Pneumatisis Intestinalis and Active Cytomegaloviral Infection After Lung Transplantation*

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Pneumatisis intestinalis occurred in a patient with a primary cytomegaloviral (CMV) infection with pneumonitis 6 weeks after single lung transplantation for primary pulmonary hypertension. The possible causal relationship between pneumatisis intestinalis, an uncommon disorder with an obscure pathogenesis, and active CMV infection has been observed before, however, to our knowledge, this is the first report of this combination after lung transplantation. The patient had no abdominal complaints, and after treatment of the CMV infection, the pneumatisis intestinalis resolved spontaneously. The early diagnosis of active CMV infection and the prevention of unnecessary abdominal surgery were essential in this case. (Chest 1994; 105: 929-30)

CMV = cytomegalovirus; PI = pneumatisis intestinalis

There is a high incidence of active CMV infection in patients after heart-lung and lung transplantation. Such infection is an important cause of morbidity and mortality, and especially primary CMV infection has a major impact on the outcome after lung transplantation.1 There is a wide spectrum of symptoms of CMV infection, and pneumatisis intestinalis (PI) may be one of these, as is shown in this report.

CASE REPORT

A 36-year-old man who was seronegative for CMV underwent right single-lung transplantation for primary pulmonary hypertension. Since the donor was seropositive for CMV, the recipient received prophylaxis with anti-CMV hyperimmune globulin on the first postoperative day and on days 7, 14, and 28 after surgery. The maintenance immunosuppressive therapy consisted of cyclosporine, azathioprine, and prednisolone. After surgery the patient also received antithymocyte globulin.

Because of suspected rejection, the patient was treated on the 11th postoperative day with methylprednisolone, 500 mg daily for 3 consecutive days, with good results. A ventilation-perfusion scan performed on day 22 after surgery revealed a homogeneous ventilation of the transplanted lung of 35 percent of the total and a homogeneous perfusion of 92 percent of the total. Pulmonary function tests showed a vital capacity of 83 percent of predicted, with a normal FEV1.

At day 33 after surgery, surveillance transbronchial biopsies displayed a grade 2 rejection, and the patient was again treated with methylprednisolone, 500 mg daily for 3 consecutive days.2 No virus could be isolated from the bronchoalveolar lavage fluid. Because of a positive test for CMV antigenemia at day 39 after surgery, the daily azathioprine dose was reduced from 100 mg (1.70 mg/kg) to 50 mg. Two days later, the chest roentgenogram showed a progressive increase in the radiopacity of the right lung, and there also seemed to be a small collection of free air below the right hemidiaphragm (Fig 1). The patient had neither abdominal complaints nor abnormal findings at physical examination. Ultrasonography of the abdomen did not reveal any abnormalities. A plain abdominal roentgenogram showed the typical signs of PI (Fig 2).

The patient’s general well-being deteriorated, accompanied by a fall in oxygen saturation, fever to 40°C, and, during 1 day, some diarrhea. Because of the primary CMV infection, treatment with ganciclovir and anti-CMV hyperimmune globulin was started. The dosage of azathioprine was further reduced to 25 mg daily. Transbronchial biopsies showed injury of the alveolar epithelium, with fibrin plugs within the air spaces. Neither perivascular nor peribronchiolar infiltrates was seen. Cultures and special staining for microorganisms were all negative.

The patient was mechanically ventilated for 1 day. The test for CMV antigenemia became negative within a few days, and there was a full clinical recovery. The PI resolved spontaneously. Treatment with ganciclovir was continued for 2 weeks. Spirometry showed normal values afterwards.

The primary CMV infection was confirmed by CMV serologic studies, as determined by enzyme-linked immunosorbent assay, as well as by complement fixation.

DISCUSSION

Pneumatisis intestinalis is an uncommon disorder characterized by multiple collections of gas in the wall of the large

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and small intestines. The stomach, mesentery, and omentum may also be involved. The gas may collect in the submucosa or subserosa (or both). The appearance is linear or cyst-like, depending on the localization. In the majority of cases, PI is an unexpected finding on plain abdominal or barium roentgenogram. The pathogenesis of this abnormality is still unknown. It is associated with intestinal obstruction (e.g., pyloric obstruction caused by peptic ulcer) or pseudo-obstruction due to motility abnormalities such as in sclerodermia and mixed connective tissue disease. Approximately 20 percent of the patients with PI have acute or chronic obstructive pulmonary disease. It is suggested that gas from ruptured pulmonary blebs dissects under pressure along tissue spaces to the intestinal wall.

As a result of bursting of the gas collections of the intestinal wall into the peritoneal cavity, a pneumoperitoneum may develop. Characteristically, this pneumoperitoneum is asymptomatic because no peritonitis results from the sterile gas, which has a composition similar to that of atmospheric air.

The majority of patients with PI require no specific treatment, and the gas collections in the intestinal wall usually resolve spontaneously. The value of a correct diagnosis lies mainly in preventing unnecessary abdominal surgery.

There are, however, symptomatic patients with cramping abdominal pain, recurrent diarrhea, rectal bleeding, or intestinal obstruction. Since the gas is composed mainly of nitrogen, treatment has been directed at reducing available nitrogen in the atmospheric air and thereby creating a pressure gradient between the blood and the gas collections. This promotes diffusion of the gas from the intestinal wall into surrounding tissue. This is realized by breathing normobaric oxygen at high concentrations, around 70 percent.

There have been a few reports of PI affecting patients after kidney transplantation or allogeneic or autologous bone marrow transplantation. It is not clear whether the condition is related to the immunosuppressive therapy. In some patients, PI has been associated with active CMV infection; for example, Van Son and coworkers described this combination in four patients after kidney transplantation. As far as we know, this is the first report of the combination of PI and active CMV infection in a patient after lung transplantation. In a report about gastrointestinal complications in 131 patients after heart or heart-lung transplantsations, PI was not mentioned at all.

Because CMV infection is associated with significant morbidity and mortality in lung transplant recipients, early diagnosis is essential. Especially the combination of a seropositive donor with a seronegative recipient, as in this case, carries grave risks. The early diagnosis of active CMV infection in this patient enabled us to start virus-specific chemotherapy in time. It is likely that this contributed to the satisfying outcome. In this respect, the test for CMV antigenemia has proved to be a valuable tool for the early diagnosis and monitoring of active CMV infection in immunocompromised patients.

REFERENCES