

Clinical Analysis of Dizzy Patients with High Levels of Depression and Anxiety

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Background and Objectives: Some patients experiencing dizziness also report psychological distress. However, the association between vestibular deficits and psychological symptoms remains controversial. Thus, the aim of this paper is to report the proportion of patients who complained of dizziness who also had high depression and anxiety indices. Also we investigated the severity of their dizziness and the distribution of the diseases underlying this symptom. **Subjects and Methods:** We assessed the dizziness and psychological distress of 544 patients experiencing dizziness using the Korean versions of the Dizziness Handicap Inventory (DHI), the Beck Depression Inventory (BDI), and the Spielberger State-Trait Anxiety Inventory (STAI). We also reviewed the audio-vestibular symptoms of patients with high levels of depression and anxiety. **Results:** The incidences of high depression and anxiety scores were 11% (60/544) and 18% (98/544), respectively. Patients with vestibular migraine were most likely to have high depression and anxiety indices. Patients in the high-BDI or high-STAI groups (117/544) obtained significantly higher DHI scores than those in neither the high-BDI nor the high-STAI group (427/544). We noticed that about 20% of the patients experiencing dizziness had high levels of psychological distress in this study; this group also suffered from various vestibular diseases and more symptoms of dizziness. **Conclusions:** The results of the study suggest that psychological evaluation should be considered when assessing patients with vertigo.

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KEY WORDS: Dizziness · Anxiety · Depression.

Introduction

Dizziness is a common complaint in the primary care setting and ranks among the most common reasons for consultation and referral to specialist care [1]. The vestibular system, which is the most common source of dizziness, works at a subconscious level. It serves many purposes related to oculomotor control, balance regulation, and perception of self-motion; has widespread cortical connections; and is multimodal in that it integrates vestibular, proprioceptive, and visual inputs [2,3]. Dysfunction in the vestibular system can lead to a wide range of symptoms, ranging from simple symptoms, such as

vertigo and visual and balance issues, to problems with emotion, memory, and self-perception [4].

A large percentage of patients with vestibular vertigo develop secondary psychiatric disorders over the course of their disease [5]. Because vestibular deficits are risk factors for the development of secondary psychiatric disorders [6], a somatopsychic hypothesis has been suggested. Conversely, patients with psychiatric disorders often report dizziness as a concomitant phenomenon in their illness [7]. This linkage of vestibular and psychiatric symptoms in patients with dizziness is the subject of an ongoing debate [8]. Moreover, psychological factors, such as anxiety and depressive disorders, may affect clinical presentations and therapeutic outcomes in patients with vestibular and balance complaints [9]. However, previous studies have focused only on the points of comorbidity between vestibular disease and psychiatric distress or

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on the mutual influence between the two disease entities [5-8,10,11].

This study investigated the incidences of high depression and anxiety indices in a relatively large sample of patients experiencing dizziness and analyzed the severity of their dizziness and the distribution of the conditions underlying this symptom.

Subjects and Methods

This prospective study, which was conducted among patients experiencing dizziness. Ethical approval was obtained by the Hallym University Institutional Review Board (IRB no. 013-098). Patients were thoroughly informed about this study. Informed consent was obtained from the patients before enrolment of patients.

Subjects

In total, 544 patients who complained of dizziness on visiting Hallym University Chuncheon and Dongtan Sacred Heart Hospital between January 2011 and May 2015 were included in the study. We excluded patients with central vertigo, a history of a previous psychological disorder, or suspicion of psychogenic dizziness.

All participants underwent a detailed diagnostic procedure consisting of clinical, neurological, and otological examinations. The vestibular function tests included positional, positioning maneuvers, a caloric test, and pursuit, saccadic, and optokinetic tests. Additionally, audiological tests, a complete blood count, and blood chemistry tests were performed.

Assessment of vestibular and psychological symptoms

Patients' dizziness and psychological symptoms were also measured using the Korean versions of the Dizziness Handicap Inventory (DHI), the Beck Depression Inventory (BDI), and the Spielberger State-Trait Anxiety Inventory (STAI). These scales were completed at the first visit. The Korean versions of these scales are translations of the original English text into Korean.

The DHI is a self-administered scale addressing the self-perceived handicapping effects of vestibular disease [12]. The BDI is a 21-item self-report scale developed to measure depressive symptoms. Response categories range from 0 (not at all) to 3 (very much), and total scores range from 0 to 63. A score >21 is considered to be depressive clinically [13]. The STAI scale measures four levels of anxiety, ranging from 1 (not at all) to 4 (very much), and the results are summed to yield a score between 20 and 80. A cut-off score of 55 is used to indicate clinically significant symptoms that reflect a state

of anxiety [14]. Thus, we defined high depression and anxiety indices as a BDI score ≥ 21 and a STAI score ≥ 55 , respectively, and we classified patients experiencing dizziness with high BDI and STAI indices into high-BDI and high-STAI groups, respectively, and patients who were not included in the high-BDI or the high-STAI group were classified into the relatively normal group.

We also examined the proportion of patients with high depression and high anxiety indices (high-BDI/high-STAI group) who also experience dizziness and identified their clinical symptoms.

Statistical analysis

The χ^2 test for independence was used to compare the rates of patients with high depression and anxiety indices by disease entity, and the Kruskal-Wallis test was used for comparisons of dizziness symptoms among groups. We used the SPSS software (ver. 17.0; SPSS Inc., Chicago, IL, USA), and a *p* value <0.05 was considered to indicate statistical significance.

Results

The sample included 544 patients with an average age of 46.3 ± 14.78 years; the male-to-female ratio was 155:389. The distribution of the disease entities underlying the symptoms of dizziness is presented in Table 1. Patients with orthostatic dizziness, sudden hearing loss with vertigo, recurrent vestibulopathy, non-specific dizziness, and post-traumatic dizziness were included in the 'other' group.

The incidences of patients with high depression and anxiety indices were 11.0% (60/544) and 18.0% (98/544), respectively. The number of patients with high BDI and/or high STAI scores was 117 (21.5%). Of these 117 patients, 41 (7.5%) had both high BDI and high STAI scores (high-BDI/high-STAI group), 19 (3.5%) had only a high BDI score (only high-BDI group), and 57 (10.5%) had only a high STAI score (only

Table 1. Demographics of dizzy patients

Parameters	n (%)*
Age (years)	46.3 ± 14.78 (12-80)
Male:female	155:389
Causes of dizziness	
BPPV	196 (36.0)
Vestibular neuritis	60 (11.0)
Meniere's disease	66 (12.1)
Vestibular migraine	89 (16.4)
Others	133 (24.5)
Total	544 (100)

*unless otherwise indicated. BPPV: benign paroxysmal positional vertigo

high-STAI group). In total, 427 (78.5%) patients did not have a high BDI or a high STAI index and placed in the relative normal group (Table 2).

The distribution of patients with high BDI and high STAI indices according to underlying disease revealed no significant differences among the disease entities; however, patients with vestibular migraine showed the highest rates of having both high BDI and STAI indices. In terms of having a high BDI index, vestibular migraine was followed by Meniere’s disease, other, and vestibular neuritis; in terms of having a high STAI index, vestibular migraine was followed by vestibular

neuritis, other, and Meniere’s disease (Table 3).

The DHI scores, including the functional, emotional, and physical subscales, of the high-BDI or high-STAI group were significantly higher than those of the relatively normal group (Table 4). Our comparison of the high-BDI/high-STAI, only high-BDI, only high-STAI, and relatively normal groups revealed significant differences among the four groups with regard to total and subscale scores on the DHI. The high-BDI/high-STAI, high-BDI, and high-STAI groups all obtained significantly higher DHI and subscale scores than the relatively normal group. Among these three groups, the high-BDI/high-STAI groups obtained higher total and subscale scores on the DHI than the only high-STAI group (Table 5).

Table 2. Incidence of patients with high depression and anxiety index

Group	n (%)
High BDI group	60 (11.0)
High STAI group	98 (18.0)
High BDI or STAI group	117 (21.5)
High BDI and STAI	41 (7.5)
Only high BDI	19 (3.5)
Only high STAI	57 (10.5)
Relative normal group	427 (78.5)
Total	544 (100)

BDI: Beck Depression Inventory, STAI: Spielberger State-Trait Anxiety Inventory

Discussion

There is a complex interaction between vertigo and psychological distress. In some individuals, vertigo may lead to psychological distress, whereas the reverse appears to be true in others in that their psychological distress manifests as vertigo or dizziness. Patients tend to avoid activities they associate with dizziness due to the unpleasant feeling of vertigo or anxiety about the potential for physical harm or social embarrassment [5,6,10,15]. The mechanism that links psycho-

Table 3. Distribution of patients that have high depression and anxiety index according to the disease entities that develop the dizziness

High BDI group		High STAI group	
Disease	n/total (%)	Disease	n/total (%)
BPPV	18/196 (9.2)	BPPV	28/196 (14.3)
Vestibular neuritis	6/60 (10.0)	Vestibular neuritis	12/60 (20.0)
Meniere's disease	7/66 (13.0)	Meniere's disease	10/66 (18.2)
Vestibular migraine	13/89 (14.6)	Vestibular migraine	23/89 (25.9)
Others	16/133 (12.2)	Others	25/133 (18.8)
Total	60/544 (11.0)	Total	98/544 (18.0)

All values are $p < 0.05$. BDI: Beck Depression Inventory, STAI: State-Trait Anxiety Inventory, BPPV: Benign Paroxysmal Positional Vertigo

Table 4. Comparison of DHI, including functional, emotional or physical subscales, between high BDI or STAI and relative normal group

Group	Age	DHI*	Functional*	Emotional*	Physical*
High BDI or STAI group (n=117)	45.4 ± 14.8	46.6 ± 25.7	18.9 ± 11.5	15.3 ± 9.5	12.6 ± 7.6
Relative normal group (n=427)	46.51 ± 4.8	27.5 ± 19.3	11.2 ± 9.0	7.8 ± 7.2	8.4 ± 5.5

* $p < 0.05$. BDI: Beck Depression Inventory, DHI: Dizziness Handicap Inventory, STAI: Spielberger State-Trait Anxiety Inventory

Table 5. Comparison of DHI, including functional, emotional, physical subscales among subgroups of high BDI or STAI group

Group	DHI	Functional	Emotional	Physical
High BDI and STAI group (n=41)	53.42 ± 4.6* [†]	21.9 ± 10.5* [†]	17.9 ± 9.9* [†]	14.1 ± 6.5* [†]
Only high BDI group (n=19)	47.9 ± 25.0*	19.8 ± 11.2*	15.5 ± 9.2*	12.6 ± 6.8*
Only high STAI group (n=57)	41.2 ± 14.2*	16.5 ± 11.2*	13.7 ± 7.8*	11.4 ± 8.3*
Relative normal group (n=427)	27.5 ± 19.3	11.2 ± 9.0	7.8 ± 7.2	8.4 ± 5.5

* $p < 0.05$, significantly different from relative normal group, [†] $p < 0.05$, significantly from only high STAI group. BDI: Beck Depression Inventory, DHI: Dizziness Handicap Inventory, STAI: Spielberger State-Trait Anxiety Inventory

logical distress and symptoms of dizziness or vertigo remains unclear, but several authors have suggested that it is related to the substantial overlap between the neuroanatomical regions and neurotransmitters involved in the vestibular system and the pathways implicated in emotional states [10,16].

The prevalence of patients with high depression and anxiety indices were 11% and 18%, respectively, among those experiencing dizziness, which are relatively low compared with those in some previous studies. Garcia, et al. [17] observed a psychological manifestation in 63.4% of vertigo patients and diagnosed as panic disorder, depressive disorder, anxiety disorder. Also Grunfeld, et al. [18] and Ketola, et al. [19] reported that over the 45% patients who have dizziness could be classified as depressed or anxious based on the self-reported instruments.

The difference in the prevalence of psychiatric conditions among individuals with vestibular vertigo found by several studies may be due to differences in standards of psychological distress that were used or in the populations studied. We adopted relatively high cut-off values for our definition of psychological distress in terms of BDI and STAI scores, and we may have also excluded patients with suspicious psychogenic vertigo or a history of a previously psychiatric disorder. Thus, for patients with high BDI or STAI indices, we enrolled patients with clinically relevant psychological distress, such as depression and anxiety, and minimized the impact of psychological distress that may affect dizziness or be a pre-existing medical condition.

It has been reported that specific comorbid psychiatric disorders were more prevalent in patients with certain vestibular disorders [5]. In our study, patients who were diagnosed with vestibular migraine had the highest prevalence of high BDI and high STAI scores, although this difference was not statistically significantly different from the rates in other disease entities. Next, the prevalence in patients with Meniere's disease and the 'others' group showed a relative high rate in BDI. In episodic vertigo conditions, such as vestibular migraine, patients may unexpectedly experience intense and recurrent vertigo attacks, which may be a particular burden [11]. BPPV, the most common cause of vestibular vertigo, but, in the BPPV patients, prevalence of high BDI or STAI indices is the lowest among various disease entities. Although BPPV may induce severe and rotatory vertigo, the duration of symptoms is very short, the symptoms respond well to canalolith repositioning maneuvers, and the prognosis is mostly good. Thus, BPPV alone is not enough to induce the development of severe psychological distress.

Patients with psychiatric comorbidities reported more psychosocial impairment, including more vertigo-related symp-

toms. In longitudinal studies, patients with mixed physical and psychological symptoms were found to be at risk of remaining symptomatic and handicapped. Depressed or anxious patients often become passive, withdrawn, apathetic, and excessively help-seeking; these factors may then contribute to negative reactions to dizziness [20].

The DHI has proven to be a useful instrument for documenting the consequences of vestibular and/or balance impairment in terms of disability and handicaps [12]. We found that patients with high levels of psychological distress obtained higher DHI scores, including on the three subscales, than patients with neither a high BDI nor a high STAI score. It was also observed that patients with high BDI and high STAI indices had significantly higher DHI scores than patients with only a high STAI index and neither a high BDI nor a high STAI index. These findings indicate that patients experiencing dizziness and high levels of psychological distress may have more vertigo symptoms; in particular, patients with both depression and anxiety have more vertigo symptoms.

We found that the incidences of patients with high depression and anxiety indices were 11.0% (60/544) and 18.0% (98/544), respectively. The rates of patients with high depression and anxiety indices was highest in those with vestibular migraine, and patients with high levels of psychological distress reported more vertigo symptoms. Thus, this phenomenon should be considered when assessing patients with vertigo.

Conflicts of interest

The authors have no financial conflicts of interest.

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