Tobacco Control and Surgical Treatment of Lung Cancer in China

Xiuyi Zhi

Director of the Beijing Lung Cancer Center, Capital Medical University (CMU)/Director of General Thoracic Surgery Department, Xuanwu hospital

Dr. Xiuiyi Zhi is currently the Director of the Beijing Lung Cancer Center, Capital Medical University (CMU). Deputy Director of Oncology Department, CMU. Director of General Thoracic Surgery Department, Xuanwu hospital. Dr. Zhi is the Deputy-President & Director-in-general of Chinese Association for Thoracic Surgeons, the Deputy-Director-in-general & the Head-office of Chinese Association of Thoracic Surgery. He also is the President of Beijing Association of Thoracic Surgery. Dr. Zhi has worked for Surgical and Modality Treatment on lung cancer for 26 years. He has worked on and contributed to the development of clinical exchange and collaboration in lung cancer field & general thoracic surgery field in China. Dr. Zhi developed the 1st-4th China Lung Cancer Summit in 2005. He also has organized 1st-4th IASLC-China Lung Cancer Workshop from 1999 to 2005 and 1st-3rd China-Japan-Korea Workshop on Lung Cancer from 2006 to 2008.

History of lung cancer surgery in China has been nearly seventy years. At present, there are about 14,000 cardio-thoracic surgeons in China and 8,000 of them are general thoracic surgeons. Nearly 300,000 cases of Thoracic surgery operations were performed each year, of which lung cancer surgery are nearly 100,000 cases. The new cases of lung cancer in China are nearly 700,000 each year. Seventeen percent of patients with lung cancer are diagnosed with advanced disease, and not suitable for surgical treatment.

There are two thoracic surgery academic organizations in China. One is the Chinese Society of Thoracic Cardiovascular Surgery (CSTCS), Another is China Association for Thoracic Surgeons (CATS). Twenty-nine provinces or autonomous regions have their own academic organizations of thoracic cardiovascular surgery or general thoracic surgery. Beijing Association of Thoracic Society (BATS) was founded in December 2008. There were more than 60 thoracic surgery centers in Beijing with a total of more than 600 thoracic surgeons.

Lung cancer surgery is the main means to cure lung cancer. Clinical staging before treatment is important. Preoperative chest CT, PET-CT, skeleton ECT, brain MRI, abdominal ultrasound or CT and fiberoptic bronchoscopy has become routine examinations for preoperative staging of lung cancer in our center. If enlarged mediastinal lymph nodes were found in chest CT scan for patients with NSCLC, video-assisted mediastinoscopy biopsy was performed to confirmed the N2 disease. If the pathology result was positive, the patient would received two cycles of preoperative neoadjuvant chemotherapy.

Lung resection and systematic mediastinal lymph nodes dissection has become a routine procedure in lung cancer surgery in China. VATS lung resection and systematic mediastinal lymph nodes dissection accounted for 30% of all operations. the video-assisted thoracoscopic pulmonary resection technology training is in progress. Chinese Society of Thoracic Cardiovascular Surgery has a thoracoscopic surgery group, which held VATS classes or seminars every year for 14 years.

Eighty percent of thoracic surgeons have mastered the technology of VATS surgery. Eight video-assisted thoracoscopic training centers were approved by China Medical Association and the National Ministry of Health.

Adjuvant chemotherapy for lung cancer after thoracic surgery have reached a consensus in China’s thoracic surgeons. Patients with stage II and III NSCLC receive four to six cycles of platinum based adjuvant chemotherapy postoperatively. Multi-center clinical research projects, including Sino-US clinical research projects are ongoing.

Clinical trial of CT-guided radiofrequency ablation to treat elderly or inoperable patients with early stage lung cancer is ongoing. the Beijing Lung Cancer Center of Capital Medical University is leading a multi-center clinical trial. The six participate lung cancer centers are from Beijing, Shanghai and Guangzhou. CT-guided radiofrequency ablation combined with molecular target drugs such as Iressa, Tarceva can benefit to elderly or inoperable patients with early stage lung cancer. Clinical trial of postoperative adjuvant target therapy is also in progress.
ACOSOG Z0030 Trial – Initial Results

Mark S. Allen
Professor of Surgery and chair of the Division of General Thoracic Surgery at the Mayo Clinic

Dr. Mark S. Allen is Professor of Surgery and chair of the Division of General Thoracic Surgery at the Mayo Clinic in Rochester, MN. He completed his medical school training at Hahneman Medical School and his General and cardiothoracic surgical training at the Massachusetts General Hospital. He is a director of the American Board of Thoracic Surgery, a director-at-large of the Society of Thoracic Surgeons. He has published numerous peer reviewed articles, book chapters and given many presentations. He is currently runs a busy clinical practice at the Mayo Clinic where he is involved in resident education and clinical research.

Background: Little prospective, multi-institutional data exists regarding the morbidity and mortality after major pulmonary resections for lung cancer or if a mediastinal lymph node dissection increases morbidity and mortality.

Methods: Prospectively collected 30-day postoperative data was analyzed from 1,111 patients undergoing pulmonary resection who were enrolled from July 1999 to February 2004 in a randomized trial comparing lymph node sampling (LNS) vs. mediastinal lymph node dissection (LND) for early stage lung cancer.

Results: Of the 1,111 patients randomized, 1,023 were included in the analysis. Median age was 68 (range, 23 to 89). 52% were men. Lobectomy was performed in 766 (75%) and pneumonectomy in 42 (4%). Pathologic stage was IA in 424 (42%), IB in 418 (41%), IIA in 37(4%), IIB in 97 (9%), or III in 45 (5%). LNS was performed in 498 patients and LND in 525. Operative mortality was 2.0% (10/498) for LNS and 0.76% (4/525) for LND. Complications occurred in 38% of patients in each group. LND had a longer median operative time and greater total chest tube drainage (15 minutes, 121 ccs, respectively). There was no difference in the median hospitalization which was 6 days in each group (p=0.40).

Conclusion: Complete mediastinal lymphadenectomy adds little morbidity to a pulmonary resection for lung cancer. These data from a current, multi-institutional cohort of patients who underwent a major pulmonary resection constitute a new baseline with which to compare results in the future.
The 7th Edition of TNM in Lung Cancer

Peter Goldstraw

Consultant Thoracic Surgeon, Royal Brompton Hospital, Professor of Thoracic Surgery, Imperial College, Chair of the IASLC Lung Cancer Staging Project.

Professor Peter Goldstraw is Consultant Thoracic Surgeon to the Royal Brompton Hospital and Professor of Thoracic Surgery at Imperial College, London.

He has given over 360 International lectures, was awarded the Price Thomas Gold Medal from the Royal College of Surgeons of England in 2004, a Lifetime Achievement Award by the British Thoracic Oncology Group in 2006, Honorary membership of the ESTS in 2007 and the Merit Award by the IASLC in 2007. He has published over 255 articles in peer-reviewed journals and over 50 chapters in specialist textbooks. He is the chair of the IASLC Staging Project.

The recommendations of the IASLC Staging Project have now been accepted by the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC) and will be incorporated into the 7th edition of TNM due to be published in May 2009. All of the data supporting these changes and other aspects of the staging system have been published in the Journal of Thoracic Oncology. These articles are available, without subscription, on their web site at www.jto.org. Those interested are encouraged to study the details in these publications, which also records the valuable contribution made by those who collaborated in this project.

Changes to the T descriptors are:

- Subclassify:
  - T1 as
    - T1a (≤ 2 cm) or
    - T1b (> 2 cm to ≤ 3 cm); and
  - T2 as
    - T2a (>3 to ≤ 5 cm or T2 by other factor and ≤ 5 cm) or
    - T2b (>5 to ≤ 7 cm).

- Reclassify T2 tumours > 7 cm as T3.
- Reclassify T4 tumours by additional nodule/s in the lung (primary lobe) as T3.
- Reclassify M1 by additional nodule/s in the ipsilateral lung (different lobe) as T4.
- Reclassify pleural dissemination (malignant pleural or pericardial effusions, pleural nodules) as M1.

There will be no changes to the N descriptors as these, for the first time, have been validated in an International database of patients treated with all modalities of care.

Changes to the M descriptors are:

- Reclassify pleural dissemination (malignant pleural effusions, pleural nodules) from T4 to M1a.
- Subclassify M1 by additional nodules in the contralateral lung as M1a.
- Subclassify M1 by distant metastases (outside the lung/pleura) as M1b.
The resultant TNM stage groupings are summarised as:

- **Occult Carcinoma**: TX N0 M0
- **Stage 0**: Tis N0 M0
- **Stage IA**: T1a N0 M0
  - T1b N0 M0
- **Stage IB**: T2a N0 M0
- **Stage IIA**: T1a N1 M0
  - T1b N1 M0
  - T2a N1 M0
  - T2b N0 M0
- **Stage IIB**: T2b N1 M0
  - T3 N0 M0
- **Stage IIIA**: T1a N2 M0
  - T1b N2 M0
  - T2a N2 M0
  - T2b N2 M0
  - T3 N1 M0
  - T3 N2 M0
  - T4 N0 M0
  - T4 N1 N0
- **Stage IIIB**: T4 N2 M0
- **Stage IV**: Any T N3 M0
  - Any T Any N M1a
  - Any T Any N M1b

The table below summarises the descriptors, proposed T and M categories, and proposed stage groupings. Shaded cells indicate a proposed change from the 6th Edition of the TNM Classification for lung cancer for a particular TNM category.

<table>
<thead>
<tr>
<th>UICC6 T/M and Descriptor</th>
<th>Proposed T/M</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 (&lt;=2cm)</td>
<td>T1a</td>
<td>IA</td>
<td>IIA</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T1 (2 - 3 cm)</td>
<td>T1b</td>
<td>IA</td>
<td>IIA</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T2 (&lt;=5cm)</td>
<td>T2a</td>
<td>IB</td>
<td>IIA</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T2 (&gt;5 - 7cm)</td>
<td>T2b</td>
<td>IIA</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T2 (&gt;7cm)</td>
<td>T3</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T3 invasion</td>
<td>T4</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T4 (same lobe nodules)</td>
<td>T4</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIB</td>
</tr>
<tr>
<td>T4 (extension)</td>
<td>M1a</td>
<td>IV</td>
<td>IV</td>
<td>IV</td>
<td>IV</td>
</tr>
<tr>
<td>M1 (ipsilateral lung)</td>
<td>M1b</td>
<td>IV</td>
<td>IV</td>
<td>IV</td>
<td>IV</td>
</tr>
</tbody>
</table>

In addition the IASLC Staging Project has confirmed the value of TNM in the clinical staging of small-cell lung cancer (7) and the use of TNM for SCLC cases will be strongly encouraged in the 7th edition of TNM, especially for stratification in trials of chemo/radiotherapy and for those cases treated by surgery. We have provided evidence for the inclusion of carcinoid tumours of the lung and tracheobronchiial tree in the 7th edition of TNM, developed an IASLC Nodal Chart to reconcile the Japanese and Mountain/Dressler Nodal
Charts and developed a precise definition of “visceral pleural invasion”. We have analysed the prognostic value of those additional prognostic factors for which we had data, re-affirmed the dominant role of the anatomical extent of disease as described by the TNM system and undertaken a meta-analysis of the place of additional prognostic factors in patient evaluation. We have reported a meta-analysis of the prognostic value of the Standardised Uptake Value on pre-treatment PET scans and have reviewed the prognostic value of biological markers in lung cancer as they stand today. The IASLC Staging Project is now recruiting Institutions to collaborate in the prospective collection of data for the 8th edition. This will be facilitated by a web-based data collection process, and will incorporate selected neuroendocrine tumours and cases of mesothelioma treated by all modalities of care. We hope that colleagues in Japan will continue to support this initiative and ensure global relevance to future proposals for the TNM system.
招開講演4

コンピュータ外科手術の現状と将来

橋爪 誠

九州大学大学院医学研究院先端医療医学

九州大学大学院医学研究院先端医療医学講座災害・救急医学分野・教授
昭和54年九州大学医学部卒。同大第二外科入局。平成10年同大第二外科助手教授を経て、平成11年同大学医学系研究所災害救急医学教授。平成15年九州大学病院先端医工学診療部部長兼務。平成18年同院救命救急センター長兼務。低侵襲治療の研究開発とコンピュータ支援技術の振興により平成18年文部科学大臣表彰科学技術賞を受賞。

1990年代に始まった内視鏡外科手術は、呼吸器外科をはじめすべての外科領域に普及し、外科治療の在り方に大きな変革をもたらした。さらに、近年の情報工学や分子生物学の発展は、低侵襲治療と患者のQOL向上に大きく貢献するものと考える。

特にコンピュータ技術やロボット技術の発展は目覚ましく、従来の内視鏡外科手術では技術的に困難であった鉗子の自由自在な操作、目で見えない臓器内部の解剖学的精密情報や認識情報の伝達、遠隔手術や遠隔指導などが実現可能となった。

臨床現場で最も普及している手術支援ロボットは、ダビンチ（Intuitive Surgical CO, USA）で、世界で1000台近くが設置されている。その内約700台が米国で使用され、泌尿器科領域や、消化器外科領域、心臓外科領域、婦人科領域、小児外科領域などで用いられている。特に、米国の全前立を除めた約7割がロボット手術に置き換わっている。ダビンチの特長は、3Dで観察でき、eye-hand coordinationに優れる点と、鉗子が7自由度あるため自由自在に鉗子先端を動かすことができる点にある。しかし、高価で、維持費も高く、費用対効果を考慮すると、米国と異なった保険医療制度を有する我が国では、臨床導入に関して検討の余地がある。

我が国では、独自の手術支援ロボットの開発が進んでおり、手術台に搭載可能な小型手術支援ロボットや、MR対応穿刺ロボット、MR対応画像誘導手術支援ロボット、さらに内視鏡ロボットなどの開発が行われている。MR対応ロボットでは、治療中に病巣部位と鉗子先端の部位の相対的位置関係を確認しながら治療することができる。また、内視鏡ロボットは、皮膚に傷をつけない新しい概念の低侵襲治療（NOTES; natural orifice transluminal endoscopic surgery）として注目され、インドで世界初のtransgastric appendectomyが報告され、欧米ではtransvaginal cholecystectomyが報告されるなど今後の進展が期待される。

さらに、立体位置計測装置を用いたリアルタイム画像重畳技術の発達により、2Dあるいは3Dモニタ上に術中画像や術中画像を重ね合わせて描出することで、より安全で正確なアプローチや手術操作が可能ととなった。我々は遠隔指導だけでなく、バットコ・福岡間の遠隔操作によるロボット手術に成功した。

今回はロボット手術の研究発表の現状と、診断と治療の融合を目指した画像誘導下手術の未来像について言及する。