Evaluation of Direct Susceptibility Testing by Disk Diffusion of *Salmonella* Typhi and *Salmonella* Paratyphi from Blood Culture

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Background: Direct susceptibility testing (DST) of organisms from blood culture saves time to appropriate antibiotic administration, and optimal management of infectious syndromes. The American Society for Microbiology recommends that DST methods from blood culture be validated against standard disk diffusion method with >90% categorical agreement (CA), and <10% errors. No DST methods have been previously reported or validated for *Salmonella* spp. In this study we have evaluated direct susceptibility testing of typhoidal *Salmonella* spp. from blood cultures.

Methods: The study was performed at the Aga Khan University clinical microbiology laboratory in Karachi, Pakistan from June to September 2016. All blood culture bottles that flagged positive in BACTEC 9240 with gram negative rods on gram stain were subjected to identification and DST by inoculating two-three drops of positive blood culture broth on Mueller Hinton agar and homogenized by swabbing. Disks were inoculated within 15 minutes; zone diameters interpreted after 18hours. Next day identification of *Salmonella* spp. by antigen detection and susceptibility testing were performed using standardized inoculum (0.5 McFarland) on 24-hour colonies and zone diameters interpreted on day 3 according to breakpoints provided by Clinical Laboratory Standards Institute. CA, very major (VME – resistant strain appearing sensitive), major (ME – sensitive strain appearing resistant), and minor errors (MnE – resistant or sensitive isolates as intermediate or vice versa) were calculated in MS Excel.

Results: 100 isolates of *S*. Typhi (n=80) and *S*. Paratyphoid A (n=20) were included. There was 100% CA between standard and DST methods for ampicillin, chloramphenicol, cotrimoxazole, ceftriaxone and cefixime, and 95% CA for ciprofloxacin with 5% MnEs. No VMEs or MEs were observed.

Conclusions: DST performance for *Salmonella* Typhi and Paratyphi A from blood cultures is comparable to susceptibility testing from standardized inoculum and should be used routinely in high volume laboratories in typhoid endemic regions. However, laboratories should validate DST processes locally for quality assurance.