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Escherichia coli O25b-ST131 is an important cause of antimicrobial-resistant infections in women with uncomplicated cystitis

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Sir,

Worldwide, the *Escherichia coli* serotype O25b-sequence type (ST) 131 clonal group is emerging and represent an important cause of antimicrobial-resistant infections that ranges from uncomplicated cystitis to life-threatening bactaeremia.[1] Nonetheless, there is only limited epidemiological information about this clonal group in Asia.[1-3] In this study, we investigated the presence of this clonal group among 271 *E. coli* isolates recovered from a prospective cohort of female outpatients with uncomplicated cystitis in Hong Kong during 2006-2008.[4] The patient demographics and antimicrobial susceptibility of the isolates have previously been published.[4] In brief, all patients had community-acquired infections. Prior urinary tract infection (UTI) history was present in 78 (28.8%) patients and 38 (14.0%) had been treated with antibiotics in the preceding six weeks.[4] The major *E. coli* phylogenetic groups (A, B1, B2 and D) were determined by multiplex PCR.[3,5] Subsequently, O25b-ST131 isolates were identified by PCRs for the O25b-ST131-specific single nucleotide polymorphism in *pabB* and the O25b *rfb* variant.[5,6]

The isolates were found to have the following phylogenetic group distribution: B2 (66.9%, 181/271), D (17.7%, 48/271), A (10.3%, 28/271) and B1 (5.2%, 14/271). Twenty-three of the B2 isolates were PCR positive for both *pabB* and O25b and were identified as O25b-ST131 isolates. All other isolates were PCR-negative for the two targets. Thus, O25b-ST131 accounted for 8.5% (23/271) of the total *E. coli* population. The 23 isolates were recovered from patients with residence in 13 of the 18 geographic districts in Hong Kong. The O25b-131 clonal group accounted for the following proportions of *E. coli* infections in the different age groups: 18-35 years (4.3%, 3/71), 36-50 years (6.5%, 7/107), 51-64 years (9.3%, 5/54) and ≥65 years (20.5%, 8/39). The proportion of O25b-ST131 isolates in patients aged ≥65 years was significantly higher than that among patients aged 18-64 years (P = 0.004). O25b-ST131 isolates were significantly more likely than non-O25b-ST131 isolates to be ciprofloxacin-resistant (69.6%, 16/23 vs. 7.7%, 19/248; $P < 0.001$), cotrimoxazole-resistant (52.2%, 12/23 vs. 28.6%, 71/248; $P = 0.02$) and gentamicin-resistant (52.2%, 12/23 vs. 14.9%, 37/248; $P < 0.001$). Table 1 showed that O25b-ST131 isolatesaccounted for 45.7% and 41.7% of the ciprofloxacin-resistant, and dually ciprofloxacin and cotrimoxazole-resistant *E. coli* populations, respectively. The incidence of O25b-ST131 among antimicrobial-susceptible (as defined by susceptibility to all of ciprofloxacin, cotrimoxazole and gentamicin) isolates was low (2.9%, 5/175). PCR and sequencing showed that the only ESBL-producing O25b-ST131 isolate had $bla_{\text{CTX-M-14}}$.

Our results showed that O25b-ST131 exhibited a wide range of susceptibility patterns. Similar to previous studies,[1,5] our findings showed that O25b-ST131 isolates were often multidrug-resistant and one was a CTX-M producer. However, the only ESBL-producing O25b-ST131 isolate was found to have $bla_{\text{CTX-M-14}}$ instead of $bla_{\text{CTX-M-15}}$.[1,5] Among blood culture *E. coli* isolates collected in 2007-2008, our recent work showed that O25b-ST131 accounted for 25.6% of the ESBL-producing isolates.[3] All ESBL-producing O25b-ST131 isolates had $bla_{\text{CTX-M-14}}$ and none had $bla_{\text{CTX-M-15}}$.[3] As our previous studies revealed, the dissemination of $bla_{\text{CTX-M-14}}$ in O25b-ST131 isolates was associated with the acquisition of an epidemic pHK01 plasmid with FII replicon.[3] In conclusion, this study showed that the O25b-ST131 clonal group is widely distributed among *E. coli* isolates causing community-acquired urinary tract infection in the region. The finding highlights the importance of clonal expansion in dissemination of antimicrobial resistance involving first-line drugs commonly used for treatment of urinary tract infections.

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Table 1. Contribution of O25b-ST131 to antimicrobial-resistant *E. coli* populations, 2006-2008

Resistance phenotype	% (number/total) of with phenotype	Fraction due to O25b-ST131, % (number/subtotals)
ESBL-positive	5.2 (14/271)	7.2 (1/14)
Cip-R	12.9 (35/271)	45.7 (16/35)
Sxt-R	30.6 (83/271)	14.4 (12/83)
Gen-R	18.1 (49/271)	24.5 (12/49)
Cip-R and Sxt-R	8.9 (24/271)	41.7 (10/24)
Cip-S, Gen-S and Sxt-S	64.6 (175/271)	2.9 (5/175)

Cip-R/S, ciprofloxacin-resistant/sensitive; Gen-R, gentamicin-resistant/sensitive; Sxt-R/R, cotrimoxazole-resistant/sensitive; ESBL, extended-spectrum β-lactamase

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