DICLOFENAC: A DANGER FOR VULTURES

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INTRODUCTION AND OBJECTIVES

The vulture is an essential animal for the balance of the ecosystem. Over the years, the vulture census has declined due to the ingestion of diclofenac residues from the carcasses of domestic ungulates. The project aims to describe the historical background of the problem and explore future scenarios, to find a possible solution.

DICLOFENAC, THE CAUSE OF POPULATION DECLINE

The correlation between uric and visceral gout post mortem and the presence of diclofenac residues (NSAID) in many population is 100 %

The most affected populations are in India, Nepal and Pakistan (95 % decline), West Africa (95 % decline) and East Africa (70 % decline).

Susceptibility

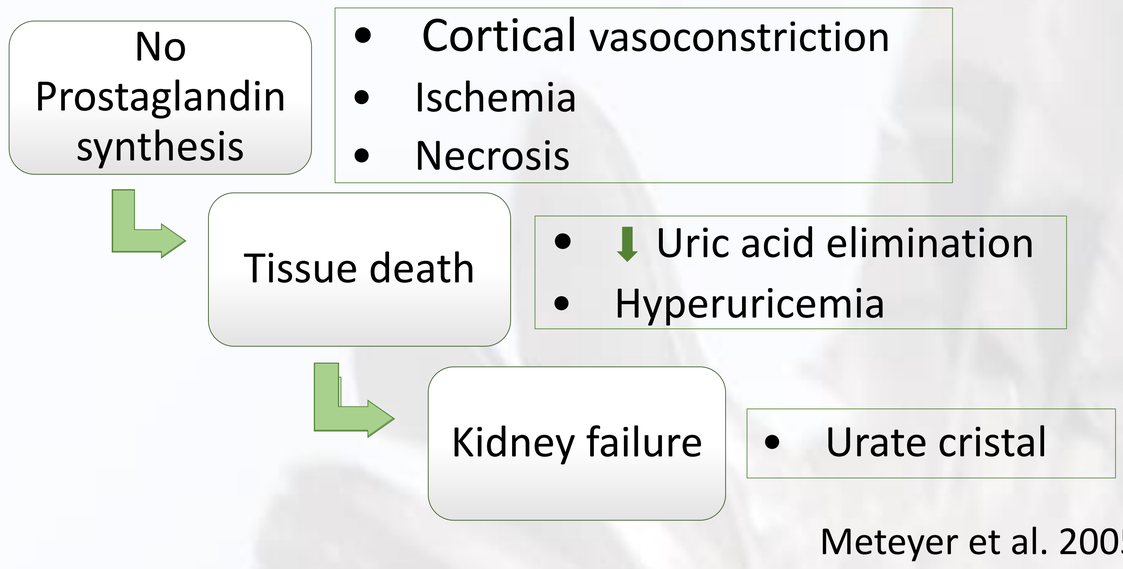
Most exposed species	Lender-billed Vulture (*Gyps tenuirostris*), Indian Vulture (*Gyps indicus*) and White-rumped Vulture (*Gyps bengalensis*)
Most sensitive species	White-rumped Vulture

Drug sensitivity differences exist between species, but all vultures of the *Gyps* genus are believed to be susceptible to the toxicity of diclofenac. >1 % prevalence of diclofenac in cattle available to feeding vulture represents a critical danger for population (Pain et al. 2003).

For this reason, some countries have banned the veterinary diclofenac use, but this has not been enough to recovery de populations due to the illegal use.

MECHANISM OF ACTION OF DICLOFENAC TOXICITY

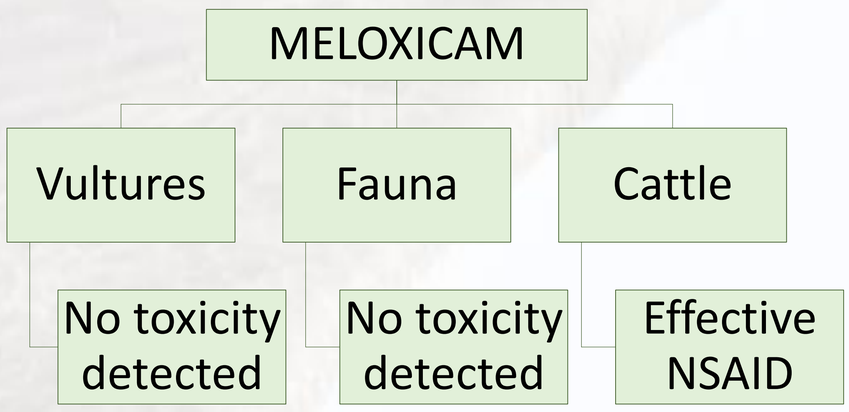
COX and Prostaglandin Synthase inhibition



Meteyer et al. 2005

In normal conditions, diclofenac is eliminated mainly by the kidney. Due to renal affectation, diclofenac conjugates excretion is diminished, prolonging toxic effects and enhancing mortality .

POSSIBLE SUBSTITUTION DRUG



Swan et al. 2006

Unlike diclofenac, meloxicam inhibits preferably COX 2, involved in the inflammatory response and pain → physiologic protection mechanisms are not affected.

- No mortality, physiologicals alterations and nor loss of corporal conditions observed with 3,2 mg/kg doses, studied in White-backed Vulture (*Gyps africanus*).

CONCLUSIONS

As the ban of diclofenac for veterinary uses has failed, to ensure the recovery of populations, some additional efforts are needed both in the legal and conscientious aspects:

- Promoting and facilitating the replacement of diclofenac by meloxicam.
- Changing the size of human use multi-dose diclofenac vials, in order to prevent the administration of non-veterinary formulation in cattle.
- Improving control systems and residual drug management in livestock.

References:

- Swan G, Naidoo V, Cuthbert R, Green RE, Pain DJ, Swarup D, Prakash V, Taggart M, Bekker L, Das D, et al. 2006. Removing the threat of diclofenac to critically endangered Asian vultures. PLoS Biol. 4:0395-0402.
- Pain DJ, Cunningham AA, Donald PF, Duckworth JW, Houston DC, Katzner T, Parry-Jones J, Poole C, Prakash V, Round P, et al. 2003. Causes and effects of temporospatial declines of *Gyps* vultures in Asia. Conserv. Biol. 17:661-671.
- Meteyer CU, Rideout BA, Gilbert M, Shivaprasad HL, Oaks JL. 2005. Pathology and proposed pathophysiology of diclofenac poisoning in free-living and experimentally exposed oriental white-backed vultures (*Gyps bengalensis*). J. Wildl. Dis. 41:707-716.