Editorial Commentary

Anatomical partial lobectomy—encouraging initial experiences of a novel approach to sublobar resection

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We welcome the large scale, retrospective single-arm study from our colleagues Qiu *et al.*, who have published the outcomes of over 3,000 early-stage non-small cell lung cancer (NSCLC) patients managed with anatomical partial lobectomy (APL); a surgical approach developed by the authors at the National Cancer Center in China (1).

Lung cancer remains a significant cause of morbidity and mortality, and according to World Health Organization (WHO) data is the most common cause of cancer-related death worldwide (2). The advent of lung cancer screening globally, following the NELSON and NLST trials, has increased the number of patients with early-stage small peripheral lung cancer coming forward for surgical management (3,4).

Lobectomy was traditionally recognised as the standard of care for resectable NSCLC—a statistically significant survival benefit for lobectomy compared with limited resection had previously been demonstrated (5). More recently, two large scale randomised controlled trials (JCOG0802/WJOG4607L and CALGB140503) questioned this finding, as for stage IA NSCLC (with tumour size <2 cm and consolidation to tumour ratio >0.5), segmentectomy was demonstrated to be non-inferior to lobectomy in terms of overall 5-year and disease-free survival (6,7). Upfront sublobar resection (segmentectomy) without a tissue diagnosis is supported by the British Thoracic Society where the Herder Score is >10% (8).

The authors have described a new method of sublobar resection which is termed anatomical partial lobectomy—defined as a "lesion-centered resection of anatomical sublobar parts" (1). This includes single/combined subsegmentectomy, and single or extended segmentectomy, demonstrated in *Fig. 4* of the paper. Importantly this does not include wedge resections. They have retrospectively analysed the outcomes for 3,336 patients who underwent such a procedure in their centre between 2013–2019, including how outcomes changed as the centre gained experience in this approach.

The baseline characteristics of the cohort are important to consider, as 67% are female and almost 80% do not have a history of smoking. The female majority is also seen in Suzuki *et al.*'s single arm study (9), however, the population is patently different from JCOG0802/WJOG4607L and CALGB140503. In both these trials the majority of patients had a smoking history, and there was better parity of gender (47.5% female and 57.4% respectively) (6,7).

In terms of methodology, it is unfortunate that a control group has not been included—this would have allowed for proper comparison of postoperative morbidity and mortality. However, even without a control arm, the

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short-term outcomes shown here are notable: A post-operative complication rate of 10.8%, compared to 27% in JCOG0802/WJOG4607L (grade 2+), and no post operative mortality (0/3,336 *vs.* 4/340 in CALGB140503) (6,7). Owing to the retrospective nature of this study where complications may not be recorded as rigorously, it would be encouraging to see this confirmed in a prospective setting. Furthermore, it is promising to see the comparison between data collected in the early and later stages of the collection period, as despite the centre taking on a higher percentage of complex cases using the APL technique, there is a significantly lower complication rate (15.4% in November 2013–November 2017 *vs.* 9% in November 2017–November 2019), and an increasing adoption of the single port approach (28.3% in 2013–2017 *vs.* 59.1% in 2017–2019). These changes likely reflect the operator's learning curve, and it would be interesting to see how this continues in future.

A further limitation of the method is the lack of inclusion criteria/clear indications for APL. The study hints at the size and tumour/consolidation ratio cutoffs employed in previous studies, but does not commit to these or offer its own, nor does it specify a TNM criteria for inclusion. Qiu *et al.* point out that 93% of those diagnosed with invasive adenocarcinoma met criteria for T1a, but this only amounts to 2,427/3,336 total cases. We also note the amalgamation of several distinct surgical methods into APL (see paragraph 4). It is not clear from the study whether there were objective triggers for extending segmentectomies, and the different methods have not been distinguished from one another in the results. In such a large-scale study there is scope for and utility in subdividing this data to compare the different surgical approaches.

Most importantly, we would welcome the addition of longer-term outcomes to this study. Whilst this appears to be a safe approach to sublobar resection, we cannot rely on previous randomised controlled trials to vouch for long-term oncologic efficacy, as they evaluated a different surgical approach: In JCOG0802/WJOG4607L the non-lobectomy group underwent either single or bi-segmentectomy (6), whilst CALGB140503 included wedge resections in their sublobar group (7). Here we have a third method, and it will be crucial to monitor longer term oncologic outcomes, particularly overall/disease-free survival and recurrence.

Ultimately despite lacking a control arm, this study provides good initial evidence for the feasibility and safety of APL, especially considering the impressive cohort size. As this centre has pioneered this approach others will struggle to compare their own practice without a common ground to work from, and therefore its applicability to wider surgical practice in the field is yet to be assessed. We would encourage further updates from this group.

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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