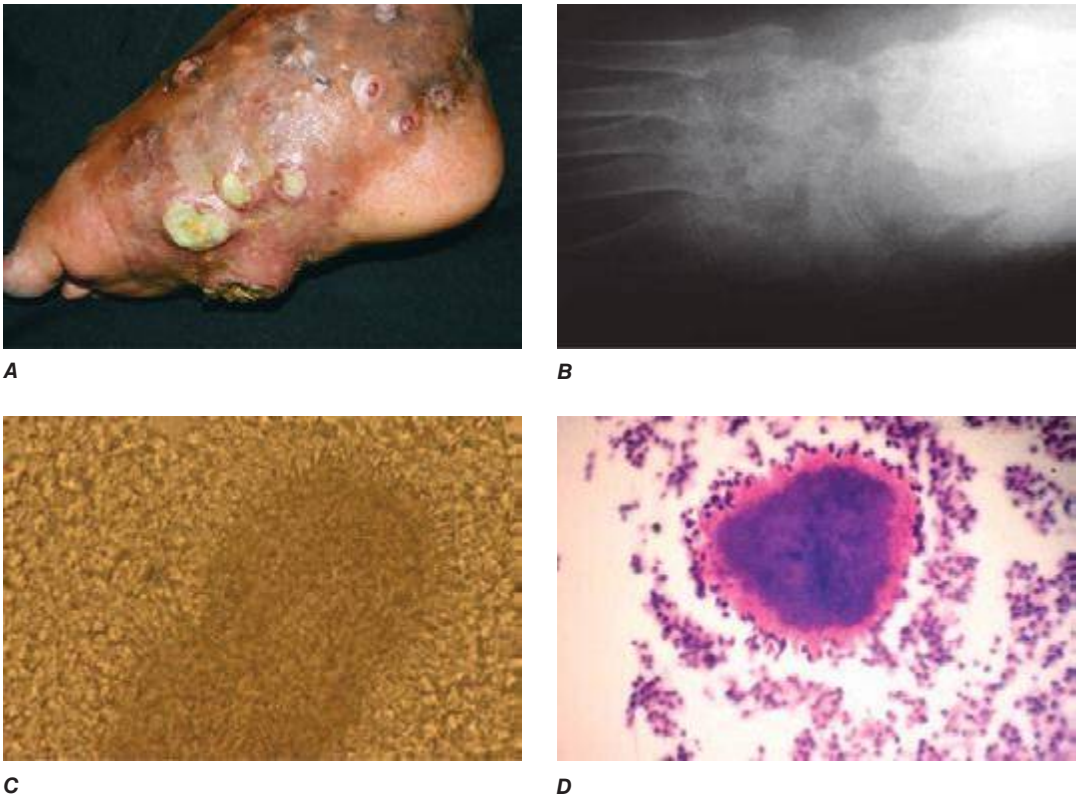

FIGURE 199-4 ***Nocardia brasiliensis*** **mycetoma.** ***A.*** Draining sinuses and giant white grains with a seropurulent discharge. ***B.*** Radiography of the foot showing marked soft tissue enlargement and bony lytic lesions. ***C.*** Direct microscopy of grains stained with Lugol's iodine (×40). ***D.*** Periodic acid–Schiff stain of skin biopsy (×40). *(Image provided by Roberto Arenas and Mahreen Ameen, St. John's Institute of Dermatology, Guy's & St Thomas' NHS Trust, London, UK. Reprinted with permission from R Arenas, M Ameen: Lancet Infect Dis 10:66, 2010.)*

and a fistula appears, typically followed by others. The fistulas tend to come and go, with new ones forming as old ones disappear. The discharge is serous or purulent, may be bloody, and often contains 0.1- to 2-mm white granules consisting of masses of mycelia (Figs. 199-4*C* and 199-4*D*). The lesions spread slowly along fascial planes to involve adjacent areas of skin, subcutaneous tissue, and bone. Over months or years, there may be extensive deformation of the affected part. Lesions involving soft tissues are only mildly painful; those affecting bones or joints are more so (Fig. 199-4*B*). Systemic symptoms are absent or minimal. Infection rarely disseminates from actinomycetoma, and lesions on the hands and feet usually cause only local disability. Lesions on the head, neck, and trunk can invade locally to involve deep organs, with consequent severe disability or death.

Eye Infections Nocardia species are uncommon causes of subacute keratitis, usually following eye trauma. Nocardial endophthalmitis can develop after eye surgery. In one series, nocardiae accounted for more than half of culture-proved cases of endophthalmitis after cataract surgery. Endophthalmitis can also occur during disseminated disease. Nocardial infection of lachrymal glands has been reported.

DIAGNOSIS

The first step in diagnosis is examination of sputum or pus for crooked, branching, beaded, gram-positive filaments 1 μm wide and up to 50 μm long (Fig. 199-5). Most nocardiae are acid-fast in direct smears if a weak acid is used for decolorization (e.g., in the modified Kinyoun, Ziehl-Neelsen, and Fite-Faraco methods). The organisms often take up silver stains. Recovery from specimens containing a mixed flora can be improved with selective media (colistin–nalidixic acid agar, modified Thayer-Martin agar, or buffered charcoal–yeast extract agar). Nocardiae grow well on most fungal and mycobacterial media, but procedures used for decontamination of specimens for mycobacterial culture can kill nocardiae and thus should not be used when nocardiae are suspected. Nocardiae grow relatively slowly; colonies may take up to 2 weeks to appear and may not develop their characteristic appearance—white, yellow, or orange, with aerial mycelia and delicate, dichotomously branched substrate mycelia—for up to 4 weeks. Several blood culture systems support nocardial growth, although nocardiae may not be detected for up to 2 weeks. The growth of nocardiae is so different from that of more common pathogens that the laboratory should be alerted when nocardiosis is suspected in order to maximize the likelihood of isolation.

In nocardial pneumonia, sputum smears are often negative. Unless the diagnosis can be made in smear-negative cases by sampling lesions in more accessible sites, bronchoscopy or lung aspiration is usually necessary. To evaluate the possibility of dissemination in patients

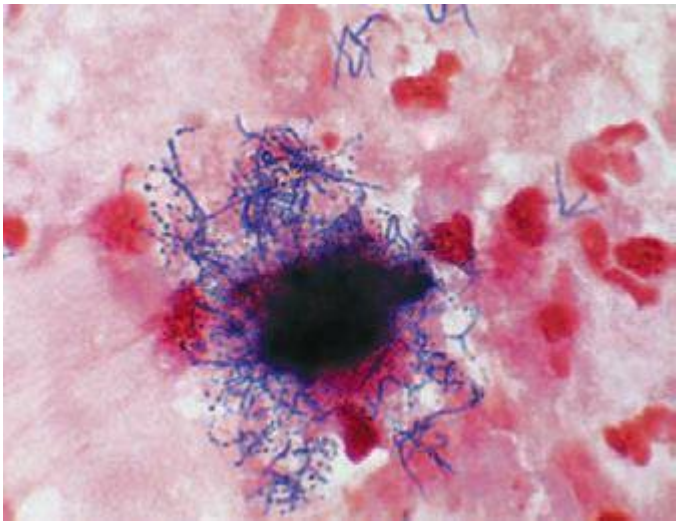

FIGURE 199-5 **Gram-stained sputum** from a patient with nocardial pneumonia. *(Image provided by Charles Cartwright and Susan Nelson, Hennepin County Medical Center, Minneapolis, MN.)*