

# A 72-year-old man with a large, left-upper-lobe lung mass

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Non-small cell lung carcinoma of the superior sulcus, or Pancoast's syndrome (rib erosion, shoulder pain radiating down the arm, and Horner's syndrome), is an uncommon, challenging tumor. The management and outcome of superior sulcus tumors have remained unchanged since the 1960s; however, the recent advent of multiple-modality therapy for treating these tumors has improved the prospects for patients, as this case report demonstrates.

A 72-year-old man was evaluated by his physician for axillary pain radiating down the inner aspect of his left arm, a 15-lb weight loss, and a chronic cough. He gave a long history of tobacco use but had no other medical problems.

## Physical examination

The patient was a well-appearing, thin male. Vital signs were stable. Physical examination of the patient's eyes, ears, and throat revealed anisocoria with a small left pupil. No palpable adenopathy was evident on examination of the lymph nodes. Heart rate and rhythm were regular. His lungs were clear to auscultation bilaterally. The patient's abdomen was soft and nontender, with no signs of hepatomegaly. Examination of his extremities revealed no evidence of cyanosis or edema; however, early clubbing was noted.

## Laboratory findings

Results of a complete blood count and biochemistry profile were within normal limits. A chest x-ray showed a large lung mass in the left upper lobe. Computed tomographic (CT) scanning of the chest demonstrated a large, 6 × 8 cm left-upper-lobe mass abutting the apical aspect of the chest wall (Figure 1). Magnetic resonance imaging (MRI) of the brachial plexus showed no displacement of the plexus

or infiltration of individual nerves.

Surgical pathology following bronchoscopy and biopsy of the mass was consistent with a diagnosis of non-small cell lung cancer. Three mediastinal lymph nodes obtained at mediastinoscopy revealed no evidence of mediastinal involvement. An MRI scan of the brain and positron emission tomography (PET) showed no evidence of distant metastatic disease.

### Question:

What is the optimal treatment approach for this patient?

## Diagnosis

The most likely diagnosis is non-small cell lung carcinoma (NSCLC) of the superior sulcus (Pancoast's syndrome). Induction chemoradiation therapy followed by surgical resection is the standard treatment approach.

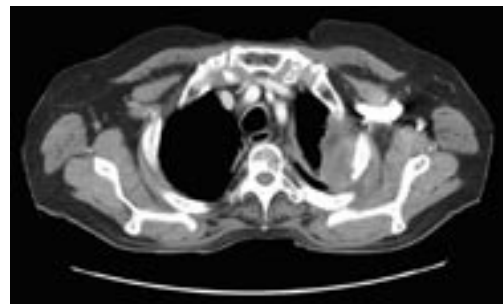
The patient presented has a T3 (chest-wall involvement), N0, M0, stage IIB NSCLC of the superior sulcus. Tumors of the superior sulcus represent an uncommon subset of NSCLC. These tumors frequently involve the brachial plexus, subclavian vessels, or spine. Involvement of the brachial plexus, which causes neuropathic pain radiating down the inner aspect of the arm, was first described by Henry Pancoast in 1932.<sup>1</sup> The disease is frequently associated

with Horner's syndrome (ptosis, miosis, and anhydrosis) caused by tumor invasion of the paravertebral sympathetic chain and the inferior stellate ganglion. Horner's syndrome occurs in 20%–30% of patients with a superior sulcus tumor.<sup>2</sup>

Staging evaluation of patients with superior sulcus tumors should include complete pulmonary function tests to assess operability, CT scanning of the chest through the liver and adrenal glands, a PET scan to exclude distant metastases, a limited MRI scan of the brachial plexus, and magnetic resonance angiography to assess for vessel or brachial plexus involvement.

## Management

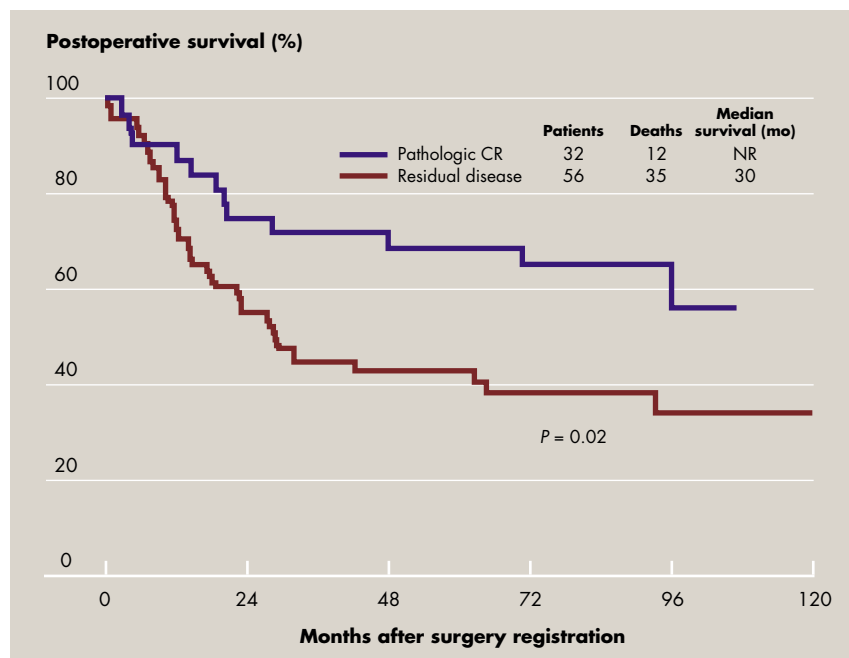
Preoperative radiation followed by surgical resection became the standard management of NSCLC of the superior sulcus in the 1960s, resulting in a consistent overall survival of approximately 30% at 5 years.<sup>3</sup> Usual



**FIGURE 1** Computed tomographic scan of the chest demonstrating a large, 6 × 8 cm left-upper-lobe lung mass abutting the apical aspect of the chest wall.

Commun Oncol 2008;5:93–94

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**FIGURE 2** Postoperative survival by pathologic response (complete response vs no response) for patients who underwent surgery. NR = not reached. Adapted from Rusch et al.<sup>6</sup>

contraindications to surgery for superior sulcus tumors include vertebral body invasion, subclavian artery or vein invasion, and clinically evident N2 disease. More recently, the use of multiple-modality therapy with induction chemoradiation therapy and surgical resection has become standard practice.<sup>3,4</sup>

Although the goal of preoperative chemotherapy for patients with resectable stage III NSCLC is to eliminate micrometastases, the objective of preoperative chemotherapy plus radiation in the treatment of superior sulcus NSCLC is primarily to decrease tumor burden sufficiently to improve resectability. In a cooperative group trial reported by Rusch et al,<sup>5</sup> patients with mediastinoscopy-negative T3–4, N0–1 superior sulcus NSCLC received two cycles of cisplatin and etoposide chemotherapy concurrent with 45 Gy of irradiation. Patients with stable or re-

sponding disease underwent thoracotomy, with en bloc resection of the involved lung and chest wall, 3–5 weeks later. The results of this landmark study recently have been updated.<sup>6</sup> Induction therapy was completed in 95% of patients, with 88 of 110 eligible patients undergoing thoracotomy. In all, 56% of thoracotomy specimens showed either a pathologic complete response (CR) or minimal microscopic disease. The 5-year survival was 44% for all eligible patients and 54% for patients who had a complete resection. Pathologic CR led to better survival than when any residual disease was present ( $P = 0.02$ ; Figure 2).<sup>6</sup>

This patient was treated with two cycles of cisplatin and etoposide chemotherapy with concurrent irradiation. He had a partial response to this therapy and successfully underwent a left thoracotomy with a left upper lobectomy. The surgical pathology

specimen demonstrated residual microscopic foci of poorly differentiated NSCLC against a background of necrotic pulmonary parenchyma and fibroplasia consistent with a marked treatment effect. He presently has no evidence of recurrent disease, 6 months after surgery.

### Clinical pearls

1. Tumors of the superior sulcus may present as Pancoast's syndrome (rib erosion, shoulder pain radiating down the arm, and Horner's syndrome).
2. The use of multiple-modality therapy with induction chemoradiation therapy and surgical resection has become standard practice. Downsizing of these tumors with chemotherapy and irradiation prior to surgery improves resectability and results in long-term survival in over 40% of patients.

### References

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