

## 7. Summary

### **The use of endoscopy and biopsy for the diagnosis of kidney disease in free-living birds of prey and owls.**

In the present study 89 free-living birds of prey and owls were clinically examined. Blood analysis and radiographs were also performed. After stabilization the birds underwent endoscopy and kidney biopsy.

The aims of the study were:

1. Investigation of the feasibility and diagnostic reliability of kidney biopsies for the diagnosis of renal disease in birds of prey and owls,
2. Evaluation of the compatibility of kidney biopsies and the effect on selected blood parameters,
3. Investigation of the reliability of clinical examination, blood tests and radiology for kidney diseases.

topic one: Kidney biopsies are a useful tool for the diagnosis of kidney diseases. The lateral approach through the caudal thoracic and abdominal air sacs allows the evaluation of one kidney and a specific biopsy. Due to the anatomic arrangement only one kidney is completely visible using this approach.

During endoscopy 2.2% (2/89) of the kidneys had severe changes, 13.5% (12/89) moderate changes and 52.8% (47/89) slight changes. 31.5% (28/89) of the birds had no macroscopically visible abnormalities. The visible changes were only local abnormalities.

Biopsies with pathological findings (n = 66) showed one (53%), two (37.9%), three (7.6%) and five (1.5%) concurrent pathological conditions. In 0.8% (1/126) of the biopsies pathological alterations were found to be severe, in 10.3% (13/126) moderate and in 43.7% to a slight degree. 45.2% (57/126) of the biopsies showed no histological abnormalities. Subcapsular bleeding (19/126), local inflammation (16/126), cell cylinder (12/126), PAS-positive material (8/126) and protein cylinders (6/126) were the most important histological findings. 76.1% of the specimens showed an conformity between endoscopy and biopsy results.

The histopathology of the biopsy material had similar results in 30.8% (12/39) of cases when compared to post mortal examination.

No endoscopically detectable changes had 20.5% (8/39) of the histopathologic examined animals.

topic two: Taking of biopsies with specific forceps was possible without complications. Post biopsy haemorrhage averaged 67 seconds. The influence of the biopsy on blood values was small. One day after the biopsy urea and phosphorus rose significantly. Some birds showed a decrease of hematocrit up to 10%. The analysis of hematocrit, phosphorus, uric acid and urea showed no correlation over five days of monitoring.

The 126 biopsies had in average a length of 2.2 mm, a width of 1.3 mm and a height of 1.0 mm. All samples contained proximal and distal tubuli and 1 - 89 glomeruli. The number of the globuli was estimated and the most biopsie samples had 25 - 29 glomeruli per histological slice. 38.9% (49/126) of them contained one to for intralobular veins.

Biopsy material consisted of 10.7% of air sac tissue.

A good estimation of the samples was possible in 89.7% (113/126) cases. 59.5% (75/126) of the specimens were not damaged.

topic three: No bird showed any indication of a kidney disease based on clinical examination. Uric acid levels above the reference value of 8.5 mg/dl had 28,3% (15/53) of the Eurasian buzzards (*Buteo buteo*) and 5.7% (3/53) had urea levels above 36 mg/dl on the day of endoscopy.

One goshawk (*Accipiter gentilis*) showed uric acid levels above 14.3 mg/dl. Two sparrowhawks had uric acid levels above the reference value of 9.1 mg/dl.

There was no correlation between radiological results and the histological biopsy results.

Some kidneys without endoscopical and histological findings revealed radiological alterations.

69.1% (38/55) of the kidneys pathological examined birds showed no bacterial growth on microbiologic examination. *E. coli* was detected in 21.8% of this kidneys. 10.9% of the samples revealed Streptokokkus, Proteus, Micrococcus, coryneform bacteria, oxidase positive and gram positive bacteria. In 18.2% of the specimens microorganisms and histological findings were diagnosed.