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Research Article

Hospital Anxiety and Depression Scale (HADS) Test for Balance Disorder Patients

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Abstract

Introduction: The Hospital Anxiety and Depression Scale (HADS) was developed by Zigmond and Snaith in 1983. HADS is a widely-used 14-item self-reported scale designed to briefly measure anxiety and depressive symptoms in non-psychiatric hospital patients. HADS only takes 2 to 5 minutes to complete. There are independent subscales for anxiety and depression.

Materials and Methods: We performed the HADS test on 25 balance disorder patients, and then investigated relationships between their HADS scores and their prognoses based upon their medical records. The 25 patients underwent the HADS test and an equilibrium test. We categorized positive (>12) and negative (<11) on the HADS test. We also categorized their prognoses into 4 categories: "cure"; "improved"; "unchanged"; and "deteriorated".

Results: Thirteen patients (52%) showed positive results, and twelve patients (48%) showed negative results, on the HADS test. Seven (53.8%) of the 13 patients who demonstrated HADS test positive result showed "cure" or "improved" prognoses, while the eleven (91.7%) of the 12 patients who demonstrated HADS test negative result showed "cure" or "improved" prognoses.

Conclusions: Screening of patents with dizziness to check for depression and anxiety with the use of HADS was useful in the treatment and prognosis assessment of dizziness.

Keywords: Anxiety; Depression; HADS; Balance Disorder

Introduction

Dizziness is deeply associated with depression and anxiety [1-3]. According to the prevailing view, depression and anxiety associated with dizziness can be viewed as symptoms of adaptive disorders under stress, rather than as pure depression or anxiety disorder [4]. Staab and Ruckenstein classified patients with psychiatric disease (e.g., depression and anxiety disorder), complaining of chronic dizziness, into three patterns (psychogenic, otogenic and interactive) and reported association between psychiatric disease and abnormal vestibular function [3]. Psychogenic dizziness in the narrower sense of the term indicates the psychogenic pattern, i.e., dizziness appearing as a symptom of psychiatric disease. However, there are also cases where mental factors adversely affect the organic vestibular disorder, causing aggravation of dizziness (otogenic pattern or interactive pattern). Therefore, assessment of anxiety and depression seems to play an important role in the diagnosis and treatment of otorhinolaryngological diseases.

Zigmond and Snaith., *et al*. developed a simplified tool for interview, enabling simultaneous judgment as to depression and anxiety, Hospital Anxiety and Depression Scale (HADS; 14 items) [5]. This tool has been translated into Japanese [6]. Using this tool, we recently conducted screening of depression and anxiety and evaluated the usefulness of this questionnaire.

Materials and Methods

Subjects

We reviewed medical records of patients who visited our department, complaining of dizziness, between January and May 2010, retrospectively. Twenty-five consecutive cases having received the equilibrium test at our outpatient dizziness clinic were interviewed using HADS during the test. Analysis was conducted of the presence/absence of anxiety and depression, balance function, treatment provided and prognosis.

HADS

The cut-off HADS score for screening of neuropsychiatric disease at the department of otorhinolaryngology was set at 12, referring to the report by Hosaka., *et al*. [7] and patients with the score 12 or more were deemed as HADS positive and the patients with the score less than 12 as HADS negative.

Equilibrium test

The equilibrium tests included posturography [8] to examine the body balance, Schellong test [9,10] to examine orthostatic dysregulation, nystagmus test with infrared CCD camera to examine vestibulo-ocular reflex , ENG recording for bithermal caloric test to examine utricle-superior vestibular nerve function and measurement of cervical vestibular evoked-myogenic potential (VEMP) to examine saccle-inferior vestibular nerve function. Posturography using EN2102 stabilometer (NEC Medical Systems, Tokyo, Japan), Schellong test, and nystagmus observation were conducted were conducted as described previously [11,12]. Caloric test using ENG recoding (NEC Medical System, Tokyo, Japan) and cVEMP measurement using Neuropack (Nihon Kohden, Tokyo, Japan) were conducted as described previously [13,14]. In the posturography, the mean area around the outer circumference and the mean Romberg ratio [8] of total locus length were compared between the HADS positive group and the HADS negative group. In the Schellong test, the positive rate [(number of positive patients/total number of patients) x 100)](%) was compared between the two groups, in accordance with the criteria reported by Okuni., *et al*. [9]. In the nystagmus test, patients showing nystagmus with each head position or change of head position were deemed as positive, and the positive rate [(number of positive patients/total number of patients) x 100] (%) was compared between the two groups. In the bithermal caloric test, the difference in maximum slow phase velocity between two sides was divided by the sum total of maximum slow phase velocity on both side, to yield canal paresis (CP, %) [10] and mean CP was compared between the two groups. Regarding to cVEMP, he difference in amplitude of peak p13–peak n23 between two sides was divided by the sum total of amplitude on both side, to yield the interaural amplitude difference (IAD) ratio [15].

Treatment and prognosis

Oral benzodiazepine (BZD, anti-anxiety drug) therapy was used for treatment. The prognosis was rated on a four-category scale: cure (complete disappearance of dizziness), improved (dizziness remaining slightly but alleviated to a negligible level), unchanged (no alleviation in dizziness) and deteriorated (exacerbation of dizziness). Cases rated as "cure" or "improved" were deemed as the improved group, and cases rated as "unchanged" or "deteriorated" were deemed as the non-improved group for further comparison and analysis.

Statistical analysis

Statistical analysis employed Mann-Whitney U-test and Fisher's exact test because of all data were not normally distributed. A p-value < 0.05 was considered statistically significant. Evaluation was determined as "not applicable" if the calculated sample size following data collection was insufficient for statistical analysis. All statistical analyses were performed using GraphPad Prism version 8.0.0 for Windows (GraphPad Software, San Diego, CA). Researchers were blinded to study groups during data analysis.

Results

Demographic information

The duration of observation was 14-140 days (mean: 56.3 ± 39.8 days). There were 12 males and 13 females aged between 14 and 78 (mean: 56.3 ± 16.5 years). The most frequent chief complaint was "feeling of motion" (13 cases), followed by "floating sensation" (7 cases) and "rotating sensation" (5 cases). Major diseases responsible for dizziness were Meniere's disease (19 cases), benign paroxysmal positional vertigo (BPPV) (3 cases), vestibular neuritis (3 cases).

Presence/absence of depression and anxiety

Of the 25 patients, 13 patients were HADS positive. The 13 HADS positive patients consisted of 8 males and 5 females aged between 33 and 78 (mean: 59.5 ± 14.5 years). The chief complaint was "feeling of motion" in 7 cases, "floating sensation" in 4 cases and "rotating sensation" in 2 cases. Major conditions responsible for the complaint were Meniere's disease (9 cases), BPPV (2 cases), vestibular neuritis (1 case). The duration of sickness for the HADS

positive group was 36 ± 48.6 weeks. The 12 HADS negative patients consisted of 4 males and 8 females aged between 14 and 71 (mean: 52.8 ± 18.3 years). The chief complaint was "feeling of motion" in 6 cases, "floating sensation" (3 cases) and "rotating sensation" in 3 cases. Major conditions responsible for the complaint were Meniere's disease (10 cases), BPPV (1 case), vestibular neuronitis (1 case). The duration of sickness for the HADS negative group was 12.9 ± 21.3 weeks. Those information are shown in table 1.

	HADS+	HADS-
Number	**13**	**12**
Age(y.o)	59.5 ± 14.5 (range 33-78)	52.8 ± 18.3 (range 14-71)
Sex (M:F)	8:5	4:8
Chief complaints		
Feeling of motion	7	6
Floating sensation	4	3
Rotating sensation	2	3
Diseases	Meniere disease9	Meniere disease10
	BPPV2	BPPV1
	Vestibular Neuritis2	Vestibular Neuritis1

Table 1: Demographic information and presence/absence of depression and anxiety.

Balance function

In the equilibrium test, none of the parameters analyzed differed significantly between the HADS positive group and the HADS negative group or between the improved group and the non-improved group (Table 2).

Treatment

None of the HADS negative patients received treatment with any anti-anxiety drug. In the HADS positive group, an anti-anxiety drug was used for one case rated as "cure," 5 cases rated as "improved" and 1 case rated as "unchanged." Thus, in the HADS positive group composed of 7 improved cases and 6 non-improved cases, anti-anxiety drug treatment was administered to 85.7% (6/7) of the improved cases while it was administered to only 16.7% (1/6) of the non-improved cases. This difference between improved and non-improved cases in the HADS positive group was statistically significant (p = 0.02, Fisher's exact test, Table 3).

		HADS (+)	HADS (-)	p value
Caloric test (CP%*) (± SD)		34.7 ± 25.8	20.2 ± 28.3	0.19[a]
Nystagmus positive rate** (%)		30.7	60.0	0.14[b]
Schellong test positive rate*** (%)		38.4	60.0	0.26[b]
Posturography (Romberg rate)	Area(± SD)	3.12 ± 1.58	2.06 ± 1.11	0.07[a]
	Length (± SD)	2.00 ± 0.39	1.74 ± 0.63	0.23[a]
VEMP IAD rate****(± SD)		0.13 ± 0.37	0.03 ± 0.43	0.54[a]

Table 2: Comparisons of both groups in equilibrium test.

*: CP%=(|rt MVS-lt MVS|)/(rt MVS+lt MVS)×100, MVS: Max Velocity Speed.

**: Nystagmus rpositive rate(%)=(number of positive patients/total number of patients) x 100)

***: Schellong test positive rate(%)=(number of positive patients/total number of patients) x 100)

****: IAD rate=(rt +lt amplitude)/(rt-lt amplitude)

a: Mann-Whitney U test, b: Fisher's exact test.

	Treatment (+) (n = 7)	Treatment (-) (n = 6)
Improved Groups	6	1
Non-Improved Groups	1	5

Table 3

Prognosis

Of the 13 HADS positive patients, 1 was rated as "cure," 6 as "improved" and 6 as "unchanged." Among the 12 HADS negative patients, the prognosis was "cure" in 8 cases, "improved" in 3 cases and "unchanged" in 1 case. Thus, in the HADS positive group, 7

cases were improved and 6 cases were non-improved. In the HADS negative group, 11 cases were improved and 1 case was non-improved. Thus, the prognosis (alleviation of dizziness) differed significantly between the HADS positive group and the HADS negative group ($p = 0.04$, Fisher's exact test, Table 4).

	HADS (+)	HADS (-)
Improved Groups (n = 18)	7	11
Non-Improved Groups (n = 7)	6	1

Table 4: Prognosis after treatment.

Discussion

HADS is a self-reported anxiety/depression test developed by Zigmoid and Snaith [5]. It was developed as a means of evaluating the anxiety and depression in patients presenting with physical symptoms. It is a simple questionnaire, consisting of only 14 items and taking only about 2-5 minutes for entry. This test is regarded to be suitable for use during outpatient care and health checkup for which only limited time is available. This test has been translated into Japanese [6] and has been utilized in various fields, yielding favorable outcomes as a means of screening. Hosaka., *et al*. reported that diagnosis of neuropsychiatric disease in patients with otorhinolaryngological diseases on the basis of HADS has a sensitivity of 92% and a specificity of 90% if the HADS score is over 12 [7]. Strictly saying, examination by psychiatrists is indispensable for the diagnosis of psychiatric disease, the scores with various questionnaires also allow estimation of psychiatric disease with considerably high accuracy, and this approach is convenient for us clinicians, since it does not necessitate patient referral to psychiatric department for the purpose of diagnosis.

In the present study, we conducted screening of depression and anxiety using HADS, and evaluated the usefulness of this questionnaire. Among the 25 consecutive cases visiting our department and receiving equilibrium test with a complaint of dizziness, 52% (13/25) were HADS positive. This HADS positive rate was slightly lower than the rate (70%, 21/30) reported by Horii., *et al*. [16].

In analysis of the duration of sickness before the test and the prognosis (alleviation of dizziness), two parameters differed significantly between the HADS positive group and the HADS negative group. This suggests that patients complaining of dizziness often have complication by psychiatric disease, which probably leads to persistence and intractable course of dizziness.

Benzodiazepine (BZD, an anti-anxiety drug) was used for treatment. In the HADS positive group, the patients having received anti-anxiety drug treatment was 6/7 in "improved" group (85.7%), and 1/6 in "non-improved" group (16.7%), showing significantly difference between two groups. This result suggests that the improvement rate will get higher among patients with dizziness complicated by psychiatric disease if anti-anxiety drug therapy is administered. Similar to the report by Horii., *et al*. [16], the present study revealed no disease specificity of dizziness when comparison was made between the HADS positive group and the HADS negative group. We may therefore say that drug therapy at outpatient otorhinolaryngological department should be started as far as possible in cases where HADS is positive and depression or a anxiety is noted, regardless of the presence/absence of any particular disease. In this connection, Horii., *et al*. [4] reported that in cases where such drug therapy is not effective, the chief complaint is shifted to other unidentified complaints or an attempt of suicide has been made and so on, the patient needs to be immediately referred to psychiatrists.

Patients complaining of dizziness often have psychiatric disease, which probably leads to persistence or intractable course of dizziness. Cases suspected of having complication by psychiatric disease require active treatment of such complication, regardless of the presence/absence of organic disease.

Conclusions

- Screening of patents with dizziness to check for depression and anxiety with the use of HADS was useful in the treatment and prognosis assessment of dizziness.
- It is essential for otorhinolaryngologists to evaluate the mental status of patients with dizziness and to treat psychiatric disease actively if complication by such disease is suspected.

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