Original Article

An Overview of Suspected and Acute Poisoning in Mater Dei Hospital

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Abstract

An observational study was carried out to give a descriptive overview of acute poisoning in Mater Dei Hospital**.** The aim of the study was to investigate characteristics of patients with suspected acute poisoning by creating a database combining clinical and laboratory data**.** Clinical and laboratory data of 677 patients aged 14 years and over, presenting with suspected acute poisoning, over a nine month period in 2010 were gathered for analysis and graphical presentation.

The peak age for males and females with acute poisoning was 20-29 years whilst another peak was observed for females in the 50-59 years group. Males predominated in the younger age groups (below 50 years). Out of 677 patients with suspected acute poisoning, 350/677 (52%) were diagnosed with acute poisoning and 327/677 (48%) were found to have an alternative diagnosis. The most common poison agents were prescription drugs, of which benzodiazepines and tricyclic antidepressants were the most common (43% and 20% respectively). Opiates were the most commonly detected (59%) drug of abuse and paracetamol was the most commonly ingested analgesic (36.6%). None of the patients died in the hospital. 21% (73/350) and 5% (19/350) of patients with confirmed poisoning required a monitored bed and intensive care respectively.

The study demonstrated trends in patient characteristics, commonly used agents and outcomes of patients with acute poisoning in the local setting.

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Keywords

Acute poisoning, descriptive study, clinical scores, Poison Severity Score.

Introduction

Suspected acute poisoning is a common condition presenting to the emergency department. Management depends on an accurate diagnosis based on history, physical examination and toxicological analysis. An observational study was carried out to give a descriptive overview of acute poisoning in Mater Dei Hospital**.**

Aim and objective

The aim of the study was to investigate characteristics of patients with suspected acute poisoning by creating a database combining clinical and laboratory data.

Methods and materials

Mater Dei Hospital is an acute general hospital with an emergency department that registers more than 100,000 patients per year. After obtaining approval from the University Research and Ethics Council, a database including 677 patients was created from data extracted from clinical notes, discharge summaries and laboratory results. Subjects included consecutive patients aged 14 years and over requiring toxicology investigations over a nine month period in 2010. Cases with insufficient information or unclear diagnosis were excluded.

The collected data were organized into fields and grouped as follows:

a. Patient age, gender and past medical, psychiatric and drug history including history of drug abuse.
b. Information related to the suspected poisoning event.
c. Clinical presentation.
d. Glasgow Coma Scale (GCS) and Modified early Warning Score (MEWS).
e. Toxicology analysis results.
f. Final diagnosis.
g. Outcomes (level of care and Poison Severity Score).

The Modified Early Warning Score (MEWS) is a composite clinical score (Table 1) based on physiological parameters and has been validated as a prognostic tool in observation and medical wards.[1-4]

***Table 1**: An example of a Modified Early Warning Score.*[4]

Physiological parameters	3	2	1	0	1	2	3
Respiration Rate		≤8		9-14	15-20	21-29	≥29
Heart Rate		≤40	41-50	51-100	101-110	111-129	≥129
Systolic BP	≤70	71-80	81-100	101-199		≥200	
Temperature		≤35	35.1-36	36.1-38	38.1-38.5	≥38.6	
Level of Consciousness				Alert	Voice	Pain	Unresponsive

Outcomes were defined by the level of care and the Poison Severity Score (PSS).[5] The PSS is a composite score based on graded abnormalities of physiological systems and is expressed as 5 grades of organ injury: grade 0 - no injury, grade 1 - mild injury, grade 2 - moderate injury, grade 3 - severe injury and grade 4 - death and has been validated in acute poisoning.[5-12] Symptoms and signs are graded for each physiological system in increasing severity.

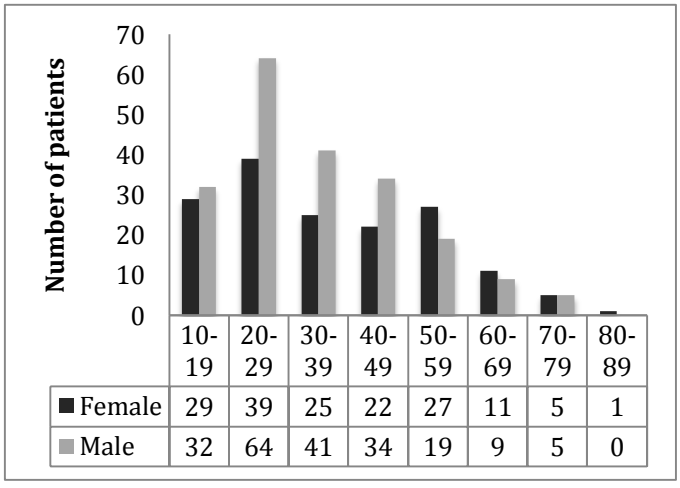
The data were inputted into a MS Access database which was modified to calculate the MEWS and PSS values automatically. The data were transferred to a MS Excel spreadsheet for analysis and graphical display.

Results

Age and gender distribution

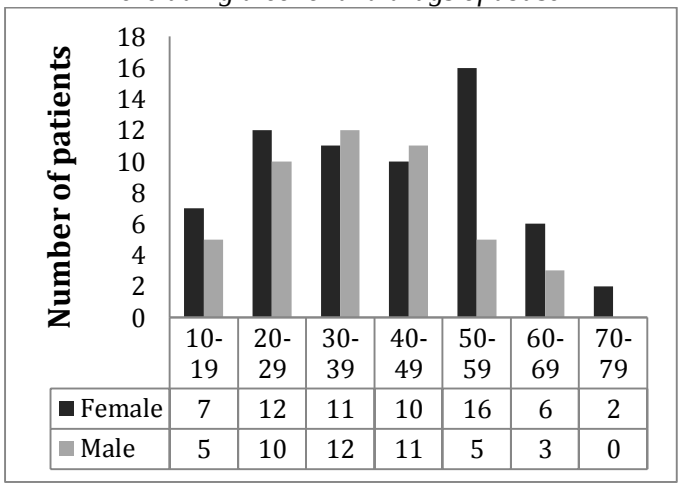
The distribution for age and gender for patients with acute poisoning is shown in Figure 1.

***Figure 1**: Age /gender distribution for all cases diagnosed with acute poisoning*



The peak age for males and females was 20-29 years whilst another peak was observed for females in the 50-59 years group. Males predominated in the younger age groups (below 50 years) whilst females predominated in the 50-69 age groups. There were no gender differences in the 70-79 years group. Figure 2 shows a predominance of females in the 10-29 and over 50 years age groups in a subgroup of patients excluding alcohol and drugs of abuse.

***Figure 2**: Age/gender distribution for drug overdose excluding alcohol and drugs of abuse*



Source of report of poisoning and reason given for poisoning

The source of the report of poisoning is often the patients themselves or the relatives as shown in Table 2. When available, the reason for the poisoning event was recorded for all drugs, analgesics and street drugs as shown in Table 3. Suicidal intent was admitted in 40% of patients with acute poisoning whilst self-harm was the intention in 3%.

***Table 2**: Source of report of suspected poisoning*

Source of Report	Number (%)
Patient	144 (41%)
Relative	24 (7%)
Friend	8 (2%)
Police/Guard	4 (1%)
Other	6 (2%)
None	164 (47%)

***Table 3**: Stated intent for acute poisoning for all drugs, analgesics and street drugs*

Intent	All Drugs	Analgesics	Street Drugs
Accidental			
Suicide	59 (40%)	8 (80%)	4 (25%)
Substance abuse	21 (14%)		10 (63%)
Self harm	5 (3%)		
To forget	16 (11%)		
To sleep	8 (5%)	1 (10%)	
Domestic fight	19 (13%)	1 (10%)	1 (6%)
Alcohol abuse	12 (8%)		
Call for help	2 (1%)		
Pain relief	1 (1%)		

Other reasons given for acute self poisoning included 'to forget' (11%), 'to sleep' (5%), pain relief (1%), and following a domestic fight (13%). Alcohol and substance abuse constituted 8% and 14% of cases respectively. Only 1% admitted to a call for help and 2% were accidental.

Differential diagnosis of suspected acute poisoning

The differential diagnosis of patients with suspected acute poisoning is shown in Table **4**. Out of 677 patients with suspected acute poisoning, 350/677 (52%) patients were diagnosed as acute poisoning of which 35% were further classified as acute drug overdose, 15% as alcohol intoxication, 1% as acute drug toxicity and 1% as chemical ingestion. 327/677 (48%) patients had an alternative diagnosis which was further classified into acute medical condition (19%), chronic drug toxicity (2%), epilepsy (5%), acute psychiatric episode (6%) and trauma (16%).

***Table 4**: Final diagnosis of patients with suspected acute poisoning*

Diagnosis	Number (%)
Acute medical condition	126 (19%)
Epilepsy	37 (5%)
Drug toxicity	14 (2%)
Acute psychiatric condition	44 (6%)
Trauma	106 (16%)
Alcohol intoxication	99 (15%)
Drug overdose	235 (35%)
Acute drug toxicity	9 (1%)
Chemical ingestion	6 (1%)
Fume inhalation	1 (0.1%)
TOTAL	**677**

Poison agents

Major classes of poison agents that were used are shown in Figure 3. The largest group included prescription drugs, of which benzodiazepines (43%) and tricyclic antidepressants (20%) were the most frequently used (Table 5). Opiates (59%) were the most commonly used drugs of abuse (Table 6). whilst paracetamol (36.6%) was the most commonly ingested analgesic (Table 7).

***Figure 3**: Distribution of major poison agents*

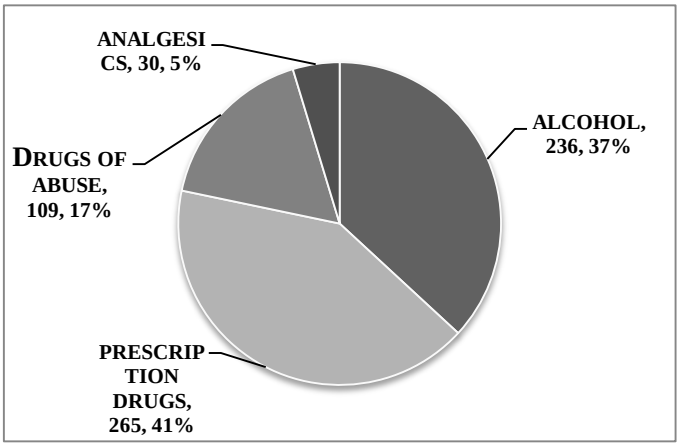


***Table 5**: Distribution of prescription drugs*

Prescription Drugs	Number (%)
Anticholinergic	7 (3%)
Anti-Epileptic Drugs	13 (5%)
Antihistamine	11 (4%)
Atypical Antipsychotic	13 (5%)
Benzodiazepine	113 (43%)
Methadone	12 (5%)
Phenothiazine	3 (1%)
SNRI	6 (2%)
SSRI	21 (8%)
TCA	53 (20%)
Tetracyclic	3 (1%)
Misc	10 (4%)

***Table 6**: Distribution of street drugs*

Street Drugs	Number (%)
Opiate	64 (59%)
Cocaine	24 (22%)
Amphetamine	8 (7%)
Ecstasy	6 (6%)
Cannabis	4 (4%)
Mephedrone	3 (3%)

***Table 7**: Distribution of analgesics*

Analgesics	Number (%)
NSAID	9 (30%)
Paracetamol	11 (36.6%)
Opiate Analgesic	8 (26.6%)
Opioid Analgesic	2 (6.6%)

Disposition and level of care

Disposition of patients with confirmed poisoning is presented in table 8. None of the patients died in the hospital, whilst 21% (73/350) and 5% (19/350) of patients with confirmed poisoning required a monitored bed and intensive care respectively.

***Table 8**: Distribution of disposition of patients with acute poisoning*

Outcome	Number (%)
Ward	196 (56%)
Monitored bed	73 (21%)
ITU	19 (5%)
Discharged	42 (12%)
Self-discharged	20 (6%)
Total	**350**

Clinical scores

Table 9 and Figure 4 show the distribution of the Glasgow Coma Scale (GCS) and the Modified Early Warning Score (MEWS) in patients with acute poisoning. The distribution of the Poison Severity Score (PSS) is shown in Figure 5 whilst the percentage of moderate to severe poisoning (PSS grade of 2 or more) was higher in the age groups greater than 50 years as shown in Table 10.

***Table 9**: Distribution of GCS in patients with acute poisoning*

Glasgow Coma Scale	15	14	13	12	11	10	9	8	7	6	3
Number of patients	68	16	10	1	2	1	2	3	1	1	9

***Figure 4**: Distribution of Modified early Warning Score (MEWS) in patients with acute poisoning*

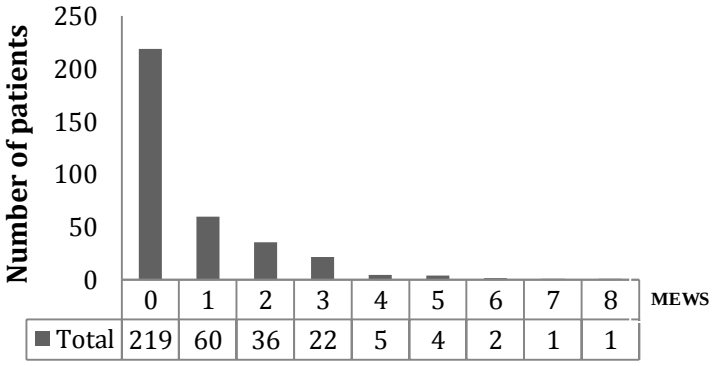


***Figure 5**: Distribution of Poison Severity Score (PSS) in patients with acute poisoning*

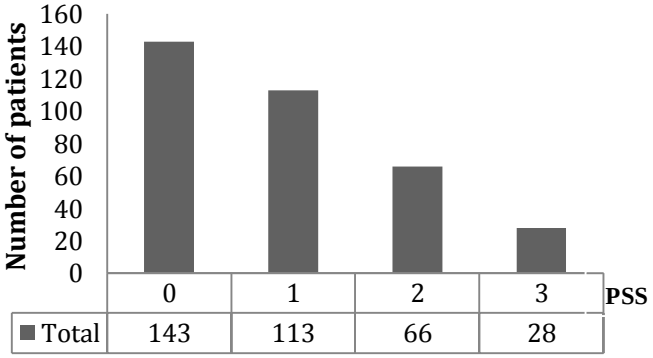


***Table 10**: Age distribution of acute poisoning comparing mild organ injury (PSS≤1) with moderate/severe organ injury (PSS>1)*

Age	No or mild organ injury (PSS≤1)	Moderate to severe organ injury (PSS>1)
10-19	75%	25%
20-29	73%	27%
30-39	80%	20%
40-49	76%	24%
50-59	61%	39%
60-69	67%	33%
70-79	70%	30%
80-89	100%	0%

Discussion

Age and gender distribution

The male preponderance of patients with confirmed acute poisoning in patients <50 years old and the reversal of the gender ratio in the 50-69 age groups contrasts with other studies showing a prevalence of females in the younger age group.[13-15] However the male predominance is likely to be due to the inclusion of alcohol intoxication and street drug abuse as shown in

the female predominance in the subgroup that excluded these cases (Figure 2).

Source of report of poisoning and reason given for poisoning

The study showed that patients and relatives were the main source of a history of acute poisoning. Most cases of acute poisoning were self induced with the most common reasons being suicide/self-harm and recreational, whilst only 2% were accidental.

Differential diagnosis

Only 51.7% (350/677) of patients requiring toxicology investigations had a diagnosis of acute poisoning. A significant proportion of this group (15%) was diagnosed as primary alcohol intoxication and only 35% had a confirmed drug overdose. The relatively low rate of positive laboratory diagnosis of a drug overdose reflects the low threshold for requesting toxicology investigations.

Poison agents

The common use of benzodiazepines and tricylic antidepressants in prescription drug poisoning reflects underlying psychological mechanisms and trends in psychotropic medication use. The preponderance of opiate poisoning among drugs of abuse is likely due to widespread regular use in the community and also the tendency to necessitate hospitalization because of respiratory depression when compared to occasional recreational/party use of stimulant drugs. The availability of paracetamol as an over the counter analgesic may explain its preponderance.

Disposition and level of care

A significant number of patients with confirmed acute poisoning (12%) were discharged. There were no deaths and only 5% required intensive care. This contrasts with a study of 226 patients with acute poisoning that whilst similarly reporting no deaths, 84/226 (37%) patients were admitted to intensive care.[2] It is however difficult to compare hospital practices since indications for intensive care and monitored areas may vary.

In Mater Dei Hospital, patients with actual or potential cardiovascular complications but without respiratory compromise are admitted to a monitored area. This would compare with the combination of patients (26%) in the local study admitted to either ITU (5%) or a monitored area (21%).

Clinical scores and the Poison Severity Score

The distribution of the GCS and MEWS shows that the majority of patients with acute poisoning are alert and stable. The higher rates of moderate to severe injury in the elderly groups is similar to a study which showed that severe poisoning was more common in males aged over 45 years.[14]

Limitations

Possible sources of bias include the retrospective design of the study, the limitation of subject inclusion to patients requiring toxicology analysis and missing clinical data. Although the final diagnosis in each case was extracted from discharge notes and laboratory results, the interpretation was made by a single author.

Conclusion

The study demonstrated trends in patient characteristics, commonly used agents and outcomes of patients with acute poisoning in the local setting.

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