Tentative Colistin Epidemiological Cut-Off Value for Salmonella spp. - DTU Orbit
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The objective of this research was to determine minimal inhibitory concentration (MIC) population distributions for colistin for Salmonella on subtype level. Furthermore, we wanted to determine if differences in MIC for colistin could be explained by mutations in pmrA or pmrB encoding proteins involved in processes that influence the binding of colistin to the cell membrane. During 2008–2011, 6,583 Salmonella enterica subsp. enterica isolates of human origin and 1931 isolates of animal/meat origin were collected. The isolates were serotyped, and susceptibility was tested towards colistin (range 1–16 mg/L). Moreover, 37 isolates were tested for mutations in pmrA and pmrB by polymerase chain reaction (PCR) and DNA sequencing. MIC distribution for colistin at serotype level showed that Salmonella Dublin (n=198) followed by Salmonella Enteritidis (n=1247) were less susceptible than “other” Salmonella serotypes originating from humans (n=5,274) and Salmonella Typhimurium of animal/meat origin (n=1794). MIC was ≤1 mg/L for 98.9% of “other” Salmonella serotypes originating from humans, 99.4% of Salmonella Typhimurium, 61.3% of Salmonella Enteritidis, and 12.1% of Salmonella Dublin isolates. Interestingly, Salmonella Dublin and Salmonella Enteritidis belong to the same O-group (O:1, 9,12), suggesting that surface lipopolysaccharides (LPS) of the cell (O-antigen) play a role in colistin susceptibility. The epidemiological cut-off value of >2 mg/L for colistin suggested by European Committee on Antimicrobial Susceptibility Testing (EUCAST) is placed inside the distribution for both Salmonella Dublin and Salmonella Enteritidis. All tested Salmonella Dublin isolates, regardless of MIC colistin value, had identical pmrA and pmrB sequences. Missense mutations were found only in pmrA in one Salmonella Reading and in pmrB in one Salmonella Concord isolate, both with MIC of ≤1 for colistin. In conclusion, our study indicates that missense mutations are not necessarily involved in increased MICs for colistin. Increased MICs for colistin seemed to be linked to specific serotypes (Salmonella Dublin and Salmonella Enteritidis). We recommend that Salmonella with MIC of >2 mg/L for colistin be evaluated on the serovar level.

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