Recurrence of Bronchioloalveolar Carcinoma in Transplanted Lungs

Reviewers: Kenneth Blank, MD

Background
Bronchioloalveolar lung cancer is characterized pathologically by cancer cells lining the lung alveoli while preserving interstitial lung tissue. Bronchioloalveolar lung cancer is widely believed to be a variant of adenocarcinoma of the lung but recent data indicate it has a natural history and prognosis distinct from adenocarcinoma. The five-year survival for bronchioloalveolar is higher than for adenocarcinoma and metastases within the lung—ipsilateral lobes or the contralateral lung—is more frequent in bronchioloalveolar lung cancer. Because conventional therapy rarely cures bronchioloalveolar lung cancer and because of the likelihood of spread within the lung tissue, physicians at University of Alabama Birmingham performed lung transplantation in the treatment of patients with bronchioloalveolar lung cancer. Their findings are reported in the April 8, 1999 issue of The New England Journal of Medicine.

Materials and Methods
Eligible patients had to have biopsy proven bronchioloalveolar lung cancer and no evidence of extrapulmonary spread. All patients underwent removal of one or both lungs and transplantation with one or two lungs from a cadaver. Post-operative care was similar to other lung transplant patients. Three patients underwent genetic analysis of their tumors with polymerase chain reaction amplification of microsatellite regions and southern blot analysis.

Results
Three of the seven patients had previously been treated by conventional resection only to have their tumor recur 4 to 17 months later. Four patients had tumor spread to another lung lobe and were therefore not candidates for conventional surgery.

Of the seven patients, four had tumor recurrences at 10, 10, 39 and 48 months after transplant surgery. Of these four patients, all recurred in the transplanted lung. Three have been subsequently treated with surgical resection and two remain alive at 4 and 18 months after the salvage surgery. One patient who relapsed underwent a second lung transplant but died of pulmonary complications and recurrent tumor nine months after the second transplant. Of the three patients without evidence of tumor relapse, two are alive at 50 and 62 months after lung transplant surgery.

Genetic studies on the original tumor and recurrences in three patients were undertaken to determine if the recurrence was a new primary or a true recurrence. In two patients amplified fragments of DNA were nearly identical to the original lung tumor and clearly distinct from the transplanted tissue. In the third patient the DNA more closely resembled the original tissue but some differences were noted.

Conclusion
Four of the seven patients were free of disease for at least three years following lung transplantation, and two patients were alive and free of disease greater than 50 months. Genetic analysis performed in three of the four patients who recurred strongly suggested that the recurrence originated from the original bronchioloalveolar lung cancer and not from the donor lung. These results compare favorably to retrospective reviews using conventional surgery plus or minus chemotherapy. However, any group of patients with lung cancer that can tolerate the rigors of transplant surgery is certainly a select bunch.