

Gyratory Epilepsy in a Patient with a Thalamic Neoplasm

Ramón Leiguarda, Martín Nogués, and Marcelo Berthier

Instituto de Investigaciones Neurológicas Dr. R. Carrea (FLENI), Buenos Aires, Argentina

Summary: A patient with a right thalamic oligodendroglioma developed seizures characterized by circling behavior, speech arrest, and secondarily generalized seizures. Gyratory epilepsy is relatively uncommon and may either represent a benign form of primary generalized ep-

ilepsy or occur secondary to a focal cortical lesion. Thalamic stimulation has been shown experimentally to induce circling movements, but no other clinical cases with a thalamic lesion have been described. **Key Words:** Gyratory epilepsy—Thalamus—Oligodendroglioma.

Last year I treated a peculiar case of a lad who had fallen from a high place and injured the left side of his head, from which he derived epilepsy. At the time of his spell he was turning in circles, three, four and even more times. . . . (T. Erastus, 1581, cited in Fariello and Mehendale, 1983).

Gyratory or rotatory epilepsy is uncommon (Fariello and Mehendale, 1983). Gastaut et al. (1986) advanced the concept of two types of gyratory epilepsy. The common form, occurring mainly in childhood or adolescence, shows bilateral, rhythmic, symmetrical, or asymmetrical 3-Hz EEG slow-wave discharges, associated with generalized seizures, a family predisposition, good response to antiepileptic drug AED treatment, and no demonstrable pathology, and is probably a benign variant of primary generalized epilepsy. The rare form occurs in infants or adults in association with focal EEG and cerebral abnormalities (Schneider et al., 1968, 1971; Fariello and Mehendale, 1983; Hochman, 1983; Donaldson, 1986).

In either form of gyratory epilepsy, the entire body suddenly turns around its vertical axis for at least 180° but at times for 360° one or more times in a "ballet-like fashion." The direction of the rotatory phenomenon, either clockwise or counterclockwise, remains constant from one attack to another in a patient, although cases with alternating attacks have been reported. This complex circling behavior is usually observed at the beginning of the attack when the patient is standing and indeed may

be the sole expression of the seizure, but more frequently is preceded or followed by other epileptic manifestations depending on the origin of the epileptiform discharge. Consciousness may or may not be preserved during the attack (Fariello and Mehendale, 1983).

All previously reported cases of gyratory epilepsy with focal pathology had cortical or underlying white matter lesions mainly involving the frontotemporal area (Schneider et al., 1968, 1971; Fariello and Mehendale, 1983; Hochman, 1983; Donaldson, 1986). Our case is the first reported in a patient with a thalamic lesion.

CASE REPORT

A 66-year-old right-handed woman was admitted to the hospital after experiencing three seizures on 3 consecutive days. The patient's recall and witnesses' accounts of the attacks agreed closely. All the attacks were identical: while in a standing position or walking, she suddenly circled toward the left, making a complete 360° turn, described as that executed by a ballet dancer, causing her to lose balance and fall. She then experienced extreme fear, was unable to speak, and had a generalized tonic-clonic seizure. Attacks lasted <2 min, and the patient recovered quickly and completely. Past and family history was noncontributory.

Neurologic examination showed an alert, oriented patient with appropriate concern for her condition. Neuropsychological assessment proved normal. Results of cranial nerve examination were unremarkable except for a mild left central facial weakness. There was no papilledema. Reflexes

Received July 1991; revision accepted March 1992.

Address correspondence and reprint requests to Dr. R. Leiguarda at FLENI, Ayacucho 2166, (1112) Buenos Aires, Argentina.

were increased on the left limbs, but no limb weakness was found; plantar responses were flexor bilaterally. Sensation was normal, and there was no evidence of neglect to single or double simultaneous stimulation. Coordination and gait were unaffected. An interictal EEG showed an occipital (9–10 Hz) alpha rhythm and an asymmetry produced by the presence of sharp and slow waves (4–7 Hz) over the right frontotemporal region. A computed tomography scan showed a well-defined nonenhancing, low-density right thalamic expanding lesion (Fig. 1), which stereotactic biopsy showed to be a differentiated oligodendroglioma. The patient was prescribed phenytoin (300 mg/day) and received radiotherapy. She experienced no further seizures during 2 years of follow-up.

DISCUSSION

Our report is the first of gyratory epilepsy with a thalamic but no cortical lesion. Turning followed by gyratory movements of the whole body or circling behavior has been evoked in humans by electrical stimulation of many cortical areas of the frontal, parietal, temporal, and occipital lobes (Fariello and Mehendale, 1983). Similar behavior has been elicited experimentally in animals through stimulation of or damage to various cerebral structures such as the vestibular cortex, amygdala, caudate nucleus, central vestibular nuclei, superior colliculi, locus ceruleus, and thalamus (Hunter and Jasper, 1969; Fariello and Mehendale, 1983). Hunter and Jasper (1969) induced turning of the eyes and head or



FIG. 1. Postcontrast computed tomography scan showed an expanding lesion involving the right thalamus.

whole body involvement in a circling movement when cats were stimulated at a point near or in the central median or subthalamic region or when other nuclei adjacent to the intralaminar region were stimulated. Turning movements were usually obtained with a high stimulation intensity, suggesting some degree of spread to nearby or functionally connected structures. Motles et al. (1983) demonstrated that electrical or chemical (carbachol) stimulation of the pulvinar-lateralis posterior nucleus complex (P-LP) in cats evoked rotational behavior. Dependent on carbachol dosage, the head-eye-body rotation was followed by prominent changes in emotional behavior such as periods of fear and/or aggressiveness, epileptic EEG activity and, on occasion, epileptic seizures.

The clinical manifestations of gyratory epilepsy have been suggested to either represent a frontotemporal automatism (Schneider et al., 1968, 1971) or to originate directly from asymmetrical activation of the portion of the extrapyramidal system connected with the substantia nigra caused by paroxysmal epileptiform discharges arising elsewhere in the brain (Fariello and Mehendale, 1983; Donaldson 1986).

The origin of the epileptic discharge in our case may have been in the right thalamus and the discharge may have spread, first involving the nigrostriatal system and causing the gyratory phenomenon and then propagating to the amygdala and the rolandic cortex or the supplementary motor area, causing the fear and speech arrest and finally triggering the generalized tonic-clonic seizure (Penfield and Roberts, 1959; Fariello and Mehendale, 1983; Donaldson, 1986).

REFERENCES

- Donaldson I. Volvular epilepsy: a distinctive and underreported seizure type. *Arch Neurol* 1986;43:260–2.
- Fariello RG, Mehendale A. Gyratory and cursive epilepsy. In: *Hemis syndromes. Psychobiology, neurology, psychiatry*. Orlando: Academic Press, 1983:129–48.
- Gastaut H, Aguglia V, Tinuper P. Benign versive or circling epilepsy with bilateral 3-cps spikes-and-waves discharges in late childhood. *Ann Neurol* 1986;19:301–3.
- Hochman MS. Rotatory seizures associated with frontal lobe malignant neoplasm: a case report. *Epilepsia* 1983;24:11–4.
- Hunter J, Jasper H. Effects of thalamic stimulation in unanesthetized animals. *Electroencephalogr Clin Neurophysiol* 1969;1:305–21.
- Motles E, Gonzalez M, Infante C. Rotational behavior in the cat induced by electrical stimulation of the pulvinar lateral posterior nucleus complex: role of the cholinergic system. *Exp Neurol* 1983;82:43–54.
- Penfield W, Roberts L. *Speech and brain mechanisms*. Princeton, University Press, 1959.
- Schneider RC, Calhoun HD, Crosby EC. Vertigo and rotational movement in cortical and subcortical lesions. *J Neurol Sci* 1968;6:493–516.
- Schneider RC, Hazel D, Calhoun HD, Koot K. Circling and

rotational automatism in patients with fronto-temporal cortical and subcortical lesions. *J Neurosurg* 1971;35:554-63.

RÉSUMÉ

Les auteurs rapportent l'observation d'un patient présentant un oligodendrogliome thalamique droit chez lequel se sont installées des crises caractérisées par une gyration, un arrêt du langage et une généralisation secondaire. L'épilepsie gyrotatoire est relativement rare, elle peut représenter soit une forme bénigne d'épilepsie généralisée primaire, ou être secondaire à une lésion corticale focale. La stimulation thalamique peut expérimentalement induire des mouvements de gyration, mais la littérature ne rapporte pas d'autres observations cliniques avec lésion thalamique.

(P. Genton, *Marseille*)

RESUMEN

Un enfermo que tenía un oligodendroglioma talámico derecho desarrolló ataques que se caracterizaban por marcha automática

circular, interrupción del lenguaje y ataques secundariamente generalizados. Esta epilepsia giratoria es relativamente infrecuente y puede representar una forma benigna de ataques generalizados primarios o ser secundaria a lesiones corticales focales. Experimentalmente se ha observado que la estimulación talámica puede inducir movimientos circulares pero no se han publicado casos clínicos en lesiones talámicas.

(A. Portera-Sánchez, *Madrid*)

ZUSAMMENFASSUNG

Ein Patient mit einem Oligodendrogliom im Thalamus bot Anfälle, die durch im Kreislaufen, speech arrest und sekundäre Generalisierung charakterisiert waren. Eine gyrotorische Epilepsie ist selten und kann einerseits Ausdruck einer primär generalisierten Epilepsie sein oder einer kortikalen Läsion. Im Experiment führt die Thalamusstimulation zu kreisenden Bewegungen; bisher sind keine anderen Fälle mit einer Thalamusläsion beschrieben worden.

(C. G. Lipinski, *Heidelberg/Neckargemünd*)