



Can major lung resection under local anesthesia become widespread?

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First, I would like to express my gratitude for being given an opportunity to write an editorial on the paper titled “Non-intubated uniportal video-assisted thoracoscopic surgery: lobectomy and systemic lymph node dissection” by Wang *et al.* (1). As can be observed in the video, they performed a very clean surgery involving the proper usage of an ultrasonic scalpel to achieve adequate lymph node dissection. I especially respect that they performed this surgery in safe conditions under local anesthesia without endotracheal intubation.

Recently, cases of major lung resection under local anesthesia have been increasingly reported owing to the comparative ease of intraoperative pain control of thoracic walls and incision wounds using local anesthesia than before because of the widespread use of modalities involving fewer incision wounds, including reduced port surgery and uniportal video-assisted thoracoscopic surgery. This technique has been applied to more advanced surgical modalities, such as tracheal carinal reconstruction, and is becoming increasingly accepted in respiratory surgical operations for mediastinal tumors, including thymectomy (2-4).

However, two concerns need to be addressed before this new technique becomes more widespread: the first concern involves guaranteeing safety. Unless intraoperative coughing and body movement can be completely controlled, the surgeon may make unexpected operational mistakes, potentially causing massive hemorrhage. Although

during an emergency, an endotracheal intubation in the lateral decubitus position may be possible, it is not easy. Furthermore, even if it is successful, proper oxygenation may be delayed. Moreover, if emergency thoracotomy is warranted, general anesthesia needs to be initiated promptly, and depending on the situation, simultaneous rapid blood transfusion may also be required. However, this may place the patient in a further life-threatening condition. Therefore, it is imperative to establish countermeasures for the abovementioned circumstances and demonstrate their effectiveness. In addition, further discussion is warranted to clarify the types of patients that should be indicated for this technique. In low-risk cases, combining this technique with uniportal surgery may enable the surgeon to achieve a less invasive operation. Conversely, it can be said that administering general anesthesia to such low-risk patients is not unreasonably detrimental. If surgery under local anesthesia is less invasive for patients, it should be preferably applied to high-risk patients, such as those with advanced chronic obstructive pulmonary disease (COPD) and interstitial pneumonia complications. However, the difficulty in achieving pulmonary collapse may render it tough to secure a field of vision, and thus, the complicated surgical procedure may prolong the operation duration. These factors may affect the safety of the patient. Moreover, patients with complications such as COPD and interstitial pneumonia may become susceptible to hypoxemia and hypercapnia owing to airway occlusion due

to phlegm, stress, and insufficient pain control. General anesthesia has been becoming increasingly safer recently and can be applied to high-risk cases relatively safely. It is therefore necessary to prove that there is no problem in the establishment and safety of an anesthetic protocol for major lung resection under local anesthesia. Additionally, the intraoperative mental stress of patients undergoing a relatively long surgical procedure, such as brachioplasty under local anesthesia, may also need to be evaluated.

The second concern is proving the advantages of this technique. As the author has mentioned, the advantages of major lung resection under local anesthesia include avoidance of the adverse effects of endotracheal intubation and one-lung ventilation and potential suppression of generalized inflammatory and immunological reactions. The primary reason for avoiding endotracheal intubation is avoiding the detrimental effects associated with general anesthesia, muscle relaxants, and positive-pressure ventilation rather than preventing rare occurrences of airway damage. One-lung positive-pressure ventilation exerts stress on the contralateral lung and may cause acute pulmonary disorder and acute aggravation of interstitial pneumonia. During respiratory surgery, the acute exacerbation of interstitial pneumonia is the most fatal complication. If major lung resection under local anesthesia improves the incidence of some complications, including acute pulmonary disorder and acute aggravation of interstitial pneumonia, it would prove to be a major advantage. Alternatively, if the absence of endotracheal tubes in proximal bronchoplasty facilitates bronchial anastomosis, it would be advantageous as well.

When introducing a new technique, one must demonstrate its benefits for the patient compared with those of other conventional techniques. The author cited evaluation items such as “shortened postoperative hospital stay”, “earlier postoperative meals”, and “earlier resumption of daily activities”. However, these are bound to be heavily influenced by the attending physician’s bias. In future reports, the author needs to present higher-level evidence for patient benefits and the minimally invasiveness of major lung resection under local anesthesia; for example, the improved incidence of acute pulmonary disorder and acute exacerbation of interstitial pneumonia and reduced postoperative complications.

Whether major lung resection under local anesthesia will be widely accepted as a minimally invasive surgical modality globally depends on whether the relevant safety issues can be overcome and the benefits to patients can be proven. As

Dr. Tsuguo Naruke, a pioneer in VATS in Japan, once said, “the road to the future cannot be opened without boldness and courage”. I hope that more advanced evidence will be presented for this challenging technique involving major lung resection under local anesthesia. Once the safety and benefits of this technique for patients are guaranteed, I expect that this minimally invasive approach will become more widely adopted.

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