A New Method for Assessment of Upright Posture Intolerance

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Abstract

Background—Upright posture intolerance can be seen in a variety of diseases but the current methodology is not quantifiable and limits the ability to identify response to treatment.

Methods—A standard questionnaire was developed to assess the following aspects of upright posture tolerance: (1) How long can you stand straight without any support? (2) Do you feel any sense of sickness when you sit or lie down after standing? (3) How long do you have to wait before you are comfortable standing again after you have stood straight? (4) How effectively and fast can you get up from sitting or lying position to stand straight? and (5) rate the ability to perform activities on a standard vertical visual analog scale between 100 (can do everything) and 0 (cannot do anything). We tested the ability of the questionnaire in four patients to identify various aspects of upright posture intolerance.

Results—The questionnaire was administered to four patients who reported upright posture intolerance. The patients with either intracranial hypotension syndrome, postural hypotension, or Klippel–Feil syndrome reported less than optimal performance in four of five components of the questionnaire. The patient with vertebrobasilar ischemia reported less than optimal performance in two of five components.

Conclusions—A new questionnaire is developed for self-administration to identify various components of upright posture intolerance and detect response to treatment.

Keywords

Upright posture intolerance; postural hypotension; intracranial hypotension syndrome; questionnaire; self-administered; vertebrobasilar ischemia

Several diseases result in upright posture intolerance such as intracranial hypotension syndrome and postural hypotension [1–3]. Upright posture intolerance is also seen in patients with vertebrobasilar arterial ischemia [4] and those with vestibular dysfunction [5] or cerebellar and spinal cord-related ataxias [6]. The assessment of upright posture intolerance is subjective, and therefore the severity and response to treatment cannot be adequately assessed. Quantitative measurement of upright posture intolerance, which can be self-administered, may be of value in both clinical evaluation and clinical trials.

Methods

A questionnaire was developed based on the feedback received from patients suffering from upright posture intolerance. The patients consistently reported regarding the short duration they were able to stand straight without any support and difficulty in performing activities

when standing up. Patients also reported upon their inability to stand up in one step from lying or sitting position. Patients also reported regarding "hangover" after standing straight and persistent residual symptoms when they sat or lied down.

This information was used to develop a standard questionnaire to inquire regarding various aspects of upright posture tolerance (see Table 1). The questionnaire inquired regarding four questions providing structured multiple choice answers for ease of interpretation and to reduce subjectivity [7–9]. The questions were as follows: (1) How long can you stand straight without any support; (2) Do you feel any sense of sickness (headache, nausea, dizziness, lightheadedness, etc.) when you sit or lie down after standing straight with or without support; and (3) How long do you have to wait before you are comfortable standing again after you have stood straight with or without support? There were four

Table 1. Upright posture tolerance questionnaire

1. How long can you stand straight without any support?	
Cannot stand straight without any support	
Less than 5 min	
5–29 min	
30 min or greater	
2. Do you feel any sense of sickness (headache, nausea, dizziness, lightheadedness, etc.) when you sit or lie down after standing straight with or without support?	
Not at all	
Less than 5 min	
5–29 min	
30 min or greater	
3. How long do you have to wait before you are comfortable standing again after you have stood straight with or without support?	
Not at all	
Less than 5 min	
5–29 min	
30 min or greater	
4. How effectively and fast can you get up from sitting or lying position to stand straight without any support?	
Can stand up easily without interruption or support	
Have to stand up from sitting or lying position with interruption (slow) or in two steps or more	
Must hold on to temporary support (less than 5 min) to stand up from sitting or lying position	
5. Rate your ability to perform activities such as household chores (housework), office work, writing, reading, eating, toilet activities while you are standing without any support	
0 (cannot do anything [worst]) to 100 (can do everything [best])	
0 Worst	
10	
20	
30	
40	
50	
60	
70	
80	
90	
100 Best	

response categories provided: (1) not at all (or cannot stand straight without any support); (2) less than 5 min; (3) 5–29 min; and (4) 30 min or greater. Another question inquired: how effectively and fast can they get up from sitting or lying position to stand straight without any support and provided three response categories: (1) can stand up easily without interruption or support; (2) have to stand up from sitting or lying position with interruption (slow) or in two steps or more; and (3) must hold on to temporary support (less than 5 min). The visual analog scale was used to rate the ability to perform activities such as household chores (housework), office work, writing, reading, eating, and toilet activities while you are standing without any support as has been used in previous measures where subjective characteristics can-

not be directly measured [10,11]. The rating was made on a standard vertical visual analog scale between 100 (can do everything, best imaginable) and 0 (cannot do anything, worst imaginable).

Results

The questionnaire was administered to four patients who reported upright posture intolerance as follows: a 34-year-old woman who developed headaches after lumbar puncture and clinical and neuroimaging characteristics was diagnostic of intracranial hypotension syndrome, a 72-year-old man who was diagnosed with postural hypotension secondary to multiple systems atrophy, a 66-year-old man who had right extracranial vertebral artery

Table 2. The responses to items in the upright posture tolerance questionnaire according to the disease entity

Intracranial hypotension	
How long can you stand straight without any support?	Less than 5 min
Do you feel any sense of sickness (headache, nausea, dizziness, lightheadedness, etc.) when you sit or lie down after standing straight with or without support?	Less than 5 min
How long do you have to wait before you are comfortable standing again after you have stood straight with or without support?	Less than 5 min
How effectively and fast can you get up from sitting or lying position to stand straight without any support?	Must hold on to temporary support (less than 5 min) to stand up from sitting or lying position
Ability to perform activities such as household chores, office work, writing, reading, eating, toilet activities while standing without support (0—cannot do anything [worst] to 100—can do everything [best])	10 (with headache) otherwise 90 (without headache)
Postural hypotension	
How long can you stand straight without any support?	5–29 min
Do you feel any sense of sickness (Headache, nausea, dizziness, lightheadedness, etc.) when you sit or lie down after standing straight with or without support?	Less than 5 min
How long do you have to wait before you are comfortable standing again after you have stood straight with or without support?	Less than 5 min
How effectively and fast can you get up from sitting or lying position to stand straight without any support?	Have to stand up from sitting or lying position with interruption (slow) or in two steps or more
Ability to perform activities such as household chores, office work, writing, reading, eating, toilet activities while standing without support (0—cannot do anything [worst] to 100—can do everything [best])	70
Vertebrobasilar arterial ischemia	
How long can you stand straight without any support?	30 min or greater
Do you feel any sense of sickness (Headache, nausea, dizziness, lightheadedness, etc.) when you sit or lie down after standing straight with or without support?	30 min or greater
How long do you have to wait before you are comfortable standing again after you have stood straight with or without support?	Less than 5 min
How effectively and fast can you get up from sitting or lying position to stand straight without any support?	Can stand up easily without interruption or support
Ability to perform activities such as household chores, office work, writing, reading, eating, toilet activities while standing without support (0—cannot do anything [worst] to 100—can do everything [best])	50
Klippel–Feil syndrome	
How long can you stand straight without any support?	5–29 min (15 min)
Do you feel any sense of sickness (Headache, nausea, dizziness, lightheadedness, etc.) when you sit or lie down after standing straight with or without support?	Less than 5 min—right away (reclining)
How long do you have to wait before you are comfortable standing again after you have stood straight with or without support?	Less than 5 min
How effectively and fast can you get up from sitting or lying position to stand straight without any support?	Have to stand up from sitting or lying position with interruption (slow) or in two steps or more
Ability to perform activities such as household chores, office work, writing, reading, eating, toilet activities while standing without support (0—cannot do anything [worst] to 100—can do everything [best])	40

stenosis and thrombosed vertebrobasilar artery aneurysm with vertebrobasilar distribution ischemic events, and a 46-year-old woman with Klippel–Feil syndrome and headaches, neck pain, and lightheadedness on rapid change in the position.

The responses to items in the questionnaire are summarized in Table 2. The patients with intracranial hypotension syndrome, postural hypotension, or Klippel–Feil syndrome reported less than optimal performance in most (four of five) of the components of the questionnaire. The patient with intracranial hypotension syndrome reported the worst performance in duration of time they can stand straight without any support (<5 min) and the ability to perform activities while standing without support (10/100) on a visual analog scale. The patient with intracranial hypotension syndrome reported that she must hold on to temporary support (less than 5 min) to stand up from sitting or lying position. The patient with postural hypotension and Klippel–Feil syndrome reported that they required interruption (slow) or in two steps or more to move from sitting or lying position to standing up and 70/100 and 40/100 in their ability to perform activities while standing without support. None of the three patients felt any sense of sickness when they sit or lie down after standing straight or need

to wait before they were comfortable standing again after they had stood straight with or without support. The patient with vertebrobasilar arterial ischemia reported suboptimal performance in two components including the sense of sickness sitting or lying down after standing and the ability to perform activities while standing without support. None of the patients reported any difficulty in the interpretation of the questions or the choices.

Comment

We present a self-administered questionnaire that quantifies various aspects of upright posture intolerance. The ease of use and self-administration are both important components for assessing upright posture intolerance which is a symptom and thus best judged by the patients themselves. Patients with either intracranial hypotension syndrome, postural hypotension, or Klippel–Feil syndrome reported less than optimal performance in four and patient with vertebrobasilar arterial ischemia reported suboptimal performance in two of five components of the questionnaire. All patients reported optimal (<5 min) performance in the question regarding how long do they have to wait before they are comfortable standing again after they have stood straight with or without support. The lack of detection of suboptimal performance in this query may be due to a predominantly psychological determinant in this measure. The rating of the ability to perform activities while standing without support on a visual analog scale appeared to be most sensitive to identify upright posture intolerance in our study. However, we acknowledge that other factors independent of upright posture intolerance may be contributing to impairment in the ability to perform activities while standing.

We expect that this questionnaire with selected questions and response categories may be useful in assessing the severity of upright posture intolerance and grading response to treatment in both clinical practice and trials. Further studies will have to determine the age-adjusted normative values for each of the components in the general population.

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