An Overview of Intubations for Drug Overdose at Gold Coast Hospital and Health Service: A Retrospective Cohort/Descriptive Study

Background

Recreational and prescription drug overdoses are common reasons for patients to present to the emergency department (ED). The substances involved are varied and often a high index of suspicion is required to ensure appropriate investigation and management.(1) Drug-related presentations can be complicated by polypharmacy. Lack of appropriate attainable history may also cloud the clinical picture. Patients present with a variety of signs and symptoms ranging from a recognisable toxidrome, to agitation or complete unresponsiveness. There are often a mix of intentional and unintentional overdoses and a mental health component may coexist.

Many of these presentations require only a brief period of supportive care.(2) However, a number of patients present critically unwell and require emergency intubation for a variety of indications. These range from those requiring sedation for physical agitation to those with a severely depressed level of consciousness and loss of airway reflexes. Most intubated patients will be transferred to the intensive care unit and have a prolonged hospital stay.(3)

The clinical decision to intubate the suspected toxicology patient is difficult due to the uncertainty regarding identification of the suspect substance, the quantity involved, as well as the necessity to exclude an underlying organic cause.(4) This requires senior clinician experience to attempt prediction of the anticipated clinical course, requirement for ongoing organ support, and assess the urgency of further investigation which may be time critical.(5)

The aim of this retrospective cohort/descriptive study is to provide an overview of the common presentations, drugs involved and the outcome of the

toxicology cohort who required emergency intubation at Australia's busiest emergency department over an 18-month period.

Population

Patients who required intubation in the Gold Coast University Hospital (GCUH) and Robina Hospital EDs due to a suspected primary overdose / toxicological cause.

Intervention/Exposure

Intubation for less than 12 hours
Intubation for greater than 12 hours

Outcomes

Primary Outcome: length of stay

Secondary Outcomes:
Length of time to extubation;
Admission to ICU;
Morbidity (complications such as aspiration, renal failure, cardiac arrest, hypotension, hypoxia ED extubationetc);
Mortality;

Hospital Site

GCUH and Robina Hospital are teaching hospitals in southeast Queensland, Australia. GCUH is a mixed adult and paediatric level 1 trauma centre with over 100,000 ED presentations annually. Robina Hospital is a mixed urban district hospital with over 60,000 ED presentations annually.

Inclusion Criteria

Patients intubated at GCUH and Robina Hospital EDs secondary to suspected prescription or recreational drug/s regardless of the specific indication for intubation.

Exclusion Criteria

Patients intubated out of hospital.
Patients intubated for an alternative indication than toxicology.
Patients with a toxicological presentation who did not require intubation.
Patients transferred from another hospital.
Age under 18.

Answerable Question

What is the demographic makeup and clinical outcome of patients presenting to GCUH and Robina hospitals requiring intubation for suspected drug overdose / toxicology?

Study Design

Retrospective cohort/descriptive study. Evaluate patients intubated with a primary indication of 'toxicology' gathered from an existing database of all emergency department intubations at GCUH and Robina Hospitals between February 2021 and June 2022. A database for quality improvement and audit purposes has been kept by the department for eight years, resulting in previous publications.(6, 7) Cases marked as toxicology/overdose presentations will be included in this research.

A low/negligible risk ethics application will be completed with appropriate waiver of consent sought, given the retrospective and deidentified nature of the project.

Principal investigator (Pellatt) will conduct chart review with assistance from co-investigators (Kaushal, Kinloch, Rahim). Data to be analysed and manually collected from iEMR records. Data will be deidentified and stored on a secure drive in the ED research office.

All data will be anonymised and unidentifiable. During data collection, identifiable data will be converted to a unique sequenced numerical identifier, and date of birth will be converted to age only. Address or any identifiable features will not be stored. Data will be accessed by the study lead (Pellatt) and three Bond medical students assisting with the work as part of their MD projects (Kaushal, Kinloch, Rahim). During write up, data is to be represented in table and graphical format, with no identifying features. In this sense it will be deidentified for publication.

Analysis of data will involve descriptive statistics and more detailed multivariate analysis. Medians and proportions will be used to describe patient characteristics. The chi-square test will be used for binary and categorical variables. Mann-Whitney U test will be used for other appropriate variables. A p value of < 0.05 will be considered significant.

Analysis will proceed with an intubation time of 18 hours (i.e. prior to extubation) as the cut-off between the two groups.

Data will be stored on a secure drive in the ED research office, which is locked and only accessible to select clinician researchers. Data will be stored for five years after publication in line with national guidelines, and then safely destroyed.

Results will be submitted to an appropriate medical journal for publication. We anticipate in the first instance this will be *Emergency Medicine Australasia*. Results will be disseminated at a local level at GCUH and Robina Hospital departmental meetings and at a national/international level at the Australasian College of Emergency Medicine Annual Scientific Meeting. Results may also be shared at toxicology-specific conferences. Results will be summarised in infographic form for distribution online and to reach a broader, non-scientific and non-medical group of people.

Sample Selection

Patients intubated at GCUH and Robina Hospital EDs between February 2021 and September 2023 with a documented toxicology or overdose indication, either through collateral history, confirmation on testing, or at high index of suspicion from the treating clinician.

Primary Outcome of Interest

Length of hospital stay

Secondary Outcome Variables

Demographic features

- sex
- age
- ATS triage category (1-5)
- past medical history

Drug factors

- main confirmed or suspected drugs
- other drugs involved

- polypharmacy
- recreational vs misadventure vs self-harm

Clinical observations prior to intubation

- GCS 3-15 including motor score
- systolic blood pressure
- heart rate
- respiratory rate
- oxygen saturations

Intubation details

- indication for intubation
- airway management prior to and separate from intubation
- airway grade
- immediate complications of intubation

Investigations

- Venous blood gas sampling
- ECG findings
- CXR findings
- CTB findings

Management

- antidotes
- toxicology consultation
- dialysis

Outcomes

- length of ICU stay
- length of hospital stay
- time to extubation
- disposition from ICU
- complications in hospital

- in hospital mortality

Ethics and Consent

As a deidentified retrospective review of data, we are completing a low-negligible risk ethics application. There are no risks to the study lead or co-investigators. In line with s2.3.10 of the National Statement, a waiver of consent has been provided.

Cohort Sizes

Over 300 patients were intubated at GCUH and Robina Hospital EDs in an 18-month period between 2021 to 2022. We anticipate approximately one third of these (100-125 patients) will have a primary indication of toxicology or overdose, based on previous airway registry work conducted and published in this health service.(6)

Setting

GCUH and Robina Hospital EDs, Queensland, Australia.

Funding

Not required.

Researcher	Estimated hours	Pay classification/point *before* oncosts	Total in-kind contribution $ including oncosts
Dr Richard Pellatt		MMOI1.02	No cost: part of role
Dr Matthew Fairnington		MEDPHO.01	No cost: part of role
Prof Gerben Keijzers		MMOI3.01	No cost: part of role
Dr Phillip Jones		MSREG.01	No cost: part of role
TOTAL			**NO OVERALL COST**

Projected Timeline

June 2022	- ethics application
July-November 2022	- data collection
November-February 2023	- data analysis, write up and review
February-June 2023	- publication and presentation

Investigators

Dr Richard Pellatt	- principal investigator
Dr Matthew Fairnington	- associate investigator
Mr Adiya Kaushal	- associate investigator
Ms Hope Kinloch	- associate investigator
Mr Ahmed Rahim	- associate investigator
Dr Philip Jones	- associate investigator
Ms Amy Sweeny	- associate investigator
Prof Rob Ware	- associate investigator
Prof Gerben Keijzers	- associate investigator

References

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