EV0393
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Susceptibility testing methods

Detection of extended-spectrum beta-lactamase producing Enterobacteriaceae by chromogenic ESBL-selective media

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Background: The aim of the study was to evaluate the detection of extended-spectrum beta-lactamase producing *Enterobacteriaceae* (ESBL-E) by chromogenic ESBL selective medium and to compare results with double disk synergy test.

Material/methods: Prospective study was performed from April 2013 to December 2013. Rectal swabs were taken in hematological patients and were plated onto standard media for the isolation of gram-negative microorganisms (MacConkey or Endo agar) and onto chromogenic ESBL selective medium CHROMagar™ESBL (CHROMagar, France). Confirmation of ESBL production was performed by double disk synergy test. Production of AmpC β-lactamase was confirmed by E-tests which contains Cefotetan and Cefotetan with Cloxacillin. TEM-1 and CTX-M genotypes were detected by real-time PCR.

Results: Total of 1552 swabs were processed. 1243 *Enterobacteriaceae* strains were isolated on standard media and on CHROMagar™ESBL. All of them were tested by double disk synergy test. A total of 394 ESBL-E strains were recovered, of those 263 (67%) were on standard media and on CHROMagar™ESBL, 123 (31%) - only on chromogenic ESBL selective medium, 8 (2%) - only on MacConkey or Endo agar, $p < 0,0001$.
Thus production of ESBL was confirmed for 386 strains obtained from chromogenic ESBL selective medium (222 (58%) *Escherichia coli*, 105 (27%) - *Klebsiella pneumonia*, 24 (6%) - *Enterobacter* spp., 18 (5%) - *Citrobacter* spp., 17 (4%) – other *Enterobacteriaceae*). Additionally we detected 23 strains from this media. From them AmpC β-lactamase production was confirmed for 65% strains (11 - *Enterobacter* spp., 2 - *Citrobacter* spp., 1 - *M. morganii,* 1 - *E. coli*) and 35% strains were sensitive to cephalosporins (3 - *E. coli, 2 - K. oxytoca, 2 - P. vulgaris*, 1 - *Citrobacter* spp.).
Sensitivity of CHROMagar™ESBL was 98% and specificity - 97%. Specificity for *K. pneumonia* strains was 100%, for *Enterobacter* spp., *Citrobacter* spp. and *Morganella morganii* - 91%.
Distribution of beta-lactamases in ESBL-E (n=394) was as follow: TEM-1 group, 43%; CTX-M group, 64%. Coexistence of TEM-1 and CTX-M was confirmed in 23% isolates.

Conclusions: Chromogenic ESBL selective medium had high sensitivity and specificity for the detection of ESBL-E and might be used in routine laboratory practice. Detection of ESBL-E from the same rectal swabs by chromogenic ESBL selective medium was significant higher than standard media (98% vs. 69%, $p < 0,0001$) and results were reported to clinical department in 18-24 hours after the laboratory sampling. CTX-M group of ESBL was detected in the majority of ESBL-E.