

## LETTER TO THE EDITOR

### Perioperative management of immune-mediated necrotizing myositis



Dear Editor,

Patients with muscular disorders are at risk of both intra- and postoperative life-threatening complications.<sup>1</sup> Immune-mediated necrotizing myopathy is a rare autoimmune myopathy characterized by severe proximal weakness with infrequent extra-muscular involvement.<sup>2</sup> It is a disorder with a prevalence of 9–14 cases per 100,000 individuals.<sup>2</sup> There is no evidence regarding the anesthetic management of immune-mediated necrotizing myositis. We report a case in which a safe anesthesia management is described.

An 82-year-old male was scheduled to undergo a right hemicolectomy due to an adenocarcinoma. He had a history of immune-mediated necrotizing myositis diagnosed three years before, after presenting muscular weakness, dysphagia, and elevation of serum aldolase 56 U.L<sup>-1</sup> and Creatine Kinase (CK) 2341 U.L<sup>-1</sup>. A muscle biopsy confirmed the diagnosis. At the time of surgery, his treatment regimen was prednisone 5 mg/ 24 h and azathioprine 150 mg/ 24 h, and his symptoms were muscular fatigue, slight dysphagia, and dysphonia. Aldolase and CK serum levels were normal in the previous controls. As per other comorbidities, the patient presented atrial fibrillation and chronic venous insufficiency. Physical examination revealed an elderly sarcopenic male (height 173 cm, weight 80 kg), moderately frail regarding the Clinical Frailty Scale.

Before the induction of general anesthesia, a blood sample was drawn in order to surveil CK levels, which were 143 U.L<sup>-1</sup>. Standard monitoring, esophageal thermometer, processed EEG (BIS<sup>TM</sup>, Medtronic, Minneapolis, MN, USA), and neuromuscular block monitoring (Tof-cuff<sup>TM</sup>, RGB, Spain) were placed. The induction was performed intravenously with 80 mg lidocaine, 150 µg fentanyl, 150 mg propofol, and 50 mg rocuronium, and maintenance with desflurane to target a Bispectral index between 40–60, as well as with boluses of fentanyl. A Train-Of-Four (TOF) monitor guided the administration of rocuronium boluses to maintain adequate neuromuscular relaxation during laparoscopy (TOF count 0–1, post-tetanic count 6–10). At the end of the surgery, the Tof-cuff<sup>TM</sup> showed a moderate block (TOF count 2) and 160 mg sugammadex were administered to complete the reversal of neuromuscular block. Extubation

was performed in the operating room uneventfully. The patient was transferred to the Intensive Care Unit (ICU) and did not present any complications, being transferred to the surgical ward in less than 24 hours. His CK levels at 5 hours after surgery were 125 U.L<sup>-1</sup>, and 122 U.L<sup>-1</sup> 24 hours after. The patient was discharged on the third postoperative day without any further impairment on muscle fatigue, dysphagia, or dysphonia reported during hospitalization. Regarding his treatment regimen, prednisone was continued with a recommended increase in the dosage of 15 mg/ 24 h and azathioprine was restarted on the fifth postoperative day.

The conjunction of a muscular disorder and frailty, defined as a syndrome of decreased physiological reserve and resistance to stressors,<sup>3</sup> leads to vulnerability to adverse outcomes and potentially fatal complications, namely postoperative respiratory failure, respiratory infections, or wound dehiscence. This is the reason why a thorough preoperative assessment was performed, including routine blood tests with CK determination, electrocardiogram, and chest radiograph. A full-body CT scan performed as part of the tumor assessment was also available. Echocardiogram or cardiopulmonary exercise testing may be useful for risk stratification in selected patients.<sup>1</sup>

It is known that in other muscular disorders, such as dystrophies or myositis, volatile anesthetics and depolarizing neuromuscular blockers should be avoided due to the risk of triggering Malignant Hyperthermia (MH).<sup>1</sup> Even though only few muscular diseases carry a significant risk of triggering MH, due to a mutation of the ryanodine receptor, all patients with muscular diseases are at risk of presenting rhabdomyolysis.<sup>4</sup> Specifically, in immune-mediated necrotizing myopathy, which is characterized by myofiber necrosis, acute rhabdomyolysis can mimic a MH episode and can also be life-threatening. The action of non-depolarizing neuromuscular blockers seems to be prolonged in muscular disorders, therefore, the use of quantitative neuromuscular monitors should be considered mandatory.<sup>1</sup> Many authors state that the use of neuromuscular blocking agents should be avoided if possible.<sup>4</sup> However, since the surgery was laparoscopic, we decided to perform it under the best surgical conditions, by inducing a closely monitored moderate-deep neuromuscular block. Moreover, we decided to use desflurane because of its characteristics, such as rapid recovery and muscle relaxation, and the absence of robust evidence for being discarded in this condition. In order to diminish the risk of residual neuromuscular block, the administration of sugammadex

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has been reported as safe in patients with muscular diseases, even though this assertion has not been proven by randomized clinical trials.<sup>5</sup> Worth noting, patients with muscular disorders often present long-term steroid intake and can have pituitary-adrenal axis suppression; in such cases, corticosteroids have to be supplemented in the operating room.

Given that anesthetic drugs can alter postoperative muscle strength, ICU admission seems a reasonable option in order to carefully monitor the patient's respiratory function and provide respiratory support if necessary. Furthermore, patients suffering from immune-mediated necrotizing myopathy have the greatest muscle enzyme elevations among those with other forms of myositis and are consequently at risk of presenting a postoperative increase in CK levels which can induce acute kidney injury.<sup>1</sup>

As far as we know, this is the first case report describing the anesthetic implications of immune-mediated necrotizing myopathy. We describe the successful perioperative management of a frail patient with immune-mediated necrotizing myopathy who underwent major abdominal surgery under general anesthesia. There are no data to establish the safety of anesthetic drugs in this context and clinical trials are very unlikely to be performed, given that immune-mediated necrotizing myopathy is a rare disease. We illustrate how desflurane, rocuronium, and sugammadex may be an option for a safe anesthesia conduct if the patient is closely and carefully monitored. An appropriate perioperative care, having in mind each hospital's facilities, can almost make the risk of life-threatening complications in this rare muscular disorder vanish.

### Declaration of Competing Interest

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