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NOTES

Anaerobic Botryomycosis

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Botryomycosis of the liver developed in a patient receiving corticosteroid therapy. The botryomycosis was caused by *Propionibacterium acnes*, which grew only anaerobically. The patient was successfully treated medically and at follow-up is asymptomatic.

Botryomycosis is a chronic bacterial infection characterized by the formation of sulfur granules. It usually involves skin and subcutaneous tissue and tends to occur in the normal host. We report a case of anaerobic botryomycosis occurring in a patient on chronic corticosteroid therapy. This case of botryomycosis was caused by *Propionibacterium acnes* and was treated successfully with medical therapy.

Case report. The patient was a 60-year-old white female who was admitted for elective cholecystectomy because of the outpatient diagnosis of noncalculous cholecystitis with cholecystosis. She had had several weeks of right upper-quadrant pain and bloating and had a long-standing history of chronic asthmatic bronchitic disease for which she was treated with prednisone (5 mg/day for 2 years) and elixophyllin.

At the time of the cholecystectomy the surgeon noted that her liver was studded with multiple small granular lesions, and a liver biopsy was performed. Histological examination showed microabscesses and sulfur granules (Fig. 1). A cystic lymph node was biopsied and revealed reactive hyperplasia, and the gall bladder demonstrated chronic inflammation.

Acid-fast and fungal stains performed on the liver biopsy were negative, but the Gram stain demonstrated occasional gram-positive rods. Since the specimen obtained at the time of surgery was not cultured, a percutaneous liver biopsy was performed and cultured aerobically and anaerobically. Growth was noted in the thioglycolate broth only and Gram stain revealed gram-positive, branching, beaded filaments. Subsequent growth was achieved after transfer to Schaedler medium under anaerobic conditions. Specific fluorescent-antibody stains for *Actinomyces* species were negative, and the organism was ultimately identified as *Propionibacterium acnes*.

The following studies were performed in the identification. Colonial morphology is described as opaque, circular, convex colonies of 1 mm or less. The organism was anaerobic and nonmotile; it formed acid in glucose, mannitol, and glycerol; it was nitrate, indole, and catalase positive and formed a clot in milk. The organism produced acetic and propionic acids. Minimal inhibitory concentrations in Schaedler medium were as follows: penicillin, <0.06 μg/ml; tetracycline, 0.25 μg/ml; chloramphenicol, <0.25 μg/ml; erythromycin, <0.06 μg/ml; clindamycin, <0.06 μg/ml; and cefoxitin, <0.06 μg/ml. The fluorescent-antibody stains, final identification, and minimal inhibitory concentrations were performed at the Center for Disease Control, Atlanta, Ga.

The patient's postoperative course was uneventful except for a wound infection from which *Bacteroides fragilis* and *Pseudomonas aeruginosa* were isolated. This was treated with drainage and appropriate antibiotics.

After a brief course of intravenous penicillin G, the patient was discharged taking 1 g of penicillin V four times per day. This therapy was continued for 6 months. At follow-up, she remains free of abdominal pain and fever. Her erythrocyte sedimentation rate, which was 43 mm/h on admission, is now 24 mm/h, and her hematocrit, which was 33% on admission, is now 47%.

Discussion. Botryomycosis has been called the champignon de castration (5) because of original descriptions of the disease after castration in horses. Though first described by Bollinger in 1870, it was Rivolta 14 years later who coined the term botryomycosis, referring to the grapelike appearance of the granules (botryo) and the presumed fungal etiology (mycosis) (4). Since then, this entity, also called granular bacteriosis, staphylococcia, actinophytosis, pseudomycosis, and granuloma pyogenicum, has been described only rarely in the medical literature. The most characteristic feature of the disease is

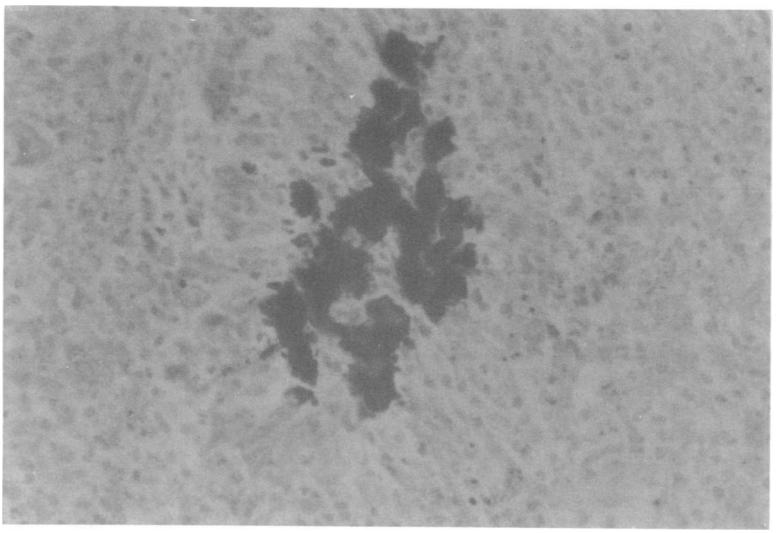

FIG. 1. *Typical granule as seen on Gram stain of surgical liver biopsy specimen.*

that bacteria, instead of spreading throughout the infected tissue, group together to form conglomerates resembling the sulfur granules of actinomycotic infection. The resultant inflammatory reaction is chronic and granulomatous and usually involves skin and subcutaneous tissue. Abscess formation and sinus tracts are not unusual.

Winslow (8) classified granular infections into three categories: (i) botryomycosis, (ii) actinomycosis and nocardiosis; and (iii) mycetomas. Each of these infections is characterized by a granule of microorganisms imbedded in a matrix. The outline of the granules resembles closely packed "clubs." There appears to exist a state of equilibrium between the host and the infecting agent. Histopathologically, one sees granulation tissue, newly formed capillaries, epithelioid cells, giant cells, and microabscesses composed of neutrophils, as well as the typical granules (7).

A recent report (1) documents the first reported case of visceral botryomycosis successfully treated with antibiotics. All but two previously reported cases had been progressive and fatal, and these two had surgically resectable lesions. Further, all patients with hepatic disease were noted to have died. This last report (1) emphasized the lack of underlying host defense abnormalities in patients previously reported.

Although most cases of botryomycosis are caused by staphylococci, streptococci, or gram-negative enteric bacilli, our patient's pathogen grew only anaerobically.

P. acnes is an anaerobic gram-positive nonsporeforming bacillus that is part of normal skin flora. Gram staining may show false branching or a beaded appearance. An infrequent invasive pathogen, *P. acnes* is a rare cause of endocarditis and may infect prostheses at various sites (2, 3, 5). The optimum level of organisms (1) that is felt necessary for the development of botryomycosis may have been achieved in our patient because of an interaction between the low virulence of *P. acnes* and the immunosuppressive effect of corticosteroid administration.

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