

## Clinical pathway for surgical treatment of primary lung cancer (2012 Edition)

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### I. Clinical pathway for surgical treatment of primary lung cancer: standard hospitalization

#### (A) Subjects applicable

1. Patients with the first diagnosis as primary lung cancer (ICD-10: C34/D02.2).
2. Patients with stage I, stage II, or completely resectable stage IIIA non-small cell lung cancer (NSCLC) (UICC 2009).
3. Patients with T<sub>1-2</sub>N<sub>0</sub>M<sub>0</sub> small cell lung cancer (UICC 2009).
4. Patients undergoing partial pneumonectomy, lobectomy, total pneumonectomy, or exploratory thoracotomy (ICD-9-CM-3:32.29/32.3-32.5).

#### (B) Diagnosis

Diagnosis is based on the "Diagnosis and Treatment Practices for Primary Lung Cancer (2011)" and the "Diagnosis Practices for Primary Lung Cancer (2011)" released by the Ministry of Health of China:

1. High risk factors: smoking index >400 cigarettes/year; > 45 years of age; and family history of lung cancer.

2. Clinical symptoms: The early symptoms are often non-specific. The common symptoms include irritable cough, hemoptum or hemoptysis, chest pain, shortness of breath, and fever.
3. Auxiliary examination: chest radiography, blood tumor marker determination, sputum cytology, and fiberoptic bronchoscopy.
4. Definitive diagnosis is based on pathological findings (cytologic or histologic findings).

#### (C) Selection of treatment options

Treatment is according to the "Diagnosis and Treatment Practices for Primary Lung Cancer (2011)" released by the Ministry of Health of China:

1. Partial pneumonectomy (including pulmonary wedge resection and segmentectomy).
2. Lobectomy (including composite lobectomy and bronchial sleeve resection and reconstruction of pulmonary artery).
3. Total pneumonectomy.
4. Systematic lymph node dissection or sampling should be performed during the above procedures.

Comprehensive treatment plan and imaging examinations (for clinical staging) should be completed prior to non-emergency surgical treatment. The possibility of surgical resection should be thoroughly evaluated and a surgical plan should be developed accordingly.

The principle for surgery is to achieve the complete resection of the tumor and regional lymph nodes and meanwhile retain the healthy functional lung tissue as much as possible. Video-assisted thoracoscopic surgery (VATS) is mainly feasible for stage I - II lung cancers.

#### (D) The standard hospital stay is ≤21 days

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**(E) Criteria for clinical pathway**

1. The first diagnosis complies with ICD-10: C34/D02.2 (diagnosis code for lung disease).
2. The heart, lung, liver, kidney, and other organs can tolerate thoracotomy under general anesthesia.
3. Any comorbidity, if exists, does not require special treatment and/or will not affect the implementation of the clinical pathway for the first diagnosis.

**(F) Preoperative preparations ( $\leq 6$  days)**

1. Required items for testing:
  - (1) Routine blood, urine, and stool tests;
  - (2) Coagulation function, blood group, liver function, kidney function, electrolytes, and screening for infectious diseases such as hepatitis B, hepatitis C, HIV/AIDS, and syphilis;
  - (3) Pulmonary function test, ECG, and arterial blood gas analysis;
  - (4) Sputum cytology and fiberoptic bronchoscopy;
  - (5) Imaging examinations: chest X-ray, chest CT (plain scan/enhanced scan), abdominal ultrasound/abdominal CT, whole body bone scan, cranial MRI, or enhanced CT.
2. The following examinations can be selected according to the patient's condition:
  - (1) Mediastinoscopy or EBUS;
  - (2) Percutaneous needle lung biopsy;
  - (3) Echocardiography and 24 h dynamic electrocardiogram (Holter);
  - (4) Tumor markers; and
  - (5) Examinations for cardiovascular and cerebrovascular diseases.
3. Preoperative risk assessment.

**(G) Selection and administration of prophylactic antibiotics**

Antimicrobial agents should be used in compliance with "Guiding Principles for Clinical Application of Antimicrobial Agents" (MoH Medical File No.285 [2004]). Antimicrobial prophylaxis should be given 30 minutes preoperatively.

**(H) Operation date: within 7 days after admission**

1. Mode of anesthesia: endotracheal intubation combined with intravenous general anesthesia.
2. Surgical consumables: Surgical stapler, cutting and stapling devices, vascular clamp, hemostasis materials, etc.
3. Intraoperative medications: antimicrobial agents.
4. Blood transfusion: based on intraoperative blood loss.
5. Pathology: frozen sections.

**(I) Postoperative hospital rehabilitation:  $\leq 14$  day after surgery**

1. Required examination items:

- (1) Routine blood tests and tests for liver function, kidney function, and electrolytes;
  - (2) Chest radiography (on the first postoperative day and before the removal of the chest tube) and chest CT (if necessary).
  - (3) Pathological examinations are performed according to the "Diagnosis and Treatment Practices for Primary Lung Cancer (2011)" released by the Ministry of Health of China.
2. Postoperative prophylactic use of antimicrobial agents should be in accordance with "Guiding Principles for Clinical Application of Antimicrobial Agents" [MoH Medical File No.285 (2004)].
  3. The days and types of antimicrobial drugs can be adjusted based on the disease condition.

**(J) Discharge criteria**

1. The wounds heal well, or the slow healing wounds can be managed in outpatient services.
2. The vital signs are stable.

**(K) Variations and causes**

1. Comorbidities that may affect the surgery and need appropriate diagnosis and treatment before surgery.
2. Postoperative pulmonary infection, respiratory failure, heart failure, bronchopleural fistula, or other complication that requires prolonged treatment or whose budget exceeds the reference cost.
3. The cause that has been recognized by a senior physician.
4. Causes from the patient and other aspects.

**(L) Reference cost**

30,000-50,000 RMB Yuan (VATS: 40,000-60,000 RMB Yuan).

**II. Clinical pathway for bronchogenic carcinoma****Subjects applicable**

Patients with the **first diagnosis** as bronchogenic carcinoma (ICD-10: C34/D02.2).

Partial pneumonectomy/lobectomy/total pneumonectomy plus systematic lymph node dissection and exploratory thoracotomy (ICD-9-CM-3:32.29/32.3-32.5).

Name: \_\_\_\_\_ Gender: \_\_\_\_ Age: \_\_\_\_ Outpatient number: \_\_\_\_\_

Inpatient number: \_\_\_\_\_

Date of admission: \_\_\_\_ YYYY \_\_\_\_ MM \_\_\_\_ DD

Date of discharge: \_\_\_\_ YYYY \_\_\_\_ MM \_\_\_\_ DD

Standard hospital stay: 12-21 days (Table 1)

**Table 1.** Clinical pathway for bronchogenic carcinoma.

Time	On the first day of admission	On the 2nd - 6th day of admission (days before surgery)	On the 4th - 7th day of admission (on the surgery day)
Main diagnosis and treatment	<input type="checkbox"/> History taking and physical examination <input type="checkbox"/> Completing the medical record <input type="checkbox"/> Order laboratory tests and other examinations <input type="checkbox"/> Physician-in-charge rounds <input type="checkbox"/> Initial diagnosis	<input type="checkbox"/> Senior physician rounds <input type="checkbox"/> Preoperative preparations <input type="checkbox"/> Clinical staging and pre-operative assessment <input type="checkbox"/> Preoperative surgical planning <input type="checkbox"/> Multidisciplinary consultation when needed <input type="checkbox"/> The hospitalist completes the medical records including notes of disease course, preoperative summary, and record of superior physician rounds. <input type="checkbox"/> Ask the patient or his/her family to sign surgical informed consent, self-paid articles agreement, consent for blood transfusion, and authorization/commission consent.	<input type="checkbox"/> Urinary catheters are placed and maintained before surgery <input type="checkbox"/> Surgery <input type="checkbox"/> The operator completes the surgical records <input type="checkbox"/> The hospitalist completes the post-operative care for the disease <input type="checkbox"/> Senior physician rounds <input type="checkbox"/> Observe the vital signs <input type="checkbox"/> Educate patients and family members on the disease conditions and post-surgical precautions.
Key medical orders	<b>Long-term medical orders:</b> <input type="checkbox"/> Secondary nursing in the department of thoracic surgery <input type="checkbox"/> Normal diet <b>Temporary medical orders:</b> <input type="checkbox"/> Routine blood, urine, and stool tests <input type="checkbox"/> Tests for coagulation function, blood group, liver function, kidney function, and electrolytes, screening for infectious diseases, and tests for tumor markers <input type="checkbox"/> Pulmonary function test and ECG <input type="checkbox"/> Sputum cytology and fiberoptic bronchoscopy <input type="checkbox"/> Imaging examinations: Chest radiography, chest CT, abdominal ultrasound or CT, whole body bone scan, and brain MRI or CT	<b>Long-term medical orders:</b> <input type="checkbox"/> Aerosol inhalation <b>Temporary medical orders:</b> <input type="checkbox"/> The following procedure(s) will be performed tomorrow <input checked="" type="radio"/> Partial pneumonectomy <input checked="" type="radio"/> Lobectomy <input checked="" type="radio"/> Total pneumonectomy <input checked="" type="radio"/> Exploratory thoracotomy <input type="checkbox"/> A minimum preoperative fasting time of six hours for water <input type="checkbox"/> Use of an enema the night before surgery <input type="checkbox"/> Preoperative skin preparation <input type="checkbox"/> Preparation for blood transfusion <input type="checkbox"/> Administration of preoperative sedative drugs (if appropriate) <input type="checkbox"/> Preparation for antimicrobial agents to be used during surgery <input type="checkbox"/> Other special medical orders <input type="checkbox"/> Mediastinoscopy, 24-hour ambulatory ECG, echocardiogram, and percutaneous needle biopsy (if necessary)	<b>Long-term medical orders:</b> <input type="checkbox"/> Routine post-operative nursing care in the department of thoracic surgery <input type="checkbox"/> Special nursing or primary nursing <input type="checkbox"/> Start the clear liquid diet 6 hours after waking <input type="checkbox"/> Oxygen inhalation <input type="checkbox"/> Monitor the body temperature, ECG, blood pressure, respiration, pulse, and oxygen saturation. <input type="checkbox"/> Record the chest tube drainage <input type="checkbox"/> Keep urinary drainage and record the 24-h input and output. <input type="checkbox"/> Aerosol inhalation <input type="checkbox"/> Prophylactic use of antimicrobial drugs <input type="checkbox"/> Use of analgesic drugs (if appropriate) <b>Temporary medical orders:</b> <input type="checkbox"/> Other special medical orders
Key nursing care	<input type="checkbox"/> Introduce the ward environment, facilities, and equipment <input type="checkbox"/> Nursing assessment at admission <input type="checkbox"/> Assistance for smoking cessation	<input type="checkbox"/> Pre-operative preparations including education and skin preparation <input type="checkbox"/> Remind the patient about the requirement of preoperative fluid fast <input type="checkbox"/> Exercise on pulmonary function	<input type="checkbox"/> Observe the changes in disease condition <input type="checkbox"/> Post-operative psychological support and daily life care <input type="checkbox"/> Maintain airway patency
Record of disease variation	<input type="checkbox"/> No <input type="checkbox"/> Yes, due to: 1. 2.	<input type="checkbox"/> No <input type="checkbox"/> Yes, due to: 1. 2.	<input type="checkbox"/> No <input type="checkbox"/> Yes, due to: 1. 2.
Signature of nurse			
Signature of physician			

Table 1 (continued)

Table 1 (continued)

Time	Admission day 5-8 (The 1st post-operative day)	Admission day 6-8 (The 2nd and 7th post-operative day)	Admission day 13-8 (The 8th - 14th post-operative day; the date of discharge)
Main diagnosis and treatment	<input type="checkbox"/> Senior physician rounds <input type="checkbox"/> The hospitalist completes the notes of disease course <input type="checkbox"/> Observe the chest drainage <input type="checkbox"/> Record the vital signs and lung sounds <input type="checkbox"/> Encourage and assist expectoration <input type="checkbox"/> Bronchoscopy suction if necessary	<input type="checkbox"/> Ward-round by a senior doctor <input type="checkbox"/> The hospitalist completes the notes of disease course <input type="checkbox"/> Review blood routine tests, blood biochemistry, and chest x-ray, if appropriate <input type="checkbox"/> Remove the chest drain after the fluid has been drained and the lung is re-expanded. <input type="checkbox"/> Bronchoscopy suction if necessary <input type="checkbox"/> Stop (or adjust the dose of) antimicrobial drugs if necessary	<input type="checkbox"/> Remove the stitches <input type="checkbox"/> Senior physician rounds, for deciding whether or not discharge is appropriate <input type="checkbox"/> The hospitalist completes the discharge summary and the medical record front sheet. <input type="checkbox"/> Educate patients and care giver/ family members on the post-surgical precautions. <input type="checkbox"/> Plan for post-operative care based on post-operative pathology
Key medical orders	<b>Long-term medical orders:</b> <input type="checkbox"/> Primary nursing in the department of thoracic surgery <input type="checkbox"/> Normal diet <b>Temporary medical orders:</b> <input type="checkbox"/> Routine blood tests, tests for liver and kidney function, and electrolytes <input type="checkbox"/> Chest X-ray film <input type="checkbox"/> Other special medical orders	<b>Long-term medical orders:</b> <input type="checkbox"/> Secondary care in the department of thoracic surgery <input type="checkbox"/> Stop the measurement of closed chest drainage <input type="checkbox"/> Stop recording the urine output, stop oxygen inhalation, and stop ECG <input type="checkbox"/> Stop atomization <input type="checkbox"/> Stop antimicrobial agents <b>Temporary medical orders:</b> <input type="checkbox"/> Remove the chest tube <input type="checkbox"/> Remove the urinary catheter <input type="checkbox"/> Change dressings <input type="checkbox"/> Review the Chest X-ray or chest CT, routine blood tests, liver and kidney function tests, and electrolytes (if appropriate) <input type="checkbox"/> Other special medical orders	<b>Temporary medical orders:</b> <input type="checkbox"/> Remove the stitches <input type="checkbox"/> Change dressings <input type="checkbox"/> Notification of discharge <input type="checkbox"/> Discharge medications <input type="checkbox"/> Regular follow-up visits
Key nursing care	<input type="checkbox"/> Observe the patient's condition <input type="checkbox"/> Psychological and social support <input type="checkbox"/> Assist the patient to cough	<input type="checkbox"/> Observe the patient's condition <input type="checkbox"/> Psychological and social support <input type="checkbox"/> Assist the patient to cough	<input type="checkbox"/> Observe the changes in disease condition <input type="checkbox"/> Post-operative psychological support and daily life care <input type="checkbox"/> Provide guidance on post-operative rehabilitation
Record of disease variation	<input type="checkbox"/> No <input type="checkbox"/> Yes, due to: 1. 2.	<input type="checkbox"/> No <input type="checkbox"/> Yes, due to: 1. 2.	<input type="checkbox"/> No <input type="checkbox"/> Yes, due to: 1. 2.
Signature of nurse			
Signature of physician			

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