Case Report

Myasthenia Gravis Accompanied with Hypokalemic Periodic Paralysis

Kittisak Sawanyawisuth MD*,
Somsak Tiamkao MD*, Thongchai Pratipanawatr MD*

** Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen*

Myasthenia gravis and hypokalemic periodic paralysis are commonly related with hyperthyroidism but rarely occur together. Here, the authors reported a case of hypokalemic periodic paralysis in a Northeastern Thai woman accompanied with myasthenia gravis. She had motor weakness despite a normal level of serum potassium. Prostigmine test was positive. She dramatically improved after pyridostigmine treatment. Autoantibodies to nicotinic AchR-Ab and dihydropyridine receptor or L-type voltage gated calcium channel were postulated to explain these associated diseases.

Keywords: *Myasthenia gravis, Hypokalemia, Periodic paralysis*

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Myasthenia gravis (MG) is an acquired neuromuscular junction disorder while as hypokalemic periodic paralysis (HPP) may be familial disease with autosomal dominant inheritance. Autoimmune disease and thymic tumors are associated with myasthenia[1]. Both MG and HPP are commonly associated with hyperthyroidism[2,3-6]. There was a case report of HPP and MG from Japan in 1970[7]. Here, the authors reported a case of MG accompanied with HPP in a Thai patient.

Case Report

A 41 year old Thai female presened with proximal muscle weakness for one week. Previously, she had experienced intermittent proximal muscle weakness for three years and was diagnosed as HPP. Her serum potassium was 1.9 mEq/L with normal level of bicarbonate at the time of paralysis attack. She denied a history of drug usage, and family members with periodic paralysis. In the past three years, she had several attacks of weakness with low serum potassium level and fully recovered by potassium replacement. One week before, she again presented with proximal muscle weakness without a history of fluctuation, ptosis, or dysphagia. Her potassium level was normal. Physical examination revealed normal cranial nerve, proximal muscle weakness (biceps grade IV/V, wrist flexion grade V/V bilaterally, hamstring grade III/V, ankle flexion grade IV/V bilaterally, generalized hyporeflexia, no sensory loss, Babinski's sign were plantar flexion bilaterally, clonus was negative bilaterally. She denied doing an electromyography test. She had a history of Cushing's syndrome (pituitary) and was treated successfully by transphenoidal hypophysectomy thirteen years ago. She had no clinical manifestation of Cushing's syndrome with negative screening dexamethasone suppression test. Urinalysis, complete blood count, serum creatinine kinase, thyroid function test, and blood test for autoimmune diseases were normal. Prostigmine test was done with positive result. Her motor weakness has still completely responded to pyridostigmine 360 mg/day after one year follow up.

Discussion

HPP is an uncommon disease of uncertain cause and may be a familial disorder. It is characterized by proximal motor weakness, hyporeflexia, and low serum potassium level without acidosis or alkalosis. Repeated episodes of muscle weakness may occur. Fatal attacks of muscle weakness or paralysis happen because of the involvement of respiratory muscle[3,8]. The pathogenesis of HPP is now better understood. The abnormal gene in most patients is located on chromosome 1q. This leads to abnormal alpha-1 subunit of

Correspondence to : Tiamkao S, Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand. E-mail: somtia@kku.ac.th

the dihydropyridine-sensitive calcium channel in skeletal muscle[9,10]. Nevertheless, the mechanism of leading episodic influx potassium into the cells is not clear. On the other hand, MG is a disorder mediated by auto-antibodies against the acetylcholine receptor (AChR-Ab)[2]. The history of fluctuation of motor weakness during the day is the cornerstone to differentiate from HPP. Respiratory failure can also be observed as in HPP.

The recurrent attacks in HPP patients with normal plasma potassium level between episodes distinguish HPP from other causes. The other differential diagnoses in this patient were thyrotoxic periodic paralysis, recurrent Cushing's syndrome, inflammatory myositis, and MG. Thyrotoxic periodic paralysis usually occurs in Asian men[3] with hypokalemia. The other two differential diagnoses (recurrent Cushing's syndrome and inflammatory myositis) should demonstrate clinical symptoms and signs. Laboratory results were used to exclude these three diseases. MG patients usually show normal deep tendon reflex. However, the presented case showed hyporeflexia. Because of several episodes of HPP attacks, these may cause hyporeflexia. Therefore, the authors proceeded to exclude MG by prostigmine test, the diagnostic test for generalized MG. Ocular involvement and history of fluctuation can be found 75.3% and 91.2% of generalized MG patients[11]. The positive prostigmine test and clinical response made the diagnosis of MG. Even though, both diseases are commonly associated with hyperthyroidism especially in Thai patients[11,12]. The occurrence of them together rarely occurs and is not well understood. Both nicotinic AchR-Ab in myasthenia gravis and dihydropyridine receptor or L-type voltage gated calcium channel in HPP have been found to be affected by autoantibodies and/or genetic anomalies[13]. Because of good response to pyridogtigmine, thymectomy was not considered. In conclusion, MG and HPP may be associated diseases.

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Myasthenia gravis พบร่วมกับ *hypokalemic periodic paralysis*

กิตติศักดิ์ สวรรยาวิสุทธิ์, สมศักดิ์ เทียมเก่า, ธงชัย ประฏิภาณวัตร

Myasthenia gravis และ hypokalemic periodic paralysis เป็นโรคที่มักพบร่วมกับโรคต่อมธัยรอยด์เป็นพิษ แต่พบร่วมกันเองน้อย รายงานผู้ป่วยนี้เป็นการนำเสนอผู้ป่วยหญิงอายุ 41 ปี ชาวขอนแก่นที่ได้รับการวินิจฉัยว่าเป็น hypokalemic periodic paralysis ร่วมกับโรค myasthenia gravis ซึ่งได้รับการวินิจฉัยเนื่องจากผู้ป่วยยังมีอาการแขนขาอ่อนแรงทั้งที่มีระดับโปแทสเซียมในร่างกายอยู่ในเกณฑ์ปกติ ผลการทดสอบ prostigmine ให้ผลบวก ผู้ป่วยตอบสนองต่อการรักษาด้วย pyridostigmine ภาวะ autoantibodies ต่อ nicotinic AchR-Ab และ dihydropyridine receptor (L-type voltage gated calcium channel) อาจเป็นกลไกหนึ่งที่อธิบายการเกิดร่วมกันของโรคทั้งสอง