Editorial

Is "less actually enough" when it comes to left upper division tumors?

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Introduction

Two recently published randomized controlled trials, JCOG 0802 (1) and the CALGB 140503 (2) have shed light on the discussion regarding the oncological outcome and their equality following segmentectomy and lobectomy for early-stage non-small cell lung cancer (NSCLC). Over the last decade, anatomical sublobar resections through minimally invasive or open techniques have gained ground. The studies mentioned above have been long awaited to support the assumption among thoracic surgeons that anatomical segmentectomies could substitute lobectomies in selected cases. The intended sublobar anatomical resection indications are more or less established for thoracic oncological surgeons. Peripheral tumors (situated in the outer third of the lung parenchyma) smaller than 2 cm and having N0 status are the least criteria for performing an anatomical segmentectomy. Nonetheless, even if these criteria are fulfilled, according to the current guidelines, a lobectomy should be performed if the patient can tolerate such a resection.

Trisegmentectomy versus left upper lobectomy

There has always been a hot discussion about the anatomical similarity between the left upper division and the right upper lobe. There is a main anatomical difference as there is most of the time no fissure—or at least a visible one—between the left upper division and the lingula compared to the upper and the middle lobe on the right side.

In the engaging paper of Nishikubo *et al.* (3), the authors first present a logical argumentation. The "natural" anatomical variation between the superior lobes of the right and the left lung is treated differently in the case of an NSCLC. In cases of tumors >2 cm without nodal involvement in the right upper lobe, a lobectomy combined with a radical mediastinal lymph node dissection is the treatment of choice from an oncological point of view. On the contrary, a tumor >2 cm in the left upper division without nodal involvement shall be treated, according to the current guidelines, with a lobectomy of the left upper lobe (including the lingula) followed by a loco-regional and mediastinal lymph node dissection.

To support this argument, in case of a right upper lobe tumor without nodal involvement, we do not perform an upper bilobectomy even if the tumor is close to the interlobar plane and the fissure is fused.

Nishikubo *et al.* reviewed and analyzed the data of 252 patients that have undergone a lobectomy of the left upper lobe or an upper division resection in a cN0 nodal status, 46 pairs of patients were created after propensity score matching.

The results of 92 patients (46 patients in each group) showed no significant difference regarding the 5-year recurrence-free survival (RFS) and overall survival (OS). These findings have also been supported in previously published articles (4-8).

Nodal status does matter

The current international guidelines for lung cancer treatment suggest that nodal status is essential when the indication for a segmentectomy versus a lobectomy is to be set. A factor that shall not be underestimated is the systemic hilar and mediastinal lymphadenectomy as a prognostic factor for a better outcome and better staging (9). Gossot *et al.* (10) emphasize the importance of the intraoperative frozen section of the lymph nodes and suggest a conversion to a lobectomy in case of lymph node involvement.

As shown in the JCOG 0802 trial (1), the oncological outcome is comparable between lobectomy and segmentectomy, but only if lymph node involvement is actively and aggressively excluded during the operation, which means that a locoregional lymph node dissection, including a frozen section of suspicious nodes, is a prerequisite for the performance of intended segmentectomies. The fact is that during a segmentectomy or an upper left trisegmentectomy, the dissection of the hilar, interlobar, and peribronchial lymph nodes is usually less meticulous than during a lobectomy. Moreover, there are cases where the final histological findings reveal pN1 or pN2 lymph node status.

In the otherwise fascinating study from Nishikubo *et al.*, the occult pN1 and pN2 disease rates in both lobectomy and segmentectomy groups were not reported. This information would provide a higher significance to the paper.

Gossot *et al.* (10) argue that the basic oncological principles of radical resection with adequate margins and a radical lymph node dissection (loco-regional and mediastinal) should be respected when performing a segmentectomy. A further recommendation based on the findings of Matsumura *et al.* (11) is that the segmental peribronchial lymph nodes and the adjacent lymph nodes (aLNs) should be examined during the operation as they could possibly indicate spread to other isolated lymph nodes (iLNs). A conversion to lobectomy is indicated in case of tumor invasion to any of the abovementioned nodes. Last but not least, every anatomical resection should be completed by a systematic mediastinal lymph node dissection to avoid missing invaded nodes.

Concerning the systematic mediastinal lymph node dissection, the recommendation from the International Association for the Study of Lung Cancer (IASLC) suggests the dissection of at least three mediastinal lymph node stations (always including the subcarinal station 7) as well as hilar and interlobar lymph node stations (12) in order to have an oncological complete resection.

Huang *et al.* (13) showed that patients with more than six lymph nodes harvested had a statistically significant higher frequency of nodal metastasis in the final pathology (9.4% versus 1.5%). Based on the more thorough lymphadenectomy and proper staging, these results were translated into a significantly higher 3-year RFS.

Summarized, the real deal is about the extension and thoroughness of hilar, peribronchial, and mediastinal lymphadenectomy that a segmentectomy requires to exclude a lymph node invasion and be accepted as an equal alternative to lobectomy in a curative oncological treatment concept.

Resection margins

We read with great interest the analysis of the segmentectomy group of patients regarding the distance of the tumor from the intersegmental plane. The three-dimensional (3D) reconstruction of the intersegmental plane was performed retrospectively. The patients were divided into two groups, depending on the distance (more or less than 2 cm) from the intersegmental plane. Surprisingly the recurrence rates among the two groups (short-distance and long-distance) did not differ significantly.

Nishikubo *et al.* (3) performed a multivariate analysis of the subgroup of patients that underwent a trisegmentectomy, indicating that the tumor distance from the intersegmental plane was not a significant predictor of RFS or OS.

Nevertheless, it would be of great interest to know how many of these tumors had a diameter smaller than the distance to the intersegmental plane. In these cases, one of the main oncological prerequisites for sublobar resection, distance to resection margin ≥ tumor diameter, would have been respected. Therefore, comparable oncological outcomes should be expected.

Conclusions

A trisegmentectomy in the case of an NSCLC in the left upper division demonstrated similar results regarding the 5-year RFS and OS compared to lobectomy in cases without nodal involvement.

Conclusively, in the case of a tumor in the left upper division, a trisegmentectomy can be considered if an R0 resection and systemic—equivalent to lobectomy—lymph

node dissection is performed. In these cases, the loco-regional lymph node dissection is of greater importance. A hilar or peribronchial positive nodal status in the frozen section intraoperatively should be a reason to extend to a lobectomy of the left upper lobe. This operation can be adapted for safety, among others, in elderly patients or patients with reduced pulmonary reserve.

Additionally, 3D preoperative reconstruction is an essential tool. It can be safely used to evaluate the tumor's position and relation to the anatomical borders, including the distance to the lingula fissure, offering a better surgical plan.

More prospective—ideally randomized controlled—trials are required in order to prove the concept's feasibility from a surgical oncology point of view.

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