

6. Lundberg A. Multisensory control of spinal reflex pathways. *Prog Brain Res* 1979;50:11-28.

Hemichorea due to Cryptococcal Meningitis

To the Editor:

We describe a patient with cryptococcal meningitis who was first seen with hemichorea. The presentation of cryptococcal meningitis with hemichorea is rare; we found only one case previously recorded in the medical literature. We discuss the possible pathophysiology of hemichorea in this condition.

A 58-year-old company director had confusion and fever over a 2-month period. He complained of headache and nausea. Examination of the nervous system revealed a confusional state with a mild right-sided pyramidal weakness, bilateral upgoing plantar responses, and prominent right-sided hemichorea. There was no evidence of neck stiffness or photophobia. He had a 10-year history of an idiopathic panuveitis, treated with prednisolone and recently with cyclosporin. He was a diet-controlled diabetic.

Lumbar puncture showed a lymphocytic meningitis with a cerebrospinal fluid (CSF) lymphocyte count of 34 cells; protein, 1,750 mg; glucose, 2.6 mM, compared with a serum glucose of 7.7 mM. India ink preparation demonstrated the presence of cryptococci, and CSF culture was positive for *Cryptococcus neoformans*. The fungus was sensitive to amphotericin and flucytosine but resistant to fluconazole. Serum cryptococcal antigen was positive at 1:8,000, and CSF antigen levels positive at 1:4,000. Computed tomography (CT) head scan showed several bilateral areas of low attenuation in the cerebral white matter, consistent with areas of ischaemia or infarction, but no lesions in the basal ganglia.

The patient improved on amphotericin and 5-fluorocytosine. The dose of prednisolone was reduced, but this led to a recrudescence of his uveitis, and the steroids were restarted. One year after presentation, his choreiform movements have improved but are still present. He still has mild cognitive impairment and has not returned to work. The CSF and serum cryptococcal titres have remained positive, and he remains on antifungal treatment.

Chorea has been noted to occur in a variety of central nervous system (CNS) infections. Burstein and Breningstall (1) described choreoathetotic movement disorders in five children with meningitis caused by different organisms. The development of chorea with tuberculous meningitis is well documented. In one series, 13% of cases of tuberculous meningitis developed dyskinesias (2). In tuberculous meningitis, basilar meningeal vessels become enveloped by a purulent exudate. Spasm or thrombosis of these vessels may result in ischaemic areas in the basal ganglia, which may not show on CT head scanning (3).

Cryptococcus neoformans causes a chronic basilar meningitis (4), the pathophysiology of which is not dissimilar to that of tuberculous meningitis (5). The disease can affect normal individuals, in whom the disease is of insidious onset or occasionally asymptomatic. In immunosuppressed patients, the course of the disease is more rapid. The disease has become more frequent with the

immunosuppression of acquired immunodeficiency syndrome (AIDS). In our patient, multiple areas of low attenuation were seen on CT scanning, and we suspect that the cause of the chorea is disturbance of local blood supply or direct fungal invasion of the striatal to subthalamic to external pallidal pathway.

Cryptococcal meningitis is a rare cause of movement disorders. In an extensive review of the literature, we found only one case of movement disorder secondary to cryptococcal infection (6). Our case occurred in a 58-year-old man who had long-standing immunosuppression. Cryptococcal meningitis is another cause of hemichorea and should be suspected when there is evidence of immunosuppression.

R. A. Weeks
*C. G. Clough
Department of Neurology
Hammersmith Hospital
*Department of Neurology
Brook General Hospital
London, England

References

1. Burstein L, Breningstall GG. Movement disorders in bacterial meningitis. *J Paediatr* 1986;Aug:260-263.
2. Udani PM, Parekh UC, Dastur DK. Neurological and related syndromes in CNS tuberculosis. *Neurol Sci* 1971;14:341-357.
3. Poltera AA. Vascular lesions in intracranial tuberculosis. *Pathol Microbiol* 1975;43:192-194.
4. Sabetta JR, Andriole VT. Cryptococcal infection of the central nervous system. *Med Clin North Am* 1985;69:333-343.
5. Stockstill MT, Kauffman CA. Comparison of cryptococcal and tuberculous meningitis. *Arch Neurol* 1983;40:81-85.
6. Namer IJ, Tan E, Akalin E, Selekler K, Zileli T. Hemiballismus with cryptococcal meningitis. *Rev Neurol* 1990;146:153-154.

Hemidystonia Consequent upon Ipsilateral Vertebral Artery Occlusion and Cerebellar Infarction



To the Editor:

Hemidystonia is often associated with focal basal ganglia lesions (1). We report the case of a female patient with a mild, predominantly right-sided unexplained movement disorder, who developed left hemidystonia after ipsilateral vertebral artery occlusion with cerebellar infarction, probably related to extracranial vertebral artery dissection.

This woman, born in 1952, was first referred to our Neurological Department in 1984 for predominantly right-sided abnormal movements. Her birth was apparently normal. Her twin brother is in good health. Abnormal movements started at 3 or 4 years of age. They consisted

of choreic and athetotic movements, predominantly affecting the right side and also, although more rarely and less conspicuously, the left side. Slight left cervical laterocollis was also present, probably resulting from dystonic activity in left-sided neck muscles. Neurological examinations [electroencephalography, computed tomography (CT) scan, biological tests, etc.] yielded normal results. The abnormal movements were presumed to be secondary to perinatal cerebral injury. However, they did not result in severe disability, and the patient was able to take up a career as a typist. Unfortunately, no video recordings of her movements at this time are available.

She was readmitted in September 1989, complaining of laterocervical pain, gait disturbance, and dizziness, all of which had appeared a few days before. A left cerebellar syndrome was diagnosed. There was persistence of the previously described abnormal movements. Angiography showed an occlusion in the first part of the left vertebral artery. CT scan showed a large left cerebellar hypodensity affecting the territory of the posterior inferior cerebellar artery and to a lesser extent that of the superior cerebellar artery. One month later, the cerebellar syndrome had improved. From November 1989, however, there was a change in involuntary movements: left-sided dystonic movements appeared, which progressively became more and more incapacitating, such that the patient could no longer perform her job as a typist and had to take up a post as a switchboard operator, but found even this more and more difficult.

In February 1991 (see videotape), dystonia predominantly affected the proximal and distal segments of the left arm, which was either hyperpronated or flexed at the elbow with wrist pronated and fingers extended. Her left foot was also affected, although to a lesser degree. A tendency toward hyperlordosis was sometimes observed when she was walking. In addition, spasmodic contraction of the neck muscles caused rhythmic jerks of the head, mainly toward the most active muscles. The movements affecting her right side were different, more rapid,

and at times evocative of choreoathetotic movements, sometimes of dystonic movements, but less markedly than on the left side. No pyramidal signs, sensory loss, or cerebellar axial syndrome were present.

An additional CT scan (difficult to implement, given the cervical dystonia) confirmed the existence of left cerebellar hypodensities. Doppler ultrasonography confirmed the occlusion of the left vertebral artery. Magnetic resonance imaging (MRI) (Fig. 1) showed a large lesion in the lower and posterior left cerebellar hemisphere, affecting the inferior semilunar lobule and to a lesser degree the superior semilunar lobule (both regions are supplied by the posterior inferior and the superior cerebellar arteries). It also showed several lesions affecting the left basal ganglia, but none were detected on the right side. HMPAO single-photon emission computed tomography (SPECT) showed reduced HMPAO uptake in the left cerebellum and in the contralateral frontoparietal area (Fig. 2). The administration of several drugs (muscle relaxants, anticholinergic agents, levodopa, etc.) did not induce any noticeable improvement, nor did thalamic stimulation of the right nucleus ventroposterolateris. Injections of botulinum toxin only led to transient partial improvement. Since early 1991, her neurologic condition has considerably worsened.

A particular feature of our observation is the modification in the aspect of preexisting abnormal movements and the development of predominantly left-sided hemidystonia after a left-sided cerebellar infarct. This raises a two-fold question as to the physiopathology of this left hemidystonia and the role played by the cerebellum. Although the etiology of hemidystonia is diverse, it is most often related to lesions affecting the basal ganglia, the lenticular nucleus, the caudate nucleus, and the thalamus (1). The choreic athetotic predominantly right-sided involuntary movements present and evolving since childhood, which were not really incapacitating, can probably be related to basal ganglia injury due to vascular lesions or occurring postanoxia, as is suggested by the patient's history and MRI.

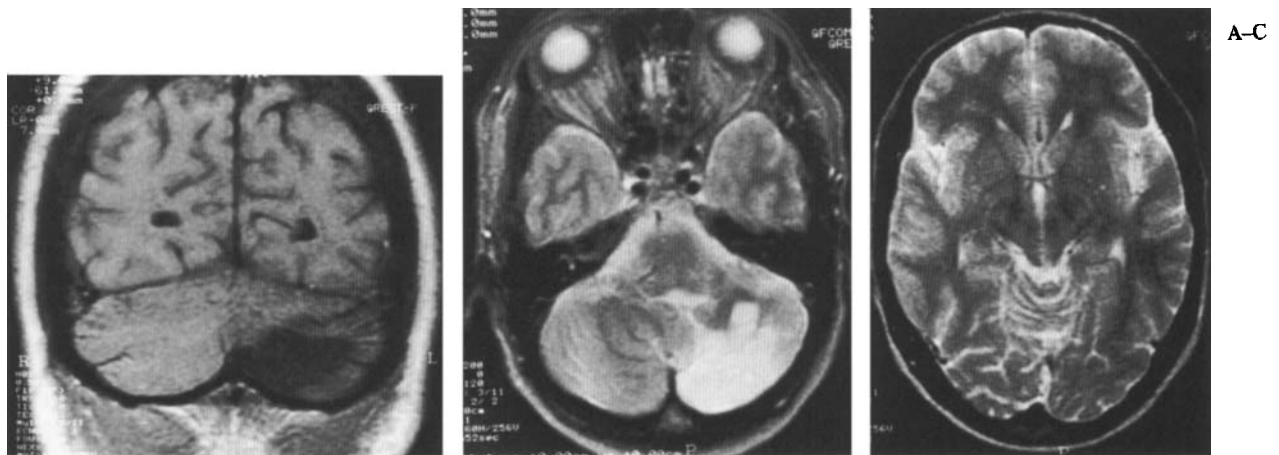


FIG. 1. MRI, 0.5 T, showed left cerebellar hypodensities (A, T1-weighted, 460, 13-; B, T2-weighted, 2,200, 120-) and small hyperintense lesions affecting the left basal ganglia (C, T2-weighted, 2,200, 120-).

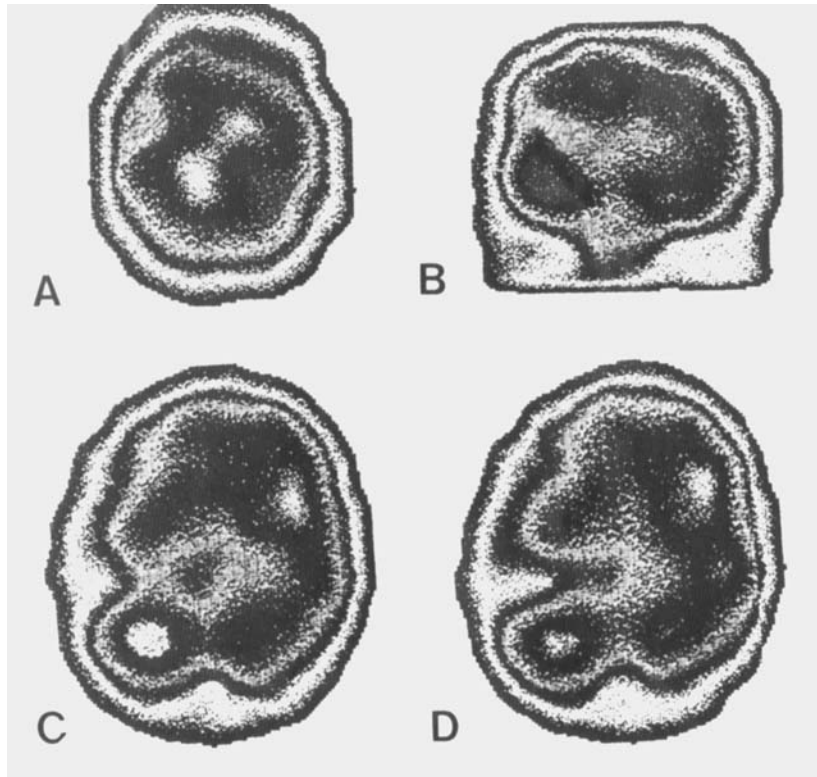


FIG. 2. Reduced HMPAO uptake in the right frontoparietal area and left cerebellum, as shown by HMPAO SPECT.

The occurrence of left cerebellar infarction later decompensated this situation, worsening the preexisting disorders in the right striatopallidothalamocortical pathway. This modification can be related to either deafferentation of the right-sided basal ganglia due to crossed cerebello-cerebral diaschisis or possibly to an alteration of the right prefrontal cortex, considered an "exit" for the right striatohalamocortical pathway.

This observation therefore raises the question of the possible role of the left cerebellar infarction in the modification of abnormal movements and the development of predominantly left-sided hemidystonia. The arguments in favor of a possible role of the cerebellum in the occurrence of abnormal dystonic movements have been drawn mostly from animal models of dystonia. In the dystonia musculorum deformans mouse (2), increased noradrenergic cerebellar metabolism has been demonstrated in addition to peripheral and spinal lesions. In rats, locus ceruleus stimulation responsible for the inhibition of the Purkinje cells induces a dystonialike syndrome (3). More importantly, the Sprague-Dawley rat mutant dystonic (dt), investigated by Lorden et al., is characterized by a dysfunction in the control of cerebellar efferents (4).

Cases of dystonia related to cerebellar lesions in humans have rarely been reported. Some cases of focal dystonia (writer's cramp, spasmodic torticollis) have been reported in degenerative cerebellar ataxia (5), and blepharospasm can be seen in patients with olivopontocerebellar atrophy (6); one case of cervical and upper limb dystonia was reported in a patient with primary cerebel-

lospinal degeneration (7). However, the role of the cerebellum in the pathogenesis of dystonic movements is disputable because in all these disorders the pathology is not confined to the cerebellum but also extends directly or indirectly compresses the brainstem, where it is known that lesions can result in cranial dystonia (8). Metabolic studies performed in dystonia seldom have shown cerebellar abnormalities. The most interesting observation, and the one most like ours, is a case of left spasmodic torticollis in a patient exhibiting a cavernous angioma in the right middle cerebellar peduncle; positron emission tomography scan showed right cerebellar hypometabolism related to crossed cerebello-cortical diaschisis (9). Gilman et al. (10) reported increased cerebellar metabolic activity contralateral to the most affected side in a single patient with idiopathic generalized torsion dystonia.

Given the considerable number of cerebellar disorders, particularly of vascular origin, and the scarcity of observations associating cerebellar lesions and dystonia, it can be wondered whether the hemidystonia and cerebellar infarction in this patient might be conciliated. However, our case is similar to that described by Tranchant et al. (9), who proposed that dystonic movements might be the consequence of striatal deafferentation from the cortex. The delay between the cerebellar infarction and the onset of hemidystonia might reflect a possible role of a metabolic disturbance. In addition, the presumed history of neonatal anoxia might possibly render basal ganglia vulnerable to any subsequent insult.

In conclusion, our observation provides an additional case of a relatively rare phenomenon, namely crossed

cerebello-cerebral diaschisis, associated with another rare phenomenon, hemidystonia. It raises the question of possible links between hemidystonia and ipsilateral cerebellar injury and provides a new twist to the already complex puzzle of the etiopathological mechanisms underlying dystonia (11).

Legend to Videotape

This tape was first recorded in February 1991, 4 months after the occurrence of the left cerebellar infarction. The patient's abnormal movements affect both sides differently: on the right, distal movements are short, quick, and often "explosive"; on the left, movements are slower, of a dystonic type, with abnormal postures of the hand, upper limb, and head. In July 1991, her movements are similar, markedly increased on the right side when she performs mental calculation. The aspect of movement disorders is slightly different on the 1992 recordings: head dystonia is more obvious, and movements are worsened. Later (June 2, 1992 and February 12, 1993), her functional status has further deteriorated (e.g., handling an envelope) and the same dissymmetry is found in the nature of her abnormal movements.

L. Rumbach
P. Barth
A. Costaz
J. Mas

Department of Neurology
Hôpital Jean Minjot
Besançon, France

References

- Marsden CD, Obeso JA, Zarranz JJ, Lang AE. The anatomical basis of symptomatic hemidystonia. *Brain* 1985;108:463-483.
- Duchen LW, Strich ST, Falconer DS. Clinical and pathological studies on a hereditary neuropathy in mice (dystonia musculorum). *Brain* 1964;87:367-378.
- Jacquet Y. A dystonia-like syndrome after neuropeptide (MSH/ACTH) stimulation of the rat locus ceruleus. *Adv Neurol* 1988;50:299-311.
- Lorden JF, Lutes J, Michela VL, Ervin J. Abnormal cerebellar output in rats with an inherited movement disorder. *Exp Neurol* 1992;118:95-104.
- Fletcher NA, Stell R, Harding AE, Marsden CD. Degenerative cerebellar ataxia and focal dystonia. *Mov Disord* 1988; 3:336-342.
- Janati A, Metzger WS, Archer RL, Nickols J, Raval J. Blepharospasm associated with olivopontocerebellar atrophy. *J Clin Neuro Ophthalmol* 1988;9:281-284.
- Tyrer JH, Sutherland JM, Eadie MJ. Dystonie musculaire déformante associée à une dégénérescence spinocérébelleuse primaire. *Rev Neurol* 1964;110:406-410.
- Gibb WR, Lees AJ, Marsden CD. Pathological report of four patients presenting with cranial dystonias. *Mov Disord* 1988; 3:211-221.
- Tranchant C, Maquet J, Eber AM, Dietemann JL, Franck P, Warter JM. Angiome caverneux cérébelleux, dystonie cervicale et diaschisis cortical croisé. *Rev Neurol* 1991;147:599-602.
- Gilman S, Junck L, Young AB et al. Cerebral metabolic activity in idiopathic dystonia studied with position emission tomography. *Adv Neurol* 1988;50:231-326.
- Marsden CD, Quinn NP. The dystonias. *Br Med J* 1990;300: 139-144.

Botulinum A Toxin for the So-Called Apraxia of Lid Opening



To the Editor:

So called apraxia of lid opening (AEO) is a nonparalytic movement disorder frequently associated with Parkinson's disease (PD), parkinsonism, or blepharospasm (BS) (1,2). As pointed out by Lepore and Duvoisin (1), it is characterized by the following combination: (a) transient inability to initiate lid opening; (b) no overt orbicularis oculi (OO) spasm; (c) vigorous frontalis contraction; and (d) absence of oculomotor or ocular sympathetic nerve dysfunction or ocular myopathy. An abnormality of the normal reciprocal relationship between the levator palpebre superior (LPS) and the OO muscles is likely involved in its pathophysiology. In fact, LPS inhibition (2) and abnormal contraction in the pretarsal OO (3) were the main electromyographic (EMG) features in different series. Thus, the disorder was also designated as involuntary levator palpebrae inhibition (1) or pretarsal BS (3).

We studied the effect of botulinum A toxin (BTX; Allergan, Irvine, CA) injected into different parts (orbital/preseptal and pretarsal) of the upper OO of two patients with so-called AEO: a 55-year-old man affected by progressive supranuclear palsy (PSP) since 48 years of age and a 76-year-old woman who had been treated for PD with carbidopa-levodopa and bornaprine for 8 years. At ages 53 and 73, respectively, they developed transient difficulty in voluntarily opening their eyes. So-called AEO was diagnosed according to Lepore and Duvoisin's clinical criteria (1). We did not perform EMG recordings of pretarsal OO or LPS because they are unwieldy, require expertise not readily available in our setting, and seem unnecessary to diagnose so-called AEO (4). Interestingly, eye closure was accompanied by lower lid spastic entropion (5) in the patient with PSP. To our knowledge, no reports exist of such an association, although both disorders can separately occur in the course of BS or parkinsonism (5). This observation adds further support to the hypothesis of an active contraction of some portion of the OO as a mechanism for so-called AEO (3).

On baseline, the episodes of lid closure lasted 30-40 s to 1-3 min and there was a trend to increasing duration from morning to afternoon hours. Sometimes eyes could be opened by massaging the lids. Edrophonium did not alter the duration of such episodes. Patients were first injected with BTX in the upper lid (20 U subdivided in two puncture sites) at the junction of the preseptal and orbital portion of the OO, medially and laterally to avoid the midline LPS. They reported slight subjective improvement of visual function, but no objective improvement was found on clinical examination; in fact, no less