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CASE REPORT

Nonintubated Video-assisted Thoracoscopic Surgery Using Regional Anesthesia and Targeted Sedation in a Myasthenia Gravis Patient

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Myasthenia gravis (MG) is a disease affecting the acetylcholine receptor in the neuromuscular junction. Symptoms of MG are muscle weakness and fatigue. Video-assisted thoracoscopic extended thymectomy (VATS-ET) is well established in the treatment of MG if medical treatment is failed. In the recent decade, VATS under nonintubated anesthesia has been intensively researched and reported, which has been advocated to be a preferred alternative to the conventional intubated anesthesia for pulmonary nodules. However, cases with MG receiving nonintubated VATS-ET have rarely been reported. Here, we described a successful anesthesia of a 44-year-old woman with MG undergoing nonintubated VATS-ET.

Key words: Anesthesia, myasthenia gravis, thymectomy, video-assisted thoracoscopic surgery

INTRODUCTION

Up to now, intubated general anesthesia (GA) and one-lung ventilation using double-lumen tube are still a standard anesthetic method for cases of myasthenia gravis (MG) undergoing video-assisted thoracoscopic extended thymectomy (VATS-ET).[1,2] Recently, nonintubated VATS for pulmonary nodules using regional anesthesia and targeted sedation has been reported.[3,4] All these techniques tried to reduce the adverse effects including intubation-related airway trauma, ventilation-induced lung injury, residual neuromuscular blockade, impaired cardiac performance, and postoperative nausea and vomiting compared with VATS under conventional intubated GA.[3] However, literature on nonintubated VATS-ET for MG is limited.[5,6] We reported the successful use of regional anesthesia and targeted sedation for a 44-year-old woman with MG undergoing nonintubated VATS-ET.

CASE REPORT

A 44-year-old, 70 kg, 158 cm female presented with bilateral ptosis for the last 2 years and gradually progressive generalized muscle weakness for the last 1 year which increased by the end of the day. Tensilon test was suggestive of MG, and acetylcholine receptor antibody (anti-AChR) test was positive. Nevertheless, she did not produce any history of recurrent respiratory tract infection, aspiration, or any other symptom of bulbar muscle weakness. Subsequent contrast-enhanced computed tomography (CECT) of the chest revealed homogenous enlargement in the anterior mediastinum, and the thymoma was highly suspected accordingly. Medical therapy with oral pyridostigmine 60 mg twice daily was initiated with good compliance. Her generalized weakness was improved, but ocular symptoms persisted even after 6 months. Therefore, she was scheduled for VATS-ET.

During the preanesthetic evaluation, she was no bulbar weakness and normal muscle power. Hematology and blood biochemistry were normal. Chest X-ray showed no specific finding. CECT of the chest did not reveal any tracheobronchial narrowing, mediastinal or hilar lymphadenopathy, or involvement of mediastinal vessels, heart, and esophagus.

The patient was premedicated with fentanyl 100 μg intravenously. Routine anesthetic monitoring included

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electrocardiogram, pulse oximetry, and respiratory rate. Thoracic epidural anesthesia (TEA) was performed by insertion of an epidural catheter at the T5/6 thoracic interspace to achieve a sensory block between the T2 and T10 dermatomes before propofol sedation, and it was maintained by continuous infusion of 2% lidocaine 5–6 ml/h. The end-tidal carbon dioxide was measured by insertion of a detector into one nostril. A bispectral index (BIS) sensor (BIS Quatro, Aspect Medical System, Norwood, MA, USA) was used to monitor the level of sedation.[7] She was then sedated with intravenous propofol (Fresfol 1%, Fresenius Kabi GmbH, Graz, Austria) using a target-controlled infusion (TCI) method (Injectomat® TIVA Agilia, Fresenius Kabi GmbH, Graz, Austria). The patient kept sleeping during the surgery, and the level of sedation was set to achieve BIS value between 65 and 75.[7] Total propofol dosage of TCI was 939 mg for the whole course. During the surgery, the patient spontaneously breathed oxygen through a ventilation mask. The SpO_2 and end-tidal CO_2 were maintained 92–100% and 35–50 mmHg during the whole anesthesia course, respectively. Postoperative analgesics were administered by patient-controlled epidural analgesia (PCEA).

The VATS-ET procedure with an anterior chest wall lifting method was performed smoothly for 2 h without any complication. With the procedure, her thymus [Figure 1] and surrounding tissue were sufficiently resected using a bilateral thoracoscopic surgical method without neck incision. Moreover, the entire period under anesthesia was 2.5 h. The patient was satisfied with the whole anesthesia course. She was transferred to the intensive care unit after the surgery. One day later, she was transferred to the ordinary ward. Finally, she discharged without any sequela 5 days later. Under PCEA, the pain intensity of the patient was 2–3/10 and 4–5/10 while at rest and coughing, respectively.

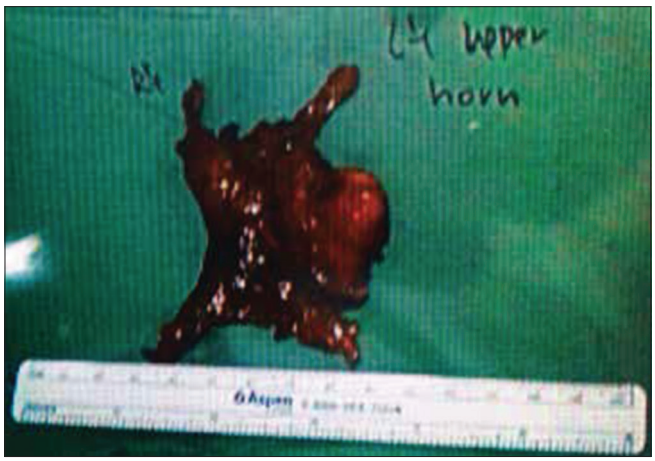

Figure 1: The gross specimen of the patient's thymus

DISCUSSION

MG is an autoimmune disease of the neuromuscular junction. When medical management fails, VATS-ET is well established for the treatment of MG.[8] Anesthetic management of patients with MG is challenging, particularly in regard to the goals of postoperative pain control, respiratory function, and early extubation to avoid prolonged periods of postoperative mechanical ventilation. Therefore, communication to the patient, family, and other caregivers of the goals of the anesthetic plan is a very important duty of the anesthesiologist.[9]

Most MG patients undergo thymectomy under intubated GA. The postsurgical risk of respiratory failure has always been a matter of concern.[10] Therefore, judiciously titrated neuromuscular blocking (NMB) drugs allow safe emergence and immediate extubation for MG patients.[9] Recently, a nonmuscle-relaxant technique was used in MG patients undergoing surgery with GA.[1,2,11] The success rate of anesthetic management for MG without NMB drugs was estimated to be 71.1%.[12] Both volatile and intravenous anesthetics are used to maintain anesthesia and make it possible to avoid the use of NMB agents in MG patients.[13,14] Conscious sedation is usually necessary for longer and intensively manipulating procedures for patients.[5,6,14-17] However, Tsunezuka *et al*. reported three MG patients receiving transsternal, extended thymectomy under high TEA with intermittent bolus midazolam sedation.[5] In the report, the patients still opened their eyes.[5] Al-Abdullatief *et al*. also showed 25 MG patients receiving VATS thymectomy under high TEA with a single administration of midazolam 3–4 mg preoperatively, and the patients were awake during the surgery.[6] The literature suggested that sedation with continuous propofol infusion provided good conditions for MG patients undergoing surgery.[14-17] Therefore, we used TCI of propofol instead of intermittent or single administration of midazolam for patient comfort.

Regional anesthesia had been reported to be effective for analgesia for thoracic surgery.[18] Various approaches have been developed and proved feasible, including TEA, paravertebral nerve block, percutaneous or thoracoscopic intercostal nerve block, and intrapleural analgesia. The TEA is the current mainstream, it provides better quality of postoperative pain control and reduces respiratory and cardiac complications,[17] and it reduces the need for intravenous opioids and does not have an adverse effect on respiratory strength perioperatively.[19]

Disadvantages of nonintubated VATS are that it is technically more challenging for anesthetist and the surgeon, the possibility of failed block and risk of dural puncture.[6]

Here, we have reported the first successful combination of TEA and TCI propofol sedation for a 44-year-old woman with

MG undergoing nonintubated VATS-ET. With well-managed anesthetic combinations of regional anesthesia, sedation, and postoperative pain service, nonintubated VATS-ET should be safe and feasible for MG patients.

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Conflicts of interest

There are no conflicts of interest.

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