Reptile-associated Salmonellosis in Man, Italy

To the Editor: Reptiles are reservoirs of a wide variety of Salmonella serotypes, including all Salmonella enterica subspecies and S. bongori. In reptiles born in captivity or kept as pets, S. enterica subsp. enterica is frequently isolated (1). Salmonella strains are well adapted to reptiles, and they usually cause asymptomatic infections in such animals, while retaining pathogenicity for warm-blooded animals. For several years, reptiles have been recognized as a source of human salmonellosis. In North America, reptile-associated salmonellosis (RAS) has been reported, particularly in children, the elderly, or immunocompromised persons; severe and fatal infections are described occasionally (2). In contrast, only a limited amount of information on RAS is available in Europe. We report a case of RAS that occurred in an adult man in Italy.

A 32-year-old man had symptoms of enteritis. For 2 weeks, he had experienced intermittent watery diarrhea, mild fever, and abdominal pain. He was then treated with ciprofloxacin, and after 15 days of treatment, he recovered from enteritis. A stool sample, collected before treatment, underwent bacteriologic analysis, and Salmonella spp. were identified biochemically (api 20E, bioMérieux, Marcy l’Etoile, France) and by a polymerase chain reaction assay specific for the invA gene of Salmonella spp. (3). Since the man was a reptile owner, RAS, rather than a foodborne infection, was initially suspected. He owned several cold-blooded animals; all had been tested for Salmonella spp. (at least 3 times at 2- to 3-week intervals), and results were negative. Three weeks before the onset of enteric symptoms, he acquired a boa (Boa imperator) that was subjected to routine analysis for Salmonella spp. in our laboratories (1). Salmonella spp. were isolated from a cloacal swab of the snake. Subsequently, both the human and reptile Salmonella isolates were characterized as S. enterica serovar Paratyphi B. In addition, both strains were found to be d-tartrate–fermenting (dT+) biovars (4), susceptible to ampicillin, amoxicillin-clavulanic acid, cephalothin, cepfa-tazidime, gentamicin, streptomycin, chloramphenicol, tetracycline, neomycin, nalidixic acid, norfloxacin, and ciprofloxacin and resistant to sulfamethoxazole and co-trimoxazole.

By pulsed-field gel electrophoresis analysis of DNA, the strains displayed the same pattern, which suggests a clonal origin (4). The isolates were also assayed for virulence-associated genes. The SopE1 gene was detected in both isolates, but the avrA gene was not detected, which is consistent with an invasive pathovar of S. Paratyphi B (4). Conversely, the spvC, pef, and sef genes were not detected (5).

In recent years, a general increase in RAS detection has been observed, which may be the result of the increasing diffusion of reptiles as pets and a better awareness of RAS risk. In the United States, annual reports of RAS cases are published by the Centers for Diseases Control and Prevention (2). In Europe, studies on free-living and captive reptiles have shown a high prevalence of Salmonella spp. (1). Nevertheless, national surveillance systems for RAS do not exist, and epidemiologic data are incomplete.

Notably, since Sweden became a member of the European Union in 1995, and the import restriction rules for reptiles were removed, a marked increase in RAS was observed in that country (6). As the deregulation of the trade in reptiles is applied, in agreement with the European Union laws, a similar scenario may be projected in other European countries. As is the case for nontyphoid salmonellosis, RAS may be underestimated, especially if patients are not hospitalized. Although a few cases of RAS have been previously reported in children in Italy (7,8), this report provides the first description of RAS in adults. S. Paratyphi B dT+, also known as S. enterica serovar Java, has been isolated in reptiles and tropical fish and has been associated with epidemics of human salmonellosis acquired from food, such as goat milk or chicken (9). The evidence shows that salmonellosis by S. Paratyphi B dT+ apparently occurs more frequently in adults (10), while so-called exotic reptile strains seem to be more prone to causing salmonellosis in children (7,8), which has led to the proposition that S. Paratyphi B dT+ strains may be highly pathogenic. By screening virulence-associated genes, both our isolates were found to be SopE1+ and avrA–, a pattern usually observed in the systemic pathovars of S. Paratyphi B (4) and associated with invasive-ness, which suggests a high pathogenic potential. Accordingly, strict preventive sanitation measures should be adopted when handling reptiles (2), and reptiles should be always regarded as a potential source of pathogenic Salmonella strains for humans.

Marialaura Corrente,* Marta Totaro,* Vito Martella,* Marco Campolo,* Alessio Lorusso,* Massimo Ricci,† and Canio Buonavoglia*  
*University of Bari, Bari, Italy, and †Agenzia Regionale Protezione Ambiente Puglia, Brindisi, Italy

References
1. Corrente M, Madio A, Friedrich KG, Greco G, Desario C, Tagliabue S, et al. Isolation of Salmonella strains from reptile faeces and comparison of different culture media. J Appl Microbiol. 2004;96:709–15.
2. Centers for Disease Control and Prevention. Reptile-associated salmonellosis—selected states, 1998–2002. MMWR Mortal Mortal Wkly Rep. 2003;51:1206–9.
Address for correspondence: Marialaura Corrente, Department of Health and Animal Well-being, Faculty of Veterinary Medicine of Bari, Str. prov. per Casamassima, km. 3 70010 Valenzano, BA Italy; fax: 39-080-467-9843; email: m.corrente@veterinaria.uniba.it

### Congenital Visceral Leishmaniasis

**To the Editor:** Visceral leishmaniasis (VL) is usually transmitted by phlebotomine sandflies. Nonvector transmission occasionally occurs through blood transfusions, contaminated needles of drug users, organ transplants, or laboratory infection (1). Only a few cases of congenital transmission have been reported. We describe a case of VL in a German infant, who never had been to a VL-endemic area. Most likely, the parasite was congenitally transmitted from the asymptomatic mother to her child.

A 9-month-old girl had a 4-week history of intermittent fever, recurrent upper respiratory tract infections, and failure to thrive. Physical examination showed a distressed infant with bilaterally enlarged cervical lymph nodes, hepatosplenomegaly, and a rectal temperature of 40°C. The following laboratory results were remarkable: hemoglobin 6.4 mg/dL, erythrocyte count 3.3 million/µL with 10.9% reticulocytes, platelet count 74,000/µL, and leukocyte count 4,300/µL (29.8% neutrophils, 62.3% lymphocytes, 7.4% monocytes, 0.5% basophils, and 0% eosinophils). Serum electrophoresis showed pronounced hypoalbuminemia and hypergammaglobulinemia. Abdominal sonography verified hepatosplenomegaly. Cultures from blood and other materials as well as additional investigations for a wide spectrum of infectious diseases, including HIV infection, were negative. Leukemia was suspected, and a bone marrow biopsy was performed.

It showed enhanced myelo-, erythro-, and thrombopoiesis with slight lymphopoenia but no leukemic cells. However, *Leishmania* amastigotes were detected in bone marrow macrophages at a density of 1 to 2 parasitized macrophages per 400× oil immersion field, corresponding to a Chulay score of 1+ (2). Serology was positive for *Leishmania* spp. by indirect immunofluorescence antibody test, with cultured promastigotes of *L. donovani* used as antigen (immunoglobulin G [IgG] antibody titer 1:1,024). Specific antibodies against 14- and 16-kDa proteins of *L. infantum* promastigotes (Figure) were confirmed by immunoblot (3). Polymerase chain reaction (PCR) on scrapings of stained bone marrow slides amplified a *Leishmania* spp.-specific sequence of the internal transcribed spacer-1 gene (4), and subsequent HaeIII-restriction fragment length polymorphism helped identify the species as *L. infantum* (Figure). Liposomal amphotericin B, at a daily dose of 4 mg per kg body weight, was given by infusion on 6 consecutive days and repeated on days 14 and 21. The therapy was well tolerated. Within 3 days, the fever subsided. The child recovered completely, and blood cell counts reached normal values 5 weeks after treatment was begun.

Since the child had never been outside Germany, vector transmission appeared highly improbable. The girl was born to a 26-year-old primigravida, prima para, woman at 39 weeks’ gestation by spontaneous labor; the infant’s birth weight was 3,350 g, and she was 51 cm long. She showed normal development until the age of 8 months.

The mother had been healthy during pregnancy and had no history of serious disease; she did not show any pathologic findings at clinical investigation or in standard laboratory tests. However, *Leishmania* serologic tests conducted on blood samples from the mother showed positive results (IgG antibody titer 1:128 against promastigotes of *L. donovani*), and immunoblot analysis confirmed specific antibodies (Figure). During the last 15 years, she had spent holidays every year in Spain (Alicante) but had never been to a tropical country. She stayed in Spain during weeks 29–32 of her pregnancy. However, she could...