

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

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General Summary

The Division of Chest Surgery and the Division of 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 of the lung, including wedge resection, segmentectomy, lobectomy, and pneumonectomy, and resection of mediastinal tumors and the thymus are all safely performed. 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 thoroscopic 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 thoroscopic 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 to improve surgical training and research.

Breast and Endocrinology Surgery

With the spread of screening mammography in Japan, ductal carcinoma in-situ now accounts for 20% of all breast cancers. We have studied biological factors involved in the progression of ductal carcinoma in-situ to invasive breast cancer by immune-staining procedures.

We have performed phase II/III studies of contrast-enhanced ultrasonography of the breast with Sonazoid (Daiichi Pharmaceutical Co., Ltd., Tokyo) in cooperation with the Department of Radiology. For small cancers of the breast, Sonazoid increases the sensitivity of ultrasonography to equal that of magnetic resonance.

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 presence of circulating tumor cells 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 circulating tumor cells in the bone marrow for survival in patients receiving chemotherapy.

Publications

Odaka M, Nakada T, Asano H, Yabe M, Kamiya N, Hirano J, Morikawa T. Thoracoscopic resection of a mediastinal venous hemangioma: report of a case. *Surg Today*. 2011; **41**: 1455-7.

Akiba T, Marushima H, Kamiya N, Odaka M, Kinoshita S, Takeyama H, Kobayashi S, Mori-

kawa T. Thoracoscopic lobectomy for treating cancer in a patient with an unusual vein anomaly. *Ann Thorac Cardiovasc Surg*. 2011; **17**: 501-3.

Akiba T, Takeishi M, Kinoshita S, Morikawa T. Vascularized rib support for chest wall reconstruction using Gore-Tex® dual mesh after wide

sternochondral resection. *Interact Cardiovasc Thorac Surg.* 2011; **13**: 536-8.

Akiba T, Marushima H, Kamiya N, Odaka M, Kinoshita S, Takeyama H, Morikawa T. Thoracoscopic surgery for pulmonary metastases after chemotherapy using a tailor-made virtual lung. *Gen Thorac Cardiovasc Surg.* 2011; **59**: 413-7.

Akiba T, Tabei I, Kinoshita S, Yanagisawa S, Kobayashi S, Odaka M, Takeyama H, Morikawa T. Three-dimensional computed tomography for lung cancer in a patient with three right vein ostia. *Gen Thorac Cardiovasc Surg.* 2011; **59**: 376-9.

Takeyama H, Kyoda S, Okamoto T, Manome Y, Watanabe M, Kinoshita S, Uchida K, Sakamoto A, Morikawa T. The expression of sialic fibronectin correlates with lymph node metastasis of thyroid malignant neoplasmas. *Anticancer Res.* 2011; **31**: 1395-8.

Takeyama H, Shimada T, Manome Y, Uchida K, Morikawa T. Detection of micrometastatic cells in peripheral blood and bone marrow fluid of stage I-III Japanese breast cancer patients and transition following anti-cancer drug treatment. *Breast J.* 2012; **18**: 85-7.

Watanabe M, Fujioka K, Akiyama N, Takeyama H, Manabe N, Yamamoto K, Manome Y. Conjugation of quantum dots and JT95 IgM monoclonal antibody for thyroid carcinoma without abolishing the specificity and activity of the antibody. *IEEE Trans Nanobioscience.* 2011; **10**: 30-5.

Kinoshita S, Nojima K, Takeishi M, Imawari Y, Kyoda S, Hirano A, Akiba T, Kobayashi S, Takeyama H, Uchida K, Morikawa T. Retrospective comparison of non-skin-sparing mastectomy and skin-sparing mastectomy with immediate breast reconstruction. *Int J Surg Oncol.* 2011; **2011**: 876520.