ORIGINAL ARTICLE

Immediate Prediction of Recovery, Based on Emotional Impact of Vertigo

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KEYWORDS
Anxiety; Cognitive Psychology; Vertigo; Neuropsychology; Neurootology

Abstract
Introduction and objective: This work presents deeper studies of comorbidity between anxiety and vestibular pathology. The aim of this work was to comprehend the reasons why patients do not feel "fully recovered" even though the treating professionals discharge them. We studied the features of personality that can favour the continuity of the condition.

Methods: The questionnaire for measuring the emotional impact of vertigo makes it possible to determine if the patient has a psychological style with a tendency to develop pathological anxiety levels. Anxiety is a subjective characteristic determinant in difficulties with medical treatment. The questionnaire was applied to 198 patients in Argentina and Mexico in parallel. Each pathology was treated by standard medical procedures. The study focused on determining the correlation between "feeling fully recovered or not at the end of treatment" and the questionnaire scores obtained before the approach.

Results: In more than 80% of cases, high scores (>15 points) on the questionnaire were correlated with the difficulty presented by the patients for full recovery from the pathology after medical treatment.

Conclusions: The objective assessments (duration and intensity of symptoms, time of onset of the disease, etc.) do not exactly predict possible difficulties during treatment of vertigo. Consequently, we consider the patient’s subjective assessment of how the vestibular pathology affects him or her to be determinant. That key information allows us to predict the course of the illness and the probability of a full recovery.

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**PALABRAS CLAVE**
Ansiedad; Psicología cognitiva; Vértigo; Neuropsicología; Neurootología

**Predicción inmediata de la recuperación del paciente, en función del impacto psicológico del vértigo**

**Resumen**

**Introducción y objetivos:** Este trabajo profundiza en los estudios sobre la comorbilidad entre ansiedad y enfermedad vestibular. El objetivo principal se orienta a comprender las razones por las cuales el paciente puede no sentirse «plenamente recuperado» pese a la alta médica de los profesionales tratantes. Se estudiaron las características de personalidad que pueden favorecer la continuidad de la afeción.

**Métodos:** El cuestionario de impacto emocional del vértigo permite determinar si el paciente posee un estilo psicológico con tendencia a desarrollar niveles patológicos de ansiedad, característica subjetiva determinante de las dificultades frente al tratamiento médico. Paralelamente se aplicó a 198 pacientes de Argentina y México. Cada enfermedad se trató mediante varios procedimientos médicos habituales. El estudio se centró en determinar el grado de correlación entre el «sentirse o no plenamente rehabilitado al concluir el tratamiento» y las puntuaciones del CIEV que respondieron previamente al abordaje.

**Resultados:** En más de un 80% de los casos se logró correlacionar las puntuaciones altas (> 15 puntos) del cuestionario y la dificultad presentada por el paciente para una plena recuperación de su enfermedad posterior al tratamiento médico.

**Conclusiones:** Las evaluaciones objetivas (duración e intensidad de los síntomas, tiempo de inicio de la enfermedad, etc.) no permiten predecir con exactitud las posibles dificultades durante el tratamiento del vértigo. Por tanto, consideramos determinante la evaluación subjetiva que el paciente realiza de cómo su enfermedad vestibular lo ha afectado, ya que esa información clave permite predecir el curso de la enfermedad y las probabilidades de una plena recuperación.

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**Introduction**

In the description of the symptoms typical of vestibular disease, it is essential to include those corresponding to the emotional response of anxiety. Anxiety and vertigo constitute a fundamental chapter in the literature nourished by the interdisciplinary advances in scientific dialogue between neurootology and neuropsychology.

What motivated our study was the patients that, despite being discharged from medical treatment, continue having their symptoms in a partial or total form. The conclusions of the professionals involved do not correspond to the patient’s subjective experience. This discrepancy imposed upon us the need to carry out an analysis that would include subjective variables beyond the “presence of anxiety associated with vestibular disease”¹, given that this is a condition also present in patients that reverse their clinical picture without problems, and it is independent of the “level of seriousness” of the disease and the time that subject has been ill.

The Israeli group of Pollak² demonstrated that the levels of anxiety experienced by patients with vestibular problems were significantly higher than those felt by other subjects with non-vestibular neurological diseases, which were even more serious and limiting. In the conclusions of that scientific study, the detection of a possible psychological connection between the limbic system and the vestibular system was mentioned, indicating that it should be considered in future studies. We believe that our study represents an opportunity to advance in understanding of the implications of the subject’s psychological characteristics, so that this feedback between emotion processing and balance can be transformed into the main obstacle of full patient recovery.

There are various studies that explore the effects of anxiety on vestibular disease. However, they have usually been carried out with smaller samples that the one studied in this investigation and not with Spanish tools. Some of these studied are commented below, as examples and to justify the relevance of our work in this specific context.

Godemann et al. established that chronic vertigo produced by acute vestibular disorders could be considered a psychosomatic process. In that way, the persistence of the response of vertigo that some patients experience is not explained by subclinical organic changes. Anxiety, according to that author, seems to be the crucial factor in chronic persistence of vertigo.

In line with this, other studies linked to persistent dizziness, such as those carried out by Heinrichs et al. indicate the need for providing patients with vestibular disorders psychological support to confront the symptoms of these disorders. Beyond the organic conditions existing, dizzy spells can be a symptom of mental illness. Heinrichs et al. also concluded that it was highly frequent for patients with vestibular problems to present even anxiety disorders, with some of the symptoms understood as a response to the experience of vestibular episodes.

In an interesting study with an objective similar to that proposed by our team (but with a different work method) Best et al.³ inferred that having a history of psychiatric disorders was a strong predictive factor to anticipate the development in the patient of alterations following the presence of episodes of vertigo.
Consequently, based on our experience and confirmed by the studies mentioned, we saw the need to explore the subjective impact of vertigo on each patient. To do so, we developed the Questionnaire on the Emotional Impact of Vertigo (Cuestionario de impacto emocional del vértigo, CIEV) as a complementary tool for use in the diagnostic stage (Annex 1).

Theoretical Framework of the Issue

Cognitive psychology, in its current version (constructivist and postrationalist), spells out the organisation of personal phobic significance. That way of being experiences the greatest emotional imbalance confronting the "loss of control over the body or the surroundings", with this being the main cause of the genesis of psychopathological disorders linked to anxiety and to somatisation.7–9

Guidano takes the concepts of the Chilean biologist and epistemologist Humberto Maturana, who indicates that knowledge in living beings (as Maturana10 verified in numerous studies) is always active, giving meaning to events based on the individual’s own structure: each observation tells us more about the observer than about what is observed.

Balbi11 summarised this constructivist posture, emphasising that in contact with reality there are only "perturbations without informative content and meaning...". That was the reason why the level of involvement that a subject can experience when faced with different problems is not an "objective" fact. This would explain the current diagnostic difficulty.

Objectives

The purpose of our study was focused on providing an answer to the difficulties in the evolution of a group of patients with proven vestibular disease that, upon finishing appropriate treatment, did not experience the improvement expected by medical studies.

Our efforts were also aimed at achieving a better predictive capacity in the first consultation with the patient with vertigo, so as to be able to anticipate possible difficulties (due to psychological factors) as much as possible.

Consequently, our main objectives were, in the first place, to establish favourable or non-favourable evolution and, in the second, to determine the capacity of prediction.

Methods

To carry out this study, the CIEV questionnaire was developed. This tool makes it possible to establish the level of emotional perturbation that the subjective experience of vertigo/dizziness provokes and the consequent changes in personal image. This is an extremely easy self-administered questionnaire, the patient not needing to be instructed, which can be finished in an average of 10 min. It is easy to analyse and adding up the score can be done in 3–4 min.

This is a retrospective study in which we studied the course of treatment for 183 patients (133 women and 50 men; mean age of 50 years) (Table 1) that came to 2 of the 3 neurological centres involved in the study: Instituto de Neurociencias de Buenos Aires (INEBA) and Instituto de Neurociencias San Lucas, Rosario, both located in Argentina, and Clínica del Mareo ABC de México D.F., in Mexico, over a period of 2 years (2008–2010).

The basic criteria of inclusion were: patients of both genders and of all ages that have vestibular disease diagnosable when they consult the treating physician, independently of the stage of development of their condition.

Vestibular disorder was diagnosed according to the traditional methods of approach for vestibular disease (clinical examination and complementary studies) (Table 2).

The subjects were then asked to respond to the CIEV questionnaire. Next, the habitual patient treatment according to their problem and centre procedures was commenced.

To establish "favourable" or "unfavourable" evolution, patients were monitored with a frequency that ranged from weekly to monthly (based on the patient’s clinical picture).

Finally, we determined, together with the patients, if they considered themselves as cured or not with respect to the original symptoms. This information was then correlated with the results obtained in the CIEV in the first consultation. We carried out a retrospective analysis comparing CIEV scores and the "favourable" or "unfavourable" evolution data (information available when the process concluded). The threshold level (score >0=16 points) that achieved the greatest precision in each case was then set, as indicated in the following section.

Results

The patients totalled 183. The presence of high-level anxiety (pathological anxiety) and its consequent difficulty for the recovery from the disease was established (together
with the patients) in 47.5% of the cases. When the data was analysed, we already had the possibility of knowing if the patient corresponded to the group "that found themselves completely recovered from the symptoms" or not. Consequently, we sought a value for the CIEV responses that achieved the greatest possible correlation with those possibilities. The greatest degree of concordance was found giving 0, 1 and 2 points to each of the CIEV responses, respectively, and classifying the patients with scores of 15 points or less as cases in which anxiety would not be expected, and those with scores of 16 points or more as patients with the possibility of having symptoms of pathological anxiety and constituting the group at risk of not achieving full recovery upon conclusion of the medical treatment (Table 3).

In 80.33% of the cases there was concordance between the subjects having a "low CIEV score" (<16 points) and a "full perception of recovery", and between those with "high CIEV score" and patients "forming part of the group of those that did not feel they had achieved complete remission of their symptoms" (the group that was the motivation for this case study).

**Sensitivity—Specificity**

Sensitivity:

\[
\text{Sensitivity} = \frac{VP}{VP + FN(60/60 + 26)} = 0.697
\]

Specificity:

\[
\text{Specificity} = \frac{VP}{VP + FP(87/87 + 10)} = 0.896
\]

**Discussion**

There is no doubt that all the predictions that focused analysis exclusively on "objective" factors did not manage to account for the group of patients that did not feel that they had achieved recovery when treatment ended. Likewise, they could not account for the investigation on symptom duration or apparent seriousness of these symptoms, and the considerations as to the possible limitations that the condition could cause did not provide the treating physician with clear information, of a correct predictive character.

Godemann et al. concluded that the chronic vertigo produced by acute vestibular disorders should be considered as a psychosomatic process and that the persistence in the experience of vertigo that some patients experienced was linked to anxiety. Directing our attention again to this study and its conclusions, we consider that this psychological aspect should be analysed specifically, giving it the same importance that is given to the organic genesis of the disorder.

The results were the product of managing to study the subjective processes involved in each case, given that the "group at risk" is mainly characterised by a specific cognitive-emotional processing that they carry out on their illness. The level of "emotional impact" that vertigo presents for each person is unique and is never "objectifiable" from external observation.

It cannot be said that the CIEV is a "personality test", given that it only analyses some specific cognitive aspects that emerge when "how events in life affect us" is analysed. However, the CIEV can be considered useful in clinical medicine of those that treat this disorder, due to its simplicity, effectiveness and predictive capability.

Finally, let us focus on a detailed analysis of the results of the CIEV in relation to the distribution of the various disorders studied. We can conclude that no significant relationship was found between the different disorders and high scores on the questionnaire. For example, if we analyse benign paroxysmal positional vertigo (BPPV), a disease with short-lived crises, quick diagnosis and resolution, it has values similar to other disorders that have a much greater impact on patient health. In all of the disorders there is an even distribution between results above the threshold of 16 points and those below that line, except for one: vestibular migraine, where the presence of "pathological anxiety" is considerably heightened. In Furman et al. coined the term *migraine-anxiety related dizziness* (known by its acronym MARD) to underscore this situation. This distinction is considered as an invitation to further research on the material (Table 4).

**Table 3** Correlation Between CIEV Score and Later Treatment Difficulty Produced by Pathological Anxiety Levels.

<table>
<thead>
<tr>
<th>Cases of anxiety</th>
<th>Classification according to CIEV Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anxiety (16 points or more)</td>
</tr>
<tr>
<td>Yes</td>
<td>60 (32.7%)</td>
</tr>
<tr>
<td>No</td>
<td>10 (5.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>70 (38.3%)</td>
</tr>
</tbody>
</table>

**Table 4** Neurological Diagnosis.

<table>
<thead>
<tr>
<th>Neurological diagnosis</th>
<th>Amount</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPPV</td>
<td>49</td>
<td>26.8</td>
</tr>
<tr>
<td>Vestibular neuritis</td>
<td>8</td>
<td>4.4</td>
</tr>
<tr>
<td>Ménière’s disease</td>
<td>20</td>
<td>10.9</td>
</tr>
<tr>
<td>Vestibular migraine</td>
<td>91</td>
<td>49.7</td>
</tr>
<tr>
<td>Other diseases</td>
<td>15</td>
<td>8.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>183</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As far as the neurological diagnosis received when treatment was started, there were 91 cases (49.7%) with vestibular migraine, 49 (26.8%) con BPPV, 20 (10.9%) with Ménière’s disease, 8 (4.4%) con vestibular neuritis and the rest—15 patients (8.2%)—with other diseases.
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We had a group of patients with vestibular problems that did not achieve full recovery from their symptoms, even though they received appropriate treatment. Focusing on this group, we found ourselves confronting the inexorable need to investigate the reach of our conclusions even more deeply. Was this specific group being given the correct help? Were we considering fewer factors that those that affect the origin or maintenance of vestibular symptoms? Was the anxiety psychic disorder being given a secondary role, subordinate to the treatment of "organic" aspects?

It has been a long time since the presence of anxiety was shown to be an omnipresent emotional reaction in vestibular disorders. We know the typical response of mammals to perceiving a loss of control over what we consider to be essential for our survival.

Those who work clinically know how difficult it is to make a differential diagnosis between vestibular disease of organic origin and the symptoms of psychopathological aetiology.

The studies of Heinrichs et al. lead us to focus on the need to provide psychological support to patients with vestibular disorders so they can confront the symptoms of these conditions. However, the greatest difficulty resides in being able to establish beforehand which ones belong to the group at risk and which do not.

All of our patients were assessed in the first consultation. Once an organic diagnosis, objectifiable, of the vestibular condition has been established, it is very difficult to predict patient response to medical treatment if we base ourselves on "objective" variables: seriousness of the disease, its duration, patient age and so on.

The CIEV is a questionnaire that provides us with information on the subjective impact of vertigo independently of its causes. One of the contributions of this research is that it involves similar levels of anxiety in easily-resolved diseases such as BPPV and ones of greater impact such as vestibular neuritis. In this sense, we see the need to consider the "subjectivity"; include the "patients' viewpoints" on their own disease and how it has affected fundamental aspects of their daily life. We have here the source of key information to anticipate the course of the disease and its likelihood and ending in full recovery.

Conclusions

We found that the CIEV:

- Explains non-favourable evolution as a consequence of anxiety, based on the personality of the patient
- Shows a high predictive value, above 80%, with high sensitivity (0.697) and specificity (0.896).

Even though this study is retrospective, it allows use to consider the CIEV as a valid instrument for increasing predictive capacity in clinical practice for vestibular disease in general, from the initial physician-patient contact. In the cases where the clinician observes high scores on the CIEV (factor of risk), it is possible to anticipate the future complications and, with demonstrable foundations, include a mental health specialist in the interdisciplinary team.

Conflict of Interests

The authors have no conflicts of interest to declare.

Annex 1.

<table>
<thead>
<tr>
<th>CIEV</th>
<th>Cuestionario de Impacto Emocional del Vértigo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Instituto de Neurociencias San Lucas, Rosario - Argentina</td>
</tr>
<tr>
<td></td>
<td>Determinación del nivel de perturbación emocional que genera la experiencia subjetiva de vértigo/mareo y los consecuentes cambios en la imagen personal.</td>
</tr>
</tbody>
</table>

**Datos personales:**

| Nombre: | Apellido: |
| Edad: | Localidad: |
| TE: | Medico Tratante: |

1) Introducción:

Entendemos por Vértigo: sensación de movimiento de uno mismo o del entorno (generalmente es un movimiento rotatorio) EJ: “Las cosas giran…”

En cambio, Mareo alude a toda sensación de desequilibrio. EJ: “Andar sobre algodones”

¿Cuál de estas dos definiciones coincide más con aquello que le ocurre a UD?

1) Vértigo ☐  2) Mareo ☐
II) Responda según su experiencia DURANTE los episodios de vértigo/mareo:

1. Mientras estaba con vértigo/mareo ¿sintió que estaba perdiendo el control de su cuerpo?
   - NUNCA ○ / A VEces ○ / MUCHAS VECES ○

2. Mientras estaba con vértigo/mareo ¿pensó que podía desmayarse o descomponerse?
   - NUNCA ○ / A VEces ○ / MUCHAS VECES ○

3. Mientras estaba con vértigo/mareo ¿se sintió desprotegido, sin nadie que lo socorra?
   - NUNCA ○ / A VEces ○ / MUCHAS VECES ○

4. Mientras estaba con vértigo/mareo ¿sintió la ansiedad o el miedo dominaban?
   - NUNCA ○ / A VEces ○ / MUCHAS VECES ○

5. Mientras estaba con vértigo/mareo ¿tuvo síntomas como taquicardia, sudoración o ahogo?
   - NUNCA ○ / A VEces ○ / MUCHAS VECES ○

6. Mientras estaba con vértigo/mareo ¿se imaginaba si alguien de confianza estaba cerca suyo?
   - NUNCA ○ / A VEces ○ / MUCHAS VECES ○

A partir de los síntomas de vértigo/mareo muchas personas experimentan cambios en su forma de ser o actuar que los hacen sentirse realmente “distintos” a cómo siempre fueron.
A continuación se detallan una serie de experiencias frecuentes de pacientes con problemas similares a los suyos.

III) Responda si algo de esto le ha ocurrido a UD y, de ser así, cuánto lo angustia notar este cambio en su forma de ser:

1. ¿Siente estar dependiendo más de la ayuda o compañía de otras personas?
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○

2. ¿Siente que está más sensible? (Ej.: Llora con más facilidad, ...)
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○

3. ¿Siente estar más irritable, menos tolerante con las personas? )
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○

4. ¿Siente que esta más miedoso, que se asusta con más facilidad que antes?
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○

5. Piensa más en la posibilidad de padeecer enfermedades graves?
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○

6. Siente temor de estar solo en su casa o viajar sin compañía?
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○

7. ¿Evita los lugares colmados de gente? (Supermercados, cines, grandes tiendas, etc.)
   a) No, no me pasó nunca ○     b) Sí, y esto me angustia un poco ○
   c) Sí, y esto me angustia bastante ○
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8. ¿Siente soportar menos las "presiones" laborales o familiares?
   a) No, no me pasó nunca ☐
   b) Sí, y esto me angustia un poco ☐
   c) Sí, y esto me angustia bastante. ☐

9. ¿Siente que le cuesta "manejar" situaciones simples, que antes controlaba mejor?
   a) No, no me pasó nunca ☐
   b) Sí, y esto me angustia un poco ☐
   c) Sí, y esto me angustia bastante. ☐

10. ¿Se siente con menos fuerza, menos "capacidad de lucha" que antes?
    a) No, no me pasó nunca ☐
    b) Sí, y esto me angustia un poco ☐
    c) Sí, y esto me angustia bastante. ☐

Puntuación Total Clie:

References