Penicillium janthinellum in sputum and bronchoalveolar lavage in an AIDS patient with pneumonia


Patients immunocompromised with acquired immune deficiency syndrome (AIDS) are at particular risk for infection with opportunistic fungi. Penicillium species are blue-green molds, and are ubiquitous in nature. They are frequently contaminants of clinical specimens, and isolation from the lung usually represents colonization after inhalation of conidia. We report pneumonia in an AIDS patient from whom Penicillium janthinellum was isolated in large quantities from expectorated sputum and bronchoalveolar washings. The patient died, and because an autopsy was not performed, the nature of the infection was not confirmed histopathologically or by culture from tissue. However, we assume that P. janthinellum was the cause of severe bilateral pneumonia with consolidation in this patient.

The patient was a 47-year-old male, HIV positive, with a CD4 count of zero. He was a former intravenous drug user, and worked at a chemical plant. He had been vacationing in Acapulco, Mexico 10 days prior to admission, and while there developed symptoms of cough producing a thick yellow-brown sputum with blood streaks, dull aching upper back pain, shortness of breath, fever, lethargy, weakness, and anorexia. He also complained of a 10-lb weight loss over a 3-week period. He denied any diarrhea, abdominal pain, night sweats, or pleuritic chest pain.

His past medical history included outpatient treatment of pneumonia twice before this admission. His medications included clotrimazole troches, clotrimazole cream, enalapril maleate 5 mg (PO) every day, trimethoprim-sulfamethoxazole DS 1 tablet (PO) every other day, NPH insulin 30 units (SC) every day, methadone 80 mg (PO) every day, rifabutin 300 mg (PO) every day, and azathioprine 100 mg (PO) five times a day.

Physical examination revealed a cachectic, lethargic male in mild respiratory distress, alert and oriented to person, place and time. His temperature was 37.9°C on admission (maximum temperature 39.2°C), heart rate 104 beats/min, respiratory rate 22/min, and blood pressure 106/60 mmHg. The physical examination was remarkable for bilateral crackles with increased vocal fremitus in the right mid-lung field on auscultation of the lungs.

Laboratory data showed a white blood cell count of 7900/mm³, with 75% polymorphonuclear cells, 8% bands, 10% lymphocytes, and 7% monocytes. A blood gas on room air test gave the following results: pH 7.45, pCO₂ 33, pO₂ 56, HCO₃ 23 mEQ/L, O₂ saturation 91%. The chest X-ray revealed a dense right upper lung infiltrate with bilateral interstitial and alveolar infiltrates (Figure 1).

The patient was started on trimethoprim-sulfamethoxazole (TS), 320 mg (IVD) every 6 h, erythromycin, 1 g (IV) every 6 h, and fluconazole, 100 mg (PO) every day, with a diagnosis of community-acquired pneumonia. There was a need to rule out pulmonary tuberculosis and Pneumocystis carinii pneumonia (PCP), and sputum for Gram stain, culture and acid-fast smear was obtained. The day after admission, a bronchoscopy with bronchoalveolar lavage (BAL) was performed. Purulent secretions were noted and a sample was taken from the right upper lung.

Culture of the sputum yielded abundant normal oropharyngeal flora and a moderate amount of a rapidly growing mold which was also isolated in large amounts from the BAL fluid in addition to Haemophilus influenzae (Figure 2). Both Gram stains and KOH preparations of the BAL fluid stained with Calcofluor white revealed the presence of somewhat dichotomously branching septate fungal hyphae 3–6 μm in width. The fungus grew rapidly at 30°C on Sabouraud dextrose agar (SDA) (Emmon’s modification) and on SDA with chloramphenicol. No growth was noted on Mycosel agar (BBL). The organism was buff-colored and produced a slight yellow pigment on the reverse that was most pronounced on potato dextrose agar. Attempts to identify the fungus were unsuccessful. The isolate was sent to the Fungus Testing Laboratory, Department of Pathology, University of Texas Health Science Center at San Antonio for identification. Blood cultures were negative. The isolate of H. influenzae was sensitive to trimethoprim-sulfamethoxazole and ceftriaxone.

The patient remained febrile with a temperature up to 38.9°C. Erythromycin and fluconazole were discontinued and a new regimen of amphotericin B and ceftriaxone was begun. The patient began to defervesce but died 4 days later. An autopsy was not performed. The mold was later identified as Penicillium janthinellum (Maren A. Klich, USDA, Southern Regional Research Center, New Orleans, LA).

Penicillium janthinellum Biourge (derived from the Latin janthinellus, meaning to be somewhat violet) is a
very common soil organism. Some authorities regard
*P. simplicissum* (Oudemans) Thorn to be a synonym of
*P. janthinellum*. Most taxonomists agree that this species
is distinctly variable, with individual isolates showing
c onsiderable differences in colonial appearance.
 Generally, as with the clinical isolate recovered
from this case, colonies are broadly floccose and spreading,
radially furrowed and pale gray-green, with the colony
reverse varying from colorless to pale dirty yellow or
demonstrating reddish to purple colorations. Conidio-
phores are finely to coarsely rough (3–5 μm in diam-
eter), and conidial heads irregular, often consisting of
a simple whorl of cells supporting the conidiogenous
cells. Conidiogenous cells (phialides) are characteristic,
very divergent (8–10 × 2–2.2 μm), and taper abruptly
to long slender tips. Conidia are mainly ellipsoidal to
subglobose, delicately roughened (3–3.5 μm long axis),
and arranged in delicate divergent twisted/tangled
chains.

Patients with severe dysfunction of cell-mediated
immunity and HIV infection are at great risk for
developing severe life-threatening illnesses caused by
opportunistic fungal pathogens not previously recog-
nized to cause human infection. The genus *Penicillium*
contains approximately 200 species, and is classified
in a group of moniliaceous (lightly pigmented/clear-
colored) molds which may cause opportunistic infec-
tions in humans. Other members of the group include
*Paecilomyces, Fusarium, Scopulariopsis, Acremonium*
and *Beauveria*. These mycelial fungi can cause a variety
of nosocomial infections in immunocompromised hosts
and rarely can be isolated from bronchial secretions of
patients with underlying pulmonary disease. However,
demonstration of mycelial elements invading alveolar
tissue is usually required to establish their role in
pneumonia [1,2]. Related fungi of the genus *Aspergillus*
cause pneumonia in patients with AIDS who have had
*Pneumocystis carinii* pneumonia [3] as well as a variety of
frankly invasive manifestations [4–6].

*Penicillium* species are ubiquitous in nature, and
when recovered from clinical specimens are usually
considered contaminants, but they are also known to
cause human disease [7,8]. Systemic infections caused
by *Penicillium marneffei*, a dimorphic fungus endemic
to Southeast Asia, and *Penicillium decumbens* have been
reported in patients with AIDS [9–12].
Penicillium janthinellum, a species of Penicillium well known to produce tremorgenic toxins, causes a neurologic disease in sheep and cattle known as rye grass staggers [13,14]. In a case report of soft drink food poisoning, *P. janthinellum* was identified as the causative mold [15]. This species of Penicillium, which was recovered from our patient’s sputum and bronchoalveolar secretions, has not been previously reported to cause pneumonia.

Bronchoalveolar lavage is the method of choice for sampling bronchial and alveolar secretions in patients with AIDS who have pneumonia, helping to make a diagnosis and direct therapy. In our patient, *P. janthinellum* was isolated in large quantities from expectorated sputum and bronchoalveolar washings, and thus we believe that this is likely to be the cause of the severe bilateral consolidation pneumonia. Although he was not neutropenic during his illness, he was severely immunocompromised, with a CD4 lymphocyte count of zero. This case points out once again the need for contemporary practitioners and laboratorians to be cognizant of the plethora of fungal agents capable of inciting disease in the host with abrogated immunity.

**References**


Enterococcal joint prosthesis infection

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Infection in a joint replacement is a disaster for the patient and a challenge for both surgeon and microbiologist. Extensive efforts are made to minimize the incidence of infection. It is common practice to identify risk factors and to avoid procedures such as urethral catheterization, in an attempt to guard against the most common infecting organisms. We report two cases of prosthesis infection which highlight the problems of identification and treatment of infection with enterococci.

Case 1
A 75-year-old man underwent right total knee replacement with cefuroxime prophylaxis (three doses). Preoperatively he had no symptoms of prostatism, and a urine sample showed no significant bacterial growth. Postoperatively he developed urinary retention, requiring multiple urethral catheterizations, each with gentamicin cover followed by oral trimethoprim. He underwent transurethral resection of the prostate 3 weeks after his arthroplasty surgery. Eight months later he presented with swelling of the right knee and an abscess on the suture line. This discharged to reveal a sinus, from which Staphylococcus aureus was cultured. In contrast, culture of joint fluid obtained by arthrocentesis grew Enterococcus faecalis. At revision arthroplasty, there was established joint infection. The prosthesis and cement were removed and a cement spacer, incorporating gentamicin, ampicillin and flucloxacillin, was inserted. At operation, superficial and sinus tract swabs grew S. aureus, E. faecalis and Proteus sp., but cultures of joint fluid, bone, cement and joint tissue yielded pure growths of E. faecalis. The patient was treated with intravenous flucloxacillin, ampicillin and gentamicin for 2 weeks, followed by oral flucloxacillin and amoxycillin for 4 weeks, and the infection cleared. He is awaiting the second stage of revision surgery.

Case 2
A 49-year-old woman with severe rheumatoid arthritis on long-term steroid therapy and azathioprine had multiple orthopedic procedures over 20 years. These included bilateral ankle arthrodeses, an osteotomy of the left knee and bilateral total hip replacements. Replacement of the right hip was complicated by recurrent dislocations, requiring open reduction on two occasions and early revision of the acetabular component. Eighteen months later she presented with severe pain in the right hip and was unable to bear weight on that joint. Radiologic changes were consistent with infection. Joint fluid obtained by arthrocentesis grew E. faecalis and skin flora. A two-stage revision was planned. At surgery the joint was seen to be grossly infected. Multiple operative cultures grew...