"I can't open my eyes!"

Mr. Joel Kennedy; and Rob Green, BSc, MD, DABEM, FRCPC

Jane's case:

Jane, 23, arrives to the ED complaining of double vision and a progressive weakness of her:

- hands,
- mouth and
- eyelids.

Symptoms began two hours prior and are not resolving.

Assessment

An initial assessment revealed:

- asymmetric ptosis with the left eyelid more pronounced,
- dysarthria and
- decreased strength bilaterally in the proximal upper extremities and hands.

Jane was given an oxygen mask and an intravenous (IV) line was put in place.

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Questions & Answers

1. What is the differential diagnosis for acute progressive weakness in otherwise healthy patients?

Weakness is a common complaint in ED patients, whether it is the primary complaint or part of a host of others. Many of the acute physiologic causes can be determined through a detailed history and physical examination. The more serious causes that must be excluded include:

- Guillaume-Barre syndrome,
- Myasthenia gravis (MG),
- Lambert-Eaton syndrome,
- Lyme disease,
- Psychiatric disorders
- Tick paralysis
- Electrolyte imbalance
- Botulism
- Infection

On further questioning, Jane describes a two year history of MG and multiple exacerbations. Currently, she is not being treated with any medications. She has not had any previous surgeries and has no known allergies.

2. What are the clinical features of MG?

MG is a fairly common disease with a prevalence of one in 7,500. Women are slightly more affected than men and are diagnosed earlier in life (20-years-of-age to 30-years-of-age vs. 50-years-of-age to 60-years-of-age). The cardinal features of MG are fatigue and weakness that increases with activity and decreases with rest. The characteristic weakness pattern usually begins with the bulbar muscles as ptosis; dysarthria and dysphagia may occur. The extraocular muscles and lids are usually the first to be affected. MG is usually asymmetric and starts proximally. Deep tendon reflexes and sensation are unaffected and are a distinguishing characteristic from neuropathies.

3. How can we confirm our diagnosis of MG?

There are serum tests that can further support the diagnosis of MG which include antiacetylcholine receptor antibodies. These are found in approximately 80% of myasthenia patients.

Diagnosis requires a high level of suspicion. Administration of cold packs can improve symptoms, making the diagnosis more likely. The Tensilon (edrophonium chloride) test is conclusive if positive. Edrophonium, an acetylcholinesterase blocker, is infused (2 mg intravenously) initially. This should be done slowly to prevent side-effects, such as nausea, vomiting and bradycardia. Atropine (0.6 mg) should be on hand for reversal. Within 30 seconds, the edrophonium will take effect and weakness should disappear for three minutes to five minutes, as there is a quick onset and/or quick offset.

If there is no improvement, 8 mg of atropine is infused. A positive Tensilon test is almost confirmatory of MG, but false positives may occur in such diseases like Lou Gehrig's disease. Repetitive nerve stimulation, with evidence of instant fatigability and weakness, is highly probable of MG.

There are serum tests that can further support the diagnosis which include antiacetylcholine receptor antibodies. These are found in approximately 80% of myasthenia patients. Patients with isolated ocular myasthenia may not test positive for the antibody. Single fiber electromyography is also supportive of a MG diagnosis and shows a delayed transmission time.

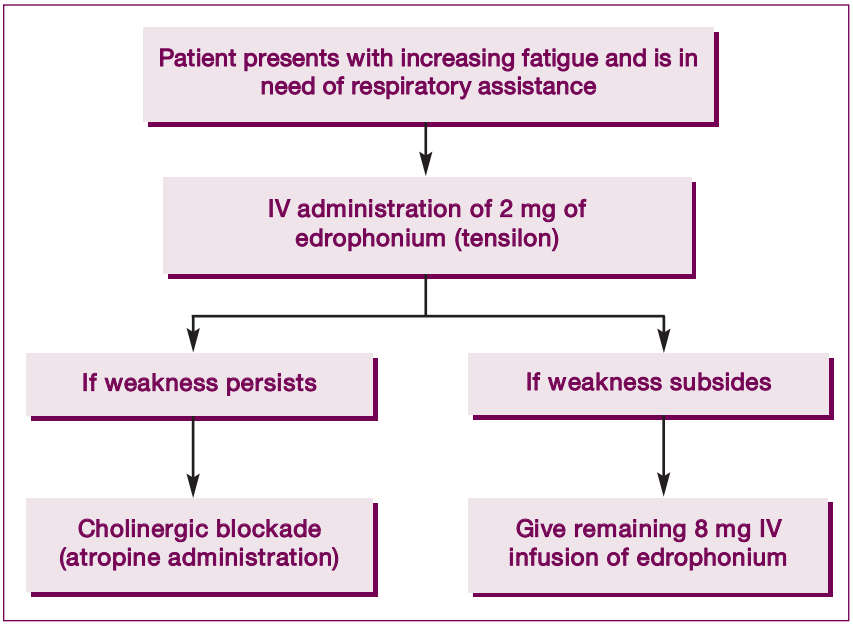

Figure 1. Treatment for myasthenic crises and differentiating myasthenic from cholinergic crisis.

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Table 1

Medication affecting neuromuscular transmission[1]

Cardiovascular
- ß-blockers
- Lidocaine
- Quindine
- Procainamide
- Trimethaphan

Antibiotics
- Aminoglycosides
- Tetracyclines
- Clindamycin
- Lincomycin
- Polymyxins

Hormonal
- Adrenocorticotropic hormone
- Thyroid replacement hormone
- Steroids

Psychotropic
- Phenytoin
- Trimethadione
- Lithium
- Chlorpromazine

Other
- Chloroquine
- Timolol
- Neuromuscular blockers
- Muscle relaxants
- Methoxyflurane

***This department covers selected points to avoid pitfalls and improve patient care by family physicians in the ED. Submissions and feedback can be sent to* diagnosis@sta.ca.**

4. *What associated conditions should be looked for in an exacerbation?*

Exacerbations are common in the first few years after onset. Conditions that may lead to an exacerbation include:

- Chronic infection
- Thymoma
- Rheumatoid arthritis
- Hypertension
- Renal impairment
- Stress
- Hyperthyroidism/hypothyroidism
- Hyperplastic thymus
- Lupus erythematosus
- Diabetes
- Glaucoma

It is important to manage these associated conditions as well as the acute exacerbation.

5. *What is myasthenia crisis and how is it managed?*

Myasthenia crisis occurs when respiration becomes difficult and requires assistance (Figure 1). There are two types of myasthenia crises. The first is a functional deficit whereby inadequate acetylcholine-acetylcholine receptor interaction leads to progressive weakness. The second is a cholinergic crisis and is a non-functional deficit. In this case, too much acetylcholine lies in the synaptic cleft from medication causing excessive acetylcholinesterase inhibition. Cholinergic crisis patients usually present with excessive sweating, salivation, lacrimation, tachycardia or with GI hypersensitivity. In these patients, cholinergic receptor blockade is important to prevent the sustained depolarization. If there are no signs of cholinergic crisis, 2 mg of edrophonium chloride can be administered intravenously. If symptoms of weakness become progressive, then the patient is in a cholinergic crisis and atropine should be administered. If weakness begins to subside, the remaining 8 mg of edrophonium chloride should be administered and weakness and fatigue should subside within 30 seconds.

6. *What medications are worrisome in MG patients?*

Patients are at risk of an exacerbation with any medications that have cholinergic effects (Table 1). These medications include cardiovascular drugs, antibiotic, psychotropic and hormonal. Dx

Resource
1. Kohn MS: Weakness. In: Rosen P, et al (ed.) *Rosen's Emergency Medicine: Concepts and Clinical Practice.* Fifth Edition, Vol. 3. St. Louis, MO, Mosby Yearbook, 1992, pp. 1815-25.