Editorial Commentary

VATS lobectomy *vs.* open lobectomy for early-stage lung cancer: an endless question—are we close to a definite answer?

Francesco Guerrera[1,2], Anne Olland[3,4,5], Enrico Ruffini[1,2], Pierre-Emmanuel Falcoz[3,4,5]

[1]Department of Surgical Science, University of Torino, Turin, Italy; [2]Department of Thoracic Surgery, A.O.U. Città Della Salute e Della Scienza di Torino, Turin, Italy; [3]Department of Thoracic Surgery, Strasbourg University Hospital, Strasbourg, France; [4]INSERM (French National Institute of Health and Medical Research), UMR 1260, Regenerative Nanomedicine (RNM), FMTS, Strasbourg, France; [5]Faculty of Pharmacy and Medicine, University of Strasbourg, Strasbourg, France

Correspondence to: Pierre-Emmanuel Falcoz. Department of Thoracic Surgery, Strasbourg University Hospital, 1 place de l'Hôpital, BP 426, 67091 Strasbourg Cedex, France. Email: pefalcoz@gmail.com.

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Initially described in 1992 (1), thoracoscopic (VATS) lobectomy is unquestionably the greatest upheaval in thoracic surgery community since the introduction of one-lung ventilation by Carlens in 1949 (2).In the last twenty years, after several initial uncertainty about its adoption, VATS lobectomy slowly but constantly propagates worldwide and, nowadays, most international guidelines suggest the adoption of this minimally invasive approach for early-stage lung cancer, over the traditional "open" approaches (3,4). Indeed, several single- and multi-institutional studies, as well as national registry analysis, showed that VATS lobectomy adoption permits a shorter chest tube duration, a shorter length of hospital stay, fewer postoperative complications, and a lower or comparable perioperative mortality *vs.* classic thoracotomy (5-13). Moreover, the recent results of UK multicentric VIOLET randomized controlled trial corroborated these statements, demonstrating an association between VATS lobectomy and enhanced short-term clinical outcomes when compared with open surgery for non-small cell lung cancer (NSCLC) (14,15).

Nevertheless, even if VATS lobectomy adoption is constantly increasing, its diffusion was not as fast as anticipated. For instance, VATS lobectomy rates were 30% in Europe (16), 50% in Italy (17), 65% in Denmark (18), 29% in Great Britain and Ireland (19), and 30–40% in the USA (20). This retard in VATS lobectomy adoption, was initially imputable to the skepticism concerning the reliability and the safety of the technique, compared to the well-established thoracotomy approaches. Currently, the major concerns are represented by short- and long-term oncologic results, that are closely correlated with long-term survival (21).

In this scenario, we read with great interest the recent article by Yang *et al.* presenting the results of the first national analysis assessing long-term outcomes of VATS versus open lobectomy in stage I NSCLC (22). Actually, the previous analysis of national registry couldn't define long-term outcomes due to data unavailability (5-12). Moreover, as secondary endpoint, the authors present short term results, including oncological surrogates' outcomes like pathologic nodal upstaging, lymph node retrieval and surgical margin positivity.

The authors reported no significant differences for 5-year overall survival between the VATS and open lobectomy, in both multivariable-adjusted survival analysis (HR: 0.95; 95% CI: 0.86–1.05) and propensity score-matched survival analysis (5-year survival: VATS 66.3% *vs.* Opens 65.8%). This result is consistent with the current literature, that, so far, was merely based on smaller mono-institutional reports.

Moreover, the authors address another point of particular concern, as the quality of lymph node assessment. Undeniably, while all the current guidelines underline the

prominence of lymph node assessment, this procedure is not regularly performed as it should. In particular, American College of Surgeons and US Surveillance, Epidemiology, and End Results (SEER) reported that mediastinal lymph nodes are rarely investigated in the majority of surgical procedures (23,24). In this context, nodal upstaging is considered one of the indexes of the oncological quality of the resection. Unfortunately, the current literature is inconsistent regarding this topic: several studies showed no differences in nodal upstaging between VATS and open lobectomy (25,26), while other reported a reduced nodal upstaging in VATS lobectomy procedures (12,21,27). In the present article, the results indicated that there were no significant differences in nodal upstaging between VATS and open lobectomy procedures; and these findings were confirmed if considered the N0 to N1 and the N0 to N2 upstaging. These results suggested an equivalence in oncologic efficacy of VATS lobectomy as compared to open approaches, once overcome the initial learning curve.

Certainly, stronger evidence on short-term outcomes will be soon provided by the VIOLET study that showed similar results reporting a comparable rate of nodal upstaging between VATS and open lobectomy groups (15). On the other hand, we believe that with the continuous spread of VATS lobectomy adoption, and the parallel enhance of surgeon expertise with the technique, most of the future evidences will converge in defining the oncological equivalence of VATS and open lobectomy for early-stage lung cancer.

Definitively, the study of Yang and colleagues represents a step forward in this the definition of oncologic equivalency between VATS and open lobectomy procedure. It is worthy to note that in the present article, only about 20% of patients were submitted to a VATS lobectomy, underlining the resiliency of the surgeons to abandon the open approaches (22). We hope that the results presented in this study could stimulate the production of evidence concerning oncological quality of VATS lobectomy procedures and could dissipate concern that still slows down its adoption worldwide.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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