CHAPTER 58

SURGICAL STRATEGIES FOR LUNG CANCER

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The word "strategy" means a general plan or a set of plans intented to achieve something, especially over a long time period. This is just what we want to do as surgeons at the treatment of lung cancer. So choosing a right strategy is the main point of treatment.

Since the mid 1980s, the beginning of thoracic surgery and the first surgeries for lung cancer, so many changes have come up (1). In recent years some surgical procedures and their indications are well described whether there are still some controversial points at lung cancer surgery. In this chapter the aim is to emphasize these topics under the light of the recent literature.

It is an indisputable fact that surgical treatment of lung cancer is the only potentially curative choice. In early stage lung cancer there is no doubt for surgery (2) even though there are some discussions on the way of surgery (thoracotomy vs videoassisted thoracoscopic surgery (VATS)), and the extend of resection (lobectomy vs segmentectomy).

Treatment plan is also well described in case of positive lymph nodes at the recent guideline of NCCN (3).

MAIN STRATEGIES OF SURGERY FOR LUNG CANCER

In 1974 Mountain et al described the TNM system for the staging of lung cancer (4). To produce the best treatment for a patient, staging is mandatory (5,6). Invasive mediastinal staging is described in the previous chapter in detail.

One of the main principles of oncological surgery is to provide tumor free surgical margins with a minimum extend of resection (5). In other words less invasive surgical approach with saving of much lung parenchyma (2). To prevent locoregional recurrence the resection should include the vascular structures ligated from their origin, lymphatics of the tissue and if neccessary surrounding soft tissues. For lung cancer, accepted surgical intervention includes removal of the involved lobe with tumour and systematic dissection of the ipsilateral hilar and mediastinal lymph nodes (6,7).

Avoiding the handling of the tumour during surgery is also important to prevent the spread of tumour cells to circulatory system (8,9). Moreover tumour and lymph node extraction from the thoracic cavity is another important point to avoid dissemination (9). Routine use of a retrieval device is essential (10).

What does the latest literature say about the following titles of lung cancer surgery?

1. Ground glass opasity, when to, how to operate?

According to the improvements in imaging methods, the detection of lung cancer in early

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VATS exploration, NCCN recommends stopping surgery and administering induction therapy. Nevertheless continuing the surgery is another suggested option. The results of 10 tertiary hospitals were investigated to answer the question whether VATS or thoracotomy outcomes differ in pN2 disease. ***Survival analysis demonstrated that VATS lobectomy was associated with statistically significant better OS of patients with surgically resected pN2 NSCLC (P < 0.0001).*** The authors mention that their results encourage VATS lobectomy even for resectable N2 patients.

7. Robotic lung cancer surgery, why, what, when, who, how?

Since lung cancer still leading the most often cancer in world wide (WHO), new strategies, treatment protocols and technologies are developed day by day. Robotic assisted lung surgery (RATS) is one of the latest surgical steps.

Lee and associates presented their results of 68 robotic lobectomies compared to 67 VATS lobectomies (58). The two groups were similar according to their demographic data, clinical and pathological stage. Only the number of female were more in robotic surgery group (p=0.012). Estimated blood loss was statistically lower (p<0.001) in robotic lobectomy whereas the procedure time was 28.5 minutes longer (p<0.001). Postoperative course were similar in two groups with no significant difference in postoperative morbidity, mortality, length of stay. Another important outcome of the study is the number of lymph nodes dissected. In robotic lobectomy group the number of nodes (p=0.004), N1 and N2 nodal sampling were all increased. This is paramount since the pathological staging will differ and adjuvant treatment can result in a survival benefit. Most important points about this procedure are the increased visualization, grasping ability, and bipolar dissection available with the robotic technology which are superior to VATS procedure.

The analysis of 426 robotic lobectomy patients compared to 3881 VATS lobectomy patients, both had similar rates of postoperative complications as well as in-hospital mortality. There was no difference in OS and cancer specific mortality (CSM) between the thoracoscopic and robotic assited groups (OS:71.4% vs 73.1% at 3 years, p=0.366; CSM: 16.6% vs 14.9% at 3 years, p=0.639) (59).

Surgical benefits are surely important to decide the surgical method. Whereas financial cost of robotic surgery is also important. Singer at al reviewed literature in this regard and analysed a total of 6 studies meeting their inclusion criteria. The total cost of robotic lobectomy was higher than VATS in 5 of the studies. Most of the cost is caused from the operating room costs which are directly associated with the robotic instruments. High volume centers suggest that costs of RATS might be reduced with surgeons experience (60). As in all other surgical procedures there is a learning curve for RATS. This is determined as 30 cases for RATS segmentectomy (61). Over and above the costs, mew technologies and perspectives should not be neglicted.

Most of the studies gave similar results of OS and DFS rates between VATS and RATS (62-64). Nonetheless the value of RATS should be established in future studies for advanced non small cell lung cancer with large tumors and lymph node metastasis.

The following topics are discussed in the other chapters of the book.

7. **Extended resections**
8. **Synchronous lung cancer surgical strategy**
9. **Metastatic lung cancer and surgery**

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