Editorial

Non-intubated uniportal video-assisted thoracoscopic surgery

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Thoracic surgeons are seeking perfectionism in the field which seems to be by better patient experience through a minimal invasive approach. Moving from conventional posterolateral thoracotomy to multiport VATS then uniportal VATS are the classic examples. some surgeons look for non-intubated VATS resection as the high-end product of this cascade. The publication from Ahn *et al.* (1) in *Korean Journal of Thoracic and Cardiovascular Surgery* 2018 represents one of the recent retrospective studies that investigate the feasibility of this technique in a well-established thoracic surgery service. However, careful investigation in the history of thoracic surgery give us a clear vision that we work in a cycle rather than a linear progress. Thoracoscopy started with examination of the pleural cavity and lysis of adhesion in an awake patient (2). Surgeons started to do lobectomies and wedge resection on awake patients with a variety of local anesthesia and nerve block (3) and this continued to the 1950s when double lumen endotracheal tubes seemed to offer a better anesthetic option with lung isolation (4).

With improvement of digital cameras and the success of laparoscopy, thoracic surgeons were able to perform VATS lobectomy in the early 1990s. This was depending much on double lumen endotracheal tube and lung isolation as a main stay to get a space to work inside the chest. Less than a decade after this step, surgeons start to complain of drawbacks of double lumen tube as increased risk of pneumonia, impaired cardiac performance, possibility of residual neuromuscular blockade and postoperative ventilator dependency, barotraumas, the development of atelectasis in both the dependent and the nondependent lung and a standing risk of major airways and vocal cords injury (5). Thus, in late 90s and beginning of the new millennium, publications started to investigate the feasibility and safety of non-intubated thoracoscopic resection enlightened by the new advances in digital cameras and wide panoramic view through HD monitors (6,7). Trails were mainly focusing on small lesions needing wedge resection, decortication, metastasectomy, bullectomy and non-anatomical resections (8,9) and the results were very encouraging not only in terms of less postoperative pain and patient perception but extend to better immunological responses and stress hormone responses (10,11). This inspired surgeons to continue and apply the same concepts on anatomical lung resection (12).

With the combination of uniportal VATS anatomical resection (13) and non-intubated techniques, patients get the most minimal invasive approach available and this "non-intubated uniportal VATS approach" is even exceeding the historical publications of early thoracoscopic trails where most cases were approached via 2 ports. Ahn *et al.* included 40 patients in 6 months' time frame that were operated by a single surgeon excluding those with BMI higher than 30, those with previous thoracic intervention, suspected N2 disease, persistent cough or excessive airway secretion and a high risk of gastric reflux. Despite getting a heterogenous group of patients with minor VATS procedures and major lung resection, they managed to

get a zero conversion to thoracotomy rate and a 7.5% conversion to intubation and 2.5% (one case) conversion to multiport VATS.

Conversion to intubation rate varies in literature from 11% to zero in some series (14,15). This seems to be affected much by the type of procedure, learning curve and the selection criteria of proper patients together with the level of harmony between the surgical team and anesthesia team. The most common causes of conversion were significant mediastinal movement, persistent hypoxemia, pleural adhesions, ineffective epidural anesthesia, bleeding, and tachypnea (16). Worse mentioning that all cases in Ahn *et al.* series that need conversion were segmentectomy cases and the cause of conversion were hypoxemia.

Conversion to multiport VATS in Ahn *et al.* group occur in one case representing 2.5% and the cause was injury to pulmonary artery branch which is not uncommon possibility in all resection cases. The good thing about uniportal VATS is that conversion not always lead to open surgery with rib spreading but instead, most surgeon try to control the injury via another port first if the uniportal VATS approach failed to do so. Ahn *et al.* calculated anesthesia time, operative time, blood loss and chest tube duration. Results were obviously similar to other series of non-intubated VATS (5,12,15,17) but still can't be statistically compared as different types of operations and different anesthesia modalities used in each series.

So far, we still do not have a prospective randomized trail comparing awake non-intubated resection to conventional thoracoscopic resection in a homogenous group of patients that can give us a hard evidence on the superiority of this technique. Yet, surgeons keep challenging their limits and their anesthesia team's skills in non-intubated uniportal VATS approach searching for a less invasive approach possible for a better patient experience.

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Footnote

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

References

1. Ahn S, Moon Y, AlGhamdi ZM, et al. Nonintubated Uniportal Video-Assisted Thoracoscopic Surgery: A Single-Center Experience. Korean J Thorac Cardiovasc Surg 2018;51:344-9.
2. Hoksch B, Birken-Bertsch H, Muller JM. Thoracoscopy before Jacobaeus. Ann Thorac Surg 2002;74:1288-90.
3. Tamburrini A, Mineo TC. A glimpse of history: non-intubated thoracic surgery. Video-Assisted Thoracic Surgery 2017;2:52.
4. Bjork VO, Carlens E. The prevention of spread during pulmonary resection by the use of a double-lumen catheter. J Thorac Surg 1950;20:151-7.
5. Kiss G, Castillo M. Nonintubated anesthesia in thoracic surgery: general issues. Ann Transl Med 2015;3:110.
6. Pompeo E, Mineo D, Rogliani P, et al. Feasibility and results of awake thoracoscopic resection of solitary pulmonary nodules. Ann Thorac Surg 2004;78:1761-8.
7. Nezu K, Kushibe K, Tojo T, et al. Thoracoscopic wedge resection of blebs under local anesthesia with sedation for treatment of a spontaneous pneumothorax. Chest 1997;111:230-5.
8. Tacconi F, Pompeo E, Fabbi E, et al. Awake video-assisted pleural decortication for empyema thoracis. Eur J Cardiothorac Surg 2010;37:594-601.
9. Pompeo E, Mineo TC. Awake pulmonary metastasectomy. J Thorac Cardiovasc Surg 2007;133:960-6.
10. Vanni G, Tacconi F, Sellitri F, et al. Impact of awake videothoracoscopic surgery on postoperative lymphocyte responses. Ann Thorac Surg 2010;90:973-8.
11. Tacconi F, Pompeo E, Sellitri F, et al. Surgical stress hormones response is reduced after awake videothoracoscopy. Interact Cardiovasc Thorac Surg 2010;10:666-71.
12. Chen JS, Cheng YJ, Hung MH, et al. Nonintubated thoracoscopic lobectomy for lung cancer. Ann Surg 2011;254:1038-43.
13. Gonzalez D, Paradela M, Garcia J, et al. Single-port video-assisted thoracoscopic lobectomy. Interact Cardiovasc Thorac Surg 2011;12:514-5.
14. Al-Abdullatief M, Wahood A, Al-Shirawi N, et al. Awake anaesthesia for major thoracic surgical procedures: an observational study. Eur J Cardiothorac Surg 2007;32:346-50.
15. Furak J, Szabo Z, Horvath T, et al. Non-intubated, uniportal, video assisted thoracic surgery [VATS] lobectomy, as a new procedure in our department. Magy Seb 2017;70:113-7.
16. Gonzalez-Rivas D, Bonome C, Fieira E, et al. Non-intubated video-assisted thoracoscopic lung resections:

the future of thoracic surgery? Eur J Cardiothorac Surg 2016;49:721-31.
17. Cui F, Liu J, Li S, et al. Tubeless video-assisted thoracoscopic surgery (VATS) under non-intubated, intravenous anesthesia with spontaneous ventilation and no placement of chest tube postoperatively. J Thorac Dis 2016;8:2226-32.

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