
STUDIES ON ISOLATION AND SUSCEPTIBILITY TO ANTIBIOTICS OF THE PATHOGENS INVOLVED IN SCUD ETIOLOGY OF AQUATIC TURTLES

George Cosmin NADĂȘ, Lucia Bel, Flore CHIRILĂ, Cosmina Maria BOUARI,
Liviu BOGDAN, Nicodim Iosif FIȚ

University of Agricultural Sciences and Veterinary Medicine, Faculty of Veterinary Medicine, 3-5
Calea Mănăștur street., 400372, Cluj-Napoca, Romania
cosmina.bouari@usamvcluj.ro

Abstract

The objectives of this study were to isolate and identify the bacteria present in the shell and plastron ulcers in a group of infected turtles compared with healthy turtles, and antibiotic susceptibility testing of bacterial species identified in order to recommend the appropriate treatment. A total number of 32 red-eared slider (*Trachemys scripta elegans*) with specific septicemic cutaneous ulcerative disease (SCUD) lesions were sampled from the shell and plastron, compared with 8 healthy turtles. Cotton swabs were used for sampling, and the inoculation was carried out on blood agar, XLD, MacConkey and SDA plates. Biochemical characterization used API Biomerieux 20 system. Susceptibility to antibiotics was evaluated using Kirby Bauer disk diffusion method on Mueller-Hinton agar. In the samples from turtles with lesions, predominantly Gram-negative bacteria were isolated, in particular *Citrobacter freundii* – 16 turtles, *Escherichia coli* – 13 turtles, *Klebsiella* – 10 turtles, *Serratia* – 9 turtles, *Shigella* – 8 turtles, *Salmonella* – 6 turtles, plus Gram positive bacteria such as *Staphylococcus* – 18 turtles, *Micrococcus* – 11 turtles and *Bacillus* – 9 turtles. Regarding the group of 8 healthy turtles ratio was significantly in favor of Gram positive, with *Staphylococcus* – 7 turtles, *Micrococcus* 6 and *Bacillus* 4 samples. Regarding the inhibition area diameter for infected turtles, the most efficient antibiotic was Doxycycline with the average value of 15.15 mm, Enrofloxacin with 14.95 mm and Florfenicol with 14.8 mm. Lower efficiency was observed for Ceftriaxone with 4.05mm and Colistin with 7.01 mm.

Keywords: SCUD, turtles, ulcers, antibiotic susceptibility.

Introduction

Septicemic cutaneous ulcerative disease (SCUD) is a shell disease of aquatic turtles caused by *Citrobacter freundii*; however, various bacteria have been isolated from diseased skin and shell. Anorexia, lethargy, and petechial hemorrhages on the shell and skin are seen; liver necrosis is also common. It is more common in soft-shelled turtles (*Appalone* spp.) (Jacobson, 2007).

SCUD is viewed more as a syndrome with many bacteria such as *Citrobacter freundii*, *Serratia anolium*, *Beneckea chitonovora* and other gram negative bacteria acting together with poor husbandry, poor water quality, abrasions and invertebrate predation to culminate in SCUD (Mader, 2006).

Shell ulceration can form when there is an injury to the shell in which the damaged area becomes infected. The initial injury could be minor and not easily noticeable or could be very obvious. It may have occurred in the form of an abrasion, scratch or even a burn. If left untreated or improperly cared for, this lesion could be penetrated and lead to a number of diseases such as fungal and bacterial infections and septicemia (Joyner, 2006).

The objectives of this study were to isolate and identify the bacteria present in the shell and plastron ulcers in a group of infected turtles compared with healthy turtles, and antibiotic susceptibility testing of bacterial species identified in order to recommend the appropriate treatment.

Materials and methods

The study was conducted in the laboratory of Microbiology at the Faculty of Veterinary Medicine Cluj-Napoca, Romania, between March and July 2015. A total number of 32 red-eared slider (*Trachemys scripta elegans*) with specific SCUD lesions were sampled from the shell and plastron, compared with 8 healthy turtles. The provenience of the turtles was Târgu Mureş ZOO. Cotton swabs were used for sampling, and the inoculation was carried out on blood agar, XLD, MacConkey and SDA plates. Biochemical characterization used API Biomerieux 20 system. Susceptibility to antibiotics was evaluated using Kirby Bauer disk diffusion method on Mueller-Hinton agar.

Results and discussions

In the samples from turtles with lesions, predominantly Gram-negative bacteria were isolated, in particular *Citrobacter freundii* – 16 turtles, *Escherichia coli* – 13 turtles, *Klebsiella* – 10 turtles, *Serratia* – 9 turtles, *Shigella* – 8 turtles, *Salmonella* – 6 turtles, plus Gram positive *Staphylococcus* – 18 turtles, *Micrococcus* – 11 turtles and *Bacillus* – 9 turtles.

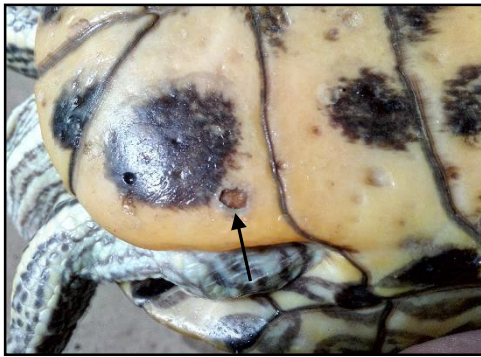


Fig. 1. Lesions at the level of the plastron (arrow)



Fig. 2. Lesions at the level of the shell (arrow)

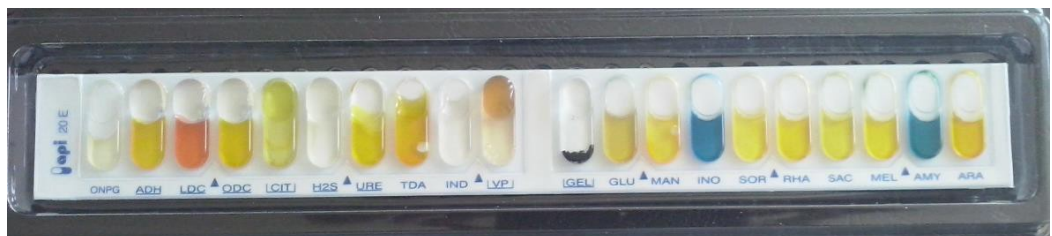


Fig.3. *Citrobacter freundii* strain identification – API 20 E gallery

Concerning the group of 8 healthy turtles ratio was significantly in favor of Gram positive, with *Staphylococcus* – 7 turtles, *Micrococcus* 6 and *Bacillus* 4 samples.

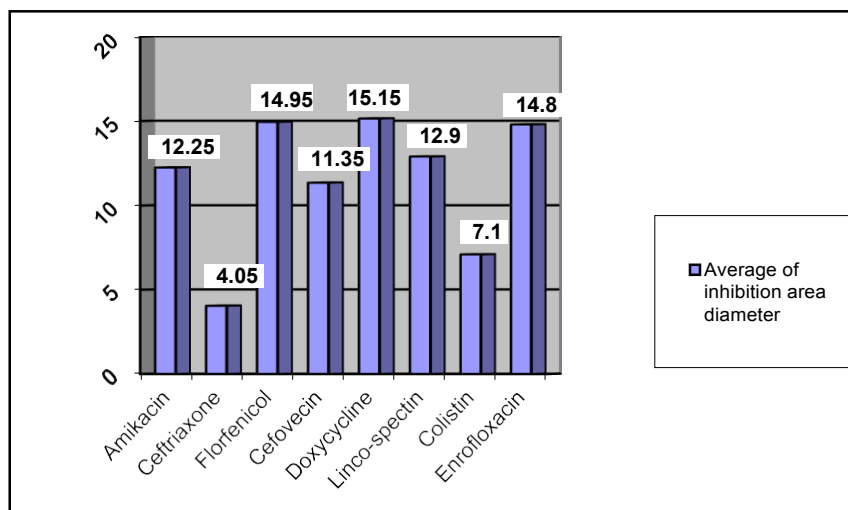


Fig.4. Average of inhibition area diameter for bacteria isolated from turtles with lesions

Regarding the inhibition area diameter for infected turtles, the most efficient antibiotic was Doxycycline with the average value of 15.15 mm, Enrofloxacin with 14.95 mm and Florfenicol with 14.8 mm. Lower efficiency was observed for Ceftriaxone with 4.05mm and Colistin with 7.01 mm.

The practice of feeding crayfish is often implicated in the ethiology of SCUD and should be discouraged.

Conclusions

- *Citrobacter freundii* is not exclusively involved in SCUD etiology but predominates associated with other Gram negative bacteria.
- Sanitation improvement and antibiotic administration improve turtle health status.
- The overall susceptibility to antibiotic was only moderate probably due to previous treatments and difficult antibiotic penetration.

References

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