



Current status of non-intubated uniportal video-assisted thoracoscopic surgery (NIUVTS) for lung cancer

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Non-intubated uniportal video-assisted thoracoscopic surgery (NIUVTS) is a surgical treatment that cannot be achieved without close cooperation between surgeons and anesthesiologists. From the point of view of the anesthesiologist, compared with uniportal video-assisted thoracoscopic surgery (UVATS), NIUVTS is expected to cause greater stress during surgery on the anesthesiologist than careful observation of the patient during anesthesia and attention to transition to intubation. Generally, many facilities may find it difficult to introduce this technique due to various circumstances in the anesthesiology department. However, it is also speculated that there may be some anesthesiologists who wish to avoid the blood pressure fluctuation due to one-lung ventilation (OLV), the trouble of airways such as atelectasis, the complications of epidural anesthesia. On the other hand, from a surgical point of view, the efficacy of surgical invasiveness in NIUVTS is the same as that of UVATS. Therefore, if there is a difference in the incidence of postoperative pulmonary complications compared to conventional UVATS due to the effects of endotracheal intubation on the airways, and the lack of use of muscle relaxants, NIUVTS should be considered. The effectiveness of NIUVTS, a vagus nerve block is performed to suppress coughing during surgery, and an intercostal nerve block is performed with a local anesthetic to control pain in the chest wall, so that the surgical technique is not affected. Needless to say, vascular treatment requires more delicate manipulation than multi-portal VATS (M-VATS), and more gentle manipulation is required for the

surrounding tissue during bronchial and perivascular lymph node dissection so as not to induce cough. Anesthesiologists as well as surgeons may be similarly stressed during their surgical procedures.

Strict surgical indication criteria for NIUVTS have been described in various papers (1,2). Exclusion indications for NIUVTS include patients with chronic bronchitis, asthma, pneumonia, etc., who often produce intraoperative sputum and require frequent intraoperative sputum suction, and patients with low cardiopulmonary function, such as arrhythmia complications and patients with stent placement. In the literature, an analysis of the conversion to tracheal intubation was examined (3-7). It goes without saying that further clarification of surgical indication criteria and proving the usefulness of NIUVTS is the key to the spread of this technique.

Performing complete lymphadenectomy in NIUVTS requires more careful technique. In this report, procedure of the NIUVTS left lower lobectomy and systemic lymph node dissection in China is described. On surgical video, compared to other surgical procedures such as UVATS, there were many close-up images, especially in left recurrent laryngeal lymph node dissection, and it seemed difficult to secure the visual field. It was expected that traction on the surrounding tissue, such as the lungs, vagus nerve and blood vessels, would be limited by this technique. As concern of matter, when using the ultrasonic scalpel, a little more consideration should be given to secondary damage to the surrounding tissue. However, lymphadenectomy in

NIUVATS comparable to that in M-VATS was performed. In discussion contraindications and surgical indications for this procedure are described. Collaboration between anesthesiologists and surgeons is emphasized. Additionally, this surgical technique, which has the potential to increase ERAS, is suitable for patients who have no complications, low risk, and meet the surgical indication criteria.

Except low invasiveness of non-intubated thoracoscopic surgery for lung cancer, oncological advantage is indicated in Hungary (8). Non-intubated thoracoscopic lobectomies for lung cancer led to the early introduction of postoperative adjuvant chemotherapy and higher completion rate for 4 cycles of chemotherapy compared conventional thoracoscopic lobectomies. Implementing enhanced recovery after thoracic surgery (ERAS) with less invasive surgical treatment such as NIUVTS for lung cancer leads to improvement of patients' willingness to receive postoperative adjuvant chemotherapy, and at the same time leads to improvement of chemotherapy completion rate. In the future, when molecular-targeted therapy and immunotherapy will be expected as preoperative and postoperative adjuvant chemotherapy, we believe that the spread of NIUVTS will be significant in the surgical treatment of lung cancer.

Additionally, a recent paper discusses the effects of early introduction of adjuvant chemotherapy after lung cancer surgery for UVATS and open thoracotomy and improvement in the completion rate (9). The effect of reducing pain by performing minimally invasive surgical treatment also leads to positive willingness for postoperative treatment on the part of the patient. The prognostic benefit effect of minimally invasive surgery should be investigated in the future, and at the same time, NIUVATS is considered to be a surgical procedure that will attract more attention.

NIUVATS is a higher hurdle in terms of surgical indications than UVATS, requiring even more gentle surgical techniques, and careful intraoperative anesthesia management. However, if the oncological benefit and definite surgical indication is further clarified, it may become a more recommended surgical procedure.

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