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Case Report

Myasthenia Gravis with Thymoma Complication: Dilemmas and Prospective Anesthesiology Approach

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ABSTRACT

Myasthenia gravis (MG) is an autoimmune disease affecting the postsynaptic neuromuscular junction. Myasthenia Gravis occurs in 1:7500 individuals, mostly female and or Asian. Myasthenia gravis can later be complicated with thymoma, and by several indications might need an operative approach. The need for thymectomy while there is a preexisting neuromuscular anomaly in Myasthenia gravis becomes a dilemma when choosing the right anesthetic regimens. This case report aims to discuss findings and offer a possible anesthetic approach that can be considered for cases of Myasthenia gravis with thymoma complications. We received a referred female patient with main complaints of dyspnoea, which was suspected as lung cancer. After further investigation, we found that the patient has previously been diagnosed with Myasthenia gravis, but did not follow through with her treatment plan. We performed a CT scan and confirmed a suspected thymoma as a complication of her Myasthenia gravis. Tymectomy was performed afterwards under general anesthesia. Post-operative extubation was successful, and maintenance of Myasthenia gravis treatment was followed by a neurologist. MG with thymoma is a rare finding in our hospital. Myasthenia gravis causes neurologic anomalies in which patients require special consideration on choosing a proper anesthesia regimen, as general anesthesia and muscle relaxants can worsen respiratory depression. Developing A proper scoring and suitable management plan will enhance the outcome and quality of life. Currently, there are several known anesthetic and supportive medicine approaches to thymectomy in Myasthenia gravis patients, including alternative regimens with similar efficacy.

Keywords*:* Anesthesia, Intubation, Myasthenia Gravis, Thymoma

Myasthenia gravis (MG) is an autoimmune neuromuscular disease, marked by presynaptic nicotinic acetylcholine receptors in the neuromuscular junction. Myasthenia gravis occurs in 1:7500 individuals, especially females. Individuals of Asian descent have an even higher risk, with 50% of them occurring before the age of fifteen. The manifestation of myasthenia gravis can be influenced by stress, surgery history, medication (antibiotics, rheumatoid medication, and cardiovascular medication), advanced age, and immunization. A myasthenia gravis patient can present in either the exacerbation or remission phase.[1–5] Myasthenia gravis patients, especially those of n-AChR type, are more at risk for complicated manifestation of thymoma. Thymus follicular hyperplasia can be found in at 10-50% of myasthenia gravis patients. Current hypothesis speculates that thymus hyperplasia and T cell infiltration might be influenced by antibody formation in the muscle protein. By several indication, some patients might need thymectomy on latter days.[1,2]

Thymectomy is a common procedure that reduces symptoms and improves quality of life. However, the need for thymectomy while there is a preexisting neuromuscular anomaly in MG becomes a dilemma when choosing the right anesthetic regimens. It is also worth noting that myasthenia gravis will influence the pharmacodynamics of various medications. For example, myasthenia gravis will increase the sensitivity of non-depolarized neuromuscular blockers, resulting in breathing depression. Prolonged intubation will in return reduce patient's outcome, and induce myasthenic crisis.[1]

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We receive a referred patient with main complaint of apnea and suspected lung cancer. Patient also have uncontrolled myasthenia gravis, with current presentation of ocular weakness. The purpose of this case report is to discuss finding and offer possible anesthetic approach that can be considered for cases of MG with thymoma complication.

CASE PRESENTATION

A 29-year-old female was referred to Arifin Achmad General Hospital with prior suspicion of lung cancer. The patient described occasional shortness of breath, numbness in the face and hands, and difficulty talking for 2 months. After further consultation, we found that this patient was previously diagnosed with myasthenia gravis, but did not comply with her medication. The plain x-ray imaging from the referring hospital shows a 2,7 x 1,1 x 2,5 cm amorphic mass in the lung, without lymph node enlargement. Other aspects of the mediastinal landmarks are within normal limits. Different organs and history are unremarkable.

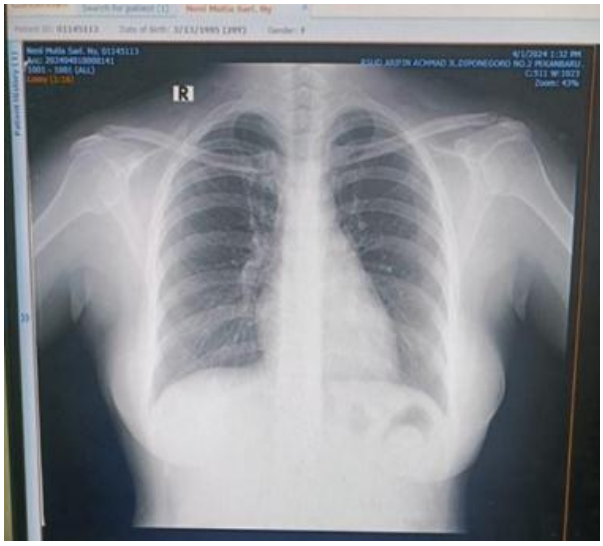

Figure 1. Chest Roentgen

CT-Scan examination was performed to confirm the working diagnosis, and the mass was visualized as a fat-density mass, with suspicion towards thymo-lymphoma or thymus hyperplasia. There is no cardiovascular anomaly found, and the patient was scheduled for thymectomy.

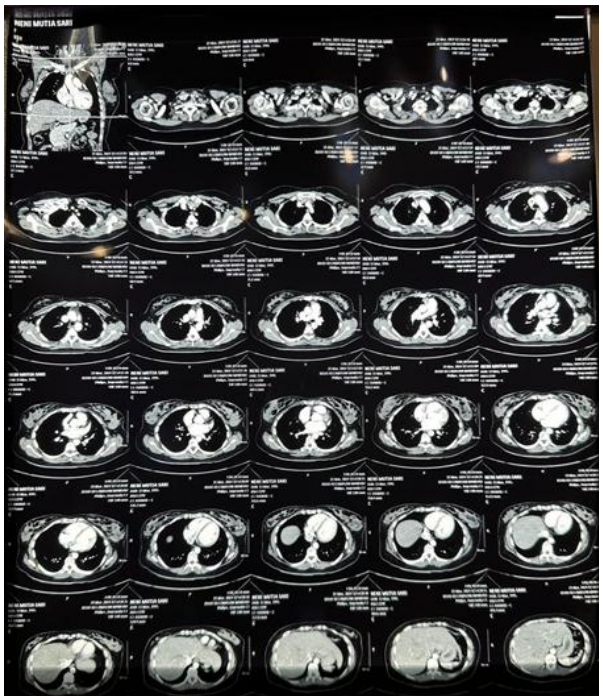

Figure 2. CT Scan Examination

Myasthenia gravis medication was prescribed to improve the clinical state. Myasthenia gravis management includes Pyridostigmine, Methylcobalamine, Methylprednisolone, and Lansoprazole. Before the surgery, the patient exhibits signs of anxiousness, therefore, we prescribe intravenous fentanyl. During surgery, the patient was sedated under general anesthesia, utilizing intravenous fentanyl, without secondary anesthesia. The patient was stable afterwards, and extubation was successfully performed two days after the surgery. The patient was discharged with myasthenia gravis medication and consulted for follow-up. The patient was managed for a total of five days.

DISCUSSION

We receive a patient with a grade II myasthenia gravis. This patient manifests signs of ocular weakness (ptosis), muscle weakness, and mild breathing depression. Fortunately, this patient does not indicate decreased pulmonary function, with a generally good prognosis.[6–8]

This patient was found with thymoma, as a complication of her untreated myasthenia gravis. Around 10-50% of myasthenia gravis develops

thymus hyperplasia, which is more prominently found in Nicotinic Acetylcholine Receptors (n-AChR) type myasthenia gravis. Immunoglobulin, such as IgG1 and IgG3, could produce n-AChR antibodies. These antibodies will attach to n-AChR and activate the Membrane Attack Complex (MAC). The autoimmune process with prevent muscle phosphorylation and manifest as numbness and muscle depression. [2,4,9,10] We suspected this patient as n-AChR type myasthenia gravis, supported by her presenting symptoms and presence of thymoma. A confirmation test with an anti-AChR serology test should have been performed. However, it was not performed due to facility limitations.

The management plan for this patient includes stabilization and thymectomy. Thymectomy was performed as an effort to prevent autoantibody development. A random case study shows that thymectomy could also reduce admission time and the need for steroids in patients with thymectomy.[2,10–12]

Pyridostigmine is a synthetic acetylcholine inhibitor that reduces enzymatic degradation in myasthenia gravis patients. Methylcobalamine is a neuroprotectant that can reduce symptoms of numbness and enhance nerve regeneration. Lansoprazole is a proton-pump inhibitor, which can reduce the risks of aspiration during surgery. The pre-operative management of this patient is suitable with current theory.[2,10,11,13]

However, we admit that anesthetic management during the operation is not suitable for the existing consensus. By theory, myasthenia gravis patients should not be sedated with general anesthesia. General anesthesia will weaken respiratory function, and if coupled with the respiratory weakness in MG patients, it can increase the risk of intubation dependency. The effect of general anesthesia utilization was noticed during the extubation process in this patient. Ideally, post-operative patients should be extubated 6 hours after the surgery ends. However, this patient was extubated after 2 days. Intubation dependency increases the risk of hospital-acquired pneumonia or infection, septic shock, and a greater health financing burden. In the worst-case scenario, the patient might never recover independent respiratory function, which leads to a poor prognosis.[1,14]

As an alternative, the patient should be sedated with epidural or inhalant anesthesia. Such anesthesia did not influence systemic functions and thus will not alter respiratory function. Currently, there are no limitations on what regimens to use, as long as the anesthesia does not affect systemic physiology. This approach should be considered for all surgeries for patients with myasthenia gravis, due to myasthenia-related and non-myasthenia-related indications. [1,14]

Although we do not prescribe muscle relaxants because they could further aggravate the patient's respiratory function. In case of prolonged breathing depression, plasmapheresis should be considered as a means to improve the immune system and accelerate the spontaneous breathing pattern. [1,14,15]

CONCLUSION

Myasthenia gravis is a relatively rare case finding. Prudence and vigilance are very important to ensure a good outcome. Myasthenia gravis patients are at risk for surgery, both due to unrelated intervention and myasthenia-related thymoma. It is worth noting that myasthenia gravis patients who are scheduled for surgery should be sedated with inhalant or epidural anesthesia, and not general anesthesia. Alternative therapy (eg, plasmapheresis) should always be prepared in case of poor operative outcome.

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