Figure 2. Evolution of chylous effusion output after LT.

References

- Boehler A, Speich R, Russi EW, Weder W. Lung transplantation for lymphangioleiomyomatosis. *N Engl J Med*. 1996;335:1275-80.
- Pechet TT, Singhal AK, Meyers BF, Guthrie TJ, Battafarano RJ, Trulock EP, et al. Lung transplantation for lymphangioleiomyomatosis [abstract]. *J Heart Lung Transplant*. 2001;20:174.
- Valentine VG, Raffin TA. The management of chylothorax. *Chest*. 1992;102:586-91.
- Demos NJ, Kozel J, Scerbo JE. Somatostatin in the treatment of chylothorax. *Chest*. 2001;119:964-6.
- Kelly-Garcia J, Roman-Berumen JF, Ibarra-Perez C. Iodopovidone and bleomycin pleurodesis for effusions due to malignant epithelial neoplasms. *Arch Med Res*. 1997;28:583-5.

Epstein-Barr virus–associated pulmonary leiomyosarcoma arising twenty-nine years after renal transplantation

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An increased incidence of several malignancies, the most common being lymphoma and carcinoma of the skin, is a well-recognized complication of chronic immunosuppression therapy. Smooth muscle tumors arising in recipients of solid organ transplants are rare, with only 14 cases reported in the English language literature. Epstein-Barr virus (EBV) infection has been implicated in the pathogenesis of these tumors because of diminished immune function due to immunosuppressive therapy. We report the case of a 61-year-old woman who had a leiomyosarcoma arising in a bronchus 29 years after renal transplantation. The presence of EBV was demonstrated in tumor tissue by in situ hybridization.

Figure 1. Computed tomography scan of the thorax demonstrating a tumor in the proximal left upper lobe bronchus with post-obstructive atelectasis.

Clinical Summary

A 61-year-old woman had productive cough for several weeks, fatigue, and a 15-pound weight loss. She had end-stage renal disease caused by post-streptococcal glomerulonephritis and had received a living related kidney transplant from her mother 29 years earlier. Low-dose prednisone (5 mg/d) was the sole agent used for long-term posttransplant immunosuppression. A chest radiograph at the time of admission demonstrated left upper lobe collapse. A computed tomographic scan of the thorax confirmed the presence of a tumor in the left upper lobe bronchus associated with post-obstructive atelectasis (Figure 1). Bronchoscopy revealed an obstructing endobronchial tumor at the orifice of the left upper lobe bronchus. Biopsies of the tumor demonstrated a spindle cell lesion suggestive of a smooth muscle neoplasm. There was no radiographic evidence of lymph node enlargement. At thoracotomy, the tumor was found to be very proximal, and although a left upper lobe sleeve resection was contemplated, a pneumonectomy was required to ensure adequate margins. The patient recovered rapidly from the procedure and her renal graft function was not significantly altered. Two years later the patient is well with no recurrence.

Pathologic Findings

The resected left lung weighed 230 g and the upper lobe appeared atelectatic with mucus plugging consistent with post-obstructive pneumonia. A well-circumscribed tumor measuring 2.8 by 1.5 cm was identified within the lumen of the left upper lobe bronchus. Two small nodules (0.2 and 0.5 cm) were identified in the lower lobe. Microscopic examination of the upper lobe tumor showed a proliferation of spindle cells organized in broad fascicles (Figure 2). There was a moderate degree of nuclear pleomorphism. Focal necrosis was evident. Mitotic figure count was 10 per 10 high power fields. Examination of the lower lobe nodules showed identical smooth muscle proliferations in the parenchyma. It was

Figure 2. Representative photomicrograph of the left upper lobe tumor demonstrating proliferating spindle cells organized in broad fascicles (arrowhead).

not clear whether these represented metastases or independent tumors. Immunohistochemical study showed strong positive reactions for vimentin and smooth muscle actin. The reactions to cytokeratin (CAM 5.2) and other epithelial markers were negative. Analysis of a fragment of formalin-fixed tissue by in situ hybridization using an EBV-encoded RNA probe (EBER) demonstrated EBV genomic material in the vast majority of smooth muscle cell nuclei.

Discussion

An increased incidence of smooth muscle neoplasms has been described in a number of patients with AIDS and recipients of solid organ transplants.^{1,2} Fourteen cases have been reported after transplantation to date.² Most have been found in children and young adults (median, 7 years), typically within 5 years of transplantation (median, 48 months). They can originate in either host or graft tissues.¹ The case described here is exceptional both for the advanced age of the patient (61 years) and the prolonged interval period between transplantation and tumor presentation (29 years). This interval represents the longest interval from transplant to tumor in the literature.

Several methods of investigation have demonstrated EBV genomic material and products in the cells of these posttransplant neoplasms, including in situ hybridization (as in the present case), immunohistochemistry, polymerase chain reaction, and reverse-transcriptase polymerase chain reaction. Smooth muscle cells have been shown to express CD21, the cell surface receptor for EBV,³ and the EBV-encoded latent membrane protein-1 oncogene has been implicated in neoplastic transformation of lymphoid tissue.⁴ However, the exact pathophysiologic mechanism by which EBV induces native smooth muscle to undergo neoplastic transformation is not entirely clear. The virus appears to be sufficient but not necessary for the development of smooth muscle cell tumors, as at least 1 reported case failed to demonstrate EBV genomic material in the tumor cells by in situ hybridization.⁵

This present case supports the concept of a pathogenetic relationship between EBV and posttransplant smooth muscle tumors

and shows that these tumors can arise at an advanced age and after a prolonged interval after transplantation.

References

1. Somers GR, Tesoriero A, Hartland E, et al. Multiple leiomyosarcomas of both donor and recipient origin arising in a heart-lung transplant patient. *Am J Surg Pathol*. 1998;22:1423-8.
2. Rogatsch H, Bonatti H, Menet A, Larcher C, Feichtunger H, Dirnhofer S. Epstein-Barr virus associated multicentric leiomyosarcoma in an adult patient after heart transplantation. *Am J Surg Pathol*. 2000;24:614-21.
3. McClain H, Leach C, Jenson H, et al. Association of Epstein-Barr virus with leiomyosarcomas in young people with AIDS. *N Engl J Med*. 1995;332:12-8.
4. Knecht H, Berger C, Rothenberger S, Odermatt B, Brousset P. The role of Epstein-Barr virus in neoplastic transformation. *Oncology*. 2001;60:289-302.
5. van Gelder T, Jonkman FA, Neisters HG, Vuzevski VD, Spillenaar Bilgen EJ, Weimar W. Absence of Epstein-Barr virus involvement in an adult heart transplant recipient with epithelioid leiomyosarcoma. *J Heart Lung Transplant*. 1996;15:650-1.

Management of mitral paravalvular leak: Therapy or misadventure?

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After mitral valve replacement, surgical closure of paravalvular leak is usually advised in severely symptomatic patients and in those requiring blood transfusion for persistent hemolysis. We present a case of persistent paravalvular leak after atrial septal defect device closure following mitral valve replacement (MVR).

Clinical Summary

A 37-year-old man with severe rheumatic mitral stenosis underwent open mitral commissurotomy on September 3, 1997. Severe mitral restenosis and increasing dyspnea developed, progressing to New York Heart Association class IV, for which he required reoperation. MVR was performed with a 3M Starr-Edwards pro-

thesis (Edwards Lifesciences, Irvine, Calif) through heart port access on June 26, 1999. One year after the operation, he had progressively increasing dyspnea on exertion, again with pedal edema and yellow discoloration of the urine and eyes. Severe mitral paravalvular leak was diagnosed. He underwent transcatheter closure of the paravalvular leak with an Amplatzer device (AGA Medical Corporation, Golden Valley, Minn) on December 4, 2001, via the right femoral vein. All the above procedures were performed at another institution.

He came to our institution with symptoms of progressively increasing dyspnea on exertion and jaundice. General physical examination revealed pallor, jaundice, pedal edema, and hepatomegaly. Cardiovascular examination revealed a loud second heart sound in the pulmonic area and a pansystolic murmur in the mitral area, a clinical picture of severe congestive heart failure. The hemogram and peripheral blood smear were consistent with hemolytic anemia. The echocardiogram revealed the mitral valve prosthesis and severe paravalvular leak with the device in situ. Cardiac catheterization and angiography (Figure 1) revealed paravalvular leak with severe mitral regurgitation and severe pulmonary venous and pulmonary arterial hypertension.

The patient underwent surgery on December 3, 2002, for replacement of the prosthesis. The intraoperative findings were consistent with the preoperative diagnosis. Both the mitral prosthesis and the device were in situ and paravalvular leak was present (Figure 2, A). The Starr-Edwards mitral valve prosthesis and device were removed (Figure 2, B) and a 31-mm St Jude Medical mitral prosthesis (St Jude Medical, Inc, St Paul, Minn) was im-

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