Quantitative assessment of bile ducts in turkeys treated with artemisinin: A model for liver toxicity?

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Quantitative assessment of bile ducts in turkeys treated with artemisinin

A model for liver toxicity?

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Conclusion

- The present findings suggest that artemisinin treatment changes the differentiation of the biliary duct system.
- The ratio of bile duct profiles with no lumen of the artemisinin treated birds is significantly higher than the same ratio in the control birds.
- No differences in the volume fraction of bile duct epithelium in relation to the volume of liver parenchyma between treatments.
- This is the first study that uses stereological microscopy for quantification of bile duct epithelium in turkey livers.

Background

Development of resistance to anticoisoidal drugs, removal of licensed antihistomonal formulations and a shift towards organic production has put the focus on natural occurring compounds for controlling protozoa infections in poultry. Artemisinin originates from Artemisia annua and is widely used as an efficient antimalarial in humans. Inhibitory activity against coccidia of chickens was reported previously; however, toxic side effects, i.e. degeneration of the brain, liver and kidney, also were induced.

In a previous study investigating the effect of artemisinin against histomonosis in turkeys and chickens, degeneration of the brain, liver and kidney, also were induced. Inhibitory activity against coccidia of chickens was reported previously; however, toxic side effects, i.e. degeneration of the brain, liver and kidney, also were induced.

Methodology

Histological preparation

- Paraffin embedded formalin fixed liver samples from Artemisinin treated turkey chickens (5-7 days old, n=15) and untreated and age-matched birds (n=10) were cut into 4 µm thick sections.
- Immunohistochemical detection of cytokeratin (Cytokeratin clone AE1/AE3, DAKO) was performed to distinguish the bile duct epithelium from liver parenchyma, connective tissue and blood vessels. Slides were counterstained with Mayer’s haematoxylin.

Stereology

- All fields of vision in all 25 sections were randomly selected within the delineated area of interest in steps of 400 µm (dualy).
- Determine the volume fraction of bile duct epithelium relative (Figure 1, red circles) to liver parenchyma using point grid counting (16 points per field of vision).
- Presence of lumen was noted for the transected bile duct profiles in each counting frame (7709.6 µm2).
- The relative number of lumen-less bile duct profiles per total number of bile duct transects was estimated as a function of the total observed area.

Key words

Toxocosis, artemisinin, turkeys

References