Management of Drug Poisoning

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Mutah Faculty of Medicine

- substance taken during Anesthesia
- Induction of Sleep

- overdose :
  1) Metabolic Acidosis
  2) Cardiac failure

Table 1. Most frequent primary suspect drugs in overdose deaths

Drug Name	Deaths
acetaminophen / Paracetamol	115
acetaminophen/HYDROcodone → Opioid	76
methadone Opioid	75
oxyCODONE	61
salicylate Aspirine	49
morphine / مسكن قوي / may take overdose / Abbott / used after surgery	34
fentaNYL transdermal	31
acetaminophen/diphenhydrAMINE Anti Histamine	25
QUEtiapine Schizophrenia / انفصام الشخصية	24
buPROPion Prescription drug / Depression	21
verapamil Ca^{+2} channel blocker	20
diltiazem	16
amitriptyline Depression	16
acetaminophen/oxyCODONE	16
cardiac glycoside	15

Poison Control Centers data for 2008[1]

Q) what are the **Causes of death in drug poisoning**? (for each!)

- **CNS depression: Narcotics, sedative-hypnotics** (→ Type of drugs: strong sedative)
- **CVS toxicity: Digitalis, Cocaine**
- **Cellular hypoxia: Cyanide and CO** (→ O_2 in arteries is below Normal level)
- **Convulsions: Cocaine**
- **Organ system damage: Paracetamol**
- **Accidents** — Patients may take more than they should (Overdose) w/ out them knowing!

ABCD of Poisoning treatment

كيف أتعامل مع مريض overdose ؟

- A: Airway
- B: Breathing
- C: Circulation
- D: Dextrose => like glucose, I give it with IV fluids.
"مصدر طاقة"

Prevention of further absorption of the poison:

- **Remove patient from the toxic environment** (chemicals, like gases)
- **Measures of decontamination**: (like clothes)
- **Removing toxins from:**
  - **Skin**
  - **GIT:** (damage for tissues)
    - **Emesis** (not in petrolium nor in corrosive poisoning) (vomiting)
    - **Gastric lavage** ⇒ غسل المعدة
    - **Activated charcoal** ⇒ binds w/ the poisons and Inactivate them

Q) All the following are, except ?

Principles of treatment of poisoning ?

- **ABCD of poisoning treatment**
  - **A: Airway, B: Breathing, C: Circulation, D: Dextrose**
- **Diagnosis; history, exam, investigations**
- **Prevention of absorption of the poison:**
  - **Skin, GIT (Emesis, G lavage, Activated Charcoal)**
- **Specific antidote** ⇒ if I knew what have been takes !
- **Enhancing elimination of toxins by:**
  - **Haemodialysis or alteration of urinary pH**

Filtration of Blood غسيل الكلى

Q) Facts About

Activated charcoal, except ?

- Reduces drug absorption
- Better than emesis or gastric lavage
- Safer, easier, adsorb toxic substances
- Binds to and inactivates many drugs → Poisons
- Does not bind iron, lithium, corrosive acids and alkali
  Q) What it can't bind w/ ?
  Q) time →
- Given early within one hour of poisoning

Q/ Specific antidote ?

Drug	Antidote
Paracetamol	Acetylcysteine
Iron	Desferoxamine
Digitalis	Digoxin antibodies
Benzodiazepines	Flumazenil
Opioids	Naloxone
OPI (CE inhibitors)	Pralidoxime

Enhancing Elimination of Toxins

- **Haemodialysis:**
  - Aspirin, Lithium, Carbamazepine → Epileptic seizure
- **Urinary pH alteration:**
  - Urine alkalinazation: aspirin → because it's weak acids
  - Urine acidification: amphetamines → because it's weak base

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Examples of Common Poisoning

لأنه متوفر بكل بيت

Paracetamol (Acetaminophen)

- Most common suicide drug
- Ingestion of 7 g total (adults) is toxic
- A highly toxic metabolite (NABQI) is produced in the liver leading to depletion of the protective hepatic glutathione
- Patient is asymptomatic initially → NO symptoms
- After 24–36 hours, hepato-renal failure and even death may occur

Q) What if the Patient in →

Paracetamol poisoning

What should we do?

- **Early treatment (within 8 hrs) is important**
- **N-acetylcysteine IV or methionine orally to increase hepatic glutathione**

10 hrs

↳ which fights and Inactivate NABQI

↳ i/AP

Q) What is Name of Paracetamol Antidote?

Pharmacokinetics of Paracetamol

- The highly toxic metabolite is N-acetyl-p-benzo quinonimine (NABQI) conjugates with glutathione
- In overdose toxicity:
  - Excess NABQI
  - Glutathione depletion
  - Then NABQI oxidizes thiol group of enzymes
  - Leading to cell death
- Resulting in hepatic & renal tubular cell damage ?

Q) what causes

Paracetamol (Acetaminophen)

- Serum level > 200 mg/L after 4 hours of ingestion suggests a risk for liver injury
- Acetylcysteine acts as a glutathione substitute, binding the toxic metabolite
- Should be started within 8–10 hours if possible

Anti-muscarinic agents (Atropine-like drugs)

Symptoms :-

- Hot, dry, flushed skin
- Blurred vision
- Delirium
- Tachycardia, mydriasis ↱ Pupils are Wide
- Treatment is supportive

Aspirin (Salicylate)

- Ingestion of > 200 mg/kg
- Hyperventilation, respiratory alkalosis, metabolic acidosis
- Hyperthermia
- Convulsions, coma
- CV collapse

Aspirin (Salicylate)

Treatement ☺

- General supportive care ⇒ deals w/ obvious symptoms
- Gastric lavage
- Activated charcoal
- IV fluid
- IV sod bicarbonate: ↑ faster renal elimination
- Severe poisoning: Haemodialysis filtration of the Blood.

Organophosphorous insecticide poisoning

In farms

- Cholinergic crisis
  - Muscarinic & Nicotinic stimulation
- Pinpoint pupil, sweating, diarrhoea
- Urination, defecation
- Hypotension, bradycardia (slow Heart beats)
- Treatment:
  - Atropine (anti-muscarinic)
  - Pralidoxime (enzyme reactivator) of cholinestrase enzyme → Hydrolysis of Ach.

Other poisoning

- **Iron:**
  - **Childhood poisoning; bleeding**
  - **Desferoxamine** Antidote
- **Opioids:**
  - **Drugs of abuse** / Addiction
  - **CNS & respiratory depression**
  - **Naloxone IV** Antidote

Q) what are Other poisonings ? Ex?

- **Carbon monoxide (CO):**
  - Colorless, odorless gas
  - Results from incomplete combustion
  - Forming carboxyhaemoglobin
  - Interfering with carrying of oxygen
  - Leading to hypoxia

Antidote of
⇒ get the patient out of the toxic environment
⇒ Removal of- clothes
⇒ put him/her in oxygenated Room/ fresh air.

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- **Cyanide poisoning:**
  - Syncope, convulsions, coma
  - Treatment: Cyanide antidote kit consists of:
    - **Nitrites**: induce methemoglobinemia ⇒ Hemoglobin is converted to bind w/ it.
    - **Thiosulfate**: converts cyanide to thiocyanate
      ↳ less in poisening