Antimicrobial susceptibility of coagulase-negative staphylococci isolated from red-tailed racers (Gonyosoma oxycephalum)

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ABSTRACT: Antibiotic resistant coagulase-negative staphylococci (CoNS) have been reported around the world. The aim of this study was to determine the antimicrobial susceptibility of CoNS isolated from red–tailed racers. Samples were swabbed from the oral cavity of 5 wild caught red–tailed racers, and were identified with biochemical test using the Kirby–Bauer disc diffusion test interpreted by referring to Clinical and Laboratory Standards Institute. The results obtained 4 species of CoNS isolated from swab samples including S. sciuri, S. xylosus, S. lentus, and S. kloosii. The antibiotic resistance test of S. xylosus, S. sciuri, and S. lentus showed susceptibility to amoxicillin, gentamicin, erythromycin, bacitracin, vancomycin and oxacillin, but resistance towards penicillin G. S. sciuri isolated from snake number 1 was intermediate towards erythromycin. S. kloosii showed susceptibility towards amoxicillin, gentamicin, bacitracin, penicillin G, vancomycin, and oxacillin, but was resistant towards erythromycin.

Keywords: antimicrobial susceptibility, coagulase-negative staphylococci, red–tailed racers, Gonyosoma oxycephalum

INTRODUCTION

The red–tailed racer (Gonyosoma oxycephalum), commonly known as red–tailed green rat snake is primarily an arboreal species snake that is generally distributed in Indonesia. In the Indonesian pet trade, there is a particular demand for a grey and yellow color morph associated with some snakes from Java (Dieckmann et al. 2015).

One of the most commonly isolated bacterial samples from snakes is coagulase-negative staphylococci (CoNS). CoNS are commensal flora of reptile skin and mucous membrane, and rarely cause primary disease. These opportunistic bacteria are usually treated as non-pathogenic or environmental contamination when detected in a sample. Currently, they are gaining the attention of researchers due to reports the bacteria can cause infections when present in large amounts, or when present in the bloodstream (Souvener et al. 1998). The aim of this study was to determine the antimicrobial susceptibility of CoNS isolated from red–tailed racers.

MATERIALS AND METHOD

The materials used in this study were swabbed samples from the oral cavity of 5 red–tailed racers (Gonyosoma oxycephalum) in Purnomo Luak Kampus pet shop, medium for isolation and identification of bacteria, and antibiotic disc amoxicillin, gentamicin, oxacillin, penicillin G, bacitracin, vancomycin, and erythromy. Isolates of Staphylococcus were classified as CoNS using a coagulase tube test. Species identification was conducted using biochemical tests are then compared with the table for the identification of CoNS based on Barrow and Feltham (2003). Antibiotic sensitivity test were carried out using Kirby Bauer Agar Disc diffusion method. Interpretation data with Clinical Laboratory Standards Institute (CLSI) 2022 for Staphylococcus spp.

RESULT AND DISCUSSION

In total, there are 4 species of CoNS isolated from swab samples of 5 red–tailed racers (Gonyosoma oxycephalum) including S. sciuri, S. xylosus, S. lentus, and S. kloosii. The antimicrobial susceptibility of the CoNS isolate was tested with different antibiotics served in Table 1.

According to the result, it can be seen that all the CoNS isolated were susceptible to amoxicillin, gentamicin, bacitracin, vancomycin, and oxacillin. S. xylosus, S. sciuri, and S. lentus were susceptible to erythromycin, while S. kloosii was resistant to erythromycin. This result was compared to Osman et al. (2016) that reported that coagulase-positive staphylococci (CoPS) and CoNS isolated from chicken meat were resistant to methicillin, quinolones, β-lactams, macro-

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lides, lincosamides and streptogamin. Another report found that S. aureus isolated from pig was resistant to tetracyclines and macrodilides (Oppliger et al. 2012). Erythromycin is a macrolide. Bacterial resistance to macrolides is often due to efflux systems, methylases or inactivating enzymes. It can also be caused by mutations in genes encoding ribosomal proteins and in the 23S rRNA gene. These chromosomal mutations alter the erythromycin binding site in the 23S rRNA molecule (Waško et al. 2012).

Table 1. Antimicrobial susceptibility of the Coagulase-Negative Staphylococci towards different antibiotics

<table>
<thead>
<tr>
<th>Snake No.</th>
<th>Bacteria Isolated</th>
<th>AMK</th>
<th>CN</th>
<th>E</th>
<th>B</th>
<th>P</th>
<th>VC</th>
<th>OX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>S. scuri</td>
<td>S</td>
<td>S</td>
<td>I</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>2.</td>
<td>S. xylosus</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>3.</td>
<td>S. scuri</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>4.</td>
<td>S. lentus</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>5.</td>
<td>S. kloosii</td>
<td>S</td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
</tbody>
</table>

Note: AML (Amoxicillin), CN (Gentamicin), E (Erythromycin), B (Bacitracin), P (Penicillin G), VC (Vancocycin), OX (Oxacillin), S (Susceptible), I (Intermediate), R (Resistant)

Lastly, all the CoNS isolated showed resistance to penicillin G. Where Penicillin G is one of the most widely used antibiotics and the oldest one. Many known bacteria have already developed resistance towards Penicillin G. Staphylococcal resistance to penicillin is mediated by Blaz, the gene that encodes β-lactamase. This predominantly extracellular enzyme, synthesized when staphylococci are exposed to β-lactam antibiotics, hydrolyzes the β-lactam ring, rendering the β-lactam inactive (Lowy 2003).

CONCLUSION

This study provides information on the current antimicrobial resistance in Staphylococcus xylosus, Staphylococcus scuri, Staphylococcus lentus and Staphylococcus kloosii isolated from swabbed of oral cavity of 5 red–tailed racers (Gonyosoma oxycephalum).

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REFERENCES


