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Research Article

What Domains of Quality of Life are Risk Factors for Depression in Patients with Epilepsy?

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Abstract

Depression affects quality of life (QOL) in patients with epilepsy, but this study investigated which domains of QOL represent risk factors for depression. Ninety-two patients were asked to complete the Quality of Life Inventory in Epilepsy-31-P (QOLIE-31-P) as a QOL questionnaire, the Side Effects and Life Satisfaction (SEALS) inventory to identify effects of antiepileptic drugs on cognition, and the Neurological Disorders Depression Inventory for Epilepsy (NDDI) for rapid screening of depression. Significant factors were entered into logistic backward elimination to investigate risk factors for depression. Major depression was seen in 18 of the 92 patients (19.6%). No significant differences were seen between depression and non-depression groups in seizure-related or demographic variables. However, NDDI score correlated with frequency of complex partial seizure. Energy/Fatigue and Emotional Well-Being subscales in QOLI-31-P and the Worry subscale in SEALS remained as QOL factors impacting on depression. Mean onset of depression was approximately 4 years before the time of the investigation. QOL subscales representing risk factors for depression were not seizures, but health-related QOL factors in QOLIE-31-P and SEALS. Confirmation of these scores may facilitate the management of depression and the achievement of better QOL in patients with epilepsy.

Keywords: Epilepsy; Depression; QOLIE-31-P; SEALS; NDDI

Abbreviations

QOL: Quality of Life; QOLIE-31-P: Quality of Life Inventory for Epilepsy-31-P; SEALS: Side Effects and Life Satisfaction Inventory; NDDI: Neurological Disorders Depression Inventory for Epilepsy; AED: Antiepileptic Drug; CPS: Complex Partial Seizure; HRQOL: Health-Related QOL; SF-36: Medical Outcomes Study Short Form; HADS: Hospital Anxiety and Depression Scale

Introduction

The prevalence of depression is higher in patients with epilepsy than in the general population, with the lifetime prevalence of depressive disorder increasing to approximately 30% [1]. Although some discussions have examined whether relationships between seizure frequency or control and depression are relevant [2-6], seizure severity has been considered as a more important factor for depression than seizure frequency [7,8]. On the other hand, depression reportedly has a greater effect than seizure frequency on quality of life (QOL) [9,10]. Many studies have identified depression as a significant determinant of QOL [11-14]. One study reported that risk factors for depression emerged as seizure worry and social functioning subscale in Quality of Life Inventory for Epilepsy-31 (QOLIE-31) [15]. The present study investigated which domains of QOL most impact on depression.

Methods

From May to December 2013, a total of 202 patients visited the epilepsy clinic in the department of psychiatry at Nagoya City University Hospital. Exclusion criteria were intellectual disability (n=78), dementia (n=11), pregnancy (n=1), severe psychosis (n=1), psychogenic seizures (n=3), and visit of a family member (n=5). Another 11 patients declined to complete the questionnaires. As a result, 92 patients were eligible for this study. These patients were diagnosed as according to the International League Against Epilepsy classification of seizures and epileptic syndromes [16,17]. They completed the modified version of the QOLIE-31 (QOLIE-31-P) [18,19] as a measure of QOL, the Side Effects and Life Satisfaction Inventory (SEALS) [20] as an indicator of the cognitive side effects of antiepileptic drugs (AEDs), the Neurological Disorders Depression Inventory for Epilepsy (NDDI) [21] for the detection of major depression. Demographic and seizure-related variables were also examined. The diagnosis of major depression in patients with NDDI score >16 was determined by a psychiatrist through a clinical interview in accordance with the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders [22]. QOLIE-31-P was widely used to indicate QOL in patients with epilepsy [18]. SEALS was developed to identify the effects of AEDs on cognition and affect, and was available as a QOL measure complementary to QOLIE-31 [23,24]. Cross-sectional data were analyzed as described below. This study was relatively small and naturalistic. The small sample size meant that a normal distribution of data could not be guaranteed. Group differences were investigated using the chi square test and Mann-Whitney U test. To identify the subscales in QOLIE-31-P and SEALS associated with depression, the significant parameters were inserted into the backward elimination method. Values of $P<0.05$ were considered statistically significant. Data analysis was performed using PASW Statistics version 18. The ethics committee of Nagoya City University Medical School approved the study protocol. Written informed consent to participate in this study was obtained from all

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Table 1: Demographic variables, seizure-related variables, QOLIE-31-P and SEALS in depression and non-depression groups.

	Depression group (n=18)	Non- depression group (n=74)	p
Age (years)**	42.5 (16.4)	45.3 (14.7)	0.49
Sex (male/female)*	10/8	33/41	0.44
NDDI**	18.4 (1.89)	10.0 (3.0)	<0.001
Duration of education (years)**	12.2 (2.5)	12.5 (2.4)	0.58
Age at diagnosis (years)**	22.9 (18.9)	18.1 (15.3)	0.31
Duration of epilepsy (years)**	19.6 (15.6)	27.9 (15.2)	0.08
Symptomatic partial/primary generalized*	17/1	59/15	0.18
Complex partial seizure (CPS)*	10	34	0.60
Frequency of CPS (at least once a month)*	1	5	1.00
Frequency of CPS (at least once a year)*	6	16	0.72
Secondary generalized seizure*	12	41	0.44
Simple partial seizure*	7	27	1.00
Absence seizure*	1	5	0.67
Myoclonic seizure*	0	4	0.41
Tonic seizure*	0	1	0.80
Tonic-clonic seizure*	0	6	0.26
EEG abnormality*	7	41	0.29
Number of AED**	1.9 (1.1)	1.6 (1.0)	0.17
Marital status*	10	38	0.80
Childbirth*	3	19	0.55
Full-time work*	7	29	1.00
Part-time work*	1	7	1.00
Sheltered work*	1	0	0.20
Student*	1	2	0.48
Unemployed*	3	17	0.75
Housewife*	2	13	0.73
Retired*	3	6	0.37
QOLIE-31-P			
QOLIE overall score**	46.9 (11.8)	73.9 (15.4)	<0.001
Energy/Fatigue**	36.1 (15.7)	64.9 (19.6)	<0.001
Emotional Well-Being**	36.2 (15.7)	71.0 (18.0)	<0.001
Social Functioning**	57.2 (19.0)	79.8 (21.3)	<0.001
Cognitive Functioning**	54.9 (21.8)	82.2 (20.9)	<0.001
Medication Effects**	56.0 (24.7)	74.7 (23.6)	0.003
Seizure Worry**	44.8 (28.5)	68.6 (24.5)	0.001
Overall Quality of Life**	36.1 (13.9)	62.4 (16.2)	<0.001
SEALS			
SEALS overall score**	54.8 (16.3)	34.1 (14.1)	<0.001
Cognition**	52.0 (21.4)	27.0 (20.5)	<0.001
Dysphoria**	50.0 (16.29	44.5 (16.7)	0.21
Tiredness**	50.1 (25.6)	35.2 (19.7)	0.014
Temper**	56.3 (24.2)	30.3 (21.3)	<0.001
Worry**	80.3 (15.9)	45.2 (22.9)	<0.001

*, Results of chi square analysis; **, Results of Mann-Whitney U test

NDDI: Neurological Disorders Depression Inventory for Epilepsy; QOLIE-31-P, Quality of Life Inventory for Epilepsy-31-P; SEALS: Side Effects and Life Satisfaction Inventory; AED: Anti Epileptic Drug

patients prior to enrolment.

Results

Depression was identified in 18 of 92 patients (19.6%). The current episode in all subject fulfilled the criteria for unipolar major depression as described by DSM4. No differences between depression and non-depression group were evident in terms of seizure-related and demographic variables (Table 1). However, a correlation was seen between NDDI and frequency of CPS (more than once per year) (Spearman's rho=0.22, p=0.035) after controlling for age and sex. Overall scores and scores in each subscale for QOLIE-31-P and SEALS were worse in the depression group than in the non-depression group, with the exception of the Dysphoria subscale in SEALS (Table 1). Logistic backward elimination revealed the QOL subscales of lower Energy/Fatigue and Emotional Well-Being in the QOLIE-31-P and the higher Worry subscale in SEALS (Tables 2,3) had the most impacts on depression. These analyses were not controlled by seizure frequency, which was not a significant factor for depression. Two patients did not complete SEALS. Brain magnetic resonance imaging was inspected for 69 of the 92 patients. Seven of the 18 patients with depression were taking antidepressants or major tranquilizers at the time of the study. In the depression group, mean (standard deviation (SD)) time from onset of epilepsy to onset of depression was 15.7 (16.8) years and the duration of epilepsy at the time of investigation was 19.6 (15.6) years. Two patients showed depression preceding the onset of epilepsy. Four patients were newly diagnosed with depression in this investigation. The AEDs taken by patients are shown in Table 4.

Discussion

This study identified the Energy/Fatigue and Emotional Well-Being subscales of QOLIE-31-P and the Worry subscale in SEALS as risk factors for depression. No differences between depression and non-depression groups were seen in seizure-related variables, but a linear relationship between NDDI and CPS frequency was identified.

The Energy/Fatigue and Emotional Well/Being subscales of QOLIE-31-P were derived from the Medical Outcomes Study Short Form (SF-36) as a health-related QOL (HRQOL) questionnaire [25]. Furthermore, patients with a depressive disorder reportedly show low SF-36 scores [26] and the time course for improvement in health-related QOL lags behind symptom improvement [27]. These observations appear to support the importance of the HRQOL score in QOLIE-31-P, including depressive symptoms. The Worry subscale score in SEALS was derived from the anxiety scale from the Hospital Anxiety and Depression Scale (HADS) [20]. The anxiety scale of HADS impacted more than seizure control on QOLIE-31 overall score [28]. The Worry subscale in SEALS thus seems to be supported as a risk factor for depression.

Table 2: Results of logistic analysis with backward elimination of QOLIE-31-P subscales predicting depression.

	Beta coefficient	Wald	p	Odds	95%CI
Energy/Fatigue	-0.072	4.90	0.027	0.93	0.87-0.99
Emotional Well-Being	-0.102	9.98	0.002	0.90	0.85-0.96

R^2=0.65, p<0.0001, CI; Confidence Interval

Table 3: Results of logistic analysis with backward elimination of SEALS subscales except the Dysphoria subscale predicting depression.

	Beta coefficient	Wald	p	Odds	95%CI
Worry	0.08	17.9	<0.0001	1.08	1.04-1.02

R^2=0.48, p<0.0001, CI; Confidence Interval

Table 4: Antiepileptic drugs used by patients in this study.

Antiepileptic drug	Number of patients (%)
Carbamazepine	30 (32.6%)
Valproate	24 (26.1%)
Phenytoin	18 (19.6%)
Phenobarbital	18 (19.6%)
Levetiracetam	11 (12.0%)
Clonazepam	10 (10.9%)
Lamotrigine	10 (10.9%)
Clobasam	6 (6.5%)
Topiramate	6 (6.5%)
Zonisamide	5 (5.4%)
Primidone	4 (4.4%)
Acetazolamide	1 (1.1%)
Diazepam	1 (1.1%)
Ethosuximide	1 (1.1%)
Sulthiame	1 (1.1%)

Some limitations to this study need to be discussed. Zhao reported Seizure Worry and Social Functioning subscales of QOLIE-31 as risk factors for depression [15]. However, our epilepsy clinic is not a tertiary epilepsy center, but rather the psychiatry department at a university hospital. As a result, our sample contained relatively few patients with CPS more than once a week or primary generalized epilepsy. We also did not investigate seizure severity. This study was cross-sectional in design and did not include an inception cohort for depression. The depression group generally first suffered from depression about 4 years before the start of this investigation, which might have affected the health-related subscales of the QOLIE-31-P. In cases with the same seizure frequency, QOL score might differ between patients with chronic depressive episodes compared to those with acute depressive episodes. In the future, analysis of seizure severity and inception cohort analysis for depression need to be included.

Conclusion

The greatest impacts of QOL subscales on depression in patients with epilepsy were the lower Energy/Fatigue and Emotional Well-Being scores in QOLIE-31-P and the higher Worry score in SEALS. Confirmation of these scores may facilitate the management of depression and the achievement of better QOL for patients with epilepsy.

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