

Laboratory Detection of Typhoidal Salmonellae in Urine Cultures in a Typhoid Endemic Setting

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Background: Despite several advances in clinical microbiology diagnostics, improved detection of typhoidal salmonellae in cultures (blood, urine, or stool) remains a challenge. Urine cultures may show growth of *Salmonella enterica* serovars Typhi or Paratyphi A in the second week of illness, albeit with low sensitivities. In addition to being highly specific, culture diagnosis has the advantages of informing molecular epidemiology and antibiotic susceptibilities. However, many urine culture systems are not designed to detect salmonellae and this may lead to a missed opportunity in diagnosing enteric fever as the cause of an undiagnosed febrile illness, especially in children where urine cultures are performed as part of fever evaluation. We present retrospective urine culture positivity rates for *Salmonella* Typhi and Paratyphi A from an endemic region.

Methods: Retrospective laboratory records of urine cultures performed from 1996 to 2015 were retrieved from archives of the Intergrated Laboratory Management Systems at the Aga Khan University clinical microbiology laboratory. The laboratory has used the cysteine-lactose-electrolyte-deficient (CLED) medium for urine cultures throughout the study years, followed by biochemical identification with the API 20E system (BioMerieux) for isolate identification. Data was exported to MS Excel. Results with *Salmonella* species were identified after removal of duplicates and frequencies were calculated.

Results: We identified 138 reports (0.03% of all positive urine cultures; with 50,000 positive urine cultures reported annually) of *Salmonella* species in urine cultures during 20 years of study period from 1996-2015. Of these 38.4% (n=53) were *Salmonella* Typhi and 23.2% (n=32) were *Salmonella* Paratyphi A, while 38.4% (n=53) were non-typhoidal salmonellae. Around 56% (n=97) of the cases were male, and male to female ratio was 1.29. Disc diffusion testing showed 63% (n=87), 30% (n=41), 84% (n=116), 17% (n=23), 64% (n=88) and 61% (n=83) of the isolates were sensitive to ampicillin, chloramphenicol, cefixime, ciprofloxacin, ceftriaxone and cotrimoxazole, respectively.

Conclusion: Laboratory personnel should be alert to the possibility of both typhoidal and non-typhoidal *Salmonella* species in urine cultures in typhoid endemic countries. Further identification of isolates having a similar biochemical profile to *Salmonella* species should be performed, especially if screening agars (eg. chromagars) are used that do not identify salmonellae.