

Practice No. 2

Salt intoxication

- The poisoning is typical for veterinary practice, rare in people
- Salt is toxic only in high levels
- Livestock is human-dependent – people provide them with water and feed – most of the poisonings because of bad treatment or because of the exchange of feed
- An animal eats a lot of NaCl (direct poisoning, develops within 24h) or lacks water (indirect poisoning, develops within 3-5 days)
- The intake of salt as mash or liquid is much worse

- The intoxication is worse in young animals
 - taste not developed yet (in poultry badly developed even in adults)
 - lower content of blood proteins – lower oncotic pressure, bigger oedemas
- The intoxication is worse also in elderly animals (decreased renal filtration), animals with hepatopathy (decreased blood protein production), lactating animals (loss of water into milk)
- Na: K rate in feed is an important factor in intoxication development:
 - ruminants 1:10 – it is much more difficult to change the rate to the situation when there is more Na than K ions
 - carnivores, omnivores 1:1 – higher risk for intoxication

- For manufactured feed mixtures and for water, there are limits of NaCl and Cl⁻ ions respectively, established in laws
- Limit for feed: max. 1 % of NaCl in feed mixture
- Limit for water - water for animals must be of the same quality as drinking water for people; Cl⁻ limit value: max. 100 mg/l

Mechanism of action of NaCl:

- NaCl is absorbed completely from guts, in excess irritates GIT and causes liquefaction of its content
- Na and Cl are extracellular ions important for osmotic balance in an organism
- High content of these ions in interstitium induces passage of water from cells to interstitium - inner dehydration
- NaCl in excessive amount destroys endothelium of capillaries and thus increases the permeability of vessels
- These mechanisms lead to accumulation of water in intercellular tissues and cause oedemas, which oppress organs, brain is the most sensitive one
- Increased content of Cl⁻ ions leads to metabolic acidosis

Clinical signs of intoxication:

- Increased salivation, thirst
- In direct poisoning vomiting, diarrhoea, colic pains; in indirect poisoning constipation
- Oedemas, head aches – presented as head pressing, ataxia and coordination disturbances, tremors and seizures, epileptic attacks are typical for direct poisoning; slower progression with smaller oedemas but decreased neuronal function which leads

to paresis and paralysis – paralysis of back legs in pigs - they sit like dogs – typical for indirect type of poisoning

- TRIAS usually not affected
- If we don't treat the animal – death in coma within 2 days after the symptoms appear

Pathological examination:

- Congestion to inflammation of GIT tissues
- Petechias in brain, meningoencephalitis
- Oedemas
- Typical histopathological sign in pigs – infiltration of eosinophils in brain tissue

Chemical examination of tissues:

- withdraw liver sample for NaCl content – in poisoning concentration approx. 3000 – 3500 mg/kg of liver tissue (normal level is 1500 – 2000 mg/kg according to animal species)
- also it is possible to measure natraemia and concentration of chloride ions in blood plasma

Treatment:

- Change of feed and drinking water
- Administration of water, but never ad libitum !!! This could deteriorate oedemas and cause quicker death
- If you cannot measure exact natraemia and use pump regulated infusion therapy, the recommended dosage is 0,5 % of body weight every hour orally

Table: Lethal doses of NaCl in different animal species

Animal species	g NaCl (pro toto)
Cattle	1500 – 3000
Sheep, goat	100 – 200
Horse	900 – 1000
Pig	50 – 200
Poultry	2 - 4,5
Dog	20 – 60
Cat	5 – 20

Practical part: Assessment of chlorides in water samples
Assessment of NaCl content in liver samples and feed