

# Acetylcholinesterase Inhibitors Test Confirmed Myasthenia Gravis in Psychosis Remitted by Aripiprazole

ANDREEA TEODORESCU<sup>1,2</sup>, PETRU IFTENI<sup>1,2</sup>, PAULA PETRIC<sup>2</sup>, SEBASTIAN TOMA<sup>1\*</sup>, ADRIAN BARACAN<sup>1,3\*</sup>, CLAUDIA GAVRIS<sup>1,3</sup>, GHEORGHE G. BALAN<sup>4\*</sup>, VLADIMIR POROCH<sup>4,5</sup>, ALINA MIHAELA PASCU<sup>1</sup>

<sup>1</sup>Transilvania University of Brasov, Faculty of Medicine, 29 Eroilor Blvd., 500036, Brasov, Romania

<sup>2</sup>Clinical Psychiatry and Neurology Hospital Brasov, 18 Mihai Eminescu Str., 500079, Brasov, Romania

<sup>3</sup>Clinical Emergency County Hospital Brasov, 25-27 Calea Bucuresti, 500326, Brasov, Romania

<sup>4</sup>Grigore T. Popa University of Medicine and Pharmacy, Faculty of Medicine, 16 Universitatii Str., 700115, Iasi, Romania

<sup>5</sup>Regional Institute of Oncology, 2-4 G-ral Berthelot Str., 700483, Iasi, Romania

*Myasthenia gravis (MG) is a chronic autoimmune neuromuscular disease affecting the neuromuscular junction and causes weakness in the skeletal muscles. The acetylcholine receptor is usually attacked in skeletal muscles, but other components of neuromuscular junction, such as muscle-specific receptor tyrosine kinase, may be affected. MG can be life-threatening when the respiratory muscles are involved. The first symptom in about 2 out of 3 cases is the damage of the extrinsic eye muscles. The condition is treatable, so an early recognition is needed. Although there have been reports of associations between psychosis and myasthenia gravis it is unclear if psychotic symptoms in MG are an integral part of the various manifestations of this disease, or are due to another co-occurring distinct disorder. Sometimes psychotic episodes could disguise the symptoms of myasthenia gravis, and delay the diagnosis.*

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Myasthenia gravis (MG) is a relatively uncommon autoimmune disorder in which autoantibodies (immunoglobulin G) anti-acetylcholine nicotinic postsynaptic receptors (AChR) develop in the neuromuscular junction [1]. In essence, it is an autoimmune reaction in which anti-AChR antibodies decrease, in fact, the number of AChR in the postsynaptic muscle membrane [2].

Patients suffering from this disease experience muscular weakness and fatigue that impact the quality of life. The weakness usually affects a specific muscular group and it's fluctuant in different days, increases with activity and improves with rest [3].

According to a recent systematic review of population-based epidemiological studies, the pooled incidence and prevalence rates of MG were estimated at 5.4 per million person/year and 77.7 per million persons, respectively [4].

Although some data about the associations of psychosis in MG have been reported, it is still unclear whether psychotic symptoms in MG represent an integral part of the various manifestations of this disease, or appear because of other distinct co-existing disorders [5].

## Experimental part

A female patient, addressed to the psychiatric emergency service in 2014 and admitted for psychomotor agitation, perturbing behavior, delusions of persecution, transformation and prejudice. The general physical examination was normal. Her family reported that the bizarre, perturbing behavior started 12 months before admission, when the patient returned home from university and they considered behaviour as a consequence of a possible substance abuse. Despite their efforts the patient systematically refused to be appointed to a psychiatrist.

The routine admission blood tests, including full blood count, electrolytes, renal, hepatic and thyroid parameters were all within normal limits. The patient was also tested for drugs and the results were negative. Head computed

tomography (CT) scan revealed a possible right-sided demyelinating parietal lesion and bilateral cortical-subcortical atrophy (fig. 1). A magnetic resonance imaging (MRI) was also recommended after discharge.

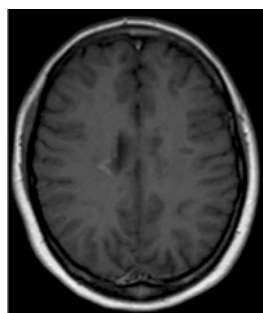


Fig. 1. Head Computed Tomography (CT): Bilateral Cortical-Subcortical Atrophy And Possible Right Parietal Demyelinating Lesion

During the admission she was treated with haloperidol 10 mg/day with improvement of symptoms but with extrapyramidal side effects (EPS). The treatment was switched to aripiprazole 10 mg/day, valproic acid 1000 mg/day and lorazepam 2mg/day. The new treatment schema was efficient and safe.

The patient was discharged after 30 days with clinical global impression-improvement (CGI-I) score of 2 (much improved). She returned to work and she was involved in an international project abroad.

Despite her complaints about fatigability, dizziness, and muscle weakness, these symptoms were considered side effects of psychotropic medication. She was advised to gradually stop valproic acid and lorazepam, but not aripiprazole because of possible relapse of psychosis.

In 2016 she returned to the first psychiatrist for another opinion. She was very unstable on her legs, presenting movement difficulties, visual disturbances, difficulty in swallowing especially for solid food. The patient was immediately sent to the neurology department to be evaluated for myasthenia gravis. At admission, myasthenic muscle score (Gajdos) [6] was 30 points. After the administration of oral cholinesterase-inhibitors the score was 60 points

\*email: sebitom2002@yahoo.com; adrianbaracan@yahoo.com; balan.gheo@yahoo.com

	Before oral cholinesterase -inhibitors	After oral cholinesterase- inhibitors
Keeping the upper limbs in a horizontal position	0	0
Keeping the lower limbs stretched in dorsal decubitus	0.5	0
Keeping the Head raised from the bed plan	0	5
Extrinsic ocular muscles	0	5
Palpebral occlusion	10	10
Mastication	5	10
Deglutition	5	10
Speaking	10	10
The transition from supine position in orthostatism	0	10
TOTAL	30.5	60

**Table 1**  
GAJDOS SCORE

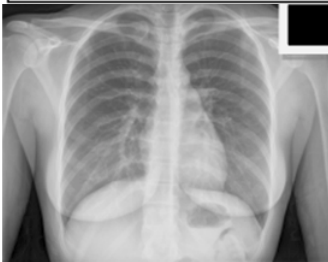


Fig. 2. Chest X-Ray

with the improvement of proximal muscle strength and the improvement of ocular movements (table 1).

The chest X-ray excluded a thymoma (fig. 2).

Blood tests were positive for rheumatoid factor, and negative for lupus cells. Other laboratory tests, including complete blood count (CBC), ionogram, biochemistry were all in normal range. Based on the clinical, paraclinical and laboratory results the patient was diagnosed with myasthenia gravis. She was advised to continue treatment with neostigmine.

## Results and discussions

Myasthenia gravis often appears with other autoimmune diseases such as thyroid disease, polymyositis/dermatomyositis, systemic lupus erythematosus, rheumatoid arthritis, cardiomyositis, subclinical heart dysfunction, and cancer [7-9].

Psychosis in MG is very rare [5] and there were no case reports with psychosis preceding MG. In only one study the authors have shown a high prevalence of psychiatric disorders in MG, especially depressive and anxiety disorders, in comparison to what is expected in the general population.

In Huntington's disease, psychotic manifestations are usually rare, and may occur mostly in patients who are already demented [10, 11] Psychiatric symptoms are present in another neurodegenerative disorders and my delayed identification and treatment [12].

In Parkinson's disease (PD) researchers are increasingly attending to and characterizing the non-motor symptoms of the disease such as depression, apathy, dementia and psychosis. Psychosis in PD is characterized by hallucinations (mostly visual), and delusions and may occur in 20-40% [13, 14].

In dementia psychotic symptoms are frequent and occur mostly in the moderate phase. Hallucinations and delusions are the components of the challenging behaviour and

requiring admission and treatment with antipsychotics and institutionalization [15, 16].

Another unusual presentation of MG could be an acute respiratory failure because of severe respiratory muscles weakness [17]. As the patients present severe dyspnea and chest pain, pulmonary embolism could be suspected. A spiral CT, and, more cost-effective, biological markers, as brain natriuretic peptide (BNP) assay can rule out this critical life-threatening condition [17-19].

Oxidative stress has also been reported in MG [20]. This could be demonstrate by assessing oxidative modification of some serum proteins [20, 21]. No independent parameters of oxidative damage estimation were tested in our case. Demonstrating of systemic oxidative stress could suggest therapeutic use of antioxidants as an adjuvant treatment, improving the evolution and quality of life in MG [20, 22].

## Conclusions

Psychosis in myasthenia gravis is rare condition. In our case, the psychotic episode was so important that it was initially considered as a first episode of schizophrenia. The patient followed treatment for 2 years as recommended. Under treatment with antipsychotic the patient was recovered but this was a major factor in delayed identification and treatment of myasthenia gravis.

## References

- MERIGGIOLI, M.N., SANDERS, D.B., *Lancet Neurol.*, **8**, nr. 5, 2009, p. 475.
- HOCH, W., MCCONVILLE, J., HELMS, S., NEWSOM-DAVIS, J., MELMS, A., VICENT, A., *Nat. Med.*, **7**, nr. 3, 2001, p. 365.
- GWATHMEY, K.G., BURNS, T.M., *Semin Neurol.*, **35**, nr. 4, 2015, p. 327.
- CARR, A.S., CARDWELL, C.R., MCCARRON, P.O., MCCONVILLE, J., *BMC Neurol.*, **10**, 2010, p. 46.
- MUSHA, M., TANAKA, F., OHUTI, M., *Tohoku J. Exp. Med.*, **169**, 1993, p. 335.
- GAJDOS, P., CHEVRET, S., CLAIR, B., TRANCHANT, C., CHASTANG, C., *Annals of Neurology*, **41**, nr. 6, 1997, p. 789.
- GILHUS, N.E., NACU, A., ANDERSEN, J.B., OWE, J.F., *Eur. J. Neurol.*, **22**, 2015, p. 17.
- FANG, F., SVEINSSON, O., THORMAR, G., GRANQVIST, M., ASKLING, J., LUNDBERG, I.E., *J. Intern. Med.*, **277**, 2015, p. 594. PMID:25251578
- ALSHEKHLI, A., MILES, J.D., KATRJI, B., PRESTON, D.C., KAMINSKI, H.J., *Neurology*, **72**, 2009, p. 1548.
- SCHIWACH, R., *Acta Psychiatr. Scand.*, **90**, 1994, p. 241.

11. CAINE, E., SHOULSON, I., *Am. J. Psychiatry*, **140**, 1983, p. 728.
12. PASCU, A.M., IFTENI, P., TEODORESCU, A., BURTEA, V., CORRELL, C.U., *Int. J. Ment. Health. Syst.*, **9**, art. nr. 33, 2015, DOI: 10.1186/s13033-015-0026-6. eCollection 2015.
13. FENELON, G., MAHIEUX, E., HURON, R., ZIEGLER, M., *Brain*, **123**, nr. 4(Pt 4), 2000, p. 733.
14. SANCHEZ-RAMOS, J.R., ORTOLL, R., PAULSON, G.W., *Arch. Neurol.*, **53**, nr. 12, 1996, p. 1265.
15. IFTENI, P., GRUDNIKOFF, E., KOPPEL, J., KREMEN, N., CORRELL, C.U., KANE, J.M., MANU, P., *Int. J. Geriatr. Psychiatry.*, **30**, nr. 12, 2015, p. 1224.
16. SZALONTAY, A., BURTEA, V., IFTENI, P., *RCIS*, **49**, 2015, p. 249.
17. VAIDYA, H., *Emerg. Med. J.*, **23**, 2006, p. 410, doi: 10.1136/emj.2005.030429.
18. PASCU, A., RADOI, M., COCULESCU, M., *Acta Endo-Bucharest*, **5**, nr. 1, 2009, p. 1-18.
19. AGHEORGHIESEI CORODEANU, D.T., POROCH, V., 6th LUMEN International Conference on Rethinking Social Action Core Values, 16-19 April 2015, Iasi, Romania, Rethinking Social Action. Core Values, p. 33-41.
20. ADAMCZYK-SOWA, M., BIESZCZAD-BEDREJCZUK, E., GALINIAK, S., ROZMIŃOWSKA, I., CZYŃEWSKI, D., BARTOSZ, G., SADOWSKA-BARTOSZ, I., *J. Neuroimmunol.*, **305**, 2017, p. 145, doi: 10.1016/j.jneuroim.2017.01.019. Epub 2017 Feb 7.
21. HALICIU, A.M., FOLESCU, R., ZUGUN, E., STRAT, L., POROCH, V., ZAMFIR, C.L., *Rev. Chim. (Bucharest)*, **68**, no. 3, 2017, p. 624.
22. SHANI, K.H., ZUBAIR, M., RIZWAN, K., RASOOL, N., ERCISLI, S., MAHMOOD, A., ZIA-UL-HAQ, M., DIMA, L., PASCU, A.M., *Oxid Commun*, **38**, nr. 3, 2015, p. 1252.

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