Answer to Photo Quiz: Enteric Fever

(See page 1053 in this issue [[doi:10.1128/JCM.01412-13](https://doi.org/10.1128/JCM.01412-13)] for photo quiz case presentation.)

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Manual and automated phenotypic methods identified the lactose-nonfermenting blood culture isolate as a *Salmonella* species. Subsequent serotyping of the isolate by use of O and Vi group D antisera definitively identified it as *Salmonella enterica* subsp. *enterica* serovar Typhi, the etiologic agent of typhoid fever. A distinguishing feature of *S. Typhi*, which is evident in Kliger iron agar and triple sugar iron agar slants, is an alkaline slant, an acid butt, a lack of gas production, and a small amount of hydrogen sulfide that is limited to the stab line and the area where the agar was punctured (1). This feature alone is often sufficient for a preliminary identification of *S. Typhi*, since most nontyphoidal salmonellae produce hydrogen sulfide that is dispersed throughout the butt of these media.

Enteric fever results from infection with *S. Typhi* and *Salmonella enterica* subsp. *enterica* serovar Paratyphi A, B, and C. More common in countries with poor sanitation and lack of access to safe food and clean water, enteric fever affects an estimated 20 million people annually worldwide and causes approximately 200,000 deaths, many of the victims being children under age 5 (2). In the United States, approximately 400 cases are reported annually, the majority of which are associated with international travel to countries where the disease is endemic (3). South Central Asia has the highest incidence of infection, but disease in other locations such as Latin America and Africa is not infrequent (2).

The clinical manifestations of enteric fever are nonspecific, especially in children, who rarely have the classic clinical findings of rose spots and relative bradycardia. Fever is nearly universal, and abdominal pain and diarrhea can be seen. Severe disease and complications are most common in young children (4). Febrile children returning from travel to regions where typhoid is endemic should be evaluated for enteric fever and, depending on the specific locale visited, other potentially life-threatening travel-related diseases such as malaria, dengue, rickettsial infection, and viral hepatitis. Bacterial blood culture is the mainstay for the diagnosis of enteric fever. The Widal test, which detects serum antibodies to *Salmonella enterica* O, H, AH, and BH antigens, is utilized in many resource-limited settings despite its poor sensitivity and specificity (5).

Intravenous antibiotic therapy with a third-generation cephalosporin is the recommended therapy for children with severe disease. Resistance to ampicillin and trimethoprim-sulfamethoxazole is common; therefore, these agents should not be used before determination of *in vitro* susceptibility (3). Oral therapy with a fluoroquinolone or azithromycin is an option in nonsevere cases (4).

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REFERENCES

1. Nataro JP, Bopp CA, Fields PI, Kaper JB, Strockbine NA. 2011. *Escherichia*, *Shigella*, and *Salmonella*, p 603–626. In Versalovic J, Carroll KC, Funke G, Jorgensen JH, Landry ML, Warnock DQ (ed), Manual of clinical microbiology, 10th ed, vol 1. ASM Press, Washington, DC.
2. Crump JA, Luby SP, Mintz ED. 2004. The global burden of typhoid fever. Bull World Health Organ 82:346–353.
3. Centers for Disease Control and Prevention. 2012. National Typhoid and Paratyphoid Fever Surveillance annual summary, 2010. Centers for Disease Control and Prevention, Atlanta, GA.
4. Bhutta ZA. 2006. Current concepts in the diagnosis and treatment of typhoid fever. BMJ 333(7558):78–82. <http://dx.doi.org/10.1136/bmj.333.7558.78>.
5. Keddy KH, Sooka A, Letsoalo ME, Hoyland G, Chagnat CL, Morrissey AB, Crump JA. 2011. Sensitivity and specificity of typhoid fever rapid antibody tests for laboratory diagnosis at two sub-Saharan African sites. Bull World Health Organ 89:640–647. <http://dx.doi.org/10.2471/BLT.11.087627>.

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