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Clinical characteristics and etiology of transient myoclonic state in the elderly

Tadashi Doden, Hiromasa Sato, Takao Hashimoto*

Department of Neurology, Aizawa Hospital, Matsumoto, Japan

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ABSTRACT

Objectives: To clarify clinical picture of transient myoclonic state in elderly patients.
Methods: The Aizawa Hospital database was searched to identify all patients with transient myoclonic state with or without asterixis between April 2006 and June 2013. Medical records, brain images and laboratory data including electroencephalograms and electromyograms were reviewed.
Results: We found 26 patients: 10 women and 16 men, and their ages ranged from 56 to 96 years (79.7 ± 9.9 years, mean ± standard deviation). The affected sites of the myoclonic jerks were predominantly the lower face, neck and upper extremities. The myoclonus appeared at conscious resting condition, slightly exaggerated by posturing or action. Asterixis was observed in eight patients. Single myoclonic bursts were 1.70 ± 0.94 s long. The interval of myoclonic bursts was 4.47 ± 2.44 s. Single myoclonic bursts were composed of 9.5 ± 2.5 Hz myoclonic contractions, and single myoclonic contractions were 44.4 ± 12.3 ms in duration. Most of the patients suffered from chronic diseases, but they were basically independent in activity of daily living. Oral administration of clonazepam was effective.
Conclusions: Transient myoclonic state has relatively stereotyped features. The pathophysiology may include some metabolic abnormality on a background of age-related arteriosclerotic changes. Its prognosis is benign, and prompt oral administration of clonazepam abolishes it. Further investigations will be needed to clarify its cause and pathophysiology.

1. Introduction

Myoclonus is defined as a sudden, brief, shock-like involuntary movement caused by muscular contractions or inhibitions [1,2]. We have been encountered several patients who presented a peculiar type of myoclonic jerks, that is, repetitive, brief trembling movements in the face, neck and upper extremities. A single trembling is a few seconds long and is composed of a burst of myoclonic muscle contractions. Asterixis-like movement is occasionally seen during the jerks. This involuntary movement have been referred to as "transient myoclonic state with asterixis" [3], "benign transient shuddering-like involuntary movement" [4] or "isolated transient myoclonus" [5]. Myoclonus of this type is not identified in the category of myoclonus classified based on temporal profile, that is, rhythmic, irregular, continuous, or intermittent [2]. We investigated the clinical and neurophysiological features of this myoclonic disorder to clarify its cause and appropriate management.

2. Methods

The Aizawa Hospital database was searched to identify all patients who were diagnosed with 'myoclonus', 'epilepsy' or 'seizure' between April 2006 and June 2013. Medical records, brain images and laboratory data were reviewed retrospectively. The patients who had presented with transient myoclonic state were selected from among them. Transient myoclonic state was defined as acute onset of myoclonus with or without asterixis in adult patients, which was composed of brief shivering-like jerks occurring at resting condition intermittently at an interval of from a few seconds to a few minutes and lasting for a few days (see video 1 and 2). Patients with tremor disorders, including essential tremor, cerebellar tremor and dystonic tremor or those with cold-induced shivering or shivering under febrile conditions were excluded. And patients with obvious disturbance of consciousness resulting from

* Corresponding author at: Department of Neurology, Aizawa Hospital, 2-5-1 Honjo, Matsumoto 390-8510, Japan.
E-mail addresses: aidr214@ai-hosp.or.jp (T. Doden), knsyi33@ai-hosp.or.jp (H. Sato), sinke-dr@ai-hosp.or.jp (T. Hashimoto).

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uremia, hepatic encephalopathy or other remarkable metabolic or organic disorders were also excluded.

We investigated their age, sex, associated diseases, medications, neuroradiological findings, physical condition at onset, presence or absence of asterixis, the distribution of involuntary movements, response to medication and recurrence. Mental state was assessed by checking orientation under clear consciousness, and global daily function was categorized into 3 levels based on their activity of daily living (ADL). Radiological findings of the brain were assessed by either computed tomography (CT) or magnetic resonance imaging (MRI). CT and MRI were examined in 23 and 8 patients, respectively. Our staff neurologists and neuroradiologists rated the degree of brain atrophy and they recorded the sites of the vascular lesions.

Electroencephalogram (EEG)–electromyogram (EMG) polygraph was performed in two patients, and EEGs alone were performed in one patient using a conventional electroencephalograph (NIHON KOHDEN, Neurofax EEG-1218, Japan). A filter bandpass was 0.5–120 Hz for EEGs and 50–120 Hz for EMGs. The duration of myoclonus bursts, the intraburst frequency of myoclonus and the interval of myoclonus bursts were measured from 20 myoclonic bursts on EEGs or EMGs in each case. The duration of myoclonic EMG discharges was measured on EMGs. A comparison of the measured data of myoclonus among the patients was performed and a two-tailed p value of <0.05 was considered statistically significant. The statistical package (SPSS ver. 18.0) was used for analyses. Informed consent was obtained from each patient for examinations and treatment. The subjects gave consent to be videoed for publication. This study was approved by the ethics committee of Aizawa Hospital for research on human subjects according to the Helsinki declaration.

3. Results

3.1. Patients' clinical feature

There were 5089 patients who had been diagnosed with disease names which included 'myoclonus', 'epilepsy' or 'seizure', and we found 26 patients (0.5%) with repetitive tremulous myoclonus among them, who were diagnosed after examination by the staff neurologists. There were 10 women and 16 men, and their ages ranged from 56 to 96 years (79.7 ± 9.9 years) (Table 1). The patients' domiciles were widely distributed in the Matsumoto region, which is approximately 980 square kilometers in area. The myoclonus developed during various seasons. There was no patient who presented with abnormal eye movement, which suggested the possibility of adult opsoclonus-myoclonus syndrome. All patients were sporadic and had not been exposed to any drugs which contain common ingredients or chemicals. Table 2 shows details of medications at onset of transient myoclonic state. The average number of medications in each patient was 2.8 and 16 patients had taken five or more kinds of medications when they presented with the myoclonus. There were two cases in which temporal correlation between administration of the drug and onset of transient myoclonic state was suggested: risperidone and levofroxacin were respectively administered to Cases 6 and 12 several days prior to onset of the myoclonus.

3.2. Characteristics of the myoclonic movement and EEG and EMG findings

Twenty patients were brought to the hospital by ambulance because of difficulty in standing and talking secondary to

Table 1
Clinical characteristics of patients.

Case no.	Age/sex	Associated diseases	Condition at onset	Asterixis[a]	Distribution of myoclonus	Daily dose of CZP	Time to remission after CZP
1	79/M	Colon cancer	Common cold	+	Face, neck, all extremities	0.25 mg 3 times	<1 day
2	80/F	Meningioma, colon polyps	After polypectomy	–	Face, neck, upper extremities	0.5 mg 3 times	1 h
3	63/M	DM, alcoholism	Normal	–	Face, neck, upper extremities	0.5 mg 3 times	<1 day
4	74/M	DM nephropathy, HT	Normal	–	Face, neck, upper extremities	0.5 mg 3 times	<1 day
5	79/M	DM nephropathy, anemia	After blood transfusion	–	Face, neck, upper extremities	0.25 mg 3 times	<1 day
6	93/F	COPD	Aspiration pneumonia	–	Face, neck	None	<2 days[b]
7	85/M	HT, CKD stage3	Normal	–	Face, neck, upper extremities	0.5 mg twice	1 h
8	66/F	DM	Normal	+	Face, neck, upper extremities	None	1 day[b]
9	68/M	None	Common cold	+	Face, neck, upper extremities	None	3 days[b]
10	88/F	AP, AS	Normal	–	Face, neck, upper extremities	0.5 mg 3 times	1 h
11	70/M	HT, DL	Normal	–	Face, neck	None	2 days[b]
12	76/M	HT, prostate cancer	Common cold	–	Neck, upper extremities	0.5 mg twice	1 h
13	75/M	HT,DM, old CI	Common cold	–	Neck, upper extremities	0.5 mg 3 times	1 day
14	91/F	IP, CKD stage3	Normal	–	Neck, all extremities	0.25 mg 3 times	2 days
15	90/F	HT	Normal	–	Upper extremities, trunk	0.25 mg twice	1 day
16	86/F	CRF on HD, HT	Normal	–	Face, neck, upper extremities	0.5 mg 3 times	1 day
17	83/F	CKD stage4, AD, DL, pancreas cancer	Diarrhea	+	Face, all extremities	0.5 mg 3 times	1.5 h
18	84/M	Gastric ulcer	Diarrhea	–	Face, neck, all extremities	0.5 mg twice	1 h
19	95/M	CHF, CKD stage3, cAVB, gastric cancer, prostate cancer	Dyspnea	–	Face, neck, upper extremities	0.25 mg 3 times	1 h
20	56/M	HT	Sleep deprivation	–	Neck, all extremities	0.25 mg 3 times	0.5 h
21	78/M	Buccal mucosa cancer, DM, CKD stage3, chronic hepatitis	Normal	+	Face, all extremities	0.25 mg 3 times	2 h
22	81/F	Depression	Normal	–	Face, all extremities	0.25 mg twice	1 h
23	96/F	HT	Normal	–	Face, upper extremities	0.5 mg twice	3 h
24	81/M	HT,DM	Normal	n.e	Face, upper extremities	0.25 mg 3 times	0.5 h
25	73/M	CRF, HT	Initiation of HD	+	Face, upper extremities, trunk	0.25 mg 3 times	10 h
26	81/M	AF, old CI, pituitary adenoma, DL	Arthritis	+	Face, upper extremities	0.25 mg twice	1 h

AD, Alzheimer's disease; AF, atrial fibrillation; AP, angina pectoris; AS, aortic valve stenosis; cAVB, complete atrioventricular block; CHF, chronic heart failure; CI, cerebral infarction; CKD, chronic kidney disease; CZP, clonazepam; COPD, chronic obstructive pulmonary disease; CRF, chronic renal failure; DM, diabetes mellitus; DL, dyslipidemia; HD, hemodialysis; HT, hypertension; IP, interstitial pneumonia; n.e, not examined.

[a] Judged by clinical observation.

[b] Disease duration to spontaneous remission.