

MEDICAL TOXICANTS

Drugs are biologically active molecules used in the treatment ,prevention & diagnosis of disease. However, drugs have made & will continue to make a major contribution to human health, we must accept the risks attached to these benefit.

The basic mechanisms for the toxicities arising from drugs are:-

- Direct& predictable toxic effects due to over doses.
- Toxic effects occurring after repeated therapeutic doses.
- Direct but unpredictable toxic effects occurring after single therapeutic doses due to idiosyncratic response (peculiar response of an individual to drug).
- Toxic effects due to another drug or substance interfering with the disposition or pharmacological response.

So, we do have a short overview of some of the common medical

Toxicants:-

A. Acetaminophen

Acetaminophen is analgesics for mild & moderate pain which is very safe provided only the normal therapeutic dose .

Acetaminophen is one of the drugs most commonly involved in suicide and accidental poisoning. Initial symptoms after an overdose are mild and non specific, often resulting in delayed arrival for medical care or a missed diagnosis.

Acute ingestion of more than 150-200mg/kg (children) or 7gm (adults) is considered potentially toxic.

Paracetamol is metabolized mainly by conjugation & minor proportion metabolized by oxidation which produces toxic products which detoxified normally.

However, overdoses change the metabolic scheme giving a rise in toxic

metabolite which react with liver proteins & cause tissue damage (leading to hepatic toxicity).

Initially, the victim is asymptomatic or has mild GI upset (nausea, vomiting) which is followed by evidence of liver injury.

Laboratory analysis

-Severity of poisoning is determined from serum acetaminophen level.

-Detection of bilirubin level and prothrombin time can tell prognosis.

-Elevated aminotransferase levels can be seen.

-Monitor blood glucose because in toxic cases hypoglycemia and hyperglycemia have been reported.

The plasma creatinine rises more rapidly than BUN when renal failure is present Liver failure may keep the BUN low.

-Serum amylase is determined because of reports of pancreatitis.

Treatment

-GI decontamination.

-Antidote N-acetylcysteine.

B. Aspirin (salicylate).

Acetylsalicylic acid, commonly known as aspirin, is still one of the most widely used minor analgesics. Salicylate poisoning is a much less

common cause of childhood poisoning deaths since the introduction of child-resistant container and the reduced use of baby aspirin. Salicylates, however still accounts for numerous suicidal and accidental poisonings. Salicylate Poisoning can also result from chronic over medication; this occurs most commonly in elderly victims using salicylates for chronic pain because of impaired biotransformation, excretion & others.

Salicylic acid is then metabolized by conjugation. These conjugation steps are saturable so the half life of aspirin increases significantly with

only small increase in the number of tablets. The first sign of salicylate toxicity is often hyperventilation and respiratory alkalosis due to medullary stimulation.

Metabolic acidosis follows due to accumulation of intracellular lactate as well as excretion of bicarbonate by the kidney to compensate for respiratory alkalosis .

Laboratory tests

-Urine should be tested for pH, the presence of ketone bodies and hemoglobin.

-A rapid qualitative test for the presence of salicylates may be done in urine.

Serum measurements of salicylate are important after acute ingestions.

Treatment

-GI decontamination

-Facilitating diuresis

-Symptomatic management

C- Barbiturates

Barbiturates belong to a class of sedative-hypnotic drugs with abuse potential & a recognized withdrawal syndrome.

Toxic ,manifestations of barbiturates vary with the amount of ingestion type of drug and time elapsed since ingestion.

Lower doses of short acting barbiturates (E.g. pentobarbital) than the long-acting barbiturates (e.g. Phenobarbital) generally cause toxicity.

Mild intoxication resembles that of alcohol intoxication. Moderate intoxication is characterized by greater depression of mental status and severe intoxication causes coma.

Laboratory analysis

1-Plasma barbiturate (e.g. Phenobarbital) levels are helpful for making

a diagnosis but of little value when predicting the severity of the overdose.

2-As with alcohol, chronic abusers of Phenobarbital may have.

elevated serum levels with little CNS depression.

Treatment

1-GI decontamination .

2-Alkalinization of urine .

3-Hemodialysis .