O157
Oral Session
Detection of broad spectrum beta-lactamases

SPECIES-DEPENDENT PERFORMANCE OF A SELECTIVE SCREENING METHOD FOR EXTENDED-SPECTRUM BETA-LACTAMASE PRODUCING ENTEROBACTERIACEAE IN HOSPITALISED PATIENTS

M. Kluytmans - van den Bergh[1], C. Verhulst[2], C. Verduin[2], C. Vandenbroucke-Grauls[3], M. Bonten[4], J. Kluytmans[5], A. Friedrich[6], SoM study group

[1]AAIDF / Julius Center, Amphia Hospital / UMC Utrecht, Breda / Utrecht, Netherlands ; [2]LMI, Amphia Hospital, Breda, Netherlands ; [3]MMI, VU University Medical Center, Amsterdam, Netherlands ; [4]Julius Center, UMC Utrecht, Utrecht, Netherlands ; [5]LMI / MMI, Amphia Hospital / VU University Medical Center, Breda / Amsterdam, Netherlands ; [6]Groningen, ,

Objectives

The use of an extended-spectrum beta-lactamase (ESBL) screening agar has been recommended for the targeted ESBL-E screening of clinical specimens. Previous studies have shown that the specificity of ESBL screening agars is lower for Enterobacteriaceae with chromosomal encoded AmpC beta-lactamase production (cAmpC) as compared to cAmpC-negative Enterobacteriaceae. This study aimed to determine the overall and species-specific positive predictive value (PPV) of a selective ESBL screening agar (EbSA) for the detection of ESBL-E in hospitalised patients.

Methods

From 2011 until 2013, 389 ward-based prevalence surveys were performed in 14 Dutch hospitals to detect patients colonised with ESBL-E. Surveys were performed 5 to 9 days after detection of ESBL-E in a patient hospitalised on the specific ward. Perianal swabs were taken from all patients hospitalised during the surveys. Swabs were placed in a selective tryptic soy broth, containing cefotaxime (0.25 mg/L) and vancomycin (8 mg/L) (TSB-VC). After incubation for 18-24 hours at 35-37°C the TSB-VC was subcultured on an EbSA (AlphaOmega), consisting of two McConkey agars, containing cloxacillin (400 mg/L), vancomycin (64 mg/L), and either cefotaxime or ceftazidime (1 mg/L). The EbSA was read after 18-24 hours incubation at 35-37°C. Species identification (VITEK-MS, bioMérieux) and antimicrobial susceptibility testing (VITEK2, bioMérieux) was performed for all oxidase-negative isolates that grew on the EbSA. The presence of ESBL was confirmed with the combination disk diffusion method for cefotaxime, ceftazidime, and cefepime, both alone and with clavulanic acid (Rosco). Test results were considered positive if the inhibition zone around the disk was >=5 mm increased for the combination with clavulanic acid.

Results

Perianal swabs were obtained from 6,512 of 8,537 (78%) patients. A total of 860 Enterobacteriaceae isolates were detected on the EbSA in 801 of 6,512 (12%) perianal cultures. Production of ESBL was confirmed for 591 isolates, cultured from 550 patients. The overall prevalence of ESBL-E carriage was 8% (550/6,512) and the PPV of growth of Enterobacteriaceae on the EbSA was 69% (591/860). The PPV was found to be significantly higher for cAmpC negative Enterobacteriaceae than for cAmpC positive Enterobacteriaceae (83% vs. 18%; p<0.001). In addition, within the group of cAmpC negative Enterobacteriaceae the PPV was observed to differ between species, i.e. 93% for *E. coli*, 62% for *K. pneumoniae* (p<0.001 vs. *E. coli*), and 47% for *K. oxytoca* (p<0.001 vs. *E. coli*).

Conclusions

The PPV of the selective ESBL-E screening agar EbSA was found to be species dependent. The PPV was significantly lower for cAmpC positive Enterobacteriaceae. Within the group of cAmpC negative Enterobacteriaceae the PPV was significantly lower for *Klebsiella* spp. as compared to *E. coli*. Phenotypic or genotypic confirmation of ESBL production in Enterobacteriaceae grown on an ESBL-E screening agar is, therefore, considered indispensable for the reliable detection of ESBL-E.