Journal of Clinical Neuroscience 18 (2011) 52–56

Contents lists available at ScienceDirect

Journal of Clinical Neuroscience

journal homepage: www.elsevier.com/locate/jocn

Clinical Study

# Characteristics of depressive symptoms in essential tremor

Zai-Wang Li [a,b,†], Min-Jie Xie [a,†], Dai-Shi Tian [c], Ji-Jun Li [d], Jin-Ping Zhang [a], Li Jiao [a], Zhou-Ping Tang [c], Rong-Hua Tang [a,*]

[a] Department of Neurology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, 1095 Jiefang Boulevard, Wuhan, Hubei 430030, China
[b] Department of Neurology, Wuxi People's Hospital of Nanjing Medical University, Wuxi, Jiangsu, China
[c] Psychology Outpatient Department, Department of Neurology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China
[d] Department of Integrated Chinese and Western Medicine, Shandong Provincial Hospital, Shandong University, Jinan, China

ARTICLE INFO

*Article history:*
Received 8 September 2009
Accepted 30 May 2010

*Keywords:*
Depression
Depressive symptom
Essential tremor
Neuropsychiatry

ABSTRACT

Depressive symptoms are common in essential tremor (ET) and may be a primary feature of the underlying disease. However, it is still unclear whether depression in ET and depression in primary affective disorders share common clinical manifestations. Sixty-one depressed ET patients and 112 depressed patients without ET were assessed using the Montgomery-Asberg Depression Rating Scale (MADRS). We compared the individual depressive symptoms of the two groups by comparing MADRS subitem scores. Although there was no significant difference between the level of cognitive function and the severity of depression, patients with ET had a lower score on items "reported sadness", "inability to feel" and "pessimistic thoughts", and a higher score on items "concentration difficulties" and "lassitude" than those of patients without ET. These results show that depressive symptoms in patients with ET possess distinct characteristics compared to those in depressed patients without ET.



## 1. Introduction

Essential tremor (ET) is one of the most common movement disorders and has long been considered as a monosymptomatic benign disorder characterized by postural and kinetic tremor of body parts (most commonly forearms and hands) in the absence of endogenous or exogenous triggers or other neurological signs.[1,2] However, it is becoming recognized that ET is not benign but complex and progressive[3] and associated with mood disorder.[4]

Accumulating evidence has demonstrated that depressive symptoms are common in ET.[5–9] Depression has a major impact on functional ability as well as the quality of life of patients with ET.[8,9] Furthermore, as well as being a secondary response to disease manifestations, depressive symptoms may be a primary feature of the underlying disease.[6] However, the etiology of depression associated with ET is poorly understood. It is still unclear whether the etiology of depression in ET is different from that in primary affective disorders without ET. Whether depression in ET and depression in primary affective disorders share common clinical manifestations also remains to be determined. Consequently, a direct comparison of depressive symptoms in patients with ET with those in patients with depression without ET may throw light on the issues.

In this study, we compared the pattern of depressive symptoms in ET patients with that of depressed subjects without ET. The results show that depressive symptoms in ET patients possess distinct characteristics compared to those in depressed patients without ET. Such information may help clinicians discriminate and diagnose the depression in ET patients.

## 2. Patients and methods

### 2.1. Patients

The consecutive series of ET patients included in this study came from the Department of Neurology, Tongji Hospital, Huazhong University of Science and Technology, from July 2007 to July 2009. ET was diagnosed on the basis of the criteria published by Elble.[10] All subjects were diagnosed with ET by a fellowship-trained neurologist. Eligibility criteria included age 18 years to 80 years and a diagnosis of definite ET. The cognition of ET patients was assessed with the Mini-Mental State Examination (MMSE) score.[11] Dementia was diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria after a clinical examination that included an interview with a caregiver in addition to cognitive testing. The ET patients were included in this study on condition that they did not suffer from dementia and had at least mild depressive symptoms with a Montgomery-Asberg Depression Rating Scale (MADRS) score of $\geqslant 7$.[12] Exclusion criteria were Parkinson's disease (PD), secondary causes of PD

* Corresponding author. Tel.: +86 027 83660280; fax: +86 027 83662418.
*E-mail address:* zyylzw@yahoo.cn (R.-H. Tang).
† Z.-W. Li and M.-J. Xie contributed equally to this work.

0967-5868/$ - see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jocn.2010.05.021

(such as Parkinsonism), dystonia and tremor of other origin (such as stroke, tumor, trauma, psychogenic tremor, drug-induced tremor, physiological tremor). Although 115 ET patients were recruited to the study, only 61 ET patients fulfilled these criteria.

The control group consisted of 112 consecutive patients with major depressive disorder (MD patients) referred to the Psychology Outpatient Department, Tongji Hospital, over the same period. The diagnosis of MD was made by a psychiatrist according to the DSM-IV criteria, and based on information obtained from several clinical interviews. Eligibility criteria included being between the ages of 18 and 80 years and a diagnosis of definite MD. Their cognitive status was assessed with the MMSE and dementia was diagnosed according to the DSM-IV criteria. The MD patients who suffered from dementia or had a MADRS score <7 were excluded. Patients with other neurological or physical diseases with potential influence on mood were also excluded. The study design was approved by the human ethics committee of Tongji Medical College. All study participants gave their informed consent.

### 2.2. Measures

ET patients underwent the Fahn-Tolosa-Marin tremor rating scale (TRS)[13] examination to evaluate the severity of the disorder. The depressive symptoms of ET patients and control groups were rated by two fellowship-trained neurologists using the MADRS scale. The consistent reliability kappa coefficient between them was 0.89. The MADRS is a 10-item clinician rating scale of depressive symptoms. Each item of MADRS is scored on a 7-point scale (0–6) (range: 0–60). Higher scores represent higher levels of depression. The scale has been shown to be a valid and reliable measure of depression in movement disorders such as Parkinson's disease,[14,15] dystonia[16,17] and post-stroke depression.[18,19] In addition, the scale is unidimensional and not confounded by somatic or psychomotor symptoms.[20,21] Thus, we applied this rating scale to assess the depressive symptoms in the ET group and MD group.

### 2.3. Analyses

Differences between ET and MD groups on baseline characteristics were tested using Student's *t*-tests and chi-squared ($\chi^2$) tests. Normally distributed continuous variables were compared by the Student's *t*-test. Chi-squared tests were used for categorical variables. The relationship between MADRS subitems and the sum score was calculated by Pearson correlation coefficients to assess whether somatic symptoms (e.g. concentration difficulties and lassitude) represent depression rather than physical dysfunction. Correlation of motor symptom severity in ET and MADRS score was analyzed also using Pearson correlation coefficients. The MADRS subitems were examined between groups using covariance analysis. Considering the age differences between the two groups, these variables were used as covariates in an analysis of covariance. Statistical analyses were performed using the Statistical Package for the Social Sciences version 13.0 (SPSS, Chicago, IL, USA). All statistical tests were two-sided and conducted at $p = 0.05$.

## 3. Results

Of the recruited 115 ET patients, 18 ET patients with comorbidity of dementia were excluded from the study. From the remaining 97 cognitively intact ET patients, 36 ET patients with a MADRS score <7 were excluded. There were 10 patients with ET who fulfilled the criteria for MD in the 97 cognitively intact ET patients. Finally, 61 patients with ET and 112 control (MD) subjects fulfilled the inclusion criteria. Table 1 shows the demographic and clinical characteristics of these patients. The patients in ET group were older than the control group ($p < 0.05$). There was no significant difference in gender composition, total MADRS score and MMSE score between ET group and the control group. Only 16.39% of mildly depressed patients with ET in the present study fulfilled MD criteria. Although all control subjects fulfilled MD criteria, some of them were in partial remission at the time of assessment.

Fifteen (24.6%) depressed patients with ET received antidepressants (11.5% fluoxetine, 9.8% paroxetine and 3.3% citalopram), whereas 99 (88.4%) of the controls took antidepressants (18.8% fluoxetine, 17.0% paroxetine, 11.6% fluvoxamine, 9.8% sertraline, 9.8% citalopram, 8.0% venlafaxine, 7.1% trazodone, 6.3% mirtazapine). In addition, 22 (36.1%) ET patients included in our study received antitremor drugs whereas the depressed patients in the control group were not treated with antitremor drugs. Beta-blockers (13.1% propranolol and 13.1% metoprolol) or anticonvulsant (6.6% primidone and 3.3% gabapentin) were offered to ET patients.

The score of all MADRS subitems positively correlated with total MADRS score in both groups (Pearson coefficient *r* range 0.389–0.898, all *p* values <0.001). The mean scores of MADRS subitems in the two groups are shown in Table 2. To assess whether the pattern of depression symptoms was different between the two groups, the MADRS subitems between groups were examined using analysis of covariance. To exclude the bias of a significant age difference between the two groups, age was used as covariate

**Table 1**
Demographic and clinical characteristics of the patients with depressive symptoms with and without essential tremor (ET)

| | Depressed ET ($n = 61$) | Depressed non-ET ($n = 112$) | Test statistic | *p* value |
|---|---|---|---|---|
| Mean age (yrs) (SD) | 50.26 (16.40) | 44.43 (12.35) | $t = 2.425$ | 0.017 |
| Male *n* (%) | 28 (45.90%) | 48 (42.85%) | $x^2 = 0.1486$ | 0.700 |
| MADRS sum mean (SD) | 16.65 (6.47) | 18.48 (7.63) | $t = -1.585$ | 0.115 |
| MMSE mean (SD) | 26.52 (1.75) | 27.04 (1.67) | $t = -1.927$ | 0.056 |
| MD at assessment *n* (%) | 10 (16.39%) | 112 (100%) | $x^2 = 102.390$ | <0.001 |
| TRS mean (SD) | 27.08 (12.17) | – | | |

ET = essential tremor, MD = major depressive disorder, SD = standard deviation, TRS = tremor rating scale.

**Table 2**
Distribution of MADRS item scores in patients with depressive symptoms with and without essential tremor (ET)

| MADRS item | Depressed ET mean (SD) | Depressed non-ET mean (SD) | *F* value | *p* value |
|---|---|---|---|---|
| Apparent sadness | 2.16 (1.05) | 2.42 (1.10) | 1.976 | 0.198 |
| Reported sadness | 2.16 (1.16) | 2.75 (1.30) | 7.658 | 0.006 |
| Inner tension | 1.80 (1.10) | 2.06 (1.15) | 2.126 | 0.147 |
| Reduced sleep | 1.89 (0.90) | 2.12 (0.98) | 2.783 | 0.097 |
| Reduced appetite | 1.20 (0.75) | 1.39 (0.98) | 2.219 | 0.138 |
| Concentration difficulties | 2.03 (0.84) | 1.60 (0.87) | 9.581 | 0.002 |
| Lassitude | 2.15 (0.54) | 1.87 (0.66) | 7.571 | 0.007 |
| Inability to feel | 1.51 (0.74) | 1.88 (0.75) | 10.638 | 0.001 |
| Pessimistic thoughts | 1.43 (0.94) | 1.76 (0.77) | 5.594 | 0.019 |
| Suicidal thoughts | 0.48 (0.81) | 0.63 (0.98) | 1.037 | 0.310 |

An analysis of covariance was used for statistical analysis, using age as covariate. SD = standard deviation, MADRS = Montgomery-Asberg Depression Rating Scale.