

### Laparoscopy in the Diagnosis of Peritoneal Tuberculosis

TO THE EDITOR — We read with interest the recent article on clinical features of abdominal tuberculosis [1]. Like the authors, we have noted difficulty in diagnosing tuberculous peritonitis; however, we have found laparoscopy to be a useful diagnostic test [2, 3].

We prospectively studied 98 consecutive patients with ascites. By laparoscopy a correct immediate diagnosis was made in 77 (78%) and a final diagnosis in 92 (94%). Visual diagnosis was highly accurate in patients with tuberculous peritonitis. The diagnosis was confirmed in 43 patients; in all but two cases confirmation was by culture or histology. The two cases without culture or histology responded to tuberculous therapy started on the

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basis of visual appearance. Unfortunately all specimens from these two patients were lost.

Peritoneal tuberculosis is an important cause of ascites in developing countries and in immigrants from these areas. Laparoscopy is a useful and safe diagnostic test, and should be considered if the diagnosis is suspected.

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### Disseminated Candidiasis in a Drug Addict Not Using Heroin

COLLEAGUES — Disseminated candidiasis in heroin addicts is a well-described entity, characterized by cutaneous, ocular, osteoarticular, and probably also hepatic involvement [1-6]. Referring to previous reports in the *Journal of Infectious Diseases*, we report a case of disseminated candidiasis in a patient injecting not heroin, but buprenorphine tablets.

A 26-y-old man had sporadically used heroin before 1983. Following an accident, which caused a fractured left humerus, he began to suffer from chronic shoulder pain. He was treated with buprenorphine, and this developed into daily use. He admitted to daily injection iv of  $\leq 15$  tablets (0.2 mg each) of Temgesic dissolved in a few drops of commercially prepared lemon juice bottled in a "plastic lemon." He also abused flunitrazepam (Rohypnol) orally, but he denied injecting heroin or any other drugs. In July 1987 he was admitted after 5-d of fever up to 40.0°C, chills, purulent expectorations, and rapid bilateral hearing loss. Physical examination revealed significant lymphadenopathy, oral thrush, and two isolated subcutaneous inflammatory nodules on the left forearm. Fundoscopic examination showed multiple white, raised chorioretinal lesions. Initial blood cultures (two), urine culture, biopsy material from the subcutaneous nodules, and swab specimen from oropharynx yielded *Candida albicans*. In addition, *C. albicans* was cultured from the bottled lemon juice, which the patient had used as a solvent. Serum antibodies to the human immunodeficiency virus (HIV) were positive by ELISA and by Western blot tests. CD4 T cells were 496/mm<sup>3</sup> and the CD4:CD8

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ratio was 1.4. There was a threefold elevation in transaminase values. Antibodies to *C. albicans* were elevated by indirect hemagglutination (1/2,560) and immunofluorescence (IgG 1/640, IgM positive). Chest radiography showed transient infiltrations of the right middle lobe. Bronchoalveolar lavage yielded predominant pneumococci in a mixed aerobe-anaerobic flora but was negative for *Pneumocystis carinii*, cytomegalovirus, herpes simplex virus, mycobacteria, and fungi. No vegetations were seen by echocardiography on cardiac valves. Cranial computed tomography and routine CSF examinations were normal. Investigation of the deafness revealed bilateral sensorineural hearing loss, which remained undefined. Under flucloxacillin for initially suspected bacterial endocarditis, the fever declined within 48 h, before antifungal therapy was started. With amphotericin B for 26 d (total dose, 1.25 g), there was a nearly total resolution of the chorioretinal lesions and the subcutaneous nodules.

Severe *Candida* infections, mainly endocarditis, have been described as complications in drug addicts since the early reports of infectious disease problems among these patients. The syndrome of disseminated candidiasis, however, has emerged only in the past decade. The main species isolated is *C. albicans* [1-8]. Several authors have suggested that the lemon juice used to dissolve brown heroin, is the likely source of infection with *Candida* in these patients [3-8]. Distinct epidemiologic changes must have led to the emergence of the syndrome. It is probable that the appearance of poorly soluble brown heroin on the drug market in the late 1970s led to the new habit of dissolving the drug in lemon juice. The use of lemon juice as a solvent was not mentioned by authors who described drug abuse habits in the 1960s [9-11]. In addition, the availability of lemon juice in plastic bottles in the last two decades, with the possibility of exchange of these bottles among drug addicts, might have been a precondition to a widespread colonization of lemon juice [7]. Contamination of lemons and commercial lemon juice through handling has been suggested [4, 5, 7, 8].

The case described here presents several distinct aspects. First, the patient was addicted to buprenorphine. He may have been using heroin in addition, but this seems unlikely, as he firmly denied contacts with the local drug abuse scene, which was confirmed by his mother, his nonaddicted girl friend, and his medical practitioner. To our knowledge, this is the first published case of disseminated candidiasis in a drug addict using a substance other than heroin. This case adds further evidence that lemon juice, and not heroin itself, is involved in the pathogenesis of the syndrome. Second, our patient also suffered from HIV infection group IV C2. Although oral and esophageal *Candida* infection are common in the presence of HIV infection, it appears that fungemia and generalized *Candida* infection are rare. Thus, there seems not to be a direct relation between HIV infection and disseminated candidiasis in this patient. However, it is possible that oral thrush led to colonization of the lemon juice through uncapping the plastic bottle by mouth. Third, the patient did not present with disseminated nodules and pustules in hair-bearing areas, as generally seen in heroin addicts, but showed only two localized lesions, as has been observed in immunocompromised patients [12]. Fourth, the organism was also isolated from blood cultures. This is unusual, as shown by Dupont and Drouhet [2], who found positive blood cultures in only one of 38 patients.

Thus, this case of disseminated candidiasis in a drug addict not using heroin adds further evidence that lemon juice, and not heroin, is the source of infection in systemic candidiasis among drug addicts. With the increased prevalence of oral candidiasis in drug addicts due to the AIDS epidemic and the continuous use of lemon juice as a solvent, disseminated candidiasis may become more frequent in the future, since until now the epidemiologic background has remained unaffected even by syringe exchange programs.

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