additive to cardioplegic solutions to prevent cytokine amplification associated with free radical-based reperfusion injuries.

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REFERENCES

1. Higgins RS, Letsou GV, Sanchez JA, et al. Improved ultrastructural lung preservation with prostaglandin E₁ as donor pretreatment in a primate model of heart-lung transplantation. *J THORAC CARDIOVASC SURG* 1993;105:965-71.
2. Mayumi H, Tokunaga K. Prostaglandin E₁ for patients who have both heart and lung failure after cardiomy. *J THORAC CARDIOVASC SURG* 1993;105:1120-1.
3. Wiederkehr JC, Dumble L, Pollak R, Moran M. Immunosuppressive effect of misoprostol: a new synthetic prostaglandin E₁ analogue. *Aust N Z Surg* 1990;60:121-4.
4. Moran M, Mozes MF, Maddus MS, et al. Prevention of acute graft rejection by the prostaglandin E₁ analogue misoprostol in renal-transplant recipients treated with cyclosporine and prednisone. *N Engl J Med* 1990;322:1183-8.

Pulmonary artery-bronchial fistula during lymphoma treatment

To the Editor:

We read with interest the article by Ricci and associates¹ and would like to add to the literature another complication of mediastinal lymphoma that we encountered at our institution. A 39-year-old man had been treated for immunoblastic lymphoma for 9 months. Despite multidrug chemotherapy comprising methotrexate, doxorubicin, cyclophosphamide, vincristine, prednisone, and bleomycin, he noted recurrent fevers, chills, night sweats, malaise, and nonproductive cough. A chest x-ray film revealed multiple nodular pulmonary infiltrates and left pulmonary hilar fullness. Evaluation of the hilar fullness with a bronchoscope revealed extrinsic compression with partial obstruction of the left upper lobe bronchus. The patient was started on salvage chemotherapy with etoposide, vincristine, doxorubicin infusion, bolus prednisone, and cyclophosphamide. He tolerated the first course well but noted blood-streaked sputum. On the second day of his second course of therapy the patient had two episodes of hemoptysis, each producing 200 to 300 ml, associated with left-sided chest pain. Coagulation parameters were normal including a platelet count of 287,000/mm³. Because of continued hemoptysis and arterial oxygen desaturation, he was transferred to the medical intensive care unit, rapidly intubated, and a bronchoscope was inserted that revealed fresh blood in the left upper lobe bronchus. The right main stem bronchus was intubated to maintain his oxygenation. Despite these measures he became hemodynamically unstable and the arterial oxygen saturation began to deteriorate. Accordingly, he was taken to the operating room for control of hemoptysis, possibly by upper lobectomy.

Through a left thoracotomy, the left upper lobe was mobi-

lized. The posterior segment of the left upper lobe appeared bluish and engorged with blood. Immediate control of the pulmonary artery was achieved by entering the pericardium. A dense desmoplastic reaction was present around the extrapericardial vessels, presumably a result of the chemotherapy or lymphomatous infiltration. The apical posterior branch to the right upper lobe was ligated and divided as was the superior pulmonary vein. While the pulmonary artery was being dissected for exposure of the anterior segmental artery, a 3 mm communication was found between the pulmonary artery and the origin of the left upper lobe bronchus with the left main bronchus (Fig. 1). The lobectomy was completed by ligating and dividing the anterior segmental artery and lingular arteries and by dividing the left upper lobe bronchus just distal to the site of the pulmonary artery-bronchial fistula. The bronchial defect resulting from the fistula was closed with interrupted silk sutures and the left pulmonary artery pseudoaneurysm was excised. The pulmonary artery was closed primarily with nonabsorbable suture. A pleural flap was then mobilized to cover the vascular repair and to ensure a separation between the arterial and bronchial repairs.

The postoperative course was marked by persistent fevers and neutropenia; however, he was extubated on the fourth postoperative day and the chest tubes were removed on the sixth postoperative day. The patient proceeded to further chemotherapy.

Histologic examination revealed large-cell immunoblastic lymphoma involving the left upper lobe bronchus and resulting in compression of the left upper lobe bronchus. Focal lymphomatous infiltration of the artery at the site of the pseudoaneurysm was observed. A neutrophilic and staphylococcal infiltrate in the lung, as well as necrosis of the surrounding parenchyma and periarterial soft tissue, suggested a postobstructive process. No bacterial involvement of the pulmonary artery was observed.

Pseudoaneurysm of the main pulmonary artery is rare and has been associated with tuberculosis and syphilis.² False aneurysms of the pulmonary artery have also been reported in the context of infective endocarditis and congenital heart disease, trauma, thromboembolism, intravenous drug abuse, and pulmonary artery catheterization.³ The association between an aneurysm of the pulmonary artery owing to lymphomatous involvement resulting in a communication to the bronchial tree has not been described. The surgical specimen revealed lymphomatous infiltration of the pulmonary artery without a component of fungal or bacterial involvement. Precipitation of bleeding from this false aneurysm could have been due to tumor regression from the salvage chemotherapy or to unknown mechanisms. Left untreated, such pulmonary aneurysms enlarge, become symptomatic, and usually eventuate in exsanguinating hemorrhage. Mycotic pulmonary artery aneurysms appear particularly prone to fatal hemorrhage after a short latency period. In one of the largest series of pulmonary artery false aneurysms, only two of 22 patients survived, and these survivors were treated surgically.⁴ A number of postmortem case reports illustrate the almost universal mortality among patients with pulmonary artery pseudoaneurysms treated nonsurgically.⁵ In this particular case there was no time for noninvasive studies such as pulmonary artery angiogram, and the patient was taken to the operating room expeditiously.

This case illustrates another in the multitude of problems that can occur with the treatment of mediastinal lymphoma. Patients in whom hemoptysis develops during treatment and who are found to have normal coagulation parameters may have a

Fig. 1. The pulmonary artery-bronchial fistula is found just at the origin of left upper lobe bronchus. The method of repair in this particular case involved excision of the aneurysm and repair of the arterial and bronchial walls with separation by a pleural flap.

mechanical cause of bleeding that may be caused by the lymphoma itself or, in rare cases, by lymphomatous involvement of the pulmonary artery with connection to the bronchial tree. Although angiography should be considered to rule out alternative disorders, this examination should not postpone control of the airway, hemodynamic stabilization, and definitive repair, for it appears that prompt surgical correction of such lesions is paramount for a successful outcome.

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REFERENCES

1. Ricci C, Rendina EA, Venuta F, et al. Surgical approach to isolated mediastinal lymphoma. *J THORAC CARDIOVASC SURG* 1990;99:691-5.
2. Morgan J, Morgan A, Addis B, Bradley G, Spiro S. Fatal haemorrhage from mycotic aneurysms of the pulmonary artery. *Thorax* 1986;41:70-4.
3. Roush K, Scala-Barnett D, Donabedian H, Freimer E. Rupture of pulmonary artery mycotic aneurysm associated with candidal endocarditis. *Am J Med* 1988;84:142-4.
4. Kauffman S, Lynfield J, Hennigar G. Mycotic aneurysms of the intrapulmonary arteries. *Circulation* 1967;35:90.
5. Hartshorne M, Eisenberg B. CT diagnosis of a giant pulmonary artery aneurysm. *Am J Radiol* 1989;153:190-1.