

The epidemiology of patients with dizziness in an emergency department

急症室頭暈病者的流行病學

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Objectives: The aims of this prospective study were (1) to describe the patterns of presentation, causes and disposition of patients with dizziness in an emergency department (ED) and (2) to identify the factors that predict central vestibular disorder. **Methods:** All adult patients (≥ 18 years) attending our ED with a chief complaint of dizziness were included. Demographic characteristics, presenting complaint, symptoms, past medical illnesses, physical findings, provisional diagnosis and disposition were recorded in a data collection sheet by the medical officers. **Results:** A total of 104 consecutive dizzy patients were recruited from 12th to 19th December 2003. The incidence of adult patients with dizziness was 4.0% (104/2594). There were 34 (32.7%) male and 70 (67.3%) female patients; 64 (61.5%) patients were below 65 and 40 (38.5%) were above 65. Lightheadedness (61.5%), vertigo (31.7%) and disequilibrium (4.8%) were the most frequent complaints. Nausea and/or vomiting (32.7%) and raised blood pressure on arrival (23.1%) were the most common associated symptoms and physical finding respectively. Hypertension (38.5%) was the most common pre-existing medical illness. Of all patients, 63.5% had non-vestibular disorder, 31.7% had peripheral vestibular disorder and 4.8% had central vestibular disorder. A clinical diagnosis could be made in 52.9% of our dizzy patients and about 20 different diagnoses were made. The majority (82.7%) of the patients were discharged from the ED. A presenting complaint of lightheadedness, altered mental state, focal neurological signs, raised blood pressure and history of stroke were predictors of central vestibular disorder ($p < 0.05$). **Conclusions:** Lightheadedness and vertigo were the two commonest presentations of dizzy patients. Most dizzy patients had benign causes and could be discharged from the ED. Lightheadedness, focal neurological symptoms and signs, altered mental state, hypertension and previous stroke were factors that would help to diagnose central vestibular disorder. (*Hong Kong j.emerg.med.* 2006;13:133-139)

目的：這前瞻性研究旨在（1）描述急症室頭暈病者徵狀的模式、成因及其安置；（2）識別可預測中樞性前庭疾病的因素。**方法：**研究包括到本急症室求診主要申訴為頭暈的所有成人患者（18歲或以上）；並由醫生將病人統計特徵、申訴、症狀、過往病歷、身體檢查結果、初步診斷及病人安置等記錄於資料收集表上。**結果：**研究連續招募由2003年12月12日至19日共104名頭暈病者。成人病者頭暈的發病

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率為 4.0% (104/2594)，其中 34 名 (32.7%) 為男性及 70 名 (67.3%) 為女性；64 名 (61.5%) 病者年齡為 65 歲以下及 40 名 (38.5%) 為 65 歲以上。輕浮頭昏 (61.5%)，旋轉眩暈 (31.7%) 及平衡不穩 (4.8%) 為最常見的申訴。作嘔及 / 或嘔吐 (32.7%) 及抵院時血壓高 (23.1%) 分別為最常見的相關症狀及身體檢查結果。高血壓 (38.5%) 為最普遍已存在的內科疾病，63.5% 為非前庭疾病，31.7% 病者為外週性前庭疾病，及 4.8% 為中樞性前庭疾病。在 52.9% 頭暈病者中可以作出臨床診斷，其中包括大約 20 個不同的診斷。大部份 82.7% 病者可在急症室治療後出院。申訴輕浮頭昏、神志不清、局部性神經病徵狀、高血壓及有中風病歷等均為中樞性前庭疾病的預報因子 ($p < 0.05$)。總結：輕浮頭昏及旋轉眩暈為頭暈病者兩項最常見的描述。大部份頭暈病者都是由於良性成因並可於急症室治療後出院。輕浮頭昏、局部性神經病徵狀、神志不清、高血壓及有中風病歷等因素有助診斷中樞性前庭疾病。

Keywords: Adult, dizziness, epidemiology, Hong Kong, vertigo

關鍵詞：成人、頭暈、流行病學、香港、旋轉眩暈

Introduction

Dizziness is a commonly encountered complaint in the emergency department (ED). It is difficult to define, challenging to diagnose and troublesome to treat. Dizziness can be caused by a wide range of benign and serious conditions.¹ As emergency physicians, we have to identify those serious and life-threatening cases in a timely fashion and manage them accordingly, in order to minimise morbidity and mortality.

"Dizziness" refers to various abnormal sensations relating to the perception of the body's relationship to space.² In a classic paper, Drachman and Hart³ described four subtypes: vertigo, lightheadedness, disequilibrium, and other dizziness. Vertigo is a false sensation that the body or the environment is moving (usually spinning). It suggests a disturbance of the vestibular system, either central or peripheral. Lightheadedness is a sensation of an impending faint. It usually results from diffuse temporary cerebral ischaemia. Disequilibrium is a sense of imbalance (postural instability) that is generally described as involving the legs and trunk without a sensation in the head. Other dizziness is typically described as vague or floating, or the patient may have difficulty in describing the sensation.

In this prospective study, we described the patterns of presentation, causes and disposition of patients with dizziness in an ED and identified the associating factors with central vestibular disorder.

Methods

This prospective observational study was performed in the ED of the Prince of Wales Hospital in Shatin, Hong Kong – a 24-hour emergency facility with a daily attendance of around 500 patients during the study period. Within the ED, there was a 16-bed observation ward staffed by emergency physicians. Consecutive patients presenting to the ED over a one-week period (12th to 19th December 2003) with a chief complaint of dizziness were recruited.

The exclusion criteria included those under the age of 18 years, and resuscitation room cases. The triage nurse identified suitable study subjects and attached a single page A4 size data collection sheet to the patient's clinical record. After assessing the patient, the attending emergency physician completed the data collection sheet (Appendix 1).

Data collected for each dizzy patient included demographic characteristics, presenting complaint, associated symptoms, past medical illnesses, drug history, physical findings, provisional and specific diagnosis and disposition.

Dizzy patients admitted to the ED observation ward or medical or neurosurgical wards were followed up using the computerised Clinical Management System (CMS). Those with central causes according to their CT/MRI results were identified. We then used univariate analysis and chi-square test (using

Statview™), to identify those factors associated with central vestibular disorder.

Results

A total of 104 dizzy patients were recruited during the period. The incidence of adult patients with dizziness was 4.0% (104/2594). There were 34 (32.7%) male and 70 (67.3%) female patients; 64 (61.5%) patients were below 65 and 40 (38.5%) were above 65. Lightheadedness (61.5%), vertigo (31.7%) and disequilibrium (4.8%) were the most frequent complaints; and 74 (71.2%) of the dizzy patients

reported no triggering factors. The most common associated symptoms were nausea and/or vomiting, which were found in 34 (32.7%) patients, followed by headache in 15 (14.4%) patients. Chest pain was present in 6 (5.8%) patients and palpitations in 7 (6.7%) (Figure 1). Forty (38.5%) patients had a past medical history of hypertension, 6 (5.8%) had diabetes mellitus, and 7 (6.7%) had ischaemic heart disease (Figure 2).

The most common physical finding was raised blood pressure (BP) on arrival: systolic BP >180 mmHg in 13 (12.5%) and diastolic BP >95 mmHg in 11 (10.6%) patients. Postural hypotension (systolic or

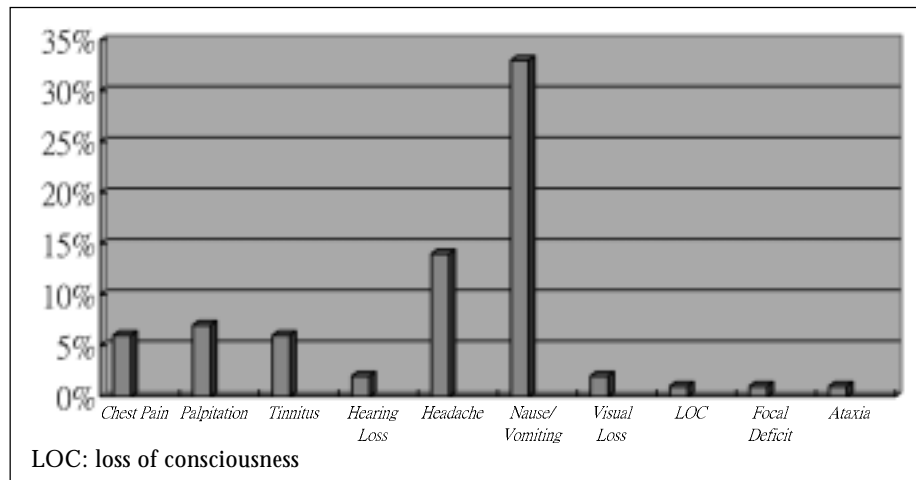


Figure 1. Associated symptoms of dizzy patients.

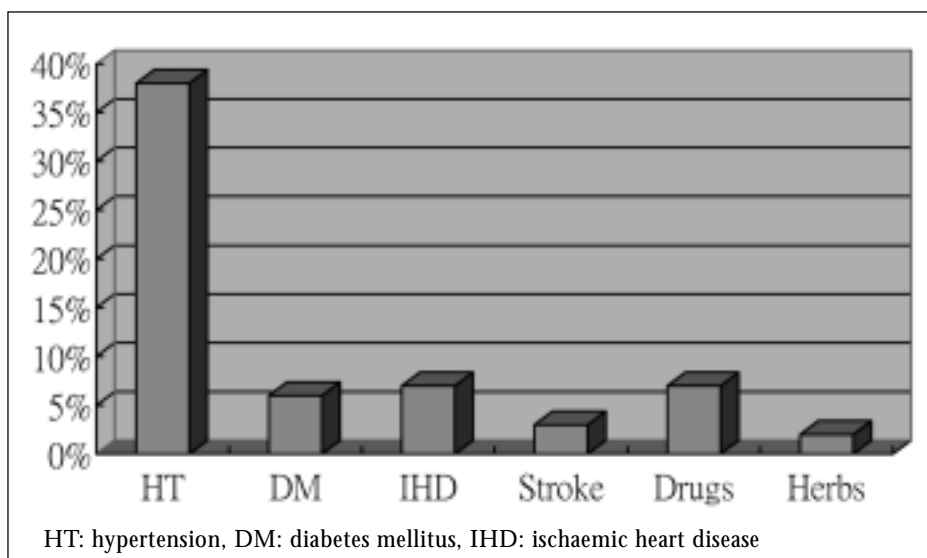


Figure 2. Past medical history of dizzy patients.

diastolic BP decreased by 20 mmHg when moved to the erect position) was observed in 3 (2.9%) patients. Two (1.9%) patients had horizontal nystagmus, and none had vertical nystagmus. Only 2 (1.9%) patients had focal neurological signs.

A diagnosis of non-vestibular disorder was made for 66 (63.5%) dizzy patients; 33 (31.7%) patients were given a diagnosis of peripheral vestibular disorder and 5 (4.8%) were diagnosed as central vestibular disorder (Figure 3). Only 55 (52.9%) dizzy patients were given a clinical diagnosis. About 20 different diagnoses were made (Table 1). The majority of dizzy patients (86 or 82.7%) were discharged from the ED; 17 of them were discharged after a short stay in the observation ward and 17 were referred for outpatient follow up. Fifteen (14.4%) patients were admitted to acute medical wards, and 3 (2.9%) were admitted to other specialty wards (neurosurgical, general surgical and gynaecological wards).

Univariate analysis showed that a presenting complaint of lightheadedness, altered mental state, focal neurological signs and symptoms, raised blood pressure and history of stroke were associating factors for a

Table 1. Specific clinical diagnoses of dizzy patients

Peripheral Vestibular Disorder

- Vestibular neuronitis: 69%
- Benign positional vertigo: 23%
- Tympanic membrane perforation: 8%

Central Vestibular Disorder

- Stroke: 100%

Non-Vestibular Disorder

- Upper respiratory tract infection: 35%
- Hypertension: 18%
- Gastroenteritis: 8%
- Vasovagal episode: 5%
- Menorrhagia: 5%
- Non-specific abdominal pain: 5%
- Sepsis: 3%
- Symptomatic bradycardia: 3%
- Complete heart block: 3%
- Acute coronary syndrome: 3%
- Pregnancy-related illness: 3%
- Tension headache: 3%
- Hyperventilation syndrome: 2%
- Sciatica: 2%
- Depression: 2%

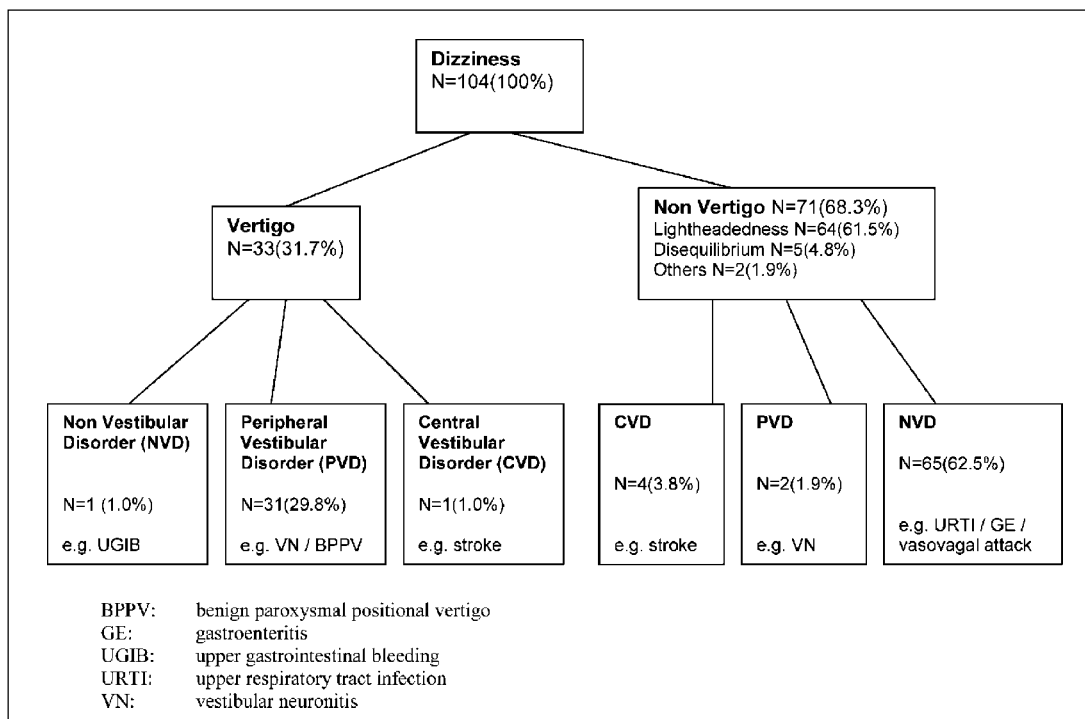


Figure 3. Summary of study result.

diagnosis of central vestibular disorder ($p < 0.05$) (Table 2). Altered mental state, focal neurological signs and symptoms, ataxia and raised diastolic blood pressure were found to be associated with central causes of dizziness ($p < 0.05$) (Table 3). However, nausea and vomiting were not shown to be associated factors for a diagnosis of peripheral vestibular disorder compared to central vestibular disorder in this study ($p = 1.0$).

Discussion

In this study, we identified that a presenting complaint of lightheadedness, altered mental state, focal neurological signs and symptoms, raised blood pressure and history of stroke were associated factors for central vestibular disorder ($p < 0.05$).

Dizziness is a common and vexing diagnostic problem in emergency medicine practice. It is a vague symptom of diseases ranging from benign to serious.¹ Overseas studies have shown that most dizzy cases are due to peripheral vestibular disorder, which usually affects the younger age group.^{4,5} However, little is known about the epidemiology of dizziness in our locality. As emergency physicians, we must identify serious and

life threatening cases rapidly and manage them appropriately to minimise morbidity and mortality.

The word dizziness is derived from the old English word "*dysig*" meaning foolish or stupid. The modern usage of the word includes "a whirling sensation in the head with a tendency to fall", "giddiness", and "mentally confused or dazed".

In the Hong Kong Chinese community, there is a similar Chinese phrase – "頭暈" – for dizziness. It is also a vague term, with different meanings for different Chinese people. In this study, most dizzy patients described three subtypes of dizziness/"頭暈": "lightheadedness", "vertigo" (true spinning sensation) and "disequilibrium" (sense of imbalance).

Dizziness is a common complaint for adults of all ages. In a busy ED, making a specific diagnosis for a dizzy patient is often difficult due to the long list of differential diagnoses. Skiendzielewski described 46 different causes in his cohort of 106 weak and dizzy patients.⁶ In our study, only half of the patients were given a clinical diagnosis by emergency physicians. Moreover, about 20 different diagnoses were made to these 55 patients with the same chief complaint of dizziness.

Table 2. Associated signs and symptoms for diagnosis of central vestibular disorder versus peripheral vestibular disorder

	Central VD (N=5)	Peripheral VD (N=33)	P-value
Lightheadedness	3	1	0.0001
Focal symptom	1	0	0.0092
Altered mental state	1	0	0.0092
Old stroke	1	0	0.0092
SBP >180 mmHg	2	2	0.0212
DBP >95 mmHg	3	1	0.0001
Focal sign	2	0	0.0002

Table 3. Associated signs and symptoms for diagnosis of central causes versus peripheral causes of dizziness

	Central causes of dizziness (N=5)	Peripheral causes of dizziness (N=99)	P-value
Altered mental state	1	0	0.048
Focal symptom	1	0	0.048
Ataxia	1	0	0.048
DBP >95 mmHg	3	7	0.0059
Focal sign	2	0	0.0019

Distinguishing those dizzy patients who have central vertigo from peripheral vertigo poses a great challenge to emergency physicians. Herr et al⁷ adopted a standardised evaluation involving history taking, physical examination and basic laboratory investigations in his study of 125 patients and identified a positive Hallpike test with either vomiting or vertigo to be a reliable predictor of peripheral vestibular disorder. The Hallpike test is a bedside manoeuvre for the diagnosis of benign positional vertigo. The classic nystagmus of benign positional vertigo occurs when the head is reclined and turned to the affected side. He suggested that these patients could be discharged and managed as outpatients.⁷

We found that nausea and vomiting (seen in 34 or 32.7% patients) were the most common symptoms associated with dizziness. However, it was not shown to discriminate between a diagnosis of peripheral vestibular disorder and central vestibular disorder in this study ($p=1.0$). For patients with central vestibular disorder, 2 (40.0%) had nausea and vomiting, while 17 (51.5%) of patients with peripheral vestibular disorder had nausea and vomiting.

Herr et al⁷ also found that medication-induced dizziness was a common cause of dizziness. However, in this study, details of drugs taken by the patients were not recorded prospectively in the data collection sheet by the treating emergency physicians. Thus, we could not assess this aspect fully. Failure to document an accurate drug history in this study reflects the fact that emergency medicine doctors often overlook this common cause of dizziness, which is more prevalent in the elderly. The elderly are more vulnerable to blood pressure fluctuations and are especially liable to sudden changes in blood pressure when they are subjected to polypharmacy; multiple medications tend to have synergistic effects on lowering blood pressure resulting in temporary cerebral ischaemia.

The majority of the dizzy patients were discharged from the ED. One patient was diagnosed to have central vestibular disorder during management in the observation ward and was subsequently transferred to a medical ward for definitive treatment. The observation ward thus serves a useful secondary screening function for some patients with dizziness.⁸

Our study did not follow up the discharged patients for their long-term outcome. This may underestimate the proportion of patients with central vestibular disorder. The long-term morbidity of the dizzy patients was also unknown. Madlon-Kay found that 7% of his 121 dizzy patients presenting to the ED had suffered either major morbidity or had died as a result of the cause of dizziness after six months.⁹ Moreover, it is difficult to comment on the clinical significance of the identified "associated factors" of central vestibular disorder as the number of cases in the study was small. These important aspects should be evaluated in further research.

Conclusion

Lightheadedness and vertigo were the two most common presentations of dizzy patients. Most dizzy patients had benign causes and were discharged from the ED. Only 4.8% were diagnosed with central vestibular disorder. Lightheadedness, focal neurological symptoms and/or signs, altered mental state, raised blood pressure and previous stroke were factors which can help to make a diagnosis of central vestibular disorder.

Acknowledgements

We would like to express our appreciation to all the medical and nursing staff of the ED at Prince of Wales Hospital. We would particularly like to thank our research nurse, Paulina Mak, who helped to conduct this study.

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Appendix 1. Data collection sheet																																																																																																																																					
<p><u>Study on Dizzy Patients (tick the appropriate boxes)</u></p> <div style="border: 1px solid black; width: 100%; height: 60px; display: flex; align-items: center; justify-content: center; margin: 10px 0;"> <p style="color: italic;">Please affix patient's label here</p> </div> <p><u>Chief Complaint (one only):</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 5%; text-align: center;">Yes</th> <th style="width: 15%; text-align: center;">No</th> </tr> </thead> <tbody> <tr> <td>Vertigo (true spinning sensation)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Lightheadedness/ fainting</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Disequilibrium (feeling of imbalance)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Miscellaneous _____</td> <td></td> <td></td> </tr> </tbody> </table> <p><u>Frequency of Attack:</u></p> <p>First episode <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If not, frequency of attack / month: _____</p> <p><u>Triggering Factors:</u></p> <table style="width: 100%; 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border-collapse: collapse;"> <tbody> <tr><td>Peripheral vestibular disorder</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Central vestibular disorder</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Non-vestibular disorder</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> </tbody> </table> <p>Any Specific Diagnosis: _____</p> <p>Doctor's Name & Signature: _____</p>		Yes	No	HT	<input type="checkbox"/>	<input type="checkbox"/>	DM	<input type="checkbox"/>	<input type="checkbox"/>	IHD	<input type="checkbox"/>	<input type="checkbox"/>	CVA	<input type="checkbox"/>	<input type="checkbox"/>	Head trauma	<input type="checkbox"/>	<input type="checkbox"/>	Psychiatric illness	<input type="checkbox"/>	<input type="checkbox"/>	Herbs	<input type="checkbox"/>	<input type="checkbox"/>	Drugs	<input type="checkbox"/>	<input type="checkbox"/>	If yes, please list: _____			Postural hypotension	<input type="checkbox"/>	<input type="checkbox"/>	Heart murmur	<input type="checkbox"/>	<input type="checkbox"/>	Carotid bruit	<input type="checkbox"/>	<input type="checkbox"/>	Nystagmus: Horizontal	<input type="checkbox"/>	<input type="checkbox"/>	Vertigo	<input type="checkbox"/>	<input type="checkbox"/>	Torsional	<input type="checkbox"/>	<input type="checkbox"/>	Internuclear ophthalmoplegia	<input type="checkbox"/>	<input type="checkbox"/>	Positive Hallpike Test	<input type="checkbox"/>	<input type="checkbox"/>	Romberg's sign	<input type="checkbox"/>	<input type="checkbox"/>	Focal neurological sign	<input type="checkbox"/>	<input type="checkbox"/>	Other findings:			Peripheral vestibular disorder	<input type="checkbox"/>	<input type="checkbox"/>	Central vestibular disorder	<input type="checkbox"/>	<input type="checkbox"/>	Non-vestibular disorder	<input type="checkbox"/>	<input type="checkbox"/>
	Yes	No																																																																																																																																			
Vertigo (true spinning sensation)	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
Lightheadedness/ fainting	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
Disequilibrium (feeling of imbalance)	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
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Chest pain	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
Palpitation	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
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Nausea / vomiting	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
Visual disturbances	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
Altered mental status	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																			
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(e.g. limb weakness, paraesthesia, slurring of speech)																																																																																																																																					
Any others: _____																																																																																																																																					
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