clearly defined and thus easier to detect. Clearly laser has its deficiencies, but we are concerned that the dramatic early effects of bevacizumab may lead to an underappreciation of its own limitations. We believe treatment success can be considered final not after the early response but only after there is complete retinal vascularization. This case and others that will likely follow should allow a more complete and balanced perspective. In our experience, laser after bevacizumab treatment seems to reduce severe complications, but further study is required to evaluate combined treatment.

This case serves as a warning to clinicians that extensive, long-term, careful follow-up and prompt subsequent intervention are needed in infants treated with intravitreal bevacizumab.

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Endogenous Endophthalmitis Caused by Salmonella Serotype B in an Immunocompetent 12-Year-Old Child

Salmonella is a rare cause of endogenous endophthalmitis.1-4 We describe a healthy child who developed severe endogenous Salmonella endophthalmitis after an episode of self-resolved gastroenteritis. In a literature search, no other cases are described with this clinical history in an immunocompetent patient.

Report of a Case. A 12-year-old boy with unremarkable medical, ocular, and family history had sudden-onset, rapidly progressive vision loss in the left eye for 2 days. His initial visual acuity was light perception and he had mild pain. The right eye was normal. Ten days prior to his initial visit, he reported a 4-day history of fever reaching a temperature of 38.9°C and a diarrheal illness that was treated at home with oral fluids and not medically evaluated. A history of consuming possibly undercooked chicken wings was elicited. At the initial visit, his vital signs were stable and the diarrhea had resolved.

Intravitreous tap and injection of vancomycin hydrochloride, 1 mg, cefazidime, 2.25 mg, and dexamethasone sodium phosphate, 0.4 mg, was performed on the
day of the initial visit, and broad-spectrum treatment with intravenous vancomycin and ceftazidime was started (Figure A). Within 12 hours, the vitreous culture was positive for Salmonella serotype B sensitive to fluoroquinolones, aminoglycosides, cephalosporins, trimethoprim sulfate, ampicillin, and meropenem. Because visual acuity remained at light perception and the clinical signs were not improving, pars plana vitrectomy and lensectomy were performed on the second posttreatment day. Intraoperatively, multiple peripheral retinal tears and sclerotic retinal vessels were noted. Two additional intravitreous injections of amikacin sulfate and tenidine were administered during follow-up. The extensive systemic workup ruled out an immunocompromised state. Blood culture results were negative. Stool culture was positive for Salmonella serotype B. Echocardiography, abdominal ultrasonography, chest radiography, computed tomography of the brain, computed tomography of the abdomen and pelvis, and an upper gastrointestinal tract series with a small-bowel series failed to identify any additional foci of infection. The patient received intravenous meropenem for 6 weeks. At the 4-month follow-up, visual acuity was no light perception and ocular hypotony was observed (Figure, B).

Comment. Salmonella gastroenteritis is relatively common, affecting an estimated 1 to 4 million people per year in the United States alone. The global impact of nontyphoidal Salmonella is high, with an estimated 93.8 million illnesses and 155,000 deaths each year. The incidence is highest in Southeast Asia, East Asia, and Central Europe. There are more than 2,300 Salmonella serotypes. The most frequent group B serotypes include Typhimurium and Heidelberg. Usually self-limiting symptoms include moderate fever, nausea, vomiting, diarrhea, and variable abdominal pain. Immunosuppression, extremes of age, decreased gastric acidity, and altered intestinal function predispose to more severe gastroenteritis. Other than with severely ill or immunocompromised patients, fluid and electrolyte replacement is the mainstay of therapy. The pathogenicity of Salmonella is multifactorial and attributed in part to production of cholera toxin–like and Escherichia coli heat-labile enterotoxin–like toxins. Transient bacteremia occurs in an estimated 1% to 4% of patients and may result in metastatic seeding in predisposed patients: cardiac seeding with cardiac structural abnormalities, intravascular seeding with atherosclerotic disease, bone and joint seeding with prostheses, and central nervous system seeding in neonates.

Pediatric bacterial endogenous endophthalmitis is rare (0.1%-4% of all endogenous bacterial endophthalmitis, which in turn accounts for 2%-8% of all reported endophthalmitis cases). Common sources include wound infection, meningitis, endocarditis, urinary tract infection and indwelling intravenous catheters, and hemodialysis fistulas. Pediatric endogenous endophthalmitis often is not suspected and is misdiagnosed.

Endogenous Salmonella endophthalmitis is a rare condition, with only 11 cases reported in the English literature (Table). The visual prognosis is usually poor, with reported outcomes being visual acuity of no light perception and involved eyes often requiring enucleation.

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lar white matter changes in the corpus callosum, which were attributed to demyelinating disease. One month later, he experienced a confusional episode. Three months later, he noted peripheral visual field loss in the left eye. Owing to concern for optic neuritis related to MS, he was treated with a short course of oral prednisone and began subcutaneous interferon beta-1a treatment. His visual symptoms improved, but 3 months later he developed peripheral vision loss in the right eye, resolving completely after a 1-week course of prednisone. Ten months after the initial visit, he experienced bilateral sequential hearing loss. Repeated magnetic resonance imaging findings of the brain were unchanged.

He had neuro-ophthalmic and retinal evaluations 15 months after beginning interferon beta-1a treatment, noting little improvement in his symptoms. Visual acuity was 20/20 OU. Funduscopic examination revealed punctate retinal hemorrhages along the superotemporal arcade, subtile sclerotic-appearing retinal arterioles, and yellow retinal arterial wall plaques (Figure 1A). Humphrey visual field showed bilateral nasal defects with a mean deviation of −7.87 dB OD and −12.0 dB OS. Fluorescein angiography showed peripheral branch retinal artery occlusions and retinal arteriolar wall hyperfluorescence (Figure 1C and D). Review of the prior magnetic resonance imaging findings showed small round microinfarctions in the corpus callosum (Figure 2). Formal audiometry evaluation showed borderline mild sensorineural hearing loss in the right ear with excellent speech discrimination and moderate sensorineural hearing loss in the left ear with good speech discrimination. Impedance testing suggested normal pressure and good compliance in both ears. These findings were highly suggestive of Susac syndrome, and interferon beta-1a treatment was discontinued.

Two weeks after interferon beta-1a cessation, repeated fluorescein angiography showed remarkable improvement in the retinal arterial wall hyperfluorescence (Figure 1G and H). Continued improvement in the areas of peripheral retinal ischemia was observed at the 3-month follow-up, and functional improvement by static perimetry was also observed with mean deviations of −1.67 dB OD and −6.60 dB OS.

### Table. Summary of the Endogenous *Salmonella* Endophthalmitis Cases in the Literature

<table>
<thead>
<tr>
<th>Source</th>
<th>Reported Risk Factors</th>
<th><em>Salmonella</em> Species</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corman et al, 1979</td>
<td>Aged 7 wk, pneumonia</td>
<td><em>S enteritidis</em></td>
<td>Enucleation</td>
</tr>
<tr>
<td>Weinstei n et al, 1982</td>
<td>Aged 48 y, chronic lymphocytic leukemia</td>
<td><em>S typhimurium</em></td>
<td>Enucleation</td>
</tr>
<tr>
<td>Sho et al, 1983</td>
<td>Aged 1 y</td>
<td><em>S typhimurium</em></td>
<td>NLP</td>
</tr>
<tr>
<td>Appel et al, 1986</td>
<td>Aged 11 mo, malaria</td>
<td><em>S typhimurium</em></td>
<td>Not reported</td>
</tr>
<tr>
<td>Kes et al, 1990</td>
<td>Aged 55 y, rheumatoid arthritis, receiving immunosuppressive agents and corticosteroids</td>
<td><em>S arizonae</em></td>
<td>Enucleation</td>
</tr>
<tr>
<td>Senf et al, 1993</td>
<td>Aged 4 mo, premature, presumed retinopathy of prematurity</td>
<td><em>Salmonella</em> serotype B</td>
<td>Enucleation</td>
</tr>
<tr>
<td>Suvarnamani et al, 1995</td>
<td>Aged 2 mo</td>
<td><em>S typhimurium</em></td>
<td>Enucleation</td>
</tr>
<tr>
<td>Yu et al, 2002</td>
<td>Aged 3 mo</td>
<td><em>S london</em></td>
<td>Not reported</td>
</tr>
<tr>
<td>Yodprom et al, 2007</td>
<td>Aged 54 y, HIV positive</td>
<td><em>S choleraesuis</em></td>
<td>NLP</td>
</tr>
<tr>
<td>Arora et al, 2008</td>
<td>Aged 32 y, no risk factors</td>
<td><em>S typhi</em></td>
<td>NLP</td>
</tr>
</tbody>
</table>

Abbreviations: HIV, human immunodeficiency virus; NLP, no light perception.

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### Exacerbation of Susac Syndrome Retinopathy by Interferon Beta-1a

Susac syndrome features the triad of multiple branch retinal artery occlusions, hearing loss due to microinfarctions of the cochlea, and encephalopathy due to brain microangiopathy. Initial misdiagnosis as multiple sclerosis (MS) is not uncommon. Magnetic resonance imaging evidence of microinfarctions of the corpus callosum and multiple yellow retinal arterial wall plaques on fundus examination are helpful in differentiating this condition from demyelinating diseases.

We describe a patient initially diagnosed as having MS who, after treatment with interferon beta-1a, was found to have multiple branch retinal artery occlusions. After interferon beta-1a cessation, rapid improvement of his visual fields and fluorescein angiographic appearance suggested that the interferon beta-1a may have exacerbated the retinal findings of Susac syndrome.

**Report of a Case.** A 23-year-old white man experienced extremity numbness and paresthesia as well as headache. Magnetic resonance imaging showed periventricular...