10. Treatment at the Finsen Institute

H. H. Hansen, F. R. Hirsch, and M. Rørth

The treatment of lung cancer should be considered in accordance with the histopathologic type of lung cancer and the stage of disease.

For practical reasons, the treatment will be presented for the following three categories of patients: group 1, patients with squamous cell, large cell carcinoma, and adenocarcinoma ("non-small cell" lung cancer); group 2, small cell lung cancer; and group 3, mesothelioma.

Treatment of Squamous Cell, Adeno-, and Large Cell Carcinoma

Surgery

The primary curative treatment for the above-mentioned cell type is surgery. A success of surgical treatment for lung cancer is highly dependent on the appropriate selection of patients. The criteria for this selection relate to the biologic nature of the tumor, the anatomic extent of disease, and the patient’s physiologic status. Candidates for definitive resection include only patients with stage I and stage II disease, and a small group of patients with stage III, where the disease is confined to the ipsilateral hemithorax, and in whom complete resection is considered technically feasible.

In addition, evaluation of the pulmonary function is mandatory before surgical resection is undertaken in order to be sure that the patient has sufficient lung function after resection. An adequate evaluation should thus indicate the patients who are at high risk for simple thoracotomy, but also estimate the maximum tolerated extent of pulmonary resection possible, and predict the postresection ventilatory capacity.

Of the tests used to evaluate the function of the airways, the flow volume relationship, the forced expiratory volume in 1 s (FEV₁), and the forced vital capacity (FVC) are considered the most reliable. The function of the alveolar capillary surface can be evaluated by measuring the carbon monoxide capacity and the blood gases while the ventilation/perfusion of the given area of the lung can be evaluated by the use of radioactive isotopes. If the pCO₂ is elevated at rest, chest surgery cannot be recommended, while decrease in pO₂ is not inconsistent with surgery, as pO₂ often increases after the intervention.

If the FVC is equal to 2.5 liters or more, the patient has essentially normal lung function and can tolerate a pneumonectomy. If the FVC is below 2.5 liters, a venti-
lation and perfusion scan should be performed in order to ensure a normal ventilation/perfusion relationship in the nonaffected lung and maintain the levels of blood gases within a normal range. If the calculated FEV\textsubscript{1} after operation is less than 1.0 liters, the patient is considered to have severe ventilatory impairment, and surgical resection of lung tissue cannot be considered.

The extent of the resection should be carefully planned preoperatively on the basis of the foregoing evaluation, even though final selection of the operative procedures must take place at the time of exploration. A procedure that encompasses all existent neoplastic tissue, and provides the maximum conservation of lung tissue, is usually the procedure of choice. It is well established that the surgical mortality is increasing with more radical procedures; however, potential for cure should not be compromised strictly by accommodating a conservative policy.

The choice of surgical procedure is usually indicated by the location of tumor involvement as determined by interoperative microscopic ventilatory reserve. The following general guidelines hold true in most situations:

1. *A wedge or segmental resection* will be selected for patients with small peripheral tumors (<2 cm in greatest diameter), with no evidence of extension or metastases (T1, N0, M0, stage I disease). In some of these patients, the preoperative diagnosis of cancer may be doubtful. A conservative resection for this extent of disease is particularly applicable in a patient whose pulmonary status is severely compromised.

2. *A lobectomy* is usually the choice for a patient with a centrally located tumor mass, completely contained within the lobe. The lobar bronchus may be involved, but there must be an adequate tumor-free margin for resection. There may be lymph node extension or metastases that are limited to the first level of lobar lymphatic drainage that can be totally encompassed by an en bloc dissection. These tumors are usually classified as stage I disease or stage II disease.

3. *Pneumonectomy* is the procedure of choice for all physiologically able patients having more extensive disease than described above. This will include tumors extending to the orifice of the lobar bronchus and tumors originating within or extending to the main stem bronchus. Further, when the primary tumor involves more than one lobe, pneumonectomy is generally undertaken. Extended pneumonectomy is recommended in the presence of mediastinal lymph node involvement stage III N-2 disease (a) if the involvement is limited to the node of the ipsilateral tracheobronchial angle or subcarinal space, (b) the histopathologic evaluation of the nodes at mediastinoscopy and thoracotomy shows that the capsules of the nodes are intact with no perinodal disease, (c) the histopathologic classification is squamous cell carcinoma.

4. *Radical pneumonectomy*, defined as resection with intrapericardial ligation of vessels, is applicable in selected patients where the disease extends proximally to the major vessels, but in which technical resection remains possible.

5. *Sleeve lobectomy* is not considered an elective alternative to pneumonectomy in physiologically competent patients as it compromises complete removal of all potentially involved lymphatics. However, this procedure may be selected as an alternative to no surgery for patients with limited pulmonary reserve having tumor involving the lobar and the adjacent main bronchus.