

Clinical and Electrophysiological Analysis of Chronic Eyelid Twitching

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Abstract

Purpose: Nearly everyone had experience of eyelid twitching (ET) and most physicians think it is benign and self limited. Most neurologists consider it is a symptom rather a disease. However, sometimes ET persists longer and becomes bothersome in some cases, i.e. chronic ET (CET). CET was seldom discussed seriously and studied extensively. Few studies concerning of CET especially its electrophysiological features had been reported. The purposes of this study are to delineate its clinical features and electrophysiological characters of CET. In consequence by knowing its pathophysiology we can prove CET is a disease entity as minor form of facial nerve neuropathy.

Methods: A retrospective study by reviewing medical charts of patients with facial twitching and have been received examinations of facial nerve latency and blink response. We defined CET as persisting of ET more than 2 weeks. We collected 142 patients, age from 12 to 73 years-old, 34 men and 108 women. The onset month and season, sex, abnormal side, and abnormal index (AI=abnormal side minus normal side/normal side) of several variables from electrophysiological study were compared between men and women of CET.

Results: There was significant gender difference on CET. Women were more vulnerable than men (female to male: 3 to 1). CET tended to develop more in cold weather (61.27%). Half of CET cases demonstrated delayed or absent R2 response in blink reflex. And 45.8% cases had prolonged facial nerve latency (>5% side to side difference), with the rate higher in women (48.5% vs 38.2%). These two findings indicating conduction defect of facial nerve pathway in CET cases.

Conclusion: Although CET has been considered as a benign, transient, somewhat physiological phenomenon, our study may suggest it can be a disease entity with minor facial nerve neuropathy.

Key Words: Eyelid twitching; Bell's palsy; Electrophysiological study; Hemifacial spasm

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INTRODUCTION

Nearly everyone had experience of transient eyelid

twitching (ET) and most physicians think it is benign and self limited. Interestingly, ET has been thought as different prospective of fortune in different cultures, such as good

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luck, bad luck, and happy, angry, sad, and joy things are going to happen for four different eyelids in Chinese and bad luck when appeared in left side in American^(1,2). However, many cases had ET persisted and interfered their daily life physically, socially and emotionally, hence were fit in as chronic ET (CET).

Neurophysiologic study as facial nerve latency (FNL) and blink response (BR) were frequently used as tools for approaching many facial nerve diseases such as Bell's palsy and hemifacial spasm etc⁽³⁻¹¹⁾. Yaltho and Jankovic stated that hemifacial spasm usually start as "twitching" of the lower eyelid⁽⁶⁾. Although the nature of CET has not been investigated thoroughly. In the literature, some movement specialists may refer it to another term as eyelid myokymia. Ross et al. made an excellent review about involuntary facial movement disorders⁽¹²⁾. However, Miller pointed out that they left out a most frequent seen condition: eyelid myokymia⁽¹³⁾. Miller also mentioned that no electrophysiological study had ever been done in this subset of cases⁽¹⁴⁾. There is only one case report about eyelid myokymia with electrophysiological study, that could be a localized form of facial myokymia and may be a manifestation of underlining brainstem disease.¹⁵ In this paper, we use the term "eyelid twitching" because it's a more common term and more specific description.

The purposes of this study are to delineate its clinical features and electrophysiological characters of CET. In consequence by knowing its pathophysiology we can prove CET is a disease entity as minor form of facial nerve neuropathy.

METHODS

We reviewed 547 medical charts with order of FNL and BR for frequently seen neurologic facial problems at West Garden Hospital, from Jan. 1, 2004 to Dec. 31, 2011, by computer screening. Only cases with symptoms of ET persisted more than two weeks were enrolled. Cases of Bell's palsy, hemifacial spasm, and other facial nerve problems were excluded since we would like to focus on pure ET. There were 12 cases excluded because of incomplete data (11) and unclear diagnosis (1). Finally, we 142 cases of fulfill CET and completed FNL and BR were enrolled for further analysis in this retrospective study. (34 men and 108 women, age range 12-73 years-old)

All FNL and BR studies were examined by same technician (there was only one neurologist and one technician of neurophysiologic Lab in West Garden Hospital at room temperature using Teca Medelec Sapphire II 2ME. For FNL, Latency (Lat) and amplitude (Amp) were pick up at m orbicularis oris alone by surface electrode, but not m orbicularis oculi for smaller amplitude and therefore lesser consistency of the later, otherwise as previous reports^(8,16,17). BR was performed by trigeminal-facial reflex by surface electrode with cathode located over supraorbital nerve at its exit from the orbital squiggle and the anode on the forehead as standard method^(8,9,17).

The sex, age, side of facial twitching, comorbidity, and onset month and season were carefully reviewed and collected. All cases were sub grouped by men and women for further comparison for gender effect analysis.

Common chronic diseases in adults as Diabetes mellitus (DM), hyperlipidemia (HLD) and hypertension (HTN) were noted as comorbidity. The comorbidity is defined as whenever there was associated code of International Classification of Diseases (ICD) in the medical chart or medication for these three diseases or in HLD, if total cholesterol exceeding 260 mg/dl, triglyceride 200 mg/dl, or low density lipoprotein (LDL) 160 mg/dl. The mean temperature of Taipei City, where West Garden Hospital is located was quoted for comparing from Central Weather Bureau, ROC.

Variables from electrophysiological study analyzed are Lat and Amp from FNL and R1 response (R1) and R2 responses of same (R2sa) and contra lateral side (R2co) from BR. These variables and abnormal index (AI) = [(abnormal side minus normal side)/normal side] of these variables were calculated for mean, standard deviation (SD).

Statistical analysis: We did the analyses using software of SPSSPC 18th ed. for windows to obtain descriptive statistic data and two sample t-test.

RESULTS

Of these 142 CET cases, details in terms of age, sex, comorbidities, and problem side were showed in table 1. The percentage of men and women were 24 % and 76.%. The mean and SD for age for total, men, and women were

Table 1. Descriptive data of chronic eyelid twitching cases and comparison between genders

Eyelid Twitching case	Total (n=142)	Men	EEG pattern	P value
Age(years), mean (SD)	43.84(12.79)	41.88(12.02)	44.45(13.02)	0.291
Sex, Case (%)		34(24%)	108(76%)	<0.001
Side, Case (%)				0.397
Left	69(48.6%)	13(38.2%)	56(51.9%)	
Right	53(37.3%)	16(47.1%)	37(34.3%)	
Bilateral	20(14.1%)	5(14.7%)	15(13.9%)	
Comorbidity, Case (%)				
DM	16(11.3%)	2(5.9%)	14(13.0%)	
HLD	32(22.5%)	7(20.6%)	25(23.1%)	
HTN	19(13.4%)	4(11.8%)	15(13.9%)	
DM+HLD+HTN	2(1.4%)	0(0%)	2(1.9%)	
DM+HLD	7(4.9%)	0(0%)	7(6.5%)	
HLD+HTN	10(7%)	2(5.9%)	8(7.4%)	
DM+HTN	3(2.1%)	0(0%)	3(2.8%)	
Any of above three	41(28.9%)	11(32.4%)	30(27.8%)	

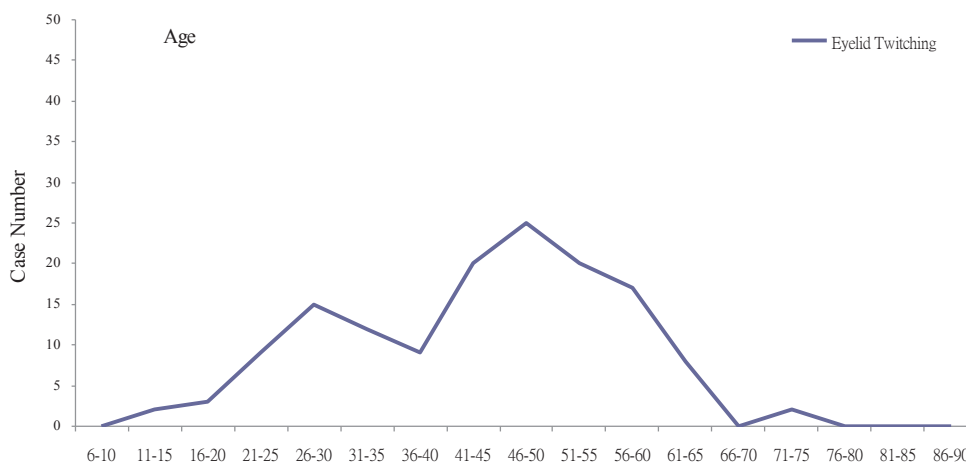
Diabetes mellitus, DM; hyperlipidemia, HLD; hypertension (HTN)

43.84 + 12.79, 41.88+12.02, and 4.45+13.02.

The peak incidence of age sections were 41–60 (see figure 1). The age distribution patterns of CET in 5 years interval are 11–15:2, 16–20:3, 21–25:9, 26–30:15, 31–35:12, 36–40:9, 41–45:20, 46–50:25, 51–55:20, 56–60:17,

61–65:8, 66–70:0, and 71–75:2.

The percentage of case No as monthly and seasonal distribution is plotted as line with comparison to mean temperature Taipei City (see figure 2A and B). The season of onset in CET cases are 33.8% in spring, 19.0% in



6-1	11-1	16-2	21-2	26-3	31-3	36-4	41-4	46-5	51-5	56-6	61-6	66-7	71-7	76-8	81-8	86-9
0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0
0	2	3	9	15	12	9	20	25	20	17	8	0	2	0	0	0

Figure 1. Age distributions of eyelid twitching cases.

summer, 19.7% in autumn, 27.5% in winter. The order of coldness for seasons there are 3, 1, 2, and 4 for spring, summer, autumn and winter.

The percentage of cases with delayed or absent R1, R2sa, R2co response in blink reflex under cutoff level >5% were 26.1% (37), 50.7% (72) and 57.8% (82). Since absent response in blink reflex study suggests more severe facial nerve conduction defect. We counted the percentage of absent response in blink reflex. The absence responses of R1, R2sa, and R2co as percentage (case number) were 1.4% (2), 40.1% (57) and 43.0% (61) for BR.

Table 2 showed the case numbers and percentage of AI exceeding cutoff levels (5%, 10%, and 15% respectively), cases with absent response included. It showed mean and SD of AI variables of FNL: Lat and Amp, and BR: R1, R2sa, R2co. in table 2.

DISCUSSION

Middle aged adults were more prompted to get CET as age distribution showed highest incidence at age of 41 to 60. There was a significant gender difference on CET.

Table 2. The number and percentage of abnormal index (AI) in studies of facial nerve latency and blink reflex in CET cases.

	All (n=142)	Men (n=34)	Women (n=108)	P-Value
AILat, mean (SD)	7.35%	9.0%	6.83%	0.660
>5%	65(45.8%)	13(20.0%)	52(80.0%)	
>10%	40(28.2%)	9(22.5%)	31(77.5%)	
>15%	21(14.8%)	6(28.6%)	15(71.4%)	
AIVol, mean (SD)	-1.67%	-14.88%	-2.45%	0.049
>5%	37(26.1%)	7(18.9%)	30(81.1%)	
>10%	31(21.8%)	5(16.1%)	26(83.9%)	
>15%	28(19.7%)	5(17.9%)	23(82.1%)	
# AIR1, mean (SD)	2.42%	2.74%	2.33%	0.723
>5%	37(26.1%)	11(29.7%)	26(70.3%)	
>10%	10(7.0%)	5(50.0%)	5(50.0%)	
>15%	2(1.4%)	2(100.0%)	0(0%)	
(Absent response)	2(1.4%)	2(5.9%)	0(0%)	
# AIR2sa, mean (SD)	0.65%	-2.22%	1.49%	0.156
>5%	72(50.7%)	18(25.0%)	54(75.0%)	
>10%	67(47.2%)	18(26.9%)	49(73.1%)	
>15%	66(46.5%)	18(27.3%)	48(72.7%)	
(absent response)	57(40.1%)	17(50.0%)	40(37.0%)	
# AIR2co, mean (SD)	1.80%	0.44%	2.42%	0.325
>5%	82(57.8%)	21(25.6%)	61(74.4%)	
>10%	72(50.7%)	20(27.8%)	52(72.2%)	
>15%	70(49.3%)	19(27.1%)	51(72.9%)	
(Absent response)	61(43.0%)	18(52.9%)	43(39.8%)	

Percentage with cases of AI exceeding of different cutoff levels PLUS cases of absent response

*AI: abnormal Index= (abnormal side-normal side)/normal side

*AILat: abnormal index of latency from Facial Nerve Latency

*AIVol: abnormal index of amplitude from Facial Nerve Latency

*R1: R1 response of Blink response; R2sa: R2 response of same side of Blink response; R2co: R2 response of contralateral side of Blink response

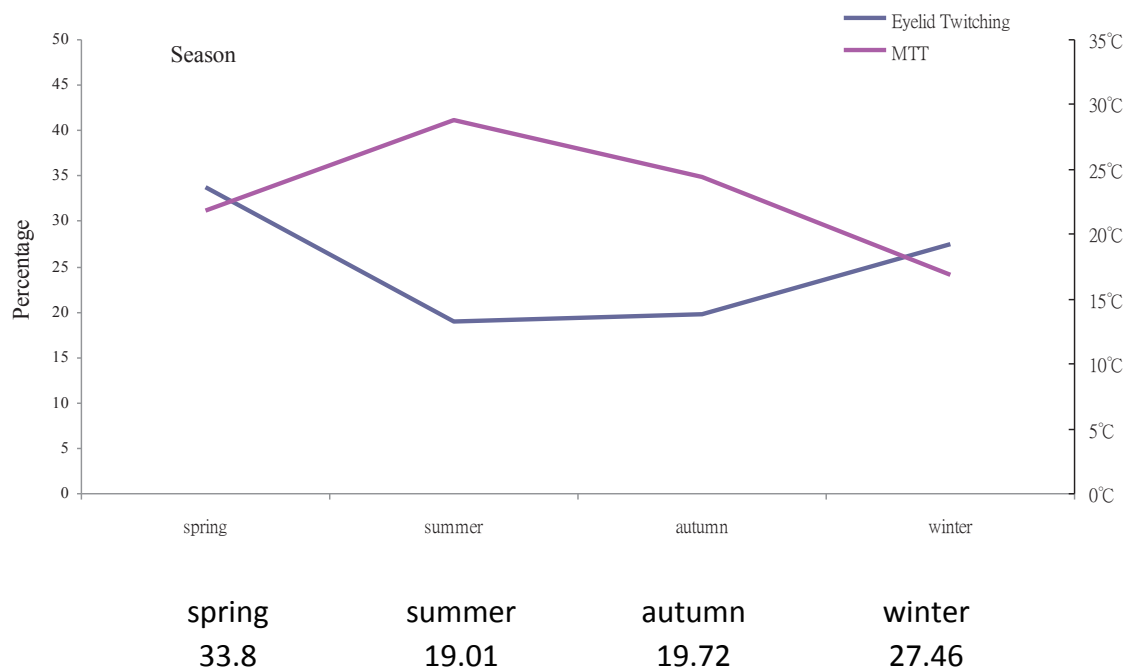
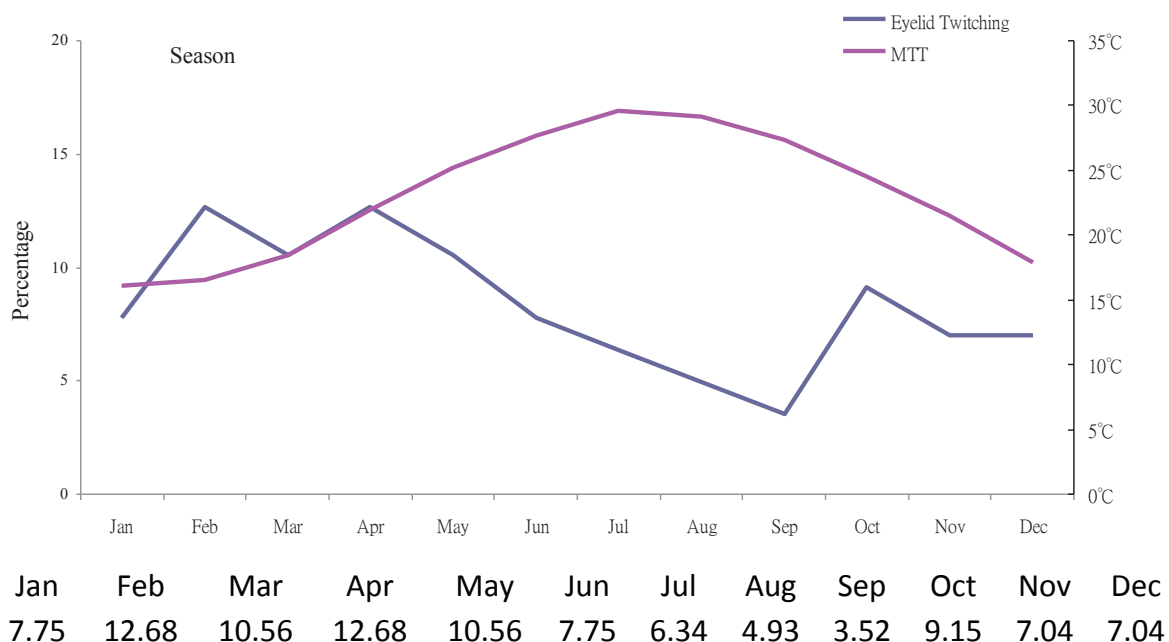


Figure 2. Chronologically distribution of onset of eyelid twitching cases percentage comparing to the mean temperature of Taipei city. A. distribution by month of the year. B. distribution by seasons of the year. MTT: mean Taipei temperature

Women were more vulnerable than men (female to male: 3 to 1). This was higher than previous report in western (female to male: 2 to 1)⁽¹⁴⁾. Except sex hormone, social background may play some role. As many agree that CET is much related to stress and women usually have more stress than men, especially in Chinese than western culture. This might explained the differences between gender and different culture. This female preference in CET is distinct from Bell's palsy, most reports showed about equal incidence between sex⁽¹⁹⁾. This may suggest different underlying pathophysiology in these two illness.

CET occurred more in colder seasons. Our data showed 61.27% cold seasons (November to March) and 38.75% in warm seasons (April to October). The seasonal ratio (cold/ warm) of CET occurrence is higher than in Bell's palsy by Campbell et al⁽¹⁹⁾. (1.31:1). Comparing detailed weather data with onset of Bell's palsy and ET is seldom done before and should be most interest point of this study⁽²⁰⁾.

Some said lower ET might frequently show in pre-stage of hemifacial spasm⁽²³⁾, and others showed abnormal lower eyelid contraction appeared in 46 out of 53 hemifacial spasm⁽⁹⁾. This was not observed in our study, probably because of the exclusion criteria.

The comorbidities we analyzed in this study are DM, hyperlipidemia, and HTN. Less percentage of these comorbidities in CET than those from official report suggests that its etiology is very unlikely related to metabolic syndrome. While Banik and Miller reported more than half of their patients admitted to one or more of three habits, as smoking, alcohol, and caffeine^(14,20). Unfortunately, our data did not include caffeine consumption at all, and smoking and alcohol consumption were incomplete, too.

AIlat with 45.8% prolonged latency of abnormal side (>5% side to side difference.) This seemed even higher in women than in men (48.5% vs 38.2%). This indicated conduction defect of facial nerve pathway in CET cases. More than half of the cases demonstrated delayed or absent R2 response, both ipsilateral and contralateral side, in blink reflex. Meanwhile, only one fourth cases (26.1%) has AIR1 more than 5%. According to previous report, this type of abnormality is due to a lesion of the descending spinal tract and can be medulla oblongata⁽²⁴⁾. Only one case of CET had done with electrophysiological

study which showed appearance of contralateral R1 response, yet Rubin and Root did not performed FNL⁽¹⁵⁾. This phenomenon had mentioned previously by other studies^(21,22). Cases of CET were seldom mentioned in previous reports. Therefore, there are limit previous data available for comparing to our results⁽¹²⁾.

Our study compared age, abnormal side, onset season distribution, and variables from FNL and BR in different sex. Further analysis of amplitude and area is suggested, especially the data of amplitude for not available in this study.

CONCLUSION

Our study provided first handed data of clinical features and neurophysiological characters in CET. 1st of all, Women were much more vulnerable than men in getting CET. 2nd, the onset of CET cases were more prompt in colder season. 3rd, there is strong evidence in electrophysiological study showed CET cases may have conduction defect in the facial nerve pathway between low brainstem and spinal tract. We have made conclusion that CET maybe a specific disease entity rather than only a physiological phenomenon.

Further study about long term followed of cases of CET with their prognosis and best treatment, and the specific lesion for it are worth looking forward.

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