



Thoracotomy versus VATS: short term outcomes from a large randomized controlled trial

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In the February 2018 issue of *Annals of Thoracic Surgery*, the results of the “Thoracoscopic Surgery Versus Thoracotomy For Lung Cancer: Short Term Outcomes Of A Randomized Trial” by Hao Long *et al.* were published (1). The aim of this non-inferiority, phase 3, multicenter randomized controlled trial both for short-term and oncologic outcome, was “to confirm that VATS lobectomy is non-inferior to open surgery for the treatment of early-stage NSCLC”. The results of this study merit the attention of thoracic surgeons for several reasons.

First of all, the results of this study, which recruited 508 patients between 2008 and 2014 from five leading thoracic referral centers in China, reported a statistically significant difference between the VATS and open groups in terms of intraoperative bleeding and duration of operation. None of the other considered parameters reached statistical significance: type of pulmonary resection, completeness of resection, modality of lymphadenectomy, duration of chest drainage, total volume of chest drainage, length of hospitalization, postoperative complications. The analysis of these operation-related variables and morbidity within 28 days was executed both including and excluding eight VATS procedures (3.72%) intraoperatively converted to open surgery, without any substantial change of the results. The primary end points for the trial were 5-year overall and disease-free survival, whereas the short-term secondary end points on perioperative outcomes were: death (28 days), morbidity (28 days), operation time, intraoperative blood loss, duration and volume of chest drainage, length of stay, completeness of operation and yield of lymph nodes. This

study focused on perioperative outcomes, since long-term efficacy will be addressed in future articles by the authors. The study enrolled patients aged from 18 to 75 years with clinical stage I–II NSCLCs surgically treated with radical lobectomy and mediastinal lymph node dissection. The number of ports for the VATS approach was not defined, but they were generally three or four; whereas patients in the control group underwent a muscle-sparing rib-spreading axillary thoracotomy.

In the present study, no differences were found between the two groups in terms of the observed incidence of macroscopic incomplete resections, surgical margins and mediastinal lymph node dissections. The authors also reported similar pathological upstaging, with incidental stage III disease for the two studied groups. Perioperative variables were also analyzed: mean operative time was statistically lower in the VATS lobectomy than in the thoracotomy group ($P=0.009$), intraoperative blood loss was significantly reduced with VATS rather than with thoracotomy ($P=0.001$). No statistically significant differences were recorded in terms of duration of chest tube drainage, postoperative complications and length of hospital stay.

However, we have to take into account that neither PET-CT nor invasive diagnostic procedures were carried on mediastinal lymph nodes and this could have led to bias in the patients selection, disease staging and therein in the final affirmations of the paper (2,3). Nonetheless, the study results suggest, as had past studies, that VATS lobectomy is superior, or at least non-inferior, to open lobectomy for the treatment of early stages NSCLC, both for postoperative

and oncological outcomes (4-6). In light of this, in 2013, the American College of Chest Physicians suggested that a minimally invasive approach should be preferred to the open one for anatomic pulmonary resection in clinical stage I NSCLC (7). This recommendation for the most part, was based on retrospective observational study results (4,8-11) and only three RCTs (12-14).

After this recommendation, in 2016, Bendixen *et al.* reported on a RCT study with the aim of “investigating postoperative pain and the quality of life” (15). Their results stated that “VATS is associated with less postoperative pain and better quality of life than anterolateral thoracotomy for the first year after surgery”; suggesting that VATS should again be the preferred surgical approach for lobectomy in stage I NSCLC. Moreover, the authors reported shorter duration of epidural analgesia, less perioperative blood loss and shorter length of stay, for the VATS group, compared to the thoracotomy group.

This first ever large RCT, published in 2018, is important, in that it further supports the 2013 decision of the American College of Chest Physicians to recommend a minimally invasive approach over open thoracotomy for anatomic pulmonary resection in clinical stage I NSCLC. Additionally, it allows surgeons to have a more confident guide in this setting. Moreover, the long-term follow-up data on these patients regarding postoperative pain, acute inflammatory reaction, respiratory function and quality of life is due by the end of 2019 and it is expected that these results will further bolster the use of VATS. Consequently, the minimally invasive approach would be further adopted worldwide therein necessitating changes in the education of health care professionals and the organization of hospital management. In fact, as seen in the past with a greater use of VATS, the costs associated with treating clinical stage I NSCLC would most likely decline in tandem with the expected higher detection rates for early lung cancer in the near future (16).

In conclusion, this RCT, comparing VATS and open lobectomy, provides further evidence that VATS lobectomy seems to be a safe and reliable procedure for the treatment of clinically early stage NSCLC.

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