Acute Management of Drug Overdose in Adolescents

Patients with drug overdose or substance abuse present as unconscious, hyperstimulated, or with psychotic features. Acute management includes basic life support protocol, sedation, as well as symptomatic and supportive treatment. Antidotes should be given if available. Oral drug overdose requires GI decontamination using activated charcoal and gastric lavage. Incidents of drug abuse can be decreased through parental monitoring and supportive family relationships.

Overview

Drug overdose is the most common cause of acute poisoning worldwide.
Acute management of drug overdose involves basic life support protocols. An **ABC (Airway, Breathing, and Circulation) approach** should be initiated. **Supportive and symptomatic care is the main treatment modality.** GI decontamination and pharmacological interventions are then used to reverse the side effects of an overdosed drug.

History, examination, and investigations are done alongside a **resuscitation approach.** There is a difference in the drug-related vocabulary of health practitioners and drug abusers. It is, therefore, important for a healthcare provider to have an idea of these locally used names.

**History of Drug Overdose**

History is indispensable in the diagnosis and appropriate management. **The patient himself may not be able to give an accurate history;** therefore, a detailed history from the caregivers or persons at the scene must be sought out.

**It is important to ask specifically about the drug history**—the type and quantity of the drug used, the time elapsed, as well as the route of administration. A past history of psychiatric illness and suicide is also important.

**Interview questions**

1. Weight loss?
2. Mood swings?
3. Problems with sleep?
5. **CRAFT** screening tool

**CRAFT screening tool**
Have you ever ridden in a CAR driven by someone including yourself who was “high” or had been using alcohol or drugs?

Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?

Do you ever use alcohol or drugs while you are by yourself (ALONE)?

Do your family or FRIENDS ever tell you that you should cut down on your drinking or drug use?

Have you gotten in TROUBLE while you were using drugs or alcohol?

Physical Examination of Drug Overdose

A physical examination includes the monitoring of the vital signs; blood pressure, heart rate, respiratory rate, temperature, and oxygen saturation. It helps in the assessment of the severity of the patient’s condition.

Some physical signs give clues regarding the type of drug used:

- Small pinpoint pupils (miosis), multiple intravenous track marks, depressed respiratory rate, and phlebitis in opioid poisoning.
- Small pinpoint pupils, increased salivation, chest congestion, depressed mental state, muscle fasciculations, and bradycardia in organophosphate poisoning.
- Nasal septal damage, palpitations, tachycardia, and anxiety in cocaine users.
- Hot dry skin with delirium in atropine overuse.
- Bitter almond smell of cyanide poisoning.
- Hyperventilation in aspirin overdose.

Clinical Features of Drug Overdose

Patients with drug abuse usually present with one of the following 3 states:

1. Unconscious patients

These patients are more likely to be affected by CNS depressants like opiates and benzodiazepines. Airway support is the priority in these patients.

2. Hyper-stimulated patients

Amphetamine, cocaine and other stimulants produce hyperstimulation. Cardiovascular and neurological assessment is important as they are prone to develop cardiac arrhythmias and seizures.

3. Patients with acute psychotic conditions

Exposure to stimulants and cannabinoids may result in acute psychotic episodes. These patients are at risk to staff and themselves. Chemical sedation with short-acting benzodiazepines and antipsychotics is a priority.

Clinical presentation

<table>
<thead>
<tr>
<th>Drug</th>
<th>Clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Disinhibition, slurred speech, ataxia, emotional lability, “blackouts”</td>
</tr>
<tr>
<td>Marijuana</td>
<td>Euphoria, red conjunctivae, dry mouth and throat, increased appetite, impaired reaction time, gynecomastia (chronic use)</td>
</tr>
<tr>
<td>Stimulants</td>
<td>Hyperalertness, restlessness, agitation, aggression, paranoia, tachycardia, hypertension, arrhythmias, dilated pupils, seizures</td>
</tr>
<tr>
<td>Opioids</td>
<td>Drowsiness, euphoria, flushing, floating feeling, constipation, miosis, respiratory depression, hypotension</td>
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<td>---------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>Dizziness, heightened sensual awareness, nausea, hallucinations, flushing, elevated temperature, tachycardia, mydriasis</td>
</tr>
<tr>
<td>Inhalants</td>
<td>Dizziness, <strong>headaches</strong>, slurred speech, sleepiness, lacrimation, rhinorrhea, mucous membrane irritation, ataxia, impaired memory</td>
</tr>
</tbody>
</table>

### Outpatient Management of Drug Abuse Cases

- Outpatient management requires structured programs, the willingness of regular follow-ups by the patient, and intensive counseling.
- Realistic goals to quit drugs.
- Psychological interventions (therapy).

### Indications for Inpatient Management

- All patients with suspected acute poisoning should be admitted for observation.
- They should also be admitted if they are at risk to harm themselves or others.
- Failure of sufficient outpatient therapy.
- Severe medical or psychiatric morbidity.
- Detoxification.

### Diagnostic Steps

1. Screen for other mental health problems
2. Laboratory findings (urine and/or blood)
   - HIV testing
   - STD testing if indicated
   - Testing should target problem
3. Drug testing if necessary or if hospitalized

### Management of Specific Drugs Overdose

#### Paracetamol

Paracetamol is the most common drug overdose in the United States. Its overdose causes liver damage (hepatotoxicity).

A Rumack–Matthew nomogram is used to predict the adverse effects depending upon the paracetamol blood levels and administration of an antidote. The nomogram can only be used if the paracetamol overdose occurred within the last 24 hours.

N-acetylcysteine is the specific antidote of paracetamol overdose. It should be started as early as possible, either orally or intravenously, for maximum efficacy.

#### Amphetamines and Cocaine

They are sympathomimetics and stimulate cardiac and neurologic systems.

- CNS stimulant: Euphoria, psychosis, seizures, hallucinations, delirium,
agitation, and may cause a stroke.
- Cardiac stimulant: Hypertension, palpitations, hyperthermia, and may precipitate an acute coronary syndrome.
- A serotonin syndrome may occur if a patient is already on SSRIs or SNRIs.

**Management**

The management is symptomatic and supportive.

- Agitation seizures and hypertension: Benzodiazepines.
- Arrhythmias: Sodium bicarbonate and amiodarone.
- Hyperthermia: Intravenous fluids and ice packs.
- Acute coronary syndrome (ACS): aspirin, nitrates, and opiate analgesics.

**Ecstasy (MDMA)**

3, 4-Methylenedioxymethamphetamine (MDMA), commonly called ecstasy, is a drug used as a recreational activity, especially by teenagers at dance parties. It increases the intimacy, sex drive, and causes euphoria.

- It stimulates CNS and cardiac systems resulting in delirium, seizures, palpitations, hypertension, and anxiety.
- It also causes bruxism.
- It causes hyperthermia and increases thirst.
- Hyponatremia occurs due to increased water intake as a result of hyperthermia and thirst.

The treatment of an ecstasy overdose is similar to that of amphetamine overdose. Hyponatremia is treated by using hypertonic saline.

**Opiates**

Small pinpoint pupils (miosis), depressed mental state, and shallow slow breathing (<10 breaths per minute) are suggestive of opiate overdose.

**Complications**

- Respiratory failure (hypercapnia)
- Hypothermia
- Rhabdomyolysis
- Aspiration pneumonitis
- Pulmonary edema (Non-cardiogenic)

**Management**

- Oxygen and respiratory support take priority in all patients suspected of opiate poisoning.
- Naloxone, an opiate receptor antagonist, reverses the effects of opioid overdose.
- Supportive care including intravenous fluids, re-warming in the case of hypothermia, and maintenance of normoglycemia.

**Cannabis**

Acute cannabis intoxication has the following clinical features:
- Anxiety, altered mood, depersonalization
- Agitation, psychosis
- Disorientation, memory impairment
- Tachycardia, palpitations, and paroxysmal atrial fibrillation
- Orthostatic hypotension
- Hallucinations

**Management**

Acute cannabis toxicity is usually NOT a serious problem. Symptoms resolve within 4-12 hours of ingestion.

- Reassurance is often sufficient in acute cannabis toxicity.
- Anti-emetics for nausea and vomiting
- Anti-psychotics
- Benzodiazepines to treat agitation

**Methods of Gastrointestinal Decontamination**

1. **Activated charcoal**

   **Indication:**

   Patient presents within one hour of ingestion of a toxic substance

   **Contraindications:**

   - Decreased level of consciousness.
   - Abused drug has a low binding affinity for activated charcoal, e.g., lithium
   - GI bleeding or GI perforation risk

2. **Gastric lavage**

   **Indication:**

   It is used in situations where a potentially toxic amount of medication has been consumed within one hour.

   **Contraindications:**

   - Compromised airway
   - Ingestion of strongly acidic or alkaline substance
   - GI bleeding or perforation risk

**Antidotes**

The available antidotes for some of the common drugs are given in the table:

<table>
<thead>
<tr>
<th>Indication</th>
<th>Antidote</th>
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<tbody>
<tr>
<td>Anticholinergics</td>
<td>Physostigmine</td>
</tr>
<tr>
<td>Arsenic, Lead, Mercury</td>
<td>BAL (Dimercaprol); Dimercaptosuccinic Acid; Penicillamine</td>
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<tr>
<td>Benzodiazepines</td>
<td>Flumazenil</td>
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<tr>
<td>B-blockers</td>
<td>Glucagon</td>
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<tr>
<td>Cyanide</td>
<td>Nitrite/Sodium Thiosulphate</td>
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<tr>
<td>Digoxin and Cardiac Glycosides</td>
<td>Digoxin-specific Fab Fragments</td>
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<tr>
<td>Ethylene Glycol</td>
<td>Fomepizole</td>
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<tr>
<td>Iron</td>
<td>Desferrioxamine</td>
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<tr>
<td>Isoniazid</td>
<td>Pyridoxine</td>
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<tr>
<td>Methaemoglobin</td>
<td>Methylene Blue</td>
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<tr>
<td>Opioids</td>
<td>Naloxone</td>
</tr>
<tr>
<td>Organophosphates</td>
<td>Atropine; Pralidoxime</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>N-acetylcysteine</td>
</tr>
</tbody>
</table>

**Complications of Drug Overdose**

- Drug overdose leads to serious morbidity and mortality.
- There is an increased risk of endocarditis, hepatitis and HIV among intravenous drug users.
- Addiction: criminal acts to sustain drug activity, theft, prostitution.

**Prevention of Drug Overdose**

- Parents should be the positive role models. They should be aware of their children’s addictions and whereabouts. They should also guide their children and educate them about the harms of substance abuse.
- Children with positive self-esteem and supportive family relationships are less likely to indulge in substance abuse.
- Keep all medicines out of the reach of the children.

**References**


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