Simultaneous Pulmonary and Renal Malignancy*


Simultaneous primary malignancy of the lung and kidney has been rarely recognized during life. Three patients with synchronous primary pulmonary and renal cancer are described. The pulmonary tumors were asymptomatic and were discovered on plain chest roentgenography. The renal tumors, also asymptomatic, were incidentally discovered on CT, performed for staging. Although one patient was treated with interleukin-2 for a presumed solitary pulmonary metastasis from renal carcinoma, in all three patients, both the kidney and lung tumors were eventually removed either concurrently or sequentially. Prior autopsy case series are reviewed. In the elderly, synchronous asymptomatic pulmonary and renal malignancy is not surprising, and it should be approached as a distinct clinical problem. With the use of chest roentgenography for screening high risk populations and CT for staging, simultaneous primary pulmonary and renal malignancy will probably be recognized increasingly. (Chest 1990; 98:153-56)

Simultaneous cancers involving visceral organs of different tissue types have been recognized for over a century, but reports have comprised autopsy case series. Three criteria for classifying a patient as possessing multiple malignancies were set forth by Warren and Gates: each tumor must present a definite pattern of malignant disease, each tumor must be distinct, and metastasis from one organ to the other must be excluded. An apparent increase in incidence of multiple malignancy may be related to successful treatment of the first cancer or to cytotoxic effects of radiotherapy and chemotherapy. The common use of ultrasonography, computerized tomography, multi-channel blood screening, chest roentgenography, and the advancing median age of our society are factors which may lead to an increasing recognition of multiple primary malignancies. In order to plan diagnostic and therapeutic strategies, it is important to recognize in which organs multiple malignancies are likely to arise, their common patterns of metastatic spread, and the clinical findings which are likely to be observed.

Over the past year, we have encountered three patients with simultaneous primary cancers of the lung and kidney in whom both tumors were surgically removed either concurrently or sequentially.

CASE REPORTS

CASE 1

In 1986, a 62-year-old male former cigarette smoker was found to have an asymptomatic left upper lobe mass on chest roentgenography. Chest CT showed a 3 cm mass in the left lung apex, and the lower sections of the scan disclosed a 6 cm solid right renal mass. A right radical nephrectomy was performed for hypernephroma (Fig 1) without capsular or vascular invasion and negative lymph nodes. The left apical lung mass was assumed to be a metastasis from the hypernephroma, and the patient was treated with interleukin-2 and lymphocyte-activated killer cells. In 1989, the lung mass enlarged. A percutaneous needle biopsy revealed adenocarcinoma consistent with primary lung cancer. The patient underwent left upper lobectomy and mediastinal lymph node dissection. Pathologic examination revealed a 7 cm adenocarcinoma of the lung (Fig 2) with one of six hilar lymph nodes containing tumor; surgical margins and pleura were free of tumor. On pathologic review, the lung and kidney tumors were histologically distinct. The patient has been followed-up for one year without recurrence of either tumor.

**Figure 1.** Patient 1. Photomicrograph showing adenocarcinoma of the kidney, clear cell type, compressing residual renal parenchyma (hematoxylin-eosin, original magnification × 16).

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CASE 2

A 77-year-old male former smoker was felt to have a stable inflammatory right upper lobe lesion for ten years. In 1988, chest roentgenography revealed enlargement of the lesion. The patient was asymptomatic and had normal results on physical examination. Chest CT revealed an irregularly-shaped mass (4 x 4 x 2.5 cm) in the apical segment of the right upper lobe (Fig 3) with eccentric calcification and a focal area of cavitation consistent with a scar carcinoma. The lower sections of the scan also showed a 4 cm round mass with solid and cystic components in the upper pole of the right kidney (Fig 4). Flexible fiberoptic bronchoscopy revealed no endobronchial lesions, and cytologic, histopathologic, and microbiologic studies were unrevealing. He underwent right radial nephrectomy on Jan 24, 1989. Pathologic review disclosed a 4 x 2 x 1.5 cm clear cell carcinoma of the kidney invading the capsule but not the perirenal fat. Vascular and ureteral margins were free of tumor as were six paracaval lymph nodes. Six weeks later, he underwent right upper lobectomy and mediastinal lymph node dissection. Pathology showed a 1 cm adenocarcinoma of the lung arising in a scar which was histologically distinct from the clear cell renal carcinoma. Lymph nodes and surgical margins were free of tumor.

CASE 3

A 66-year-old female smoker developed right anterior and posterior rib pain in November 1989. A chest roentgenograph revealed a 5 x 6 cm left apical lung mass (Fig 5). Radiouclide bone scan showed increased uptake in the right fourth and 12th ribs. The CT of the chest and abdomen showed a solitary left upper lobe mass as well as a 6 cm left renal mass. Fiberoptic bronchoscopy revealed an undifferentiated carcinoma. A percutaneous transbronchic needle biopsy was confirmatory, and the cytologic findings were suggestive of primary lung carcinoma. Renal arteriography showed a hypervascular tumor confined to the capsule. Open surgical biopsies of the ribs showed old fractures. In January 1989, the patient underwent left radical nephrectomy. Pathology showed an oncocytoma (Fig 6) without invasion. During the same anesthesia, she underwent left upper lobectomy and mediastinal lymph node dissection. Pathologic study showed an epidermoid carcinoma (5 x 5 x 5 cm) invading the parietal pleura, with lymph nodes free of tumor (Fig 7). She recovered well postoperatively.
or cannot differentiate two primaries from a primary with a solitary metastasis, it may be reasonable to remove both lesions without preoperative histopathologic confirmation. The prognosis may be favorably affected by removal of a hypernephroma and its solitary pulmonary metastasis, despite the rare occurrence of regression of pulmonary metastases spontaneously or after removal of the kidney primary. Failure to obtain preoperative histologic confirmation in patient 2 by bronchoscopic biopsy is explained by the relatively low diagnostic yield of this procedure in peripheral lung cancers and by the pathologic finding that most of the lesion was composed of inflammatory and/or fibrotic tissue.

Despite the fact that her CT and renal arteriography suggested the presence of hypernephroma, patient 3 proved to have an oncocytoma, a low-grade renal malignancy which rarely metastasizes. In renal malignancy, CT may be helpful in assessing capsular, lymphatic, or vascular involvement, and it may reveal signs of benignity with renal hamartomas and angiomylipomas. These benign renal lesions may be associated with pulmonary hamartomas, pulmonary lymphangioleiomyomatosis, and "benign metastasizing leiomyomas." The CT is more sensitive than plain roentgenography in excluding multiple pulmonary nodules.7 The sensitivity of CT for assessing mediastinal lymphatic involvement in lung cancer has been established, and the finding of mediastinal nodes greater than 2 cm in diameter in the appropriate clinical setting may be specific for nodal involvement.8,9

Autopsy series have added to our knowledge of multiple primary cancers, and pulmonary and renal tumors in particular. Warren and Gates in 1933 estimated a 1.84 percent incidence of double primary tumors in 1,259 autopsies, while Burke10 later predicted 7.8 percent incidence. Hajdu and Hajdu11 noted that 90 percent of double primary tumors occurred synchronously (within one year). The mean age was 70 years, and the male:female ratio was 3:1. Among multiple primary cancers, the lung and kidney were two of the five most common primary sites, along with colon, prostate, and stomach. In this series of double primaries, 26 percent of hypernephromas were associated with another primary tumor, while 10 percent of lung cancers were associated with hypernephromas.11 In another series, 42 percent of hypernephromas were associated with a second primary cancer, and the lung was found to be the most common second primary.12 These observations may be juxtaposed to the known predilection for hypernephroma to be metastatic at presentation in 25 to 50 percent of patients.12

While most investigators agree that no convincing evidence exists of any specific neoplasm imparting a

**Figure 6.** Patient 3. Oncocytoma of the kidney, composed of large cells with abundant eosinophilic cytoplasm and bland appearing nuclei (hematoxylin-eosin, original magnification × 16).

**Figure 7.** Patient 3. Poorly differentiated epidermoid carcinoma of the lung (hematoxylin-eosin, original magnification × 16).
predisposition to the development of any other neoplasm, it is also agreed that double primary cancers occur with greater than the expected frequency of chance alone. After the sixth decade of life, the discovery of clinically silent primary simultaneous pulmonary and renal cancers is not surprising. With the common use of plain chest roentgenography and CT, simultaneous pulmonary and renal cancers will probably be recognized more frequently. Therefore, one should not be deterred from approaching them as distinct clinical problems. In the absence of distant spread, an aggressive approach is justified to assess such a possibility, rather than to assume that one tumor is a metastasis from the other. Preoperative histologic confirmation by bronchoscopy or percutaneous transthoracic needle biopsy is desirable in planning therapy, but the preoperative evaluation and the intraoperative approach are best individualized.

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