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Approach to the Patient with Unknown Poisoning

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Poisoning is a common cause mortality and morbidity in India like many other countries in the world. While pesticide poisoning is common in India many other poisoning are emerging like alcohol, sedatives, antipsychotics, anti-depression, cardiovascular drugs, analgesic, antimicrobial, herbal and plant products, household materials, homeopathic medicines and illicit drugs. The toxic agents can enter body by injection, inhalation and through skin. The number of possible causes of poisoning are large and that unless proper diagnosis is made in systematic way the diagnosis may be missed and the patient can be lost. Once diagnosed rational use of treatment will reduce the chance of deaths.

Suspecting possible poisoning are the cause of illness is most important in initating treatment. Factors that raises this suspicion of poinsoning include acute behavioural changes, concerns raised by family members and friends regarding possible poisoning and pills found in patients possession. The importance of taking the detailed history can not be over emphasised. However attempts to identify poison should not delay life saving supportive care.

CLINICAL ASSESSMENT

Poisoning can be present with various clinical symptoms including abdominal pain, vomiting, tremor, altered mental status, seizure, cardiac dysrhythmias, respiratory depression. Some of the vital signs can give a clue to diagnosis.

Toxic Vital Signs

Toxic vital signs such as bradycardia, tachycardia, hypo & hyperthermia, hypo & hypertension, respiratory variability, seizure & coma, odour, cynosis, pupilary size can give clue to the diagnosis (Table 1).

Toxidromes

A collection of symptoms associated with certain classes or poisoning is known as toxidrome which helps in making a diagnosis (Table 2).

Laboratory Test

Routine Test: Measurement of electrolyte, blood urea nitrogen, creatinine, glucose, liver function test, bicarbonate and arterial blood gas analysis should be done in all cases. Blood gas analysis will demonstrate anion gap metabolic acidosis which is seen in methanol, ethelene glycol, acetaaminophen, salisylates, metformin, lacteacidosis. Metabolic acidosis with increasing osmolar gap may be present in poisoning due to methanol, ethanol, ethelene glycole.

Table 1: Toxic Vital Signs and its Causes

- **Bradycardia:** Oleander, organophosphorous poisoning and anticholinisterase drugs, betablockers, clonidine, calcium channel blocker, antiarrythmics alcohol, opioids.
- **Tachycardia:** Anticholinergic, antihistaminics, anti-psychotic, sympathomimetics (Cocoine, Caffeine, Amphitamine) Theophilline, Thyroid hormone, trycyclic antidepressant (TCA)
- **Hypothermia:** Alcohol, Sedatives and hypnotics, Hypoglcaemic agent, opioids, Carbon monoxide.
- **Hyperthermia:** Anticholinergics, antidepressants, antipsychotic, antihisteminics, salicylate, Alcohol withdrawal, Hypertension, Hypotension, Antihypertensive, Rodenticide, Antidepressants, Sedatives, Opiates, Heroin.
- **Hypertension:** Thyroid hormone, cocaine, sympathomyetics, Caffeine, Anticholiergic, Nicotine.
- **Rapid Respiration:** OP Poisoning, Chemical pneumonitis, salicilate toxin included metabolic acidosis and nerve agents, paraquat.
- **Slow respiration:** Sedatives, Alcohol, Opioids, Marijuna.
- **Coma:** Op poisoning, Alcohol, Ethyleneglycol, Tricyclinic Antidepressant, Anti-convulsant agents, anti-psychotics, anti-depressants, anti-histaminics, hypoglycaemic agents, isoniazid, heavy metals, hepatic encephalopathy.
- **Agents causing Seizure:** Organo phosphorous poisoning (OP), Hypoglycaemic agent, isoniazid, salicylate, tricyclic antidepressant, Ethanol withdrawal.
- **Miosis:** Organophosphorous compound and other cholinergic agents, carbamates, opiates, clonidine, phenothiazine, sedatives.
- **Mydriasis:** Anticholinegic (Datura, Atropine), Sympathomimetics.
- **Diaphoresis:** OP poisoning, salicylates, sympathomimetics.
- **Dry skin:** Antihistamines, Anticholinergic
- **Cyanosis:** Dapsons, hypoxia, aniline dyes, nitrate, Ergotamine, Methhaemoglobinomia.
- **Odour :** Garlic - OP Compound, Gasoline - Petroleum products.

Table 2: Toxidrome

Syndromes	Symptoms	Common causes
Cholinergesic	Bradycardia, bronchorrhoea, miosis, salivation, wheezing, diarrhoea, diaphoresis	Organophosphorus, Physostigmine, Pyridostigmine
Cholinergic (Nicotinic)	Abdominal pain, fasciculation, hypertension, paresis, trachicardia, seizure.	Organ phosphorous compound, Nicotine
Anticholinergic	Delirium, mydriasis, tachycardia, hyperthermia, dry skin, urinary retention	Antihistaminics, Atropine, Tricyclic antidepressants, Psychoactive drugs
Opioids	Miosis, sedation, hypotention, hypoventilation, coma, bradycardia	Opioids
Sympathomimetics	Mydriasis, Trachycardia, Hypertention, Seizure, Hyperthermia	Cocaine, Amphetamine, Ephedrine, Theophylline

Serum cholinesterase estimation is a easier way of knowing organophosphorous poisoning.

ECG to be done in all cases particularly cases with dysrhythimias.

Toxicology Screening : The results are difficult to interpret. It's negative result will not exclude poisoning. Large no. of tests are available with high cost, time consuming and difficult to interpret. Therefore it should not be used routinely. Tests specifically related to suspected poisoning should be advised. Drugs whose concentration in blood is associated with treatment recommendations include acetaaminophen, Salicylate, theophiline, lithium, lead, Iron, carbon monoxide, methhaemoglobin, toxic alcohol, anticonvulsant and digoxin may be measured when suspected.

Gastric fluid analysis is helpful for forensic study but of no clinical use.

Urine testing is helpful in certain cases.

Treatment :Management of acute poisoning should start with basic supportive measures. Most patients do well with supportive care alone.

AIRWAY, BREATHING, CIRCULATION (ABC)

ABC has to be stabilized in every patient. Oxygen saturation can be measured using bed side pulse oxymetry. ABG analysis will further help in assessing the metabolic status which will guide the treatment.

Decontamination

Skin Decontaminations : Removal of dress and cleaning of skin with plain water will prevent poison from absorption from the skin. Hence recommended.

Gastrointestinal decontamination : Controversy exists concerning the role of induced emesis, gastric lavage, activated charchol and cathertics in decontaminating gastrointestinal tract.

a. Ipecac induced emesis is no longer recommended for use in the emergency department.

b. Gastric lavage is no longer indicated for most ingestion. It may be considered when patients present within one hour of ingestion. No gastric lavage in corossive poisoning, volatile hydrocarbon, combating patient, unconscious patients. Orogastric lavage can result in death. Hence it is not recommended.

c. Activated charcoal : Activated charcoal can be used within 1 hr of ingestion of potential toxin. However it has not shown survival benefits. It is contraindicated in cases with unprotected airways. Substances not absorbed by activated charcoal are pesticides, potassium hydrocarbon, acid, alcali, alcohol, iron, insecticide, lithium solvent. Substances that are absorbed by activated charcol are antimalarial, barbiturate, carbamazepin, dapson.

d. Cathertics : No definite indications for use. A single dose of sorbitol 1 ml/kg may be considered in poisoning due to sustained release/enteric coated drugs.

e. Whole bowel irrigation : No conclusive evidence that it improved clinical outcome. However it may be considered in ingestion of large doses of enteric coated/sustained release drugs. It is given by infusion through nasogastric tube 1-2 litres of polyethelene glycol.

Anticonvulsant

For toxin induced seizures and alcohol or sedative withdrawal phenytoin is not generally effective. Benzodiazepins, barbiturates and valpoic acid are considered as 1st and 2nd line therapy.

Coma cocktail

In unknown poisoning with unconsciousness the following cocktail can be considered.

a. IV glucose can be given emperically to combat hypoglycaemia. However availability of urgent blood glucose monitoring will avoid emperical therapy. It will be indicated in hypoglycaemic state.

b. Naloxone is an opoid antagonist which may be used in suspected cases of opioid overdose with caution. The usual initial dose is 0.4 to 2 mg in IV

Table 3 : Antidote and their Indication in Poisoning

Antidote	Poisoning where indicated
PAM	Organophosphorous
Calcium	Calcium Channel Blocker
n-acetylcysteine	Acetaminophen
Naloxine	Opioids
Physostigmine	Anticholinergics
Ethanol / Fomepizole	Methanol/ethylene glycol
Sodium bicarbonate	Tricyclic antidepressants
Fab fragments	Digoxin
Nitrites	Cyanide
Hyperbaric oxygen	Carbon monoxide
Dextrose, glucagon	Oral hypoglycemics
Methylene blue	Methemoglobinemia
Deferoxamine	Iron
Dimercaprol	Arsenic
Succimer	Lead, mercury

infusion. Flumazenil should not be emperically used as it can induce seizure.

c. Thiamine should be reserved for alcoholic patients. Thiamine can produce anaphylaxis in certain cases.

ANTIDOTAL THERAPY (TABLE 3)

There should not be indiscriminate use of antidote. The no. of effective antidotes are few. With the exception of naloxone antidote therapy is limited in unknown poisoning. Most poisoning patients can have uneventful recovery with routine supportive care.

Table 4 : Toxins Accessible to Hemodialysis and Charcoal Hemoperfusion

Hemodialysis Useful	Charcoal hemoperfusion useful
Salicylates	Theophylline
Alcohol	Barbiturates
Barbiturates	Carbamazepine
Lithium	Paraquat
Ethylene Glycol	Glutethimide

Extracorporeal elimination

Hemodialysis and charcoal hemoperfusion are helpful in certain poison elimination as mentioned in Table 4.

SUMMARY AND CONCLUSION

Treatment of patient with unknown poisoning is challenging. Careful history, clinical examination, routine test and useful supportive care can save life in many cases. Detecting or suspecting a offending poison helps in improving the survival of patients due to better management. It is not difficult. We can do it.

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