

## **Ice-on-Eyes Test in the Diagnosis of Myasthenia Gravis**

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### **Abstract**

*Myasthenia gravis is the most frequent autoimmune neuromuscular transmission disorder with incidence of 2-20 patients per million. Its pathophysiology is autoimmune, with acetylcholine receptor auto antibodies damaging the post-synaptic fold at the muscle membrane. The diagnostic confirmation of myasthenia gravis is often challenging. Ice-on-eyes test can be used to diagnose this disease for its simplicity, safety and cost-effectiveness. Here we report a case of myasthenia gravis in Enam Medical College Hospital, Savar, Dhaka where ice-on-eyes test was done with improvement of ptosis of the patient. Aim of this case report is to make aware our physicians to apply this simple bed side test instead of common traditional edrophonium (tensilon test) test for confirmation of the diagnosis of ocular myasthenia gravis.*

**Key words:** Ice-pack, Edrophonium, Autoimmune.

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### **Introduction**

Myasthenia gravis (MG) is an autoimmune disease leading to fluctuating muscle weakness and fatigability. It often presents with isolated ocular symptoms, including diplopia and ptosis. Even in patients with generalized symptoms, ocular signs occur in almost all patients in some point during the course of the disease. In 15% of the patients the disease remains confined to the eyes.<sup>1</sup> Other clinical features include bulbar symptoms (dysphagia, dysarthria), weakness of the proximal limb muscles and fatigue. The main characteristic of MG is the fluctuating weakness during the day. It is mild in the morning and severe in the evening. Physical activity usually worsens the weakness.

The diagnostic confirmation of MG is often challenging. The tests usually performed to confirm the diagnosis of MG are

- i) The edrophonium test (Tensilon®)
- ii) Repetitive nerve stimulation (RNS)
- iii) Single fibre EMG
- iv) Serum acetylcholine receptors (AChR) antibodies
- v) Sleep test in dark room.

The most traditional bedside diagnostic test for myasthenia gravis is the edrophonium test. But the ice pack test does not require any medications or expensive equipment and is free of adverse effects.<sup>2</sup> We describe a case in Enam Medical College Hospital where the ice pack test was done at the bedside for diagnosis of MG.

### **Case report**

A 40-year-old woman presented to the department of Medicine in Enam Medical College Hospital, Savar, Dhaka with the complaints of generalised weakness, difficulty in speech, gradual drooping of both upper eyelids for last six years. This was better early in the day and with rest but worsened at the end of the day. She had no diplopia. She had neither diabetes mellitus nor hypertension. On examination, her visual acuity was normal. She had ptosis of both upper eyelids (Fig 1), a full range of ocular movements, normal pupillary reactions and a normal fundus bilaterally. There was no proptosis or signs of inflammation of ocular and orbital tissues. Power of the limb muscles was 4/5, deep tendon jerks were

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normal and sensory function was intact. Forward arm abduction test and ceiling test (the ability to look up for a sustained period of time to test for fatigability of the eye) was positive. Myasthenia was high on the list of the differential diagnoses. Her routine investigations like complete blood count and random blood sugar were within normal limit. Chest radiography revealed no abnormality. We placed ice over the closed eyelids for 2 minutes. The ptosis completely disappeared, strongly suggesting a diagnosis of MG (Fig 2).



Fig 1. Before test



Fig 2. After test

### Discussion

Clinical and laboratory experiences showed an important correlation between temperature and myasthenia gravis. It is widely known that warm temperature worsen MG symptoms and cooling is able to ameliorate them.<sup>3</sup> The improvement of MG with cooling probably occurs by lesser acetylcholinesterase activity in temperature below 28°C, providing increasing amount of acetylcholine molecules in the synaptic cleft.<sup>4</sup>

Based on this evidence, orbital cooling (ice pack test) has been developed as a simple, safe and reliable procedure for the diagnosis of ocular myasthenia.

### How to do Ice-on-Eyes test

Ice in between 0 and 4° centigrade is placed over the closed eyelids of both eyes for 2 minutes (fill an examination glove with ice and place this on the closed eyelids to stop ice from 'sticking' to the skin of the eyelids and causing injury). Photographs before and after application of ice can be taken to record the results of the test objectively. The test is considered positive when the eyelid aperture (palpebral fissure) widens by more than 2 mm (ptosis improves by 2 mm or more) from baseline as demonstrated in our patient.

### Sensitivity and specificity of Ice-on-Eyes test

The sensitivity of ice pack test in ocular myasthenia with ptosis associated with or without generalized symptoms is high varying from 80 to 100%.<sup>5</sup> On the other hand, the specificity of the ice pack test is very high considering that it is not positive in other diseases that can simulate MG such as oculomotor nerve palsy, oculopharyngeal muscular dystrophy and mitochondrial myopathies. False positive results were virtually not seen.<sup>6</sup> In such studies, all cases with positive edrophonium test had positive ice test whereas none of the cases with negative edrophonium test had positive ice test. Therefore, the significance of the test in the diagnosis of the MG is very good, supporting its use in the diagnosis of MG.

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