density, these attractants should be removed. Homeowners with small children should remove latrines as quickly as they are discovered (2). The risk of children acquiring potentially fatal baylisascariasis can be reduced if parents understand how to reduce the likelihood that children will come into contact with raccoon latrines.

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L. Kristen Page, Chris Anchor, Ellen Luy, Sarah Kron, Grace Larson, Lauren Madsen, Kenneth Kellner, and Timothy J. Smyser

Author affiliations: Wheaton College, Wheaton, Illinois, USA (L.K. Page, E. Luy, S. Kron, G. Larson, L. Madsen, K. Kellner); Wildlife Division of the Forest Preserve District of Cook County, Elgin, Illinois, USA (C. Anchor); and Purdue University, West Lafayette, Indiana, USA (T.J. Smyser)

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References

1. Kazacos KR. Protecting children from helminthic zoonoses. Contemp Pediatr. 2000;17:1–24.
2. Kazacos KR. Baylisascaris procyonis and related species. In: Samuel WM, Pybus MJ, Kocan AA, editors. Parasitic diseases of wild mammals. Ames (IA): Iowa State University Press; 2001.
3. Sorvollo F, Ash LR, Berlin OGW, Yatabe J, Degoigio C, Morse SA. Baylisascaris procyonis: an emerging helminthic zoonosis. Emerg Infect Dis. 2002;8:355–9.
4. Pai PJ, Blackburn BG, Kazacos KR, Warrier RP, Begue RE. Full recovery from Baylisascaris procyonis eosinophilic meningitis. Emerg Infect Dis. 2007;13:928–30.
5. Gavin PJ, Kazacos KR, Shulman ST. Baylisascariasis. Clin Microbiol Rev. 2005;18:703–18. DOI: 10.1128/CMR.18.4.703-718.2005
6. Page LK, Swihart RK, Kazacos KR. Raccoon latrine structure and its potential role in transmission of Baylisascaris procyonis to vertebrates. Am Midl Nat. 1998;140:180–5. DOI: 10.1674/0003-0031(1998)140[0180:RLAP2.O.CO;2.
7. Sloss MW, Kemp RL, Zajac AM. Veterinary clinical parasitology. Ames (IA): Iowa State University Press; 1994.
8. Page LK, Swihart RK, Kazacos KR. Implications of raccoon latrines in the epidemiology of baylisascariasis. J Wildl Dis. 1999;35:474–80.

Address for correspondence: L. Kristen Page, Biology Department, Wheaton College, 501 College Ave, Wheaton, IL 60187, USA; email: kristen.page@wheaton.edu

Reemergence of Strongyloidiasis, Northern Italy

To the Editor: Strongyloidiasis is a helminth infection caused by Strongyloides stercoralis, a nematode ubiquitous in tropical and subtropical countries and occasionally reported in temperate countries, including Italy (1). Sources of infection are filariform strongyloid larvae present in soil contaminated by infected feces; the larvae penetrate through the skin of a human host. After the first life cycle, a process of autoinfection begins, which persists indefinitely in the host if the infection is not effectively treated. The infection can remain totally asymptomatic for many years or forever or cause cutaneous (itching and rash), abdominal (epigastric pain, pseudoappendicitis, diarrhea), respiratory (cough, recurrent asthma), and systemic (weight loss, cachexia) symptoms that can be debilitating. More importantly, when host immunity is impaired because of...
a concurrent disease or immunosuppressive therapy (including corticosteroids, sometimes used to treat symptoms of the unrecognized infection or the concurrent eosinophilia), disseminated strongyloidiasis may occur (2–4), causing a massive and almost invariably fatal invasion of virtually all organs and tissues by filariform larvae and even adult worms (Figure), often combined with bacterial superinfection. This complication is believed to be rare but is probably underestimated because of the extreme variability of the clinical presentation.

Although strongyloidiasis can be suspected in the presence of symptoms or eosinophilia (which is frequent but not mandatory), the low sensitivity of direct diagnostic methods often lets the disease go unrecognized (5–7). By far the most sensitive diagnostic tools are serologic tests: sensitivity and specificity of indirect fluorescent antibody test (IFAT) (in-house produced IFAT) are 97.4% and 97.9%, respectively, at a dilution ≥1/20, and 70.5% and 99.8% at a dilution ≥1/80 (6). A suspected case is defined by a positive antibody titer ≥20 (IFAT); a case is confirmed by a positive direct test result (culture in agar being the most sensitive direct technique) or by a positive antibody titer ≥80 (6). Despite some anecdotal reports on the presence of strongyloidiasis in Italy (1,6), reliable information about the real prevalence of the infection is lacking. After seeing several patients affected by the disease, 1 of whom died because of dissemination (Z. Bisoffi, unpub. data), we decided to carry out a preliminary rapid assessment of the extent of the problem in elderly patients with eosinophilia.

During a 4-month period, from February through May 2008, every patient born in 1940 or earlier who came to the clinical laboratories of 2 contiguous health districts in northern Italy (Mantova, Lombardy Region, and Legnago, Veneto Region) for a diagnostic blood test (hematocrit and leukocyte count/formula) for whatever reason and having a eosinophil count >500 cells/μL was asked to join the study. This study was the pilot phase of a larger, multicentered study, which obtained formal approval from the Ethical Committee of Sacro Cuore Hospital of Negrar, Verona. Informed consent was required of each patient. Of the 132 patients eligible for inclusion (mean age 76.4 years, range 68–90 years, male:female ratio 1.6), none refused to give informed consent. Serum specimens were subjected to the IFAT for S. stercoralis at the Sacro Cuore Hospital Centre for Tropical Diseases.

Unexpectedly, we found that 37 (28%) of 132 patients were positive, with titers ranging between 20 and ≥320 (and ≥80 in most cases). However, caution should be exercised in interpreting the results because the patients may not be representative of the general population. Moreover, our results are based on an indirect (although highly sensitive and specific) test. Because the reported cases involve only a few patients every year (of whom some are anecdotally reported as dying from the infection, usually unpublished), we suspect that most strongyloidiasis cases remain undetected.

If relevant transmission still exists in the area, it is unknown but is unlikely because of the improvement of hygienic conditions in the past 5 decades. Reports of the infection in children or young adults with no travel history outside Italy are lacking. Strongyloidiasis in the elderly is therefore most likely to result from an infection that occurred much earlier in life, either in infancy or at a young age, while walking or working barefoot in agricultural fields. The long persistence is the consequence of the autoinfection cycle typical of this parasite as described above. The result is an important and unrecognized public health problem affecting the geriatric population of northern Italy. These preliminary results confirm the need for the already planned, multicentered study involving a larger sample and a wider geographic area.
Salmonella enterica Serovar Typhi with CTX-M β-Lactamase, Germany

To the Editor: Infection with Salmonella enterica serovar Typhi, the causative agent of typhoid fever, is an acute systemic illness with a high proportion of illness and deaths, especially in developing countries. In Europe, S. enterica ser. Typhi infections occur among travelers returning from disease-endemic areas. After emergence of multidrug-resistant S. enterica ser. Typhi strains that confer resistance to chloramphenicol, trimethoprim, and ampicillin, quinolones have become the primary drugs for treatment (1). We report here the isolation of CTX-M–producing S. enterica ser. Typhi in Germany.

We isolated S. enterica ser. Typhi from blood and feces specimens from a 30-year-old Iraqi woman who was admitted to the hospital in Cologne in August 2008. The patient was febrile, dizzy, and had epigastric pain and headache. The symptoms began 2 weeks earlier, after she had returned from a month-long visit to her relatives in Sulaymaniya, the capital of northeastern Iraqi Kurdistan region. The interview indicated that the same symptoms had developed in other family members in Iraq. The patient was treated successfully with mero- penem (1 g 3×/day) for 2 weeks, and no relapse was observed in a follow-up period of 6 months.

The isolated strain was identified as S. enterica ser. Typhi with the VITEK2 system (VITEK2 GN-card; bioMérieux, Brussels, Belgium) and by slide agglutination with Salmonella antiserum (SIFIN, Berlin, Germany) in accordance with the Kauffmann-White scheme. By using Vi-phaage typing according to the International Federation for Enteric Phage Typing (L.R. Ward, pers. comm.), the strain was classified as S. enterica ser. Typhi Vi-phaage type E9. Antimicrobial drug susceptibilities were determined according to the guidelines of the Clinical Laboratory Standards Institute with the VITEK2 AST-N021 card and Etest (bioMérieux). The extended-spectrum β-lactamase (ESBL) phenotype was confirmed with a combined disk diffusion test (MASTDISCS ID, Mast Diagnostica GmbH, Germany). PCR and sequence analyses were performed with universal primers for the ESBL genes blaCTX-M, blaTEM, and blashv as described previously (2). Primer CTX-M-F 5′-GTTGCTCTTCTCCAGAATAGG-3′ and primer CTX-M-R 5′-CAGCCTTTGCGGCTTCA-3′ were used for sequencing the entire blaCTX-M gene. Investigation of the CTX-M environment was performed with primers IS26-F (5′-GCCTGTGTAACGCCAGGTTTTTG-3′) and IS26-CR (5′-ACAGCGGCACACTCCTTAAC-3′). The presence of plasmid-mediated quinolone resistance genes (qnr) was determined by PCR and sequencing of qnrB (3), qnrS (primer F, 5′-CGGCACACAACTTTCAC-3′; primer R, 5′-CAACAAATACCCG-3′), and qnrA (primer F, 5′-ATTTCCTCGGCGAGATTTTT-3′; primer R, 5′-CGGGAAAGTTGATGAC-3′). In addition, the nucleotide sequences of the quinolone resistance-determining regions of the gyrA, gyrB, parC, and parE genes were determined as previously described (4). Transfer of β-lactam resistance was tested by broth mating assays with a sodium azide–

References

1. Pirisi M, Salvador E, Bifossi Z, Gobbo M, Smirne C, Gigli C, et al. Unsuspected strongyloidiasis in hospitalised elderly patients with and without eosinophilia. Clin Microbiol Infect. 2006;12:787–92.
2. Scowden EB, Schaffner W, Stone WJ. Overwhelming strongyloidiasis: an unappreciated opportunistic infection. Medicine. 1978;57:527–44. DOI: 10.1097/00005792-197811000-00004
3. Fardet L, Genereau T, Poirot JL, Guidet B, Kettaneh A, Cabane J. Severe strongyloidiasis in corticosteroid-treated patients: case series and literature review. J Infect. 2001;33:1040–7. DOI: 10.1016/s0163-4453(00)00579-2
4. Siddiqui AA, Berk SL. Diagnosis of Strongyloides stercoralis infection. J Infect. 2007;54:18–27. DOI: 10.1016/j.jinf.2006.01.016
5. Boscolo M, Bifossi Z. Dissemination: the fatal risk for a missed diagnosis of Strongyloides stercoralis infection. J Infect. 2007;55:284–5. DOI: 10.1016/j.jinf.2007.01.009
6. Siddiqui AA, Berk SL. Diagnosis of Strongyloides stercoralis infection. Clin Infect Dis. 2001;33:1040–7. DOI: 10.1086/322707
7. Boscolo M, Gobbo M, Mantovani W, Degani M, Anselmi M, Badona Monteiro G, et al. Evaluation of an indirect immunofluorescence assay for strongyloidiasis as a tool for diagnosis and follow-up. Clin Vaccine Immunol. 2007;14:129–33. DOI: 10.1128/CVI.00278-06
8. Loutfy MR, Wilson M, Keystone JS, Cain KC. Serology and eosinophil count in the diagnosis and management of strongyloidiasis in a non-endemic area. Am J Trop Med Hyg. 2002;66:749–52.