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Case report

Adversive seizure as a clinical manifestation of the atrioventricular block



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ABSTRACT

Introduction: Spontaneous and recurrent epileptic seizures are necessary diagnostic criteria for epilepsy. There exist, however, circumstances in which an epileptic seizure is provoked by incidents of a cardiac origin. Focal neurological signs and symptoms secondary to arrhythmia are quite common. However, an epileptic seizure as a manifestation of the third degree atrioventricular block exemplifies the very rare case of such a correlation.

Aim: To demonstrate this clinical situation and to point out to the need to differentiate the origin of seizures, verify diagnosis of epilepsy, and perform multi-channel neurophysiological diagnostics, extended by a basic ECG examination.

Case study: We present the case of a 79-year-old male patient who was admitted to the Clinical Department of Neurology due to recurrent incidents of conjugated eye and head movements to the left secondary to the third degree atrioventricular block.

Results and discussion: Diagnostic and therapeutic approach implemented for patients with epileptic seizures and cardiac arrhythmia are discussed in detail.

Conclusions: An interdisciplinary diagnostic approach, carefully conducted interview and an appropriate selection of additional examinations and tests are essential for a proper differential diagnosis of seizure-like incidents.

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1. Introduction

Spontaneous and recurrent epileptic seizures are necessary diagnostic criteria for epilepsy. There exist, however, circumstances in which an epileptic seizure is provoked by incidents of a cardiac origin. Focal neurological signs and symptoms secondary to arrhythmia are quite common. However, an epileptic seizure as a manifestation of the third degree atrioventricular block exemplifies the very rare case of such a correlation.¹

2. Aim

To demonstrate this clinical situation and to point out to the need to differentiate the origin of seizures, verify diagnosis of epilepsy, and perform multi-channel neurophysiological diagnostics, extended by a basic ECG examination.

3. Case study

A 79-year-old male patient was admitted to the Clinical Department of Neurology due to recurrent incidents of conjugated eye and head movements to the left. They had lasted for a month, appeared a few times a day, each lasted several seconds. During such incidents and directly afterwards, the patient was disoriented; the twilight state disappeared after a few minutes.

The patient had been treated due to arterial hypertension and prostatic hyperplasia for several years. Three years earlier he had undergone a laryngectomy due to laryngeal cancer. No signs of focal damage to the central nervous system (CNS) were found in the neurological examination. Based on the clinical picture, a preliminary diagnosis of focal frontal seizures was established and treatment with valproic acid (VPA) was initiated. Magnetic resonance imaging (MRI) of the brain revealed small vasogenic lesions, but no neoplastic or metastatic lesions were found. Their presence had been suspected based on the history of cancer and focal adverse seizures. A video-electroencephalography (EEG) recording was performed (Fig. 1). One-hour monitoring detected four seizures of an adverse clinical nature with the presence of focal lesions evidenced as spike-and-wave discharges in the right frontal area. All incidents were preceded by the third degree atrioventricular block lasting for several seconds, which was registered in the electrocardiography (ECG) channel, performed simultaneously with the EEG. No interparoxysmal disturbances were found in the EEG.

As an emergency procedure, a dual-chamber, rate-modulated (DDDR) pacemaker was implanted. A follow-up examination after 3 months revealed that no seizures occurred since the cardiac intervention. Two-phase computed tomography (CT) of the head did not detect new focal lesions, and the EEG demonstrated normal basic brain bioelectric activity, without focal or seizure-like disturbances. Antiepileptic drugs were not introduced.

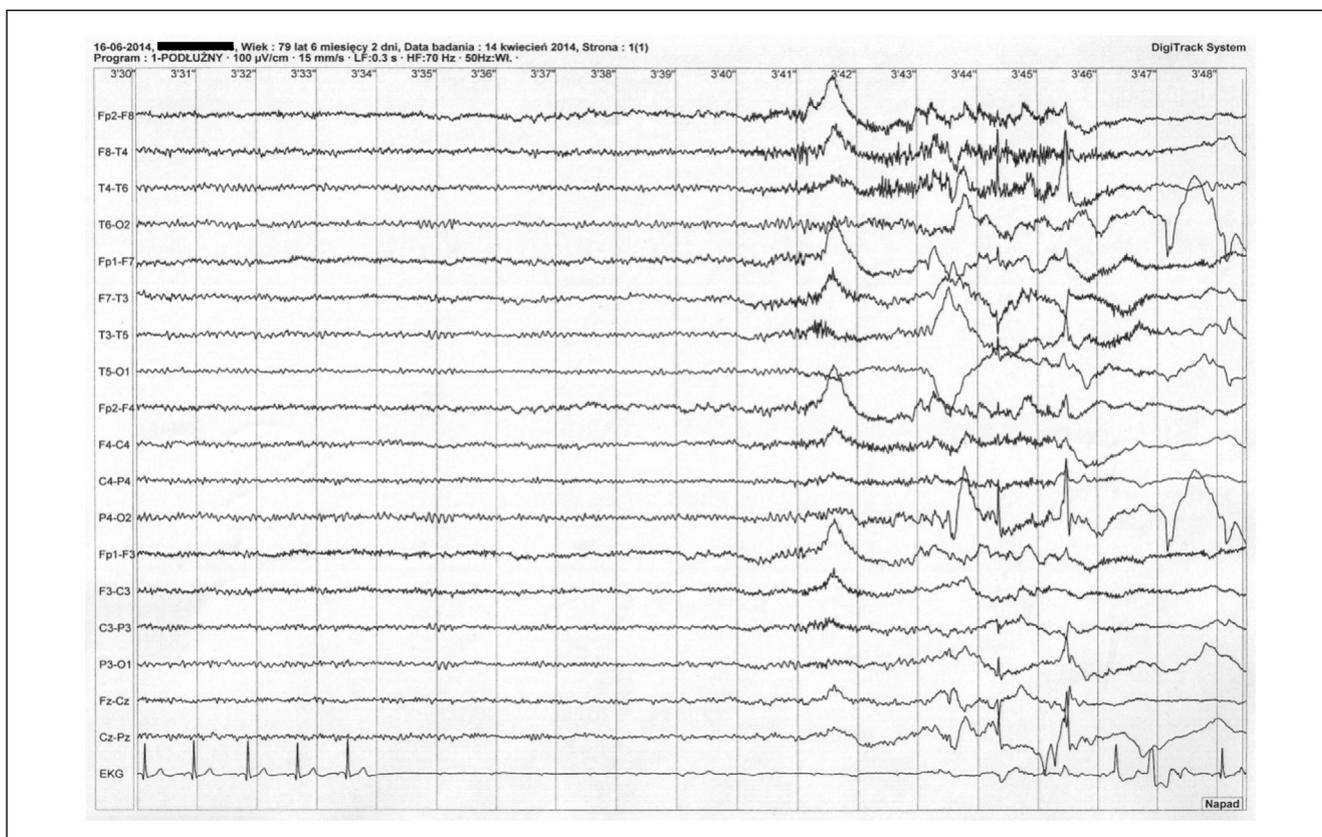


Fig. 1 – The third degree atrioventricular block in the ECG channel.

4. Results and discussion

Differential diagnosis of seizure-like episodes should include, among others, neurological, cardiac, endocrine and psychiatric diseases. Differentiating between the cardiac and neurological origins of such disturbances is a challenge in everyday clinical practice.^{1–3} Transient cerebral hypoxia secondary to vasovagal response, brady- or tachyarrhythmia may lead to signs and symptoms imitating epileptic seizures – transient syncope accompanied with arrhythmic muscle jerks, myoclonic activity, oral automatism and head turns.^{4,5} On the other hand, epileptic seizures may disturb the basic electrical activity of the myocardium, leading to bradycardia, atrioventricular block and asystole. In the presented case, adverse seizures were secondary to advanced arrhythmia and cerebral hypoxia. Seizures that appear due to triggering factors are not spontaneous, thus they do not meet the criteria for epilepsy as a disease characterized by non-provoked seizures. By definition, epilepsy requires recurrence of the seizures. This requirement was met in the described case and this may have led to an incorrect diagnosis. According to various data, it is estimated that 20–30% of patients are misdiagnosed with epilepsy.^{6,7} In the majority of cases misdiagnosis was caused by a poorly taken interview and a wrong interpretation of the EEG recording.⁷ Because arrhythmias and disturbances in the electric cerebral activity co-occur and mask each other, the golden diagnostic means that can minimize misdiagnoses seems to be a simultaneous recording of the electrical activity of both systems.^{8–10} Cardiac evaluation should always be considered in newly diagnosed epilepsy, especially in elderly patients, treatment-resistant seizures, and atypical course of the incidents. Frequently, simultaneous polygraphic EEG and ECG recording facilitate, as in our case, correct diagnosis and appropriate therapy.¹

5. Conclusions

An interdisciplinary diagnostic approach, carefully conducted interview¹¹ and an appropriate selection of additional

examinations and tests are essential for a proper differential diagnosis of seizure-like incidents.

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