

Presumptive Secondary Ethylene Glycol (Antifreeze) Toxicity in a Turkey Vulture (A Case Report)

Wael M. Hananeh ^{1,*} and Rudy Bauer ²

¹Veterinary Pathology Laboratory, Department of Pathology and Public Health, Faculty of Veterinary Medicine, Jordan University of Science and Technology, Irbid, PO Box 3030, Jordan

² Department of pathobiology, School of Veterinary Medicine, Louisiana state University. Baton Rouge 708002, USA.

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Abstract

A presumptive diagnosis of secondary ethylene glycol toxicity in a female Turkey vulture (*Cathartes aura*) was made depending on the histopathological changes found in the renal tubules and presence of *Isospora spp.* of non-avian type within the colon. To the best of our knowledge, this is the first reported case of possible secondary ethylene glycol toxicity in a Turkey vulture in Louisiana State/USA.

Keywords: Ethylene glycol, oxalate nephrosis, kidneys, vulture

1. Introduction

Ethylene glycol is a sweet, clear and colorless fluid which is mostly found in antifreeze and hydraulic brake fluids. In addition, it is used as a solvent. However, ethylene glycol itself is relatively non-toxic; its metabolites are highly toxic causing renal failure secondary to calcium oxalate precipitate within the renal tubules and metabolic acidosis due to glycolic acid circulation (Brent, 2009).

2. Case Report

A 1.8 kg, adult female Turkey vulture, found neurologic at the front lawn of the Veterinary School, Louisiana State University, died shortly thereafter.

Upon necropsy on the next day, the vulture was in a good nutritional body condition and exhibited mild postmortem autolysis. No significant gross abnormalities were seen. Blood collected from the heart and brain were sent for bacterial culture and the colon was sent for parasitological examination. Representative tissue samples from lungs, heart, liver, kidneys, brain, skeletal muscles and intestines were fixed in 10% neutral buffered formalin, routinely processed and embedded in paraffin, sectioned at 4µm, and stained with hematoxylin-eosin; and examined histopathologically.

3. Results

No significant histopathological findings were present throughout the examined tissues other than the kidneys.

Both the cortical and medullary renal tubules were mildly to moderately dilated with degenerative, necrotic or desquamated epithelial linings and some renal tubules contained intraluminal crystals (Figure 1). Under polarized lenses, the crystals were birefringent either filling the renal tubules or tending to form rosette like structures (Figure 2). The renal blood vessels were congested.

E. coli and *Staphylococcus aureus* were isolated from the brain and heart blood. *Isospora spp.* was identified in the colon. However, the identified *Isospora spp.* was not consistent with those found in birds but was consistent with those found in canine/ feline host.

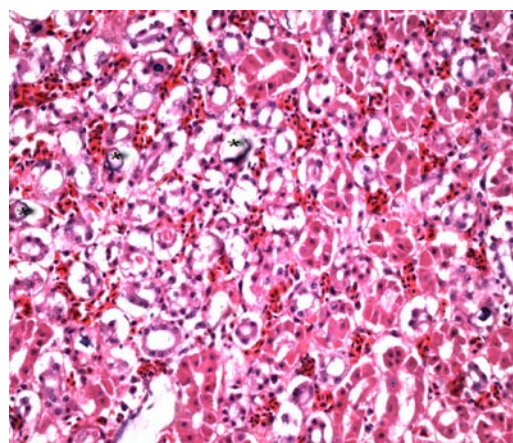


Figure 1. Turkey vulture, kidney. Multiple renal tubules were mildly to moderately dilated with degenerate, necrotic or desquamated epithelial linings with or without intraluminal crystals *. H&E. 400X

* Corresponding author. e-mail: whananeh@just.edu.jo.

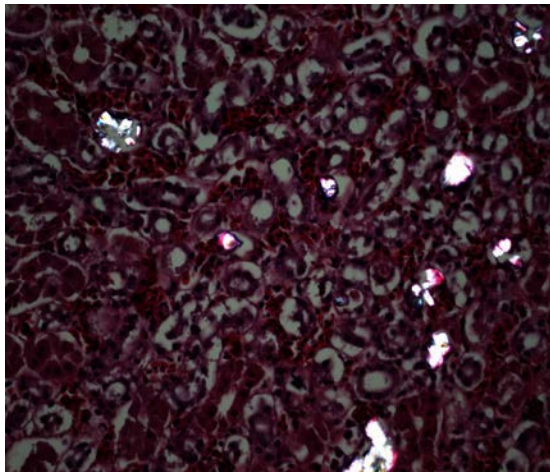


Figure 2. Turkey vulture, kidney. Multiple renal tubules exhibited birefringent shiny crystals under polarized lenses either filling the renal tubules or tending to form rosette like structures. H&E. 400x

4. Discussion

The findings mentioned above were similar to previously reported cases of ethylene glycol toxicity in birds (Stowe *et al.*, 1981; Hutchison and Dykeman, 1997). Not only had domestic birds and animals been intoxicated with ethylene glycol but wildlife birds and animals had been intoxicated too (Amstrup *et al.*, 1989; Murnane *et al.*, 1995; Foley and McBurney, 2002). Toxicity came mainly either through an accidental ingestion of antifreeze in animals or through an intentional ingestion of antifreeze, a method of suicide used in human beings (Hoffmann *et al.*, 2008). Also, for wild animals and birds, deliberate poisoning would be possible.

The present case is the first reporting presumptive secondary oxalate nephrosis in a Turkey vulture. The morphology and location of the birefringent crystals were consistent with oxalate nephrosis. The source of oxalate could not be determined, but toxicity has to be considered. Whether this bird drank water contaminated with antifreeze or possibly ate an animal that had been poisoned with antifreeze could not be determined. However, the latter possibility would be supported by the presence of *Isospora spp.* that were not consistent with an avian type. Furthermore, Campbell (2006) stated that whether wild animals are being exposed unintentionally, or whether wild animals may have, instead, been deliberately poisoned is questionable. The same author mentioned that The Canadian Peregrine Foundation recorded 19 different wild life cases that were poisoned by ethylene glycol. One of those records was a turkey vulture. The same author considered that case as an unusual case of ethylene glycol poisoning. It is worth

mentioning that the same foundation in 2002 recorded another case of ethylene glycol poisoning in a turkey vulture based on the presence of calcium oxalate crystals in renal tubules that were accompanied with damage to the tubules (The Canadian Peregrine Foundation). Those cases were limited to the Ontario region and they were only recorded in newsletters of the foundation. Moreover, those recorded cases were not described in detail in the literature.

The presence of *E. coli* and *Staphylococcus aureus* in the brain and heart blood culture is believed to be of no significant since no evidence of an infectious process was noted throughout the examined organs.

In summary, the present case report revealed that the Turkey vulture could be a victim of antifreeze toxicity either directly or indirectly. Furthermore, this case sheds light on the importance of proper antifreeze disposal.

5. Conflict of Interest Statement

The authors of this paper have neither financial nor personal relationships with other people or organizations that could inappropriately influence or bias the content of the paper.

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