to be hospitalised, but few were admitted to an ICU or HDU, and no patients died during their hospital stay.

The article has been peer-reviewed.

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Publisert: 24 June 2024. Tidsskr Nor Legeforen. DOI: 10.4045/tidsskr.23.0417
Received 13.6.2023, first revision submitted 29.11.2023, accepted 28.4.2024.