POISONING

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POISON/TOXIN:

- Substance able to produce adverse effects.

- Some of them are poisonous when taken in excessive amount, while some of them in any amount.

Poisoning:

- Local
- Systemic

Severity and reversebility:

- Concentration (dose)

- Contact time

- The potency of the chemical

- Type and condition of the exposed surface

- Functional reserve of the individual/affected tissue

- Presence of secondary complications

- Coexisting illness

Poison

- Caustic
- Neurotoxic (seizure, coma)
- Cardiotoxic -arrest

  -arrhytmias: bradycardia/tachycardia
- Haematotoxic -hemolysis

  -bone marrow depression

  -Prevents O2 carrying capacity
- Nephrotoxic - acute tubular necrose

To evaluate the diagnosis:

- history
- physical examination
- routine/toxicology lab evaluaton

History:

- Time, route and duration of exposure
- Name/amount of each drug/chemical
- Time of onset of the symptoms
- Nature /severity of symptoms
- Post medical and psychiatric history

Physical examination:

Vital signs

Cardiopulmonary and neurological status

Treatment:

- Emergency

- Maintanance

Emergency Treatment:

I) Supportive care (vital sign)

II) Prevention of further poison absorbtion

III) Enhancement of poison elimination

IV) Administration of spesific antidots

I) Supportive care:

- Airway protection
- Oxygenation/ventilation
- Hemodynamic support
- Treatment of seizures
- Correction of temperature abnormalities
- Prevention of secondary complications

All symptomatic patients should have:

- IV line
- O2 supplemetation
- Cardiac monitoring
- Baseline laboratory
- Continous observation

Depression of CNS

Stimulators

- Cafeine
- Coramine
- Na benzoat
- Cardiazol

Depression of respiration:

- O2

- Endotracheal tube

- CNS stimulators

Seizure:

Sedatives:

- Diazepam
- Phenobarbital

Shock:

To increase venous return

- legs are held up
- elastic band is performed to the legs
- fluid perfusion (volume expander)

TA > 85 mmHg
urine putput > 30 ml/h

→ no need a dense treatment
(fluid perfusion is enough)

TA < 85 mmHg
urine output < 30 ml/h
heart rate >110/min

→ fluid perfusion and vasopressor agents

(dopamin,dobutamin, adrenalin, noradrenalin)

II) Prevention of further poison absorbtion

Vomitting:

- Spontaneously
- Sirop d' ipe'ca
- Apomorphine (!!! CNS depression)
- Salt

Vomitting is **contraindicated:**

Caustic, corosive toxins

Petrollium distillation products

Coma, seizures (Aspiration)

II) Prevention of further poison absorbtion

Gastric lavage:

In trandelenburg and left lateral decubitis position to prevent aspiration

It should be performed in first 4 hour (can be delayed to 6 hour in salicylates)

It can be performed later if the poison taken after meals

Gastric lavage is **contraindicated**:

- corosive poisons (acid, alkaline)
- striknine
- petrol distillation products

*It is too late for gastric lavage in a comatose patient; if wanted should be entubated

II) Prevention of further poison absorbtion

Activated charcoal:

-by mouth or by a stomach tube before and after gastric lavage

-as an adsorban for:

alcohol-atropin-morphin-opium

arsenic-barbiturate-nicotin-penicilin

salicylates

II) Prevention of further poison absorbtion

Whole bowel irrigation:

Bowel cleansing solution (electrolytes and polyethyleneglicol).

It may be of particularly benefit in patients with foreign body, drug packed and slow release medication injections

II) Prevention of further poison absorbtion

Dilution:

Ingestion of corrosive (acid-alkaline)

Water or other clean liquid

II) Prevention of further poison absorbtion

Endoscopic or surgical removal:

-Ingestion of a potentially toxic foreign body that fails to transit the GI tractus (potentially lethal amount of a heavy metal-arsenic,iron, Hg, thallium)

-Ingestion of packets of drugs (cocaine)

Enhancement of poison elimination

A) **Multiple dose activated charcoal**

A dose of 1 g/kg for every 2 to 4 hour (with sorbitol as needed to enhance GI motility

Enhancement of poison elimination

B) Force diuresis and alteration of urinary pH

- For the poisons that are excreted by the kidney

(excreted by glomerular filtration and active tubular secretion)

- Renal reabsorbtion of poison is prevented

-Mannitol (20%-250 ml-IV)

*Contraindications:Congestive heart failure, renal failure

- Alkaline diuresis (pH>7.5):

  Na HCO3 / Na lactate added in fluid.

  salicylates, phenobarbital, chlorpropamide

- Acide diuresis

**(not used because of significant risks)

(amphetamines, cocain, quinidine)

*Acid-base balance, Fluid and electrolyte parameters should be carefully monitored

Enhancement of poison elimination

C) Extracorporal removel

- Dialysis
  - -Peritoneal dialysis
  - -Haemodialysis

- Haemoperfusion

- Exchange transfusion

Dialisable molecule:

- Low molecular weight
- High water solubility
- Low protein binding
- small volume of distribution
- prolonged elimination (long half life)
- high dialysis clearence

Dialysis is preferred:

- in anuric cases

- The metabolites of the poison is more toxic

  (Methanol - Formic acid)

- ethanol, methanol, salicylate, lithium, heavy metals,bromide, etc.

Exchange transfusion:

- Less effective, but it may be used when other procedures are not effective or are contraindicated

- removes poison affecting red blood cells (methemoglobinemia)

Neutralisation

- Adsorbsion

Active carbon

- **Neutralisation of the acids**

Milk of magnesia

Na HCO3

CaCO3

Ca(OH)2

- Neutralisation of alkaline

Asetic acid

Lemon juice

Orange juice

*Milk, olive oil,white of the egg and starch protect the mucosa and delay the absorbtion of the poison

REFERENCES

Brett AS et al; Predicting the clinical course of international drug overdose: Implications for utilization of intensive cara unit. Arch ıIntern Med 1987; 147:133

Goldberg MJ et al: An approached to the management of the poisoned patient.. ARCH Intern Med 1946;146:1381

Linden CH, Lovejoy FH. Poisoning and drug overdosage. Harrison's Principles of Internal Medicine, 14 th edition, Braunwald (ed). USA McGraw –Hill Companies,1998 pp2523-2544

Olson KR et al.Physical assesment and differantial diagnosis of the poisoned patient. 1987;2:52

Pond SM.Diuresis, dialysis and hemoperfusion: Indications and benefit. Emerg Med Clin North Am 1984; 2: 29.

WHEELER- USHER DH et al. Gastric emptying.Risk versus benefit in the treatment of acute poisoning. Med Toxical 1986:1;142.

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