

CASE REPORT

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# An unusual case of delayed recovery from spinal anesthesia in a patient with Lambert-Eaton myasthenic syndrome—a case report

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## Abstract

**Background** The Lambert-Eaton myasthenic syndrome (LEMS) is a rare disorder characterized by proximal muscle weakness and autonomic dysfunction due to involvement of the neuromuscular junction. A case of delayed unilateral recovery from spinal anesthesia in a patient with LEMS undergoing open cholecystectomy is described.

**Case presentation** A 42-year-old lady, on treatment for LEMS with pyridostigmine, prednisolone, and azathioprine presented with cholelithiasis and was scheduled for open cholecystectomy. Neuraxial anesthesia combined with a light plane of general anesthesia provided adequate muscle relaxation without the use of neuromuscular blocking drugs. In spite of perioperative continuation of anticholinesterases, the patient required 12 h post-surgery for complete bilateral motor recovery from spinal anesthesia.

**Conclusions** A combination of spinal anesthesia with a light plane of general anesthesia appears to be a safe anesthetic technique for managing patients with Lambert-Eaton myasthenic syndrome undergoing open cholecystectomy. However, neurologically asymptomatic patients with good treatment compliance may also show an unusual delay in recovery from neuraxial anesthesia.

**Keywords** Case report, Lambert-Eaton myasthenic syndrome, Neuromuscular blocking agents, Neuromuscular monitoring, Spinal anesthesia

## Background

The Lambert-Eaton myasthenic syndrome (LEMS) is a rare disorder characterized by proximal muscle weakness and autonomic dysfunction due to involvement of the neuromuscular junction. (Kesner et al. 2018) The disease may be auto-immune or paraneoplastic in origin. (Kesner et al. 2018) The P/Q-type voltage-gated calcium channels present on presynaptic nerve terminals are the target of

auto-antibodies, which results in a diminished release of acetylcholine. (Kesner et al. 2018) Increased sensitivity to both depolarizing and nondepolarizing neuromuscular blocking drugs is seen in patients with LEMS. (Macdonell et al. 1992) Hence, the use of muscle relaxants predisposes such patients to increased risk of postoperative respiratory complications. (Wirtz et al. 2002) Often neuraxial anesthesia is combined with general anesthesia to achieve muscle relaxation without the use of neuromuscular antagonists. We describe a case of unusual delay in recovery from neuraxial anesthesia in a patient with LEMS undergoing open cholecystectomy.

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### Case presentation

A 42-year-old lady, a known case of LEMS, presented with cholelithiasis. She had developed weakness of both lower limbs 2 years ago, which gradually involved upper limbs. An initial muscle biopsy revealed myopathy. Although electromyography and nerve conduction studies were unremarkable, a positive voltage-gated calcium channel antibodies test with a value of 53 pmol/L confirmed the diagnosis to be LEMS. Subsequently, she was diagnosed with cholelithiasis and was scheduled for open cholecystectomy.

At the time of preoperative assessment, the patient was on pyridostigmine (60 mg oral tablet, four times a day), prednisolone (20 mg daily, once a day as an oral tablet), and azathioprine (75 mg oral tablet, twice a day) and had no neurological symptoms or signs. Previous anesthetic history included an uneventful vaginal hysterectomy under spinal anesthesia 12 years ago. Her laboratory reports including hemogram, renal, liver, and pulmonary function tests; electrocardiogram; and echocardiography were unremarkable.

The surgeons opted for open cholecystectomy. Preoperatively, the patient was asked to not take solid food for 6 h prior to surgery and avoid clear fluids for 2 h. She was asked to continue her medication on the morning of surgery. On arrival of the patient in the operating room, routine monitors were attached, an 18-G peripheral intravenous (IV) cannula was placed, followed by an epidural catheter in the T7/8 interspace on the first attempt, with the patient in the sitting position. Fifteen milligrams of 0.5% bupivacaine heavy were administered in the subarachnoid space at L3-L4 interspace. The level of blockade after spinal anesthesia was assessed and found to be T6 dermatome. General anesthesia was administered with injection fentanyl 100 mcg IV and injection propofol 120 mg IV. The airway was secured with size 4 i-gel supraglottic airway (Fig. 1). Neuromuscular transmission monitoring using supramaximal train-of-four (TOF) stimulation every 20 s was opted for (Fig. 2). Anesthesia was maintained with 60% nitrous oxide and 0.8% isoflurane in oxygen, alongside propofol infusion at 200 mg/h. Ventilation was adjusted to maintain normocapnia. TOF ratio ranged from 0.7 to 0.8. A bolus of injection propofol 20 mg IV was required once to deepen the plane of anesthesia in order to achieve adequate muscle relaxation. The surgery was uneventful and concluded in 2 h. No neuromuscular blocking agents were administered. After emergence from general anesthesia, the i-gel was removed and the patient was shifted to the post anesthesia care unit (PACU). The TOF ratio remained between 0.7 and 0.8 throughout surgery and was >0.9 prior to emergence.



**Fig. 1** Neuromuscular monitoring using TOF stimulation



**Fig. 2** I-gel supraglottic device used to secure airway

An hour into her PACU stay, the patient started complaining of weakness and pain at surgical site. Her eyelids were drooping, although respiratory efforts were adequate. Her modified Bromage score was 5 in her left lower limb and 2 on the right side. A nasogastric tube was inserted and pyridostigmine tablet 60 mg was administered. Half-an-hour following this, her condition improved. An epidural top-up with 8 ml of 0.125% bupivacaine was administered, which relieved her pain. However, at the end of 6 h of PACU stay, her modified Bromage score was 6 on the left side and 3 on the right side.

Given the unilateral nature of lower limb weakness and slight, albeit prolonged recovery, a decision was taken to wait and watch rather than go for spine imaging. All her chronic medications were continued in the

perioperative period. The patient regained full motor power of both lower limbs by the end of 12 h post-surgery. Intermittent epidural boluses were administered for postoperative pain. After 3 days, the epidural catheter was removed. The rest of the patient's hospital stay was uneventful, and she was satisfied with her treatment.

## Discussion

Patients with LEMS undergoing surgery are at risk of postoperative respiratory compromise especially if neuromuscular antagonists are used. Inhalational or intravenous anesthetics should be preferred for these patients, and both depolarizing and non-depolarizing neuromuscular antagonists should be avoided. (Sakura et al. 1991).

To avoid the use of neuromuscular blocking agents, epidural analgesia (Sakura et al. 1991) or fascial plane blocks such as rectus sheath and transversus abdominis plane blocks combined with a light plane of general anesthesia may be attempted. (Kimura et al. 2013) In the case described, neuraxial anesthesia was combined with a light plane of general anesthesia to achieve sufficient surgical relaxation, as an alternative to the use of neuromuscular antagonists. Sufficient postoperative analgesia is also provided by neuraxial blocks.

Neuromuscular monitoring during anesthesia is considered essential in patients with neuromuscular pathology. Patients at the end of surgery with TOF ratios <0.9 have increased risk of complications such as aspiration, airway obstruction, and critical respiratory events. In our case, TOF monitoring allowed us to check for sufficient responses to TOF stimulation at the end of surgery.

Anterior spinal artery syndrome, transverse myelitis, arachnoiditis, cauda equina syndrome, and spinal hematoma are some of the documented neurological complications following spinal anesthesia and MRI has been advocated to rule out hematoma or ischemia. However, since the neurological deficit in the case described was gradually improving, spine imaging was not opted for. Stable perioperative hemodynamics, normothermia, and the spontaneous recovery of the unilateral motor deficit ruled out the other differential diagnoses. Since the neuraxial anesthesia was attempted with the patient in sitting position and the surgery proceeded with the patient in the supine position, the etiology of the unilateral nature of delayed recovery from spinal anesthesia remains obscure.

## Conclusions

Perioperative continuation of anticholinesterases is pertinent in patients suffering from LEMS. The case described here demonstrated that neurologically asymptomatic patients with good treatment compliance may also show

an unusual delay in recovery from neuraxial anesthesia. This report also proves that neuraxial anesthesia may be safely employed in patients with LEMS without any lasting complications.

## Abbreviations

LEMS	Lambert-Eaton myasthenic syndrome
IV	Intravenous
TOF	Train-of-four
PACU	Post-anesthesia care unit

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## Authors' contributions

SM was involved in patient management and was the major contributor in writing the manuscript. VW was involved in patient management and critically analyzed the manuscript. MK was involved in patient management and in writing the manuscript. KAK was involved in the patient management, collecting the data, and providing the vital inputs for the manuscript preparation. The authors read and approved the final manuscript.

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