

## Department of Surgery Division of Chest Surgery, Breast and Endocrinology Surgery

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### General Summary

The Divisions of Chest Surgery and Breast and Endocrinology Surgery were established in June 2005. Since then, all staff members have been active in surgical practice, research, and education. Many studies are ongoing.

### Research Activities

#### *Chest Surgery*

Thoracoscopic surgery is the focus of our clinical activity. This minimally invasive surgery produces fewer postoperative complications and sequelae and is especially beneficial for elderly, high-risk patients. Thoracoscopic surgery requires advanced skills, and we have independently developed total thoracoscopic surgery, which uses only a thoracoscope and video monitors to provide intraoperative views. Our method of thoracoscopic surgery can be used to treat many chest conditions, such as juvenile pneumothorax, peripheral lung nodules, mediastinal tumors, and lung cancer.

Thoracoscopic surgery is also indicated for higher-risk patients with such complications as advanced pulmonary emphysema, impaired pulmonary function, and extremely high age who are not candidates for conventional open surgery.

Operative procedures, including wedge resection, segmentectomy, lobectomy, and pneumonectomy of the lung, are all safely performed, in addition to resection of mediastinal tumors or the thymus. Surgery for lung cancer requires much more advanced skills and oncological considerations, which have also been independently developed. Of the mediastinal procedures, thymectomy is usually performed via thoracoscopy rather than via a conventional median sternotomy. In our department the percentage of the chest operations performed via thoracoscopy is more than 90%, which we assume to be the highest rate in the world.

The minimal invasiveness of thoracoscopic surgery is being investigated with prospective clinical studies. These studies include a comparative study of open surgery and video-assisted surgery for lung cancer, an evaluation of video-assisted surgery for bullous lung diseases in elderly patients with impaired lung function, an evaluation of video-assisted surgery for thymic tumors, and an evaluation of video-assisted thymectomy for myasthenia gravis.

Our clinical studies are also evaluating new devices and methods, such as narrow-band imaging for the thoracoscopic diagnosis of benign and malignant lung diseases, and LaparoSonic coagulating shears (Ethicon Endo-Surgery, Inc, Cincinnati, OH, USA) for small thoracotomy. Three-dimensional diagnosis with computed tomography is used to make thoracoscopic surgery safer. The diagnosis and treatment of ground glass opacity of the lung, which is considered to indicate early adenocarcinoma, are being evaluated.

Many basic research studies are also underway. In the morphological expression-related advancement of the molecular genetic analysis of lung cancer, we are investigating whether carcinogenesis of the lung as reflected by CA19-9 activity is an important marker of de novo carcinogenesis. The biological and genetic characteristics of peripheral adenocarcinoma of the lung are being investigated to establish the most appropriate surgical procedures.

A system for viewing videos on the Internet is now being developed which will help improve surgical training and research.

#### *Breast and Endocrinology Surgery*

With the spread of screening mammography in Japan, the number of cases of ductal carcinoma in-situ has been increasing. We have studied factors involved in the progression of ductal carcinoma in-situ to invasive breast cancer by targeting microinvasive ductal carcinoma.

Triple-negative breast cancer (TNBC) is often associated with early resistance to chemotherapy and extremely poor outcomes. Neoadjuvant chemotherapies have demonstrated efficacy in some patients with TNBC. By analyzing clinicopathological data, we have identified chemosensitivity factors in TNBC.

Sentinel lymph-node navigation has become a standard procedure in breast cancer surgery worldwide. However, the use of sentinel lymph node biopsy after preoperative chemotherapy remains controversial. We are investigating its validity for standard use, especially after preoperative chemotherapy.

The detection of circulating tumor cells (CTCs) in the peripheral blood and the bone marrow of patients with breast cancer is an independent prognostic factor. We are studying the prognostic value of CTCs in the bone marrow for survival in patients receiving chemotherapy.

#### **Publications**

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