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Research Article

Not Evolutive Epileptogenic Brain Lesions (Neebls) in Old People: An Underestimated Condition?

Chirchiglia Domenico[1]*, Della Torre Attilio[2] and Chirchiglia Pasquale[3]

[1]Professor of Department of Neurosurgery, University of Catanzaro, Campus Germaneto, Catanzaro, Italy

[2]Assistant at Department of Neurosurgery, University of Catanzaro, Campus Germaneto, Catanzaro, Italy

[3]Phd at University of Catanzaro, Italy, Campus Germaneto, Catanzaro, Italy

***Corresponding Author**: Chirchiglia Domenico, Professor of Department of Neurosurgery, University of Catanzaro, Campus Germaneto, Catanzaro, Italy.

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Abstract

Purpose: To study correlations between not evolutive brain lesions and epilepsy. Not evolutive epileptogenic brain lesions (NEEBLs) are disorders mainly related to middle- advanced age and characterized by epileptic seizures, associated with other neurological signs, engaging cognitive functions such as memory loss, impairment of attention and initiative, as well motor and sensory deficits. NEEBLs are not progressive, but stabilized lesions, such as cortical - subcortical atrophy, gliosis, encephalomalacic cavities, post traumatic head injuries, all outcomes of brain insults.

Method: We retrospectively analyzed 150 cases of patients, who reported neurological signs, of which 45 had reported partial and generalized epileptic seizures. The subjects had age between 65 and 82 years, mainly males, while the percentage of epileptic patients was around 30%. All patients had undergone neuroimaging and electroencephalographic examinations. Brain CT and MRI examinations had shown in all patients, not evolutive brain lesions.

Results: In epileptic patients, antiepileptic therapy was administered (AEDs), followed by a good control on the seizures. We have also taken into account the comorbidity with associated diseases, with signs of impairment of cognitive functions, adopting a personalized anti-epileptic treatment.

Conclusions: This work shows that epilepsy secondary to these lesions is a fairly common underestimated sign, associated with other neurological symptoms, on which treatment with AEDs, must take account of cognitive disorders, often associated. Ultimately, NEEBLs, as the cases we reported, are an important nosological entity, still not well known, in which stabilized brain lesions may cause secondary epilepsy.

Keywords: *Epilepsy; Gliosis; Cerebral Atrophy; Elderly Epilepsy; Brain Insults*

Introduction

Not evolutive epileptogenic brain lesions (NEEBLs) represent a risk factor in developing epilepsy, mainly in middle-advanced age, still not well evalued. Symptomatic epileptic seizures increase with increased age, being cause of new-onset epilepsy in the enderly [1]. Epileptogenic adult lesions are categorized as tumours, cerebrovascular malformations, thrombotic stroke, hemorrhagic stroke, traumatic brain injury, but also primary degenerative disorders as Alzheimer' disease (AD). These are all causes of new-onset epilepsy in elderly, revealing in acute or subacute forms, proved as evolutive brain lesions except for degenerative ones.

NEEBLs instead are already stabilized brain lesions, as cortical-subcortical atrophy, gliosis, porencephalic and encephalomalacic areas, cerebrovascular, traumatic brain injury outcomes, predisposing to cause epilepsy in old people [2]. In this study we have found a high per-

centage of older patients, who experienced new-onset epileptic seizures, showing investigations, MRI and CT, now stabilized sequelae of brain disorders such as atrophic lesions, gliosis, malacic areas. Both partial and generalized seizures were reported, successfully treated, taking into account comorbid diseases, other used drugs, more or less severe cognitive impairment, so adopting a personalized antiepileptic therapy, the most effective, safe and appropriate. The high proportion of new-onset epilepsy in old age, according to our survey has led us to believe that NEEBLs may be an underestimated condition, causing epilepsy. So, management of these patients can be difficult, mainly for atypical seizure presentation, similitude with other disorders and challenging because associated comorbidities and choice of therapy.

Materials and Methods

We analyzed data from patients evaluated at Neurophysiopathology Unit, Neurosurgery Institute, University of Catanzaro, Italy, in a time period of about 10 years. The series consisted of 150 old people, we visited for cognitive function deficits, impaired memory and attention, confusion, depression, but also sensory and motor abnormalities. Age was between 65 - 82 years (mean age 73,8), 92 males, 58 females. Brain CT and MRI had shown mainly atrophic lesions in 130 patients, malacic areas in 7 patients, as outcomes of surgical procedures to haemorrhagic accidents and tumors, gliosis in 13, as post-traumatic brain injuries and infectious diseases outcomes. Furthermore, epileptic seizures were reported in 45 subjects, about 30 % of all, 30 of which manifested generalized seizures, 15 partial seizures. Particularly, partial seizures developed between malacic outcomes. Electroencephalogram showed paroxysmal activity only in 10 patients, while slow wave activity was found in the remaining. AED treatment was started, using levetiracetam first choice drug in both partial and generalized seizures, followed by phenobarbital, topiramate, however taking into account the associated comorbidity, as depression and cognitive deficits. Results were good, regarding the control of seizures, that was full, while antidepressant drugs were modulated and personalized patient to patient, maintaining effectiveness and safety. None of patients experienced side-effects from AEDs.

Discussion

With increasing age, the prevalence and incidence of epilepsy may increase together [3,4]. Common causes are represented by tumors, cerebrovascular lesions, acute traumatic head injury. In the case of brain tumors or cerebrovascular lesions, such as intracranial aneurysms, however, are evolutive or structural lesional epileptogenic lesions, in which epilepsy can be the presenting symptom.

Another cause of late-onset epilepsy in old age, is represented by non-evolutive, stabilized lesions such as cortical atrophy, gliosis, encephalomalacia, outcomes of traumatic brain injury. The percentage of such epileptogenic lesions is variable, from the literature, going from a range of 4% to 31%, average 17,50 % [1]. New-onset epilepsy in the elderly is often difficult to diagnose, since in older patients can be unwitnessed or present with atypical symptoms, also for the association with other diseases, mainly cognitive. In this study, we correlated the new-onset epilepsy in elderly subjects with the presence of stabilized brain lesions. We have found a high percentage of epilepsy in patients examined, having considered the 30% an interesting result compared with the literature data. Cortical atrophy has proved the leading cause of new-onset epilepsy, presenting as generalized and focal, affecting only a limited area of the brain, but also as typical ischemic findings of subcortical regions to the neuroimaging tests. Gliosis, another finding, is a reactive change of glial cells in response to damage to the central nervous system, in extreme form leading to the formation of a glial scar. Gliosis occurs as a result of many pathologies of central nervous system, such as traumatic, ischemic, hemorrhagic lesions [1,5]. Then, encephalomalacia, term describing loss of brain parenchyma, ending result of its necrosis following ischemic and hemorrhagic events, traumatic brain injury, surgical procedures outcomes. Encephalomalacic areas are considered highly epileptogenic [6-8]. Our work demonstrates how the new-onset epilepsy in old people, caused by not evolutive epileptogenic brain lesions (NEEBLs) is a condition still not well evaluated which it needs further scientific investigation.

Conclusion

Not evolutive epileptogenic brain lesions are cause of new-onset epilepsy in old age, with a variable percentage, in order to literature data. These lesions are stabilized, outcomes of brain insults, probably underestimated, with which we will have to compare, for the

increase in age of life. The aim is to diagnose epileptic seizures and control them with adequate therapy, considering comorbidity with associated pathologies.

Declaration Conflict of Interests

I Professor Domenico Chirchiglia and my co-authors declare no competing interest.

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