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Risk factors for urinary tract infection caused by extended-spectrum beta-lactamase gram negative bacteria in infants

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Objectives: Community-acquired extended-spectrum beta-lactamase (ESBL) producing bacterial infections are an evolving public health problem. Urinary tract infections (UTIs) due to ESBL-producing bacteria are increasing even in infants rarely exposed to antibiotic. We aimed to identify risk factors for UTI caused by ESBL-positive bacteria in infants.

Methods: We retrospectively analyzed the medical records of hospitalized infants with first episode of UTI from March 2018 to August 2019. Data includes demographic characteristics, birth history, previous use of antibiotic, febrile event, urinalysis results, and urine isolated organisms and their ESBL status. Multivariate regression analysis was used to quantify independent risks associated with ESBL-positive UTI.

Results: UTIs were diagnosed in 266 patients at median age of 3.6 (interquartile range (IQR) 2.3-5.4) months. Sixty-two (30.4%) patients were diagnosed with UTI caused by ESBL-producing bacteria. When we divided patients according to ESBL status, there was no difference in gender, age, birth history, milk type, and use of postpartum care center. Maternal use of antibiotic during pregnancy and previous antibiotic exposure to patients were higher in ESBL-positive group than in ESBL-negative group (32.3% vs. 10.3%, P <0.001 and 22.6% vs. 12.3%, P =0.044, respectively). *Klebsiella* species was more frequently identified in ESBL-positive group than in ESBL-negative group (19.4% vs. 4.9%, P =0.002). In multivariate analysis, maternal use of antibiotic during pregnancy (odds ratio (OR), 3.817; 95% confidence interval (CI) 1.812-8.040, P <0.001), previous antibiotic exposure to patients (OR 2.418; 95% CI 1.071-5.461, P =0.034), and *Klebsiella* species as a causative organism (OR 6.222; 95% CI 2.396-16.158, P <0.001) were associated with ESBL positivity.

Conclusions: In this study, high rate of ESBL positivity was detected in infantile UTI. Antibiotics exposure on both patients and mothers was associated with UTI caused by ESBL producing bacteria. Identification of underlying risk factors could improve treatment and preventive strategies.