

Clinical and Electrophysiological Characteristics of Post-stroke Tremor

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- Abstract -

Background : Tremor is uncommon manifestation of stroke. Therefore a few cases have been reported until now. There is still uncertainty about the characteristics of post-stroke tremor. Furthermore the pathogenesis and responsible structures of post-stroke tremor are not precisely known. We have recently experienced 34 cases of post-stroke tremor for the past 6 years. We analysed the clinical features and electrophysiologic findings of post-stroke tremor to evaluate the general characteristics and to analogize the possible pathogenetic mechanisms of post-stroke tremor.

Methods : The clinical characteristics of post-stroke tremor were summarized in according to the onset time, involved body parts, types, tremor frequencies, neuroradiologic findings, and associated symptoms. The tremor frequencies were recorded by using a gyroscope. The spectral analysis of tremor frequencies were done automatically with Motus I soft ware.

Results : Tremor onset were remarkably varied. Some patients showed a tremor appearing at the onset of a stroke and other patients showed delayed-onset tremor 10 years after a stroke. Tremor frequencies were also much varied. The range of hand tremor frequencies were from 1.5 to 12 Hz. Lesions were found in 31 cases(infarction 27, hemorrhage 4) on neuroimaging. In the cases of cerebral infarctions, 7 cases showed multiple small vessel diseases and 20 cases showed cerebral vessel lesions. The most commonly involved cerebral vessel lesion was the middle cerebral artery territory Several different clinical patterns of post-stroke tremor were identified.

Conclusions : There are some evidences from the data summarized here to suggest that several pathogenetic mechanisms including central oscillators could be involved for the development of tremors and that tremor generating neural circuits could be more complex than previously suggested neural circuits.

Key Words : Stroke, Tremor

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TEL) 063 - 250 - 1895, FAX) 063 - 251 - 9363, e - mail) smw@moak.chonbuk.ac.kr

Holme's tremor

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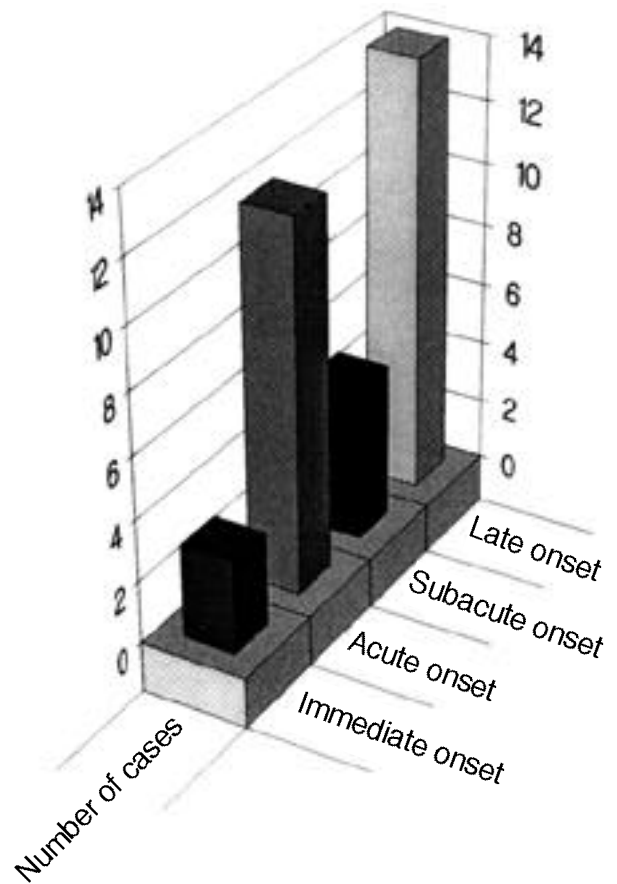


Figure 1. Tremor onset after stroke. Tremor onset were remarkably varied. Some patients showed a tremor appearing at the onset of a stroke and other patients showed delayed-onset tremor 10 years after a stroke. Immediate or acute onset cases were more frequently identified than other previous reports.

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4	.	1.5 Hz	12 Hz

Table 1. Clinical, electrophysiological, and radiological characteristics of post-stroke tremors.

No	Sex	Age	Onset	Body parts	Type (Hz)	Frequency	MRI	Assoc. Sx	Others
1	F	73	1 D	Rt HA	P>K	4.5	Multiple SVD inf.	Rt hemiparesis	
2	F	70	3 M	Lt HA	P	9.5	Lt MCA deep inf.	Rt hemiparesis, dystonia	
3	F	64	8 Y	Rt HA	K>R>P	7	Lt MCA cortical inf.	Rt U/E monoparesis	
4	F	52	2 Y	Rt HA	K>P>R	6	Lt MCA deep inf.	Rt hemiparesis, dysarthria	
5	M	53	3 Y	Rt HA	P>K	7	Lt MCA deep inf.	Rt hemiparesis	
6	F	69	1 Y	Rt HA, HE	P, K	12(HA), 10(HE)	Lt CBLL inf.	Ataxia	ET family
7	M	58	3 M	Lt HA	P	10	Lt BG hem.	Lt hemiparesis	EICT
8	M	66	Immediate	Rt HA	P, K	1.5	Rt CBLL inf.	Rt hemiparesis	
9	M	57	8Y 10M	Rt HA	P	7.5	Lt BG SVD inf.	Rt hemiparesis, dystonia	
10	F	46	Immediate	Rt HA	K>P>R	7.5	Non-specific	None	Isolated
11	M	61	Acute	Rt HA	P, K	3	Lt MCA deep inf.	Rt hemiparesis, dysarthria	EICT
12	F	62	3 D	Lt HA	P	6	Rt MCA-PCA border inf.	Lt homony. hemianop.	
13	F	72	Immediate	Generalized	P	4	Rt ACA deep inf.	Rt hemiparesis, aphasia	TIA
14	M	67	1 M	Rt HA	R	5.5	Lt ACA-MCA	Rt hemiparesis	SRIRT
15	M	58	26 D	Lt FO	Sitting	5	Rt MCA inf.	Lt hemiparesis	EICT
16	M	53	1 M	Lt HA, HE	K>P>R	5.5(HA), 5(HE)	Pons hem.	Quadriparesis, dysarthria	
17	F	72	4 M	Generalized	P>K>R	7.5	Lt MCA comp. inf.	Rt hemiparesis, aphasia	
18	M	45	3 M	Lt HA	R	3	Rt MCA deep inf.	Lt hemiparesis	Rhyth. akat.
19	M	67	Immediate	Rt HA	K>P	6	Lt MCA deep inf.	Rt hemiparesis	
20	M	67	7 M	Lt HA	P	8	Lt BG SVD inf.	Rt hemiparesis, Nocturnal myoclonus	
21	M	62	3 Y 5M	Rt HA	P	8.5	Non-specific	Lt U/E monoparesis	TIA
22	M	60	3 Y	Lt HA	P	6.5	Lt PCA cort. inf.	Lt hemiparesis	Cold-induced
23	F	74	1Y 5M	HE	S	4	Multiple SVD	None	
24	M	19	3 M	Rt HA	K>P>R	3.5	Multiple hem.(F, T)	Rt hemiparesis, Nocturnal myoclonus	Holme's T
25	M	61	1Y 11M	Rt HA	P, K	6.5	Lt MCA cort. inf.	Rt hand clumsiness, dysarthria	
26	M	52	1M	Rt HA	R, P, K	4	Pons inf.	EOM limitation	
27	M	67	5 M	Both HA	R	4.5(Lt), 5.5(Rt)	Lt MCA deep inf.	Transient Rt hemiparesis	Shaking
28	M	56	Immediate	Rt HA	K	8	Lt BG SVD inf.	None	
29	M	64	3Y 9M	Rt HA	P	7.5	Lt thalamic SVD inf.	Rt hemihypesthesia, dysarthria	
30	M	74	Immediate	Lt HA, FO	P	7(HA), 5(FO)	SVD	None	Hemitremor
31	F	80	Immediate	Lt HA, FO	P	3(HA), 3(FO)	Brain CT: normal	None	Hemitremor TIA
32	M	69	10 Y	Lt HA	P	6.5	Rt MCA-PCA borderzone inf.	Lt hemiparesis	
33	M	25	2 M	Lt HA Lt FO HE	K>P>R 4(F) 3.5(HE)	3.5(HA)	Rt SDH, Rt frontal hem.	Lt hemiparesis	Holme's T
34	F	56	Immediate	Rt HA	5	Non-specific		Transient Rt hemiparesis	TIA

Abbreviations: Sex(F: Female, M: Male), Body parts(HA: Hand, FO: Foot, HE: Head), Type(R: Resting, P: Postural, K: Kinetic, S: Sitting), Frequency(HA: Hand, FO: Foot, HE: Head), Assoc. Sx(Associated Symptoms), Others(ET: Essential Tremor, EICT: Enhanced Isometric Contraction Tremor, TIA: transient Ischemic Attack, SRIRT: Stretch Reflex Induced Resting Tremor, Rhyth. Akat.: Rhythmic akathisia, Holme's T.: Holme's tremor, Shaking: Limb shaking).

Table 2. The clinical patterns of post-stroke hand tremor. Various clinical patterns suggest that several pathogenetic mechanisms could be involved for the development of tremors and that tremor generating neural circuits could be more complex than previously suggested neural circuits.

The clinical pattern of tremor	NO
Non-specific resting tremor	1
Stretch Reflex Induced Resting Tremor(SRIRT)	1
Non-specific postural tremor	12
Non-specific postural-kinetic tremor	6
Non-specific resting-postural-kinetic tremor	6
Holme's tremor	2
Enhanced Isometric Contraction Tremor(EICT)	1
Limb shaking	1
So called, rhythmic akathisia	1

(6.1 ± 2.3 Hz) , 3.5 10 Hz (5.6 ± 3.0 Hz) 3 5 Hz (4.3 ± 1.0 Hz) (Table 1).

10 3 , 12 , 5 , 14 (Fig. 1).

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가 Ghika-Schmid 1

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Ghika-Schmid 1 29 3

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PET

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PET

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Ghika-Schmid 1

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13, 17, 27

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17%(5/29)

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Pettigrew Janković

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(Stretch-Reflex Induced Resting Tremor,

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(Enhanced Isometric Contraction Tremor,

), 7, 11, 15

1) 2) 3) 4) 5) 6) 가

(Dewey)¹⁴ akathisia가 가

¹⁵ 30, 31 가 가

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Ghika-Schmid¹ 2

Baquis³³ 가

6 가 가

가 가

18 가

가 3 Hz

(Rhythmic akathisia) 가

Braude³⁴ 가 , Nemes³⁵

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