

## Chronological trends of resistant *Escherichia coli* isolated from community-acquired urinary tract infections

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**Introduction & Objectives:** *Escherichia coli* (*E. coli*) is the most popular causative bacteria of community-acquired urinary tract infections (UTIs). Recent studies have shown an increase in the prevalence of resistant *E. coli*. We report the chronological incidence of quinolone-resistant *E. coli* (QR-EC) and extended spectrum  $\beta$ -lactamase producing *E. coli* (ESBL-EC) isolated from UTIs.

**Materials & Methods:** Between October 2009 and June 2018, the clinical and microbial data of UTI patients, whose *E. coli* ( $\geq 10^4$ CFUs/ml) was isolated, were collected. QR-EC was determined when their minimum inhibitory concentration of levofloxacin was 4  $\mu$ g/mL or above. ESBL producing ability was determined by double disk method. The study period was separated in the first period (October 2009 - November 2012), the second period (December 2012 - March 2015) and the last period (April 2015 - June 2018). Chronologically, the prevalence of QR-EC and ESBL-EC isolated from UTI patients was studied.

**Results:** In this study period, 1,212 strains of *E. coli* were isolated from UTI patients. Out of 1,212 strains, 352 strains were isolated from uncomplicated UTI and 860 strains were from complicated UTI. The overall the prevalence of QR-EC and ESBL-EC were 28.8% and 13.5%, respectively. Chronologically, the prevalence of QR-EC in the first period, the second period and the last period were 25.2%, 32.3% and 30.3%, respectively and those of ESBL-EC were 10.1%, 13.7% and 18.4%, respectively. The prevalence of QR-EC and ESBL-EC in complicated UTI patients were 34.1% and 15.0%, respectively. Among uncomplicated UTI patients, the prevalence of QR-EC and ESBL-EC were 15.9% and 11.4%, respectively. Chronological study in uncomplicated UTI patients, the prevalence of QR-EC of the first period, the second period, and the last period were 11.3%, 17.9%, 21.4%, respectively and those of ESBL-EC were 5.0%, 14.1%, 18.8%, respectively. Four out of 18 patients with acute uncomplicated cystitis (AUC), whose QR and ESBL-EC were isolated, encountered clinical failure by fluoroquinolone or oral cephalosporin treatment.

**Conclusions:** Among uncomplicated UTI patients, the isolation of QR-EC and ESBL-EC has been increasing in the last period and the prevalence of QR-EC and ESBL-EC were 21.4% and 18.8%, respectively. Current UTI guidelines from the Japanese Association of Infectious Disease / Japanese Society of Chemotherapy recommend fluoroquinolone as a first-line and oral cephalosporin as a second-line antibiotics for the treatment of AUC. We experienced clinical failure in 4 patients with AUC, whose QR and ESBL-EC were isolated, despite of fluoroquinolone or oral cephalosporin treatment with the Japanese guideline. The prevalence of resistant *E. coli* from uncomplicated UTI patients increased in approximate 20% and it is strongly recommended to perform an antimicrobial sensitive test with a urine sample before empiric treatment for patients with uncomplicated UTI.