

Ataxia Rating Scale (ICARS) score was 38/100. No strength and sensory deficits were detected. Corticospinal signs were absent.

Routine blood tests showed only hyperglycaemia. Antinuclear and extractable nuclear antigen antibodies, anti-thyroglobulin and anti-thyroperoxidase, anti-gliadin and anti-endomysium antibodies, thyroid hormones and inflammatory indices resulted negative. Vitamin E dosage was normal. Genetic analysis for the heritable forms of spinocerebellar ataxia (SCA 1, 2, 3, 6, 7 and 17) was normal. Cerebrospinal fluid (CSF) examination showed normal proteins and cells. However, a mild increased IgG index and few oligoclonal bands were detected. CSF and serum virology were also negative. Cytological analysis of CSF was negative. Anti-neuronal antibodies (anti-Hu, anti-Yo, anti-Ri, anti-CV2, anti-Tr, anti-amphiphysin) were absent. Increased titres of anti-GAD65-Ab (14.6 U/l; n.v., 1.5 U/l) were detected by radioimmunoassay (RIA) performed 3 months after the onset of symptoms. These titres normalised in a subsequent detection on both the serum and CSF sample, performed during hospitalisation after initiation of steroid treatment.

Total body PET and CT scan, and bone scintigraphy did not detect any malignancy. Brain and spine MRI with gadolinium excluded other inflammatory CNS disorders. Neurophysiological examination and magnetic stimulation were normal. The patient was treated with intravenous methylprednisolone (1000 mg/day for 5 consecutive days) followed by oral prednisone 25 mg/day for 2 months. On the second day of steroid treatment, a dramatic clinical improvement was observed, and the ICARS score was 29/100. One week after the beginning of treatment, the ICARS score was 22/100, slow gait was possible with a walker, and dysmetria was improved on the finger-to-nose test as well as diadochokinesis and dysarthria. After 40 days of oral prednisone (25 mg/day), the patient showed a further improvement in dysarthria, dysmetria and diadochokinesis. Writing and drawing the Archimedes spiral became normal. Interestingly, the patient showed an impressive improvement in trunk and gait ataxia in the capacity of walking

without a walker and maintaining the Romberg position (ICARS score 19/100). A further clinical improvement (ICARS score 7/100) was observed 3 months later, when the patient was receiving 12.5 mg of oral prednisone therapy every other day. At this time, steroids were stopped without any change in the patient's clinical condition and at the last follow-up in December 2007.

The clinical course in relation to therapy is presented in fig 1.

Discussion

GAD-Ab are considered a marker of autoimmune diabetes, in which they can be found in patients' sera, sometimes before clinical onset. GAD-Ab have also been reported in a few cases of cerebellar ataxia,¹ even if their pathogenetic role remains unclear. In our case, we detected low levels of anti-GAD antibodies. These antibodies were absent in measurements performed after hospitalisation. Although anti-GAD antibodies were not highly positive, a diagnosis of anti-GAD cerebellar ataxia has been presumed, since it has already been shown that GAD-Ab can be undetected and can be absent or present at different times in the course of the disease.⁵ This floating of antibody titres in the same patient may be related to a complex activation or suppression of auto-reactive immunity that could involve a cell-mediated immune response against GAD or other cerebellar antigens.¹ According to previous reports,¹ we believe that in our patient, the CSF inflammatory profile (mild increase in IgG index and presence of CSF oligoclonal bands) supports the hypothesis of a cerebellar specific inflammatory process, probably mediated by GAD-Ab. In fact, the persistence of CSF oligoclonal bands, even when the patient was anti-GAD-Ab-seronegative, may be a sign of an immunomediated mechanism possibly triggered by anti-GAD-Ab. From the analysis of the available literature on the treatment of anti-GAD cerebellar syndromes, we can argue that immunomodulating therapies could represent a possible treatment approach. High-dose intravenous immunoglobulins were not effective or induced only a transient improvement in few patients. Plasmapheresis does not seem to improve cerebellar dysfunction.

Indeed, two authors reported a good response to steroids in two cases with anti-GAD cerebellar ataxia.^{4,5} Our case presented a sudden and consistent clinical response after lasting administration of corticosteroids, providing further evidence of the efficacy of this treatment and supporting the immunogenesis of the anti-GAD-Ab cerebellar syndrome.

R Virgilio,^{1,2} S Corti,^{1,2} P Agazzi,³ D Santoro,^{1,2} S Lanfranchi,¹ L Candelise,¹ N Bresolin,^{1,2} G P Comi,^{1,2} A Bersano¹

¹ Dino Ferrari Centre, Department of Neurological Sciences, University of Milan, IRCCS Foundation Ospedale Maggiore Policlinico Mangiagalli and Regina Elena, Milan, Italy;

² Centre of Excellence on Neurodegenerative Diseases, University of Milan, Milan, Italy; ³ Civic Hospital of Lugano, Lugano, Switzerland

Correspondence to: Dr A Bersano, Department of Neurological Sciences, University of Milan, Fondazione Ospedale Maggiore Policlinico, Mangiagalli e Regina Elena, Via F.Sforza 35, 20122 Milan, Italy; anna.bersano@unimi.it

Acknowledgements: With thanks to "Associazione Amici del Centro Dino Ferrari". The financial support of the following research grants is gratefully acknowledged: MIUR (Ministero Istruzione Università di Ricerca Scientifica) Italian Ministry PRIN 2007. We wish to thank D Papadimitriou for the revision of the manuscript.

Competing interests: None.

Ethics approval: Provided by Ethical Committee of IRCCS Foundation Ospedale Maggiore Policlinico Mangiagalli and Regina Elena, Milan, Italy.

Patient consent: Obtained.

Received 17 December 2007

Accepted 15 March 2008

J Neurol Neurosurg Psychiatry 2009;**80**:95–96.
doi:10.1136/jnnp.2007.142745

REFERENCES

- Honnorat J, Saiz A, Giometto B, et al. Cerebellar ataxia with anti-glutamic acid decarboxylase antibodies: study of 14 patients. *Arch Neurol* 2001;**58**:225–30.
- Vianello M, Tavalato B, Armani M, et al. Cerebellar ataxia associated with anti-glutamic acid decarboxylase autoantibodies. *Cerebellum* 2003;**2**:77–9.
- Manto MU, Laute MA, Agüero M, et al. Effects of anti-glutamic acid decarboxylase antibodies associated with neurological diseases. *Ann Neurol* 2007;**61**:544–51.
- Lauria G, Pareyson D, Pitzolo MG, et al. Excellent response to steroid treatment in anti-GAD cerebellar ataxia. *Lancet Neurol* 2003;**2**:634–5.
- Birand B, Cabre P, Bonnan M, et al. A new case of cerebellar ataxia with anti-GAD antibodies treated with corticosteroids and initially seronegative. *Rev Med Interne* 2006;**27**:616–19.

CORRECTION

doi:10.1136/jnnp.2008.147983corr1

S Slewa-Younan, S van den Berg, I J Baguley, et al. Towards an understanding of sex differences in functional outcome following moderate to severe traumatic brain injury: a systematic review. *J Neurol Neurosurg Psychiatry* 2008;**79**:1197–1201. As a result of printer error the first line of the paper was omitted. The first sentence should read: "An important factor mediating the incidence of traumatic brain injury (TBI) is a patient's sex."

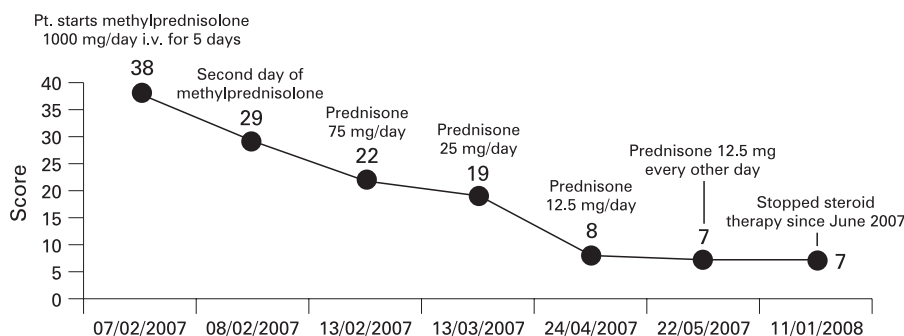


Figure 1 International Cooperative Ataxia Rating Scale score changes in response to therapy.