UPC determination in hedgehogs: Association with outcome and reference intervals.

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INTRODUCTION

European hedgehogs *Erinaceus europaeus* are very commonly admitted in wildlife rescue centers in France. In order to ease the medical triage, clinicians are looking for lab tests useful to predict the care outcome. Whereas blood sampling can be challenging in this species, urine collection by cystocentesis is easy to perform during the routine admission inhalant chemical restraint.

Purposes of the present study: To determine if admission UPC could bring useful information on the care outcome of distressed wild hedgehogs AND to generate UPC reference intervals in hedgehogs.

EXPERIMENTAL DESIGN

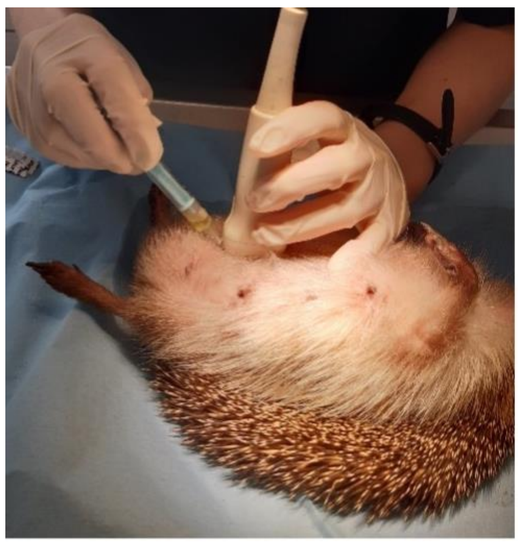

Fig 1: Ultrasound guided cystocentesis of a hedgehog

Between 20th April 2022 and 20th June 2022, UPC were determined on 53 wild hedgehogs at admission and their respective care outcome (dead vs. released) was recorded. In addition, UPC were performed on 59 recovered and ready-to-be-released hedgehogs, with the aim to establish reference values using *Reference Value Advisor*. Among the 59 recovered hedgehogs, 15 matched with the hedgehogs at admission. Leptospirosis status was determined by PCR analysis in the urines obtained at admission and before release in those 15 hedgehogs.

RESULTS

Among the 53 hedgehogs sampled at admission, 21 were released, 28 died, and 4 were still under treatment at the end of the study. Extremely variable UPC values were detected at admission, with no significant difference between the hedgehogs that survived (Min-Max-Mean-Median: 0.7 – 43.3 – 6.2 – 4.2) and those who died (Min-Max-Mean-Median: 1.1 – 41.9 – 8.2 - 4.6). However, UPC from hedgehogs "ready-to-be-released" are significantly lower from those at "admission". This is true for the 15 "paired" hedgehogs ($p<0,001$) as well as for the general "non-paired" population ($p<0,0001$). **The reference interval obtained from the 59 ready-to-be-released hedgehogs was [0.2-1.8] with 90% confidence interval (CI) for lower limit [0.2-0.3] and 90% CI for upper limit [1.6-1.9].** There was no correlation between leptospirosis status and UPC values. Among the 15 matched hedgehogs at admission, 10 were positive for leptospirosis. The leptospirosis status did not change between admission and release: hedgehogs that were positive for leptospirosis at admission were still positive at release. They all carried the same strain "australis", for which the natural reservoir is not yet known.

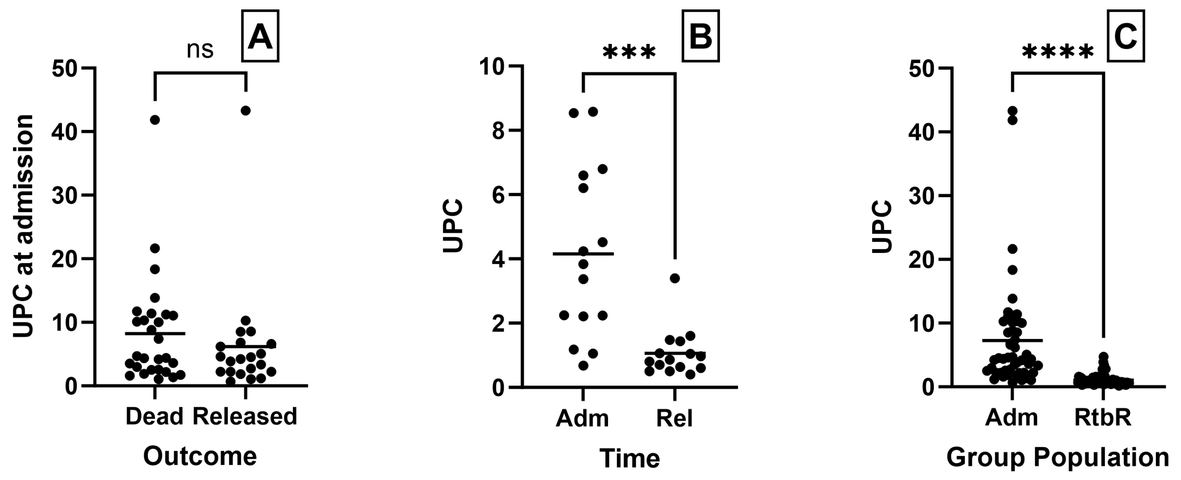

Fig 2: **A.** UPC at admission did not differ significantly between hedgehogs that died and those which recovered. **B.** UPC improved significantly during hospitalisation ($p<0,001$) for the 15 hedgehogs with paired data between admission and release. **C.** UPC from the population "at admission" are significantly higher ($p<0,0001$) than those from the population "ready to be released". *UPC: Urine Protein to Creatinine ratio; Adm: Admission; Rel: Release; RtbR: Ready to be released.*

CONCLUSIONS

1. **The UPC at admission is not predictive of the outcome.**

2. **UPC values in hedgehogs with good physical exam ("ready to be released") are significantly lower than those from admission. Yet, they are wider and higher than expected from small domestic animals. Reference intervals are herein proposed.**

3. **It seems that hedgehogs are subclinical carriers of *Leptospira australis* and might serve as a reservoir.**

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