Thoracic Surgery Division

Introduction

The Thoracic Surgery Division deals with various kinds of neoplasms and allied diseases in the thorax, with the exception of the esophagus. Included are both primary and metastatic lung tumors, mediastinal tumors, pleural tumors (mesothelioma), and chest wall tumors. The surgical management of lung cancer patients has been the main clinical activity of the division, as well as the subject of most of its research. In addition to continuing to improve the procedures, such as the combined resection of neighboring vital structures and minimally invasive techniques (video-assisted thoracic surgery, VATS), it has become increasingly important to define the role of surgery in the multimodality treatment for patients with poor prognosis.

Routine Activities

The division has four attending surgeons. Three subteams with attending surgeons and residents do all the inpatient care, operations, examinations, and outpatient care. The first year of the two-year fellowship program is devoted to patient care as a chief resident, and the second year is devoted to clinical/basic research. We have annually adopted one to three residents who want to major in general thoracic surgery. Beside two weekly division meetings for preoperative evaluation and inpatient review, the chest group has a plenary meeting to share basic information about the diagnosis and treatment of patients, especially those needing a multimodality approach.

The treatment strategy for patients with lung cancer is based on tumor histology (non-small cell vs. small cell), extent of disease (stage), and physical status of the patients. In lung cancer patients, surgical resection is usually indicated for stages I, II, and a part of IIIA of non-small cell histology and stages I and II of small cell histology. However, to improve the poor prognosis of patients with clinically and histologically proven mediastinal lymph node metastasis or with invasion to the neighboring vital structures, the optimal treatment modalities are sought in a clinical trial setting.

Salvage and palliative resections are also important aspects of lung cancer surgery. Salvage surgery is intended to eradicate all the remaining or recurrent tumors when other modalities fail. Palliative resection is intended to treat jeopardizing symptoms such as intolerable pain or to avoid impending death caused by airway bleeding or other life-threatening situations.

For metastatic lung tumors, resection has been attempted on the basis of Thomfold's criteria; eligible patients are those who are at good risk, with no extrathoracic disease, with the primary site in control, and with completely resectable lung disease. Metastasis from the colorectal carcinoma is the most common. For mediastinal tumors, thymic epithelial tumors are most commonly encountered for resection. In the mediastinum, where a variety of tumor histologies can arise, the treatment must be carefully determined by the cytologic/histologic diagnosis before surgery. For this purpose, a CT-guided needle biopsy is replacing the formerly common biopsy under X-ray fluoroscopy. For patients with thymoma we adopt video-assisted resection of the tumor recently. The indication of VATS resection of mediastinal tumor is exclusive to small sized thymoma.

Research Activities

Peripherally located small cell lung cancer (SCLC) is rare. SCLC is easy to disseminate to the regional lymph nodes and/or distant organs, and surgery is rarely indicated for this disease. Controversies still remain as to management and diagnosis of this type of tumors. Among peripheral SCLC, large cell carcinoma could be included and the tumor should be diagnosed as large cell neuroendocrine carcinoma (LCNEC). Asamura et al. reported that the prognosis of patients with resected LCNEC was poor. They proposed a clinical spectrum of pulmonary neuroendocrine tumors, such as lung carcinoid tumor, LCNEC and SCLC. Appropriate management of LCNEC is going to be investigated, and the role of adjuvant chemotherapy following resection should be discussed in the near future. The planning of this clinical trial is on-going. The role of surgery for peripherally located SCLC is also a matter of debate. JCOG 9101 dealt with this clinical controversy. Tsuchiya et al. reported that postoperative chemotherapy for resected SCLC was feasible and the prognosis is satisfactory. The similar strategy will be investigated for LCNEC.

Owing to the advent of new technology in CT scanning, minute lung cancers are being found in a screening setting and by chance. They usually present as "ground-glass opacity (GGO)" appearance on CT, and their pathology is early adenocarcinoma termed as "bronchioloalveolar carcinoma (BAC)". The surgical management of such GGO-BAC type of lung cancer remains undetermined in terms of extent of pulmonary parenchymal resection and lymph node dissection. Some cases might be followed up with careful watching by CT, since the existence of indolent tumors is known. We are seeking for the appropriate way of management of these patients. Related to the GGO-BAC, we have a clinical trial. The clinical trial investigates the relationship between radiological and pathological findings as to the GGO-BAC (JCOG0201). We intended to predict pathological minimally invasive tumor based on radiological findings in order to select patients feasible for limited surgical resection. This trial is the first multi-institutional prospective study for GGO-BAC, and the results will have an impact on clinical practice for GGO-BAC. More than 800 lung cancer cases have already been accrued to the study, and the study has been closed.

The lymph node dissection for lung cancer has been one of the major issues in lung cancer, which has been extensively studied in our division. We continue to improve the surgical technique of dissection based on the oncological and surgical considerations: the more effective and less invasive lymph node dissection termed as "selective mediastinal/hilar dissection" according to the location of primary tumor by the lobe. The video-assisted surgery for thoracic malignancies is also an important challenge of our division. Especially the indication and surgical technique of video-assisted surgery for early lung cancer are points of great interest because of increased incidence of such minute tumors by improved CT devices and CT screening.

Watanabe et al. reported the quality of surgery of our division. Operative mortality was quite low. Mortality of patients who underwent lobectomy was reported to be less than 1%. This number is outstanding compared with previous reports. Suzuki et al. reported the significance of surgical resection for patients with lung cancer invading the superior vena cava (SVC). Prognosis was significantly better when tumors invade the SVC system.

Clinical Trials

The survival benefit of preoperative and postoperative chemotherapy for stage IIIA disease was evaluated in three JCOG studies (JCOG 92-09-055, JCOG 93-04-059, and JCOG 9805). Although JCOG-9805 was intended to evaluate the feasibility of surgical resection after concurrent chemo-radiotherapy in a phase II setting, this multi-institutional study was terminated because of the higher mortality rate experienced in other institutions involved in the study. Our group has chosen to continue this study in collaboration with the thoracic oncology group, and we continue to accrue the candidates. A similar preoperative approach with concurrent chemoradiotherapy has been employed for a special type of lung cancer known as superior sulcus tumor (STS, JCOG 9806). In our division, we have experienced neither fatal toxicity nor serious surgical complication as a result of this approach. This study has just been closed and the result has been presented at the last ASCO annual meeting. Induction chemoradiotherapy followed by surgery is considered to be a standard treatment strategy for Pancoast tumor according to the results of ours. A clinical trial for stage IB - IIB NSCLC started. This clinical trial (JCOG0204) evaluates the feasibility of preoperative chemotherapy for those early stage lung cancers. This randomized phase II trial will give us another clue for the future multimodal treatment for early stage lung cancer.

JCOG trials usually deal with multimodal treatment strategy for lung cancer. JCOG 0201 is a unique clinical trial for very early lung cancer. This study investigates the radiological-pathologic correlation and will give us criteria for the definition of "early peripheral lung cancer" which will be candidate for limited surgery. More than 800 cases have been accrued for this trial. The feasibility trial of limited surgical resection for those "early peripheral lung cancer" is now planning.

● K. Suzuki ●

Table 1. Number of patients

Lung carcinoma	444
Metastatic lung tumor	61
Mediastinal tumor	25
Pleural disease	3
Chest wall tumor	4
Total	537

Table 2. Type of procedure

Lobectomy	360
Pneumonectomy	18
Segmentectomy	37
Wide wedge resection	79
Mediastinoscopy	18
Resection of mediastinal tumor	25
Total	537

Table 3. Operative morbidity and mortality

Major complications (Bronchopleural fistula, empyema, etc.)	2.30%
Operative death within 30 days	0.15%
In-hospital death	0.15%

Table 4. Survival rates

Stage	No. of pts.	5yr survival (%)
I	493	76.4
II	172	55.5
IIIA	199	26.5
IIIB	138	27.2
IV	28	3.1
Total	1030	45%

Stage: TNM (5th ed.)
Op. year: 1990-1996