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Resistance to quinolones, cephalosporins and macrolides in Escherichia coli causing bacteraemia in Peruvian children(Article)

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Objectives To characterise the β-lactam, quinolone and macrolide resistance levels and mechanisms in 62 Escherichia coli isolates causing bacteraemia in Peruvian children. Methods Minimum inhibitory concentrations (MICs) of ciprofloxacin, nalidixic acid (NAL) and azithromycin were determined in the presence and absence of Phe-Arg-β-naphthylamide. Susceptibility to other 14 antimicrobial agents was also established. Extended-spectrum β-lactamases (ESBLs) were identified, and mutations in gyrA and parC as well as the presence of transferable mechanisms of quinolone resistance (TMQR) and macrolide resistance (TMMR) were determined. Results Fifty isolates (80.6%) were multidrug-resistant. High proportions of resistance to ampicillin (93.5%), NAL (66.1%) and trimethoprim/sulfamethoxazole (66.1%) were observed. No isolate showed resistance to carbapenems and only two isolates were resistant to nitrofurantoin. Twenty-seven isolates carried ESBL-encoding genes: 2 bla_{SHV-12}; 13 $bla_{CTX-M-15}$; 4 $bla_{CTX-M-2}$; 6 $bla_{CTX-M-65}$; and 2 non-identified ESBLs. Additionally, 27 $bla_{TEM-1}$and 9 $bla_{OXA-1-like}$ genes were detected. All quinolone-resistant isolates showed target mutations, whilst TMQR were present in four isolates. Efflux pumps played a role in constitutive NAL resistance. The association between quinolone resistance and

ESBL production was significant (P = 0.0011). The mph(A) gene was the most frequent TMMR (16 isolates); msr(A) and erm(B) genes were also detected. Only one TMMR-carrying isolate [presenting mph(A) and erm(B) concomitantly] remained resistant to azithromycin when efflux pumps were inhibited. Conclusions A variety of ESBL-encoding genes and widespread of $bla_{CTX\text{-}M\text{-}15}$ in Lima has been shown. The role of efflux pumps in azithromycin resistance needs to be further evaluated, as well as effective control of the use of antimicrobial agents. © 2017 International Society for Chemotherapy of Infection and Cancer

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- Peru
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