New Approaches to Pancoast and Chest Wall Tumors

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Superior pulmonary sulcus carcinoma, or Pancoast's tumor, was first identified in 1932 by H. K. Pancoast, who described a small tumor at the apex of the lung producing a characteristic pain pattern and rapid, universal mortality. Despite early indications that this type of carcinoma was amenable to neither radiation nor surgery, the current treatment approach calls for irradiation therapy (3,000 rad over 2 to 3 weeks) followed by surgical resection of the chest wall, lower brachial plexus, and en bloc resection of the lung. In selected patients with negative mediastinal nodes, this approach has been associated with a 34% 5-year and a 29% 10-year survival. (Chest 1993; 103:360S-61S)

In a classic paper published in 1932, the radiologist H. K. Pancoast from the University of Pennsylvania first described an extremely small tumor arising from the apex of the lung, producing a characteristic pain in the right chest wall or arm with Horner's syndrome and possible rib or vertebral involvement at presentation. One of the most perplexing characteristics of these "Pancoast tumors" was their almost universal and rapid mortality, despite extremely small tumor size and general lack of metastasis. In addition, the tumor seemed to be resistant to radiation therapy and, though surgically accessible, was not amenable to resection.

Pancoast's syndrome is generally recognized as the result of a bronchogenic carcinoma arising in the superior pulmonary sulcus, or thoracic inlet, and invading the lymphatics in the endo-thoracic fascia.

It is the primarily extrapulmonary location of this tumor that is responsible for the characteristic clinical pattern associated with Pancoast's syndrome. Direct extension of the tumor involves the lower roots of the brachial plexus, the intercostal nerves, the stellate ganglion, the sympathetic chain, and the adjacent ribs and vertebrae, in turn producing the characteristic severe pain in the shoulder and ulnar distribution of the arm and hand as well as Horner's syndrome (Fig 1).

Diagnostic Strategies

Pancoast tumors are extremely difficult to diagnose at initial presentation. They are commonly mistaken for superior sulcus carcinoma, thoracic outlet syndrome, or cervical disc disease early in their course. The generally accepted approach to diagnosis and staging is illustrated in Table 1. The stratagogram, historically relied upon for definition of superior sulcus carcinoma in the early days of its recognition, has given way to such sophisticated diagnostic techniques as computed tomography (CT) scan and magnetic resonance imaging (MRI) of the chest and upper abdomen. Such tools allow for more accurate staging, and consequently, a more appropriate management approach. Results of the CT scan,

for example, determine the extent of bone involvement and thus the feasibility of resection, which is the currently recommended approach to treatment—despite the original belief that these tumors were inoperable. In comparison, MRI is more useful for determining the extent of neural involvement and suggesting the most accurate surgical approach.

Clinical Management

A true Pancoast tumor usually extends through the visceral pleura into the parietal pleura and chest wall (T-3), and may well be resectable unless it reaches T-4 and invades the vertebrae. A surgical approach also generally requires that there be no lymph node metastases (N0) and no peripheral metastases (M0).

For appropriate patients, preoperative radiotherapy may reduce tumor size, protect the lymph system, and control "seeding" with cancerous cells at the time of surgery. In

![Figure 1. Direct extension of Pancoast tumor. From the CIBA Collection of Medical Illustrations by Frank H. Netter, M.D. Copyright 1979, CIBA-GEIGY Corporation.](http://journal.publications.chestnet.org/pdftoolkit.asmx?url=/data/journals/chest/21670/ on 06/21/2017)
general, the recommended radiation does is 3,000 rad given over 2 to 3 weeks, 2 to 4 weeks before en bloc resection. For selected patients, 4,000 rad may be used, but healing becomes problematic above that level.

**TREATMENT RESULTS**

Any of several possible neurologic defects may result from surgical resection of superior pulmonary sulcus carcinoma. Resection of the lower trunk of the brachial plexus, for example, may compromise distribution of the ulnar nerve, and dorsal sympathectomy can result in Horner’s syndrome and anhydrosis. These deficits may be permanent but usually not disabling.

In a study series involving 204 selected patients with negative mediastinal nodes who completed treatment with combination preoperative radiotherapy and extensive surgical resection, 34% survived 5 years and 29% were alive at 10 years. Survival rates were independent of whether patients underwent segmental resection or lobectomy.

**REFERENCES**

2. Chardack WM, MacCallum JD: Pancoast tumor (five year survival without recurrence or metastases following resection and postoperative irradiation). J Thorac Surg 1956; 31:535