Editorial Commentary

Anatomical partial lobectomy for lung cancer: less or more?

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In the last two decades, sublobar resections have emerged as a compelling alternative to lobectomy for the treatment of early-stage non-small cell lung cancer (NSCLC). This shift is supported by pivotal studies such as those from the Japan Clinical Oncology Group (JCOG) and Cancer and Leukemia Group B (CALGB). These studies suggest that for certain early-stage lung cancers, particularly those presenting as ground-glass opacities (GGOs) and lesions smaller than 2 cm, sublobar resections can provide comparable oncological outcomes to lobectomy with potentially fewer functional impairments (1,2).

The growing interest for lung parenchymal sparing surgical solutions has led in recent times to the adoption, in some cases, of even more limited anatomical resections such as subsegmentectomies. Although early results are encouraging, to date, very limited numbers are available on these procedures (3,4).

The advent of high-resolution computed tomography (CT) screening has led to an increase in the detection of these early-stage cancers, making the evaluation of sublobar resections in this setting more relevant than ever (5,6).

In addition to this, advancements in three-dimensional (3D) imaging technology have revolutionized preoperative planning for lung cancer surgery. By providing detailed anatomical visualization of the tumor in relation to surrounding bronchial and vascular structures, 3D reconstruction allows for precise surgical planning and execution (7,8). For surgeons, these reconstructions can be invaluable in assessing complex anatomical variations and ensuring oncologically safe resections, notably while planning the parenchymal resection at the level of the intersegmental/subsegmental plane.

In this scenario, the authors of the study have proposed anatomical partial lobectomy (APL) as a novel surgical strategy that aims to balance the oncological need for adequate margins with the preservation of lung function (9). A wider surgical entity than standard segmentectomy, APL focuses on resecting the tumor with a margin of healthy tissue, tailored to the tumor's location and the lung's anatomy. This approach seeks to address cases where a standard single segmentectomy may not achieve oncologically adequate margins, but where a lobectomy or even a bisegmentectomy may seem to be excessive, offering a potential alternative that could improve patient outcomes while minimizing lung function loss. The types of resections included under this nomenclature were single segmentectomy, extended segmentectomy, combined segmentectomy and combined subsegmentectomy.

The study conducted by Qiu *et al.* demonstrates the feasibility and safety of APL in selected patients on a large series of 3,336 patients, with no mortality and a morbidity rate of 10.8% (9). Being APL a more technically demanding procedure than a standard lobectomy, the authors interestingly report a reduction in postoperative complications over time suggesting that APL could become a viable option for treating early-stage lung cancer as surgical teams gain more experience with the technique.

However, the study presents some limitations, including the lack of a control group with a standard procedure such as lobectomy or single segmentectomy. Furthermore, while only short-term postoperative outcomes have been presented, evaluating disease-free survival and overall

survival in future research would be beneficial to ascertain the oncological efficacy of the procedure.

When considering sublobar resections, patient selection remains crucial for the surgical indication. APL might satisfy the current trend towards parenchymal sparing surgery, providing an additional therapeutical option for patients presenting, for example, with a ground glass lesion of <2 cm, located deeply in the lung parenchyma, thus precluding the possibility for a wedge, the resection of which would require to cross the intersegmental border in order to achieve oncologically safe surgical margins. This would allow the avoidance of more extensive procedures like bisegmentectomy or lobectomy. Another potential indication might be for those patients presenting with multiple GGOs in the same or different lobes, all potentially synchronous early-stage lung cancers, which would otherwise require a very extended resection for relatively limited lesions.

Nonetheless, despite the growing interest in parenchymal sparing resections, lobectomy might still be the best option in some cases and every patient must be evaluated in its entirety from the anatomical and functional point of view during the planification of the surgical approach, particularly when considering that the JCOG0802 trial did find a higher proportion of local relapse among patients undergoing segmentectomy over lobectomy (10.5% *vs.* 5.4%) even if the overall survival was better in the first group.

In conclusion, the treatment landscape for early-stage NSCLC is evolving, with sublobar resections gaining prominence as potentially preferable alternatives to lobectomy in certain cases. The role of 3D reconstruction in surgical planning is becoming increasingly important, enabling more precise and tailored approaches to lung cancer surgery. APL represents a promising development in this setting, offering a new surgical strategy that could enhance patient outcomes. However, further research is needed to fully understand its benefits and limitations.

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