Emerging Challenges in One Health: Detection of Multidrug-Resistant and Methicillin-Resistant Staphylococcus haemolyticus and Mammaliicoccus sciuri in Wild Birds in Southern Brazil

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Knowledge Area
Clinical Laboratory Analysis and Diagnosis

Funding
CAPES, CNPq/MCTI (408445/2023-8)

Keywords
Methicillin-resistant Staphylococcaceae, Santa Catarina, Epidemiological surveillance

Abstract

We assessed methicillin-resistant Staphylococcaceae in wild birds on Santa Catarina Island. Samples were collected from 173 wild-caught birds and 75 birds in rehabilitation centers using oropharyngeal swabs. Samples from R3 Animal Association were collected as part of The Santos Basin Beach Monitoring Project (PMP/BS). This project is a requirement set by Brazilian Institute of the Environment (IBAMA) for the environmental licensing of oil and natural gas production and transport by Petrobras in the pre-salt province under ABIO N° 640/2015. Samples from CETAS-SC were collected under the Public Notice n. 001/2018/IMA, which establishes a partnership between Instituto do Meio Ambiente de Santa Catarina and Instituto Espaço Silvestre to co-manage Santa Catarina Wildlife Rehabilitation Center (CETAS-SC). The process involved enriching swabs in TSB broth supplemented with cefoxitin, then allowing overnight incubation. Samples were plated onto Mannitol Salt Agar with a cefoxitin disk inserted. Colonies located near the disk were selected, identified using MALDI-TOF, and subjected to antimicrobial susceptibility testing via disk diffusion. Confirmation of methicillin resistance was conducted through PCR targeting mecA, mecC and SCCmec. Five isolates of methicillin-resistant Mammaliicoccus sciuri were found in five birds from birds at a rehabilitation center and demonstrate resistance to multiple drugs. Additionally, two methicillin-resistant Staphylococcus haemolyticus isolates were identified: one a bird from rehabilitation center and other in wild-caught bird, both resistant to multiple antibiotics and harboring SCCmec Type I. The results show that the mecA gene and SCCmec type I are circulating in the wild in a region where MRSA infections are not prevalent. This study enhances our understanding of antimicrobial resistance in Brazilian wild birds and highlights the crucial role of epidemiological surveillance in controlling the spread of resistant bacteria.