sive use, none of the nucleoside analogues used to treat our patients (zidovudine, lamivudine, or stavudine) have been associated with gynecomastia, whereas indinavir has already been described as a cause of breast enlargement in women. One of the patients we described and the two previously reported women with indinavir-associated breast enlargement developed redistribution of body fat, a feature of the syndrome of peripheral fat wasting (lipodystrophy), hyperlipidemia, and insulin resistance that has been recently described in patients who received HIV-1 protease inhibitors [1]. One of our patients had associated lipid abnormalities; repeated fasting blood glucose levels have remained within normal limits.

Gynecomastia is a benign glandular enlargement of the male breast. This entity has been associated with the use of various drugs including anabolic steroids; antimicrobials (isoniazid, ketoconazole, metronidazole); cardiovascular, antilucre, and psychotropic medications; and certain chemotherapeutic agents [6]. Breast enlargement, although uncommon, should be included among the adverse effects associated with use of protease inhibitors in both men and women. The mechanism for this side effect is unknown, but does not appear to be associated with any obvious endocrine abnormalities. Whether this effect is exclusively due to indinavir is a matter of speculation, and it remains to be determined if gynecomastia is another feature of the syndrome of HIV-1 protease inhibitor–associated peripheral lipodystrophy.

**Clostridium difficile Diarrhea After Use of Tacrolimus Following Renal Transplantation**

Tacrolimus (FK506; Prograf [Fujisawa Healthcare, Deerfield, IL]) is a relatively new immunosuppressive agent with a macrolide molecular structure, which is indicated for the prophylaxis of organ rejection after allogeneic kidney or liver transplants. We describe a patient with *Clostridium difficile* diarrhea that was associated with the use of tacrolimus after renal transplantation.

A 29-year-old man with end-stage renal disease secondary to hypertensive nephrosclerosis received a cadaveric renal transplant in February 1990. He had had excellent allograft function until mid-1996, when he stopped taking his antirejection medication. He was noted to have a serum creatinine level of 1.4 mg/dL in 1995, and, in November 1996, when he returned for a visit, his creatinine level was 4.2 mg/dL. He was treated with methylprednisolone with no improvement in his creatinine level.

He was subsequently given mycophenolate mofetil (Cell-Cept, Roche Pharmaceuticals, Nutley, NJ) and then tacrolimus in February 1997. His creatinine level continued to rise, and he began receiving hemodialysis with a plan to taper his immunosuppressants. Within 4 weeks of starting tacrolimus, he developed diarrhea, nausea, and malaise. He had no nosocomial exposure to infectious causes and had not been receiving any antibiotics in the preceding 3 months. He was initially treated symptomatically with little benefit. A routine stool test for *C. difficile* toxin was found to be positive. He had no other opportunistic infections, and his symptoms improved with 2 weeks of metronidazole therapy. Tacrolimus was continued at this stage.

In April 1997, diarrhea and fever recurred. He was admitted to the hospital with severe dehydration. Testing for sepsis was negative except for a positive result for *C. difficile* toxin in his stool. At this point, tacrolimus was discontinued. In addition, he received oral vancomycin solution, with complete resolution of symptoms in the next 2 weeks. A repeat stool test was negative for *C. difficile* toxin. He continues to do well while receiving hemodialysis.

Antibiotic-associated pseudomembranous colitis became a major clinical problem in the 1960s and 1970s, particularly with the use of broad-spectrum agents such as lincomycin and clindamycin, antibiotic-associated pseudomembranous colitis, antibiotic-associated diarrhea [4]. Antibiotic treatment, older age, and underlying illness are the major risk factors for the development of symptomatic disease [4]. In the last 3 years, there have been reports of pseudomembranous colitis following treatment with clarithromycin, a newer macrolide antibiotic indicated for eradication of *Helicobacter pylori* in peptic ulcers [5], and with third-generation cephalosporins [6].

Tacrolimus is a newer macrolide used for immunosuppression, and there have been no previous published reports of *C. difficile* diarrhea associated with its short-term use. The manufacturer of Prograf has received isolated reports of *C. difficile*–induced diarrhea in association with Prograf use (personal communication, P. C. Blahunka, Medical Information Department, Fujisawa Healthcare, 1998). This case serves as a warning of the need for attentiveness to the side effects of macrolide molecular structure.

**References**


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Pacemaker-Induced Endocarditis Due to Propionibacterium acnes

Propionibacterium acnes and other Propionibacterium species are branching, gram-positive, anaerobic bacilli that are part of the normal human microflora of the skin, conjunctiva, external ear, sebaceous follicles, and mouth and upper respiratory tract [1–5]. Although P. acnes is of low virulence, it has been identified as the etiologic agent in a variety of infections including CNS shunt infections, brain abscesses, endophthalmitis, neurosurgical wound infections, and, rarely, pulmonary infections [6–10]. Invasive disease usually involves a foreign body [5]. When identified in blood cultures, P. acnes is generally considered a skin contaminant. To our knowledge, we describe herein the first case of infectious endocarditis due to P. acnes associated with a pacemaker.

A 78-year-old man was admitted to Winthrop-University Hospital (Mineola, New York) for evaluation of syncope and intermittent fever with chills, night sweats, fatigue, and malaise of 6 months’ duration. The patient’s medical history included hypothyroidism, hypertension, and implantation of a permanent pacemaker in 1982, which was replaced in 1994. The patient denied drug use. On admission to the hospital, laboratory evaluation revealed thrombocytopenia and antibody to cardiolipin. He had a pulmonary embolus which was replaced in 1994. The patient’s medical history included hypothyroidism, hypertension, and implantation of a permanent pacemaker in 1982, which was replaced in 1994. The patient denied drug use. On admission to the hospital, laboratory evaluation revealed thrombocytopenia and antibody to cardiolipin. He had a pulmonary embolus which was replaced in 1994.

On physical examination, the patient was alert, oriented, and in no acute distress. A pulse generator was palpable at the left upper anterior chest wall, but there was no inflammation or tenderness. The heart rate was normal, the rhythm was regular, and first and second heart sounds (S1, S2) were normal; no murmur was noted. The remainder of the physical examination findings were noncontributory. There were no ocular hemorrhages, Janeway lesions, splinter hemorrhages, or Osler nodes, and there was no splenomegaly.

Admission laboratory studies included the following values: WBCs, 11.4×10^3/mm^3; hemoglobin, 151 g/L; hematocrit, 45%; platelets, 50,000/mm^3; and creatinine, 0.8 mg/dL. Results of a urinalysis were negative. A chest radiograph showed no infiltrate or effusion. An electrocardiogram showed ventricular-paced beats. A transesophageal echocardiogram (TEE) showed a normal left ventricular size; a mildly enlarged left atrium, right atrium, and right ventricle; mild aortic regurgitation, mitral regurgitation, and pulmonary regurgitation; and a large, 5-cm mass on the ventricular pacing lead.

A coronary angiogram showed two-vessel disease, and the patient underwent coronary artery bypass grafting with removal of a large right atrial mass that crossed through the tricuspid valve and surrounded one of the ventricular pacing leads (figure 1). The pacemaker leads and the pulse generator were removed and replaced with an epicardial lead and an abdominal pulse generator. Neither purulent discharge nor other signs of infection were noted at the old pulse generator site. Gram staining of the atrial thrombus revealed numerous gram-positive beaded branching rods, which were identified as P. acnes on culture.

After cardiac surgery, the patient was sent home with iv ampicillin/gentamicin to complete a 6-week course of therapy. He had an uneventful recovery.

We believe that the P. acnes isolated in this case was indeed the cause of infection for the following reasons. The organism was recovered in pure culture from surgically obtained tissue and was demonstrated by gram staining of the emulsion prepared from this tissue. Histological evaluation of the resected tissue, which revealed an organized, laminated clot fragment directly attached to the pacemaker lead, demonstrated large aggregates of pleomorphic P. acnes on culture.

Figure 1. Pacemaker leads surrounded by organized, laminated clot containing Propionibacterium acnes, from a patient with endocarditis.