the use of the single-valve Denver shunt. Because it was prone to obstruction, this device was superseded by a two-valve model. In both the Spanish[3] and French trials, in addition to the patients with late shunt failures, a substantial proportion of patients initially did not have a successful diuresis. It is essential for immediate as well as long-term functioning that the tip of the venous tube of a peritoneovenous shunt be located in the superior vena cava distal to the orifice of the azygos vein or, preferably, in the proximal right atrium. It is advisable to verify this optimal position by intraoperative radiography. This was emphasized in a reference that we cited[4] but was not discussed in our paper. If a patient is to benefit from peritoneovenous shunting, the shunt must function. Finally, since the completion of our study, the category of medical therapy has been improved by the addition of the regimen of one or more large paracenteses plus intravenous albumin.[5] Accordingly, refractory ascites can be redefined as ascites that is not controlled satisfactorily by this or a similar regimen. If the patient or physician is not satisfied with the results of this treatment (especially if renal failure develops), peritoneovenous shunting, if not contraindicated, offers an alternative solution.

MALCOLM M. STANLEY, M.D.
Veterans Affairs Medical Center
Hines, IL 60141

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LYME DISEASE TRANSMITTED BY A BITING FLY

To the Editor: Lyme disease, first described by Steere et al. in 1977,[1] was identified as a disease transmitted by the bite of ixodes ticks.[2] Burgdorfer, Barbour, and colleagues then isolated the infectious agent, a spirochete now known as *Borrelia burgdorferi*.[3] The spirochete has been shown to be transmitted by a variety of ixodes ticks, including *Ixodes dammini, I. ricinus, I. pacificus,* and *I. persulcatus*.[4] *B. burgdorferi* has been identified in biting flies, and there has been anecdotal mention of possible transmission of *B. burgdorferi* by such flies.[5,6] This report describes a case of Lyme disease transmitted by a fly bite.

On July 10, 1989, while jogging with no shirt on, a 42-year-old man from Old Lyme, Connecticut, an area in which Lyme disease is endemic, was bothered by a large fly that he believed to be either a deerfly or a horsefly. After swatting at it unsuccessfully, he was bitten by the fly several times on the right side of the chest. The bites were acutely painful. The area around the bites was swollen for one to two days; the swelling then subsided. The patient was not aware of any tick bites in the previous three months. On July 23, he presented with classic erythema migrans surrounding the bite area, headache, chills, fever, myalgias, arthralgias, and fatigue.

The patient had a temperature of 37.2°C and a pulse of 76 per minute. Examination disclosed a 16-cm by 11-cm rash (erythema migrans) on the right side of the chest, with several small papular areas in its center consistent with fly bites. No regional adenopathy was present, and no cardiac, joint, or neurologic abnormalities were found. A diagnosis of Lyme disease was made, and treatment was initiated with amoxicillin (500 mg three times a day) and probenecid (500 mg three times a day) for 10 days. On the first night after treatment the patient had a Jarisch–Herxheimer reaction, with a fever and worsening of his headache and myalgias. At his 10- and 30-day follow-up visits he was asymptomatic, and has remained well since.

Antibody titers to *B. burgdorferi* were determined by enzyme-linked immunosorbent assay in the acute phase and at the 10- and 30-day follow-up visits. These analyses confirmed a more than fourfold rise in antibodies to *B. burgdorferi* (Table 1). Results of other laboratory tests were within normal limits.

Table 1. Antibody Response to *B. burgdorferi* in the Patient and According to Diagnostic Criteria.

Antibody	Patient			Negative	Indeterminate	Positive
	Day 1	Day 10	Day 30			
IgM	<1:100	1:25,600	1:6400	<1:100	1:100–1:200	>1:200
IgG	<1:400	1:400	1:400	<1:400	1:400	>1:400

This patient was bitten by a biting fly (an act he both saw and felt) and subsequently presented with Lyme disease, with erythema migrans at the site of the bite. Serologic testing confirmed a more than fourfold rise in antibodies to *B. burgdorferi*. In contrast to the painless bite of *I. dammini*, the bite of flies is painful and not likely to be overlooked by the patient as a means of transmission of Lyme disease. I conclude that although in most cases Lyme disease is transmitted by the bite of ixodes ticks, it may rarely be transmitted by biting flies.

STEVEN W. LUGER, M.D.
8 Davis Rd.
Old Lyme, CT 06333

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NEUROPSYCHIATRIC SIDE EFFECTS OF MEFLOQUINE

To the Editor: In a pharmacokinetic study by Patchen et al. (Nov. 16 issue),[1] four of seven subjects given mefloquine base (13.5 to 15.4 mg per kilogram of body weight) experienced dizziness, and three also had vertigo. Indeed, analysis of registration documents indicated that dizziness occurred in 24 percent of patients with malaria treated with 750 mg of mefloquine, in 38 percent treated with 1000 mg, and in 96 percent treated with 1500 mg. Dividing a 1250-mg dose into two doses given eight hours apart reduced the incidence of dizziness to 23 percent.[2]

The symptoms of malaria and adverse effects of treatment can be difficult to separate. The Swiss Malaria Prophylaxis Study[3] describes 2780 persons who took mefloquine prophylactically. Adverse effects other than skin reactions and nausea occurred in 8.8 percent; this category included dizziness, vertigo, and other signs and symptoms. The corresponding rate of adverse effects among 9171 persons who took chloroquine ranged from 8.9 to 9.8 percent (at doses of 300 to 450 and 600 to 700 mg per week). Six chloroquine recipients had to be hospitalized (including two with psychosis), but none of the mefloquine recipients required hospitalization. Similar results were obtained in a French study of prophylactic use.[4]

Additional information is available from spontaneous reports of adverse effects from all over the world. Spontaneous reports have limitations; they probably give less precise estimates of minor adverse effects than of more serious ones. Between its introduction and September 15, 1989, an estimated 1.2 million persons took mefloquine prophylactically, and less than 5000 therapeutically. Thirty-seven of those who took mefloquine prophylactically reported dizziness, vertigo, unsteadiness, paresthesias, unconsciousness, convulsions, and other neurologic phenomena, and 23 reported restlessness, anxiety, depression, acute psychosis, or other psychiatric disorders. Eighteen of these 60 subjects continued to take mefloquine