

Pathogenetic principles and diagnostic approaches in toxicology. Treatment methods and principles of acute poisonings

1. Compartmental model-structure and role of the biological membranes in clinical toxicology

-forms of membrane transport

-body compartments and effects on the clinical presentation of poisonings

2. Toxicokinetics –definition and stages

-absorption

-distribution

-biotransformation

-elimination

3. Routes of absorption(intoxication)

3.1. Oral intoxications

-prevalence

-pathogenetic mechanisms

-anatomical and physiological background

-common chemistry basis affecting GIT absorption

- effects on GIT motility/absorption

3.2. Inhalatory intoxications

- pathogenetic mechanisms,

-anatomical and physiological background, physiological gas exchange

-types of respiratory toxicity

-volatile toxins

3.3. Parenteral route- pathogenetic mechanisms,

-anatomical and physiological background

-iatrogenic , accidental and deliberate poisonings, iv drug abuse

-clinical examples

3.4. Transdermal poisoning

3.5. Less common routes of poisonings

4. Distribution

4.1. Protein binding, free plasma fraction

4.2. Volume of distribution

4.3. factors affecting toxic distribution

4.4. Dialyzability of drugs.

5. Biotransformation(metabolism)

5.1 basic principles

5.2. types of reaction

5.3. main metabolic pathways. CYP450 system

5.4 enterohepatic circulation

6. Elimination

- bowel and renal excretion

-clinical implications

7. Toxicodynamics

- receptor effects
- enzyme effects
- effects on membranes, protein synthesis, DNA functions

8. Toxidromes – signs and symptoms, pathological mechanisms

- cholinergic
- anticholinergic
- sedative/hypnotic
- opioid
- serotonin
- sympathomimetic

9. treatment approaches

9.1. Initial management of the critically poisoned patient

- recognition
- ABCDE approach
- basic resuscitation
- life saving methods

9.2. Depuration/detoxication

- GIT depuration
- *gastric lavage - indications, contraindications, procedure, differences in Bulgarian and European law
- *activated charcoal as universal antidote- efficacy , indications,
- *whole bowel irrigation
- enhanced elimination – forced diuresis

9.3. non invasive specific treatment.

- antidotes- principles of use
- most common antidotes in clinical practice

9.4. invasive treatment

- hemodialysis
- cardiopulmonary perfusion
- plasmapheresis
- exsanguinotransfusion

Clinical case:

You are the clinical toxicology registrar in a busy NHS hospital. You are asked to review three poisoned patients in the A&E.

Pt A is 23 y/o who is brought by paramedics following an iv heroin overdose, Pt B is known to suffer with severe depression and has ingested 200ml of methanol 4h ago and pt C has accidentally taken 30 Amitriptyline tablets whilst being drunk 30 mins ago, but is the only conscious and adequate of them all.

- which patient would need urgent hemodialysis and why
- which patient could you treat with specific antidote and how
- which patient is indicated for gastric lavage? What are the alternatives to it?

