김 병 건

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어지럼의 흔한 원인

1. BPPV, VN, Meniere's disease
2. Vestibular migraine
3. Psychogenic dizziness
4. Pre-syncope
5. Central vertigo
   - VBI
   - central positional vertigo

6 types of dizziness

1. **Vertigo:**
   주위가 빙글빙글 돈다
2. **Near-Faint Dizziness (pre-syncope):**
   아찔하며 기절할 것 같은 느낌
3. **Disequlibrium**
   중심을 못 잡고 비틀거린다
   술취한 사람처럼 걷는다
4. **Psychogenic dizziness**
   머리가 항상 멍하고 무겁다
   머리 속이 도는 듯하다
5. **Multisensory dizziness (presbyastasis)**
6. **Physiological dizziness**

어지럼의 아형에 따른 기전 및 원인질환

어지럼의 종류	기전	원인질환
Vertigo	Imbalance of vestibular tone	말초전정 vs 중추전정
Pre-syncope	Diminished CBF	기립저혈압, 미주신경성, 부정맥, 과호흡
Disequilibrium	Proprioception, VSR, vestibular, cerebellum	양측전정부전, 말초신경질환, 소뇌질환
Psychogenic	Impaired central integration of sensory signal	불안, 공황장애, 광장공포증, PPV
Ocular	Visual-vestibular mismatch	새안경, 안운동신경마비
Multisensory	Partial loss of multiple sensory system	노인, 당뇨
Physiological	Sensory conflict due to unusual sensory signal	놀이기구, 멀미, 고소현기, mal de debarquement

현훈의 기간에 따른 분류

- ▶1분미만 : BPPV
- ▶수분 : VBI, vestibular paroxysma,
- ▶수십분 : migraine aura, panic attack
- ▶수시간 : Meniere's disease
- ▶수일 : vestibular neuritis, stroke

- ▶Psychogenic dizziness, vestibular migraine : 수분 - 지속성

재발 유무에 따른 분류

Recurrent attack

- ▶ BPPV
- ▶ Meniere's disease
- ▶ Vestibular migraine
- ▶ VBI
- ▶ Panic attack
- ▶ Hyperventilation syndrome
- ▶ Psychogenic dizziness

Single attack

- ▶ Vestibular neuritis
- ▶ Stroke
- ▶ Psychogenic dizziness

VN: historical perspective

- 1908 Ruttin:
  - first case description at Austrian Otological Society

"A patient suffered from sudden vertigo, could hardly walk and vomited. No tinnitus, no deafness. Strong nystagmus to the left. No reaction or vertigo after irrigation of the right ear, typical reaction after left ear irrigation. No other neurologic symptoms"

- 1952 Dix and Hallpike:
  - 'vestibular neuronitis'
  - in order to distinguish from Meniere's disease
  - from peripheral vestibular nerve to vestibular neuclei
- 1969 Coats
  - restricted to unilateral caloric weakness
  - but include slowly progressive cases

- Acute peripheral vestibulopathy

Vestibular neuritis: Nomenclature

- Acute unilateral (peripheral) vestibular loss
- Acute unilateral (peripheral) vestibular paralysis
- Acute unilateral (peripheral) vestibulopathy

- Idiopathic unilateral vestibulopathy
- unilateral vestibulopathy of unknown cause

- Vestibular neuronitis
- Vestibular neuritis

- Labyrinthitis
- Neurolabyrinthitis

* primarily affects sup. division of vestibular nerve trunk (ant and horizontal SCC)
* VN is not a well defined clinical entity, but rather a syndrome with two possible causes (viral or vascular)

Diagnosis of vestibular neuritis

1) Sustained vertigo

2) Spontaneous nystagmus toward the unaffected ear

3) Falling toward the affected ear

4) Caloric weakness & Pathologic head-thrust test

5) No cochlear symptoms & Normal N/E and MRI

VN의 안진

Pseudo VN (소뇌경색)의 특징

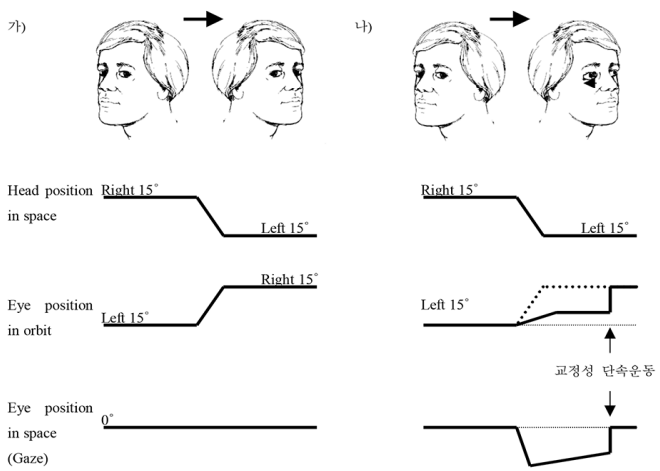
- **bed side examination**
- severe imbalance with falling
- severe vertigo without nystagmus
- severe nystagmus without vertigo
- normal head thrust test

Central nystagmus
- perverted head shaking
- GEN
- downbeat nytagmus
- torsional nystagmus

- **laboratory test**
- No caloric weakness

Head thrust test (Halmagyi maneuver)

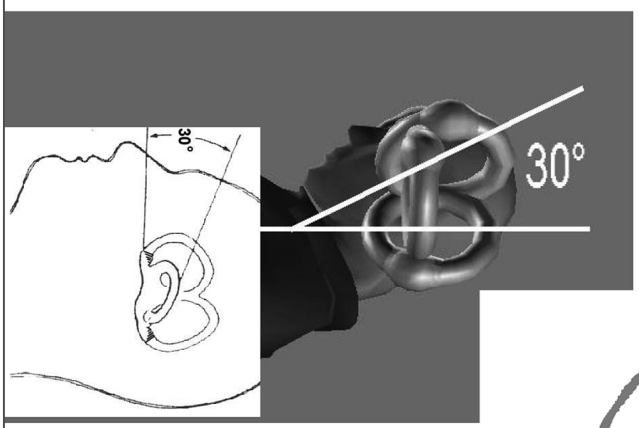
- most specific test for horizontal VOR
- same physiologic basis as doll's eye
- re-fixation saccades

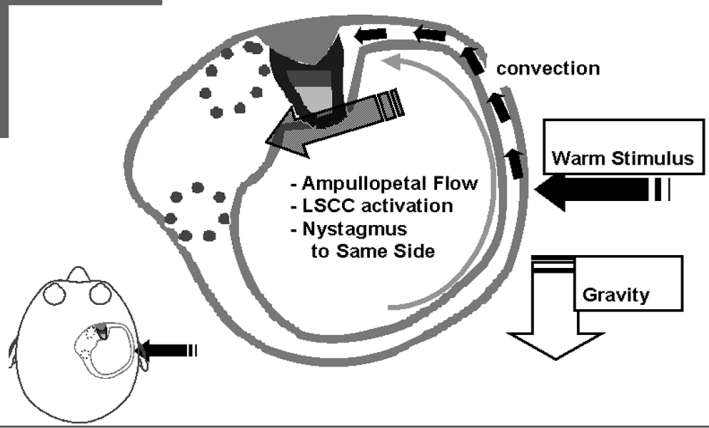


Head-thrust sign in VN

Catch-up saccade during brief, high-acceleration, head rotation (left-sided loss)

Caloric test

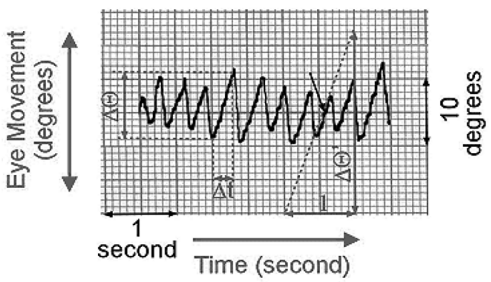




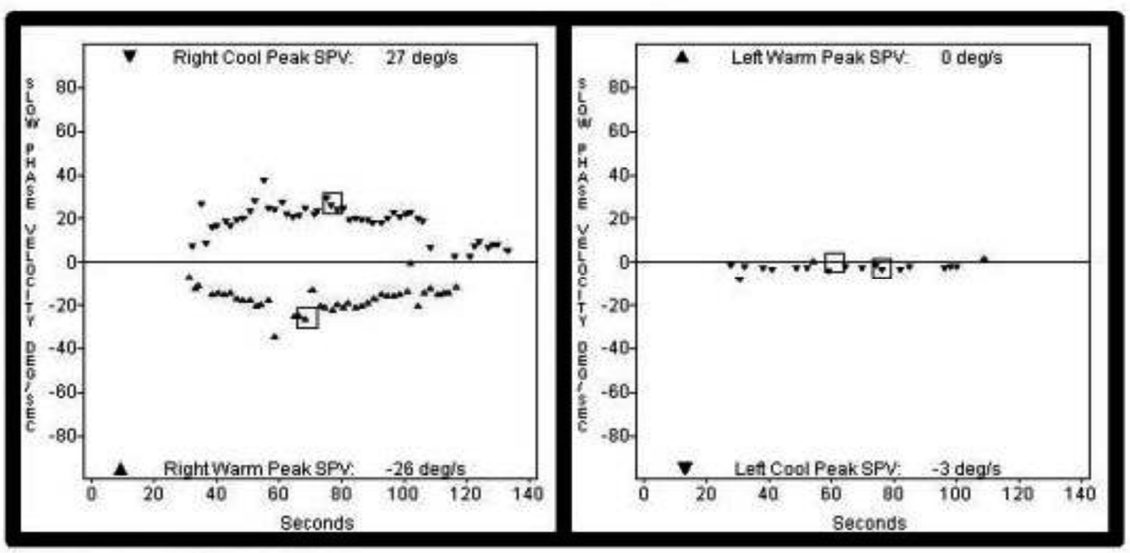
Canal Paresis (CP)

Interaural asymmetry in nystagmus
- canal paresis (CP)

$$CP(\%) = \frac{(LW + LC) - (RW + RC)}{(LW + LC) + (RW + RC)} \times 100\ (\%)$$



Canal Paresis (Left)



Caloric Weakness: 89% in the left ear
Directional Preponderance: 4% to the right

Peripheral vestibular loss

- Unilateral vestibular loss
  -> vertigo and nystagmus
- Bilateral vestibular loss
  -> oscillopsia and ataxia


MEDICAL INTELLIGENCE

LIVING WITHOUT A BALANCING MECHANISM*

J. C.

BOSTON

ONE morning, now about four years ago, I ar-

Vestibular neuritis: Prognosis

- Vertigo with nausea/vomiting: < 1-3 days
- Vestibulospinal reflex: < 1wk
- Spontaneous nystagmus:
  - < 3-4 days with visual fixation
  - < 1mo with Frenzel
- Most patients feel symptom free: < 6wks

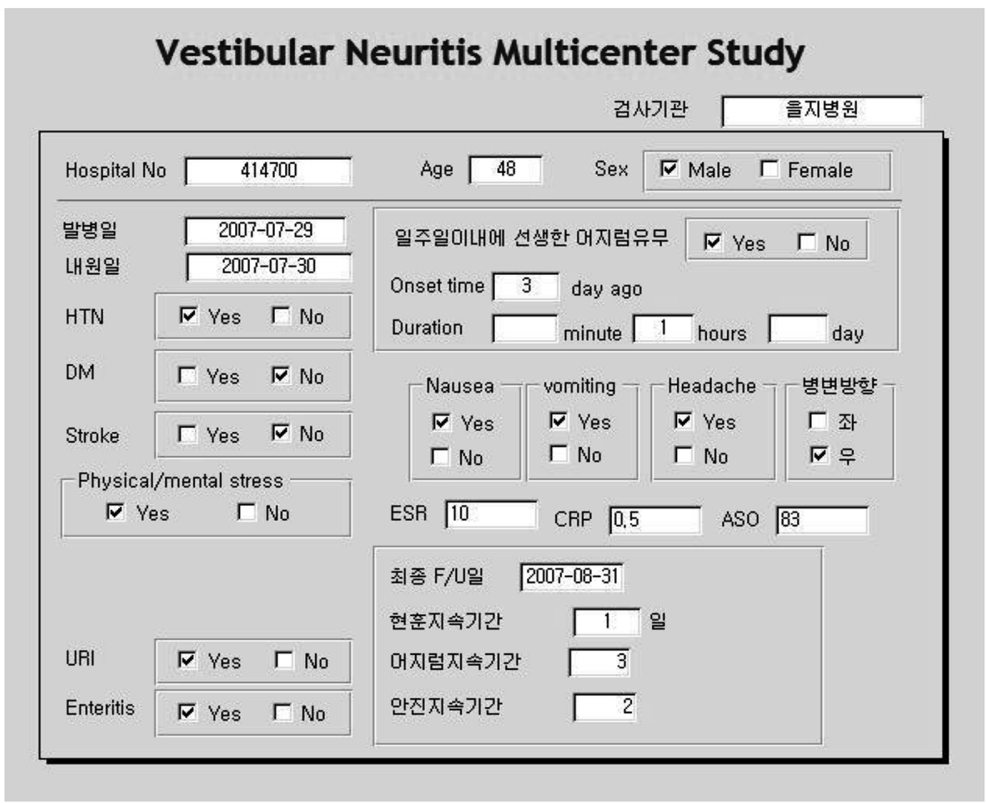
* Complete recovery rate is less than 70% in long term F/U
- Impaired balance or oscillopsia after rapid head rotation
- Caloric weakness

Recurrence rate

(Long term F/U study:
Huppert, 2006 Neurology)

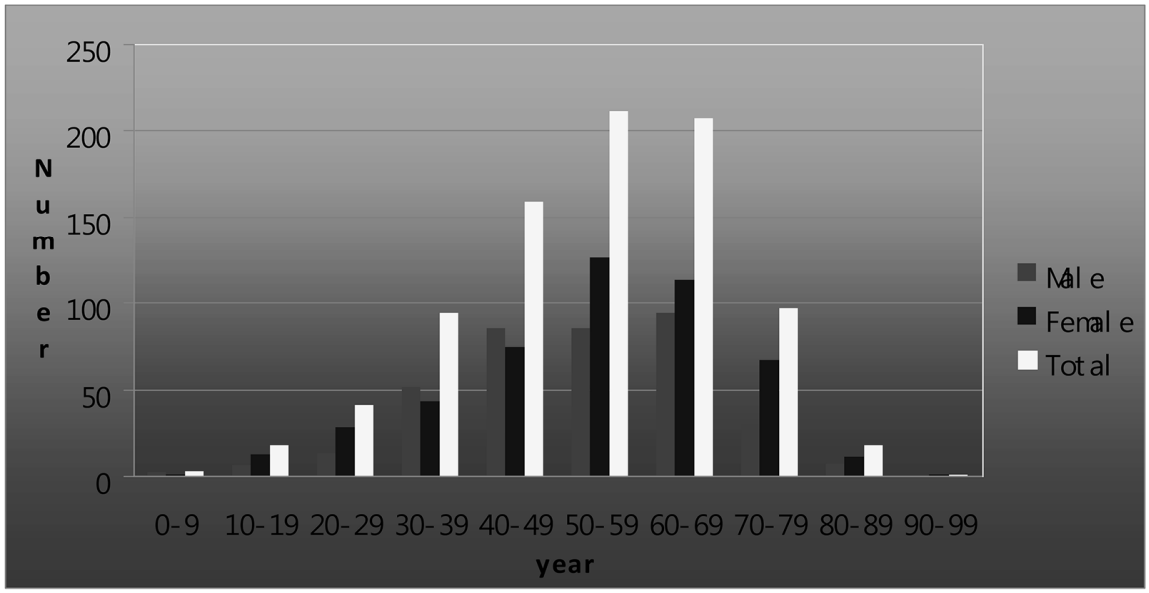
- N=103
- Mean F/U : 9.8 years
- VN: 1.9% (2 out of 103 patients)
  - occurred in contralateral ear
  - low recurrence rate but compared to general population, OR 55

cf . 3/18 in the same ear
(Bergeneus, 1999)



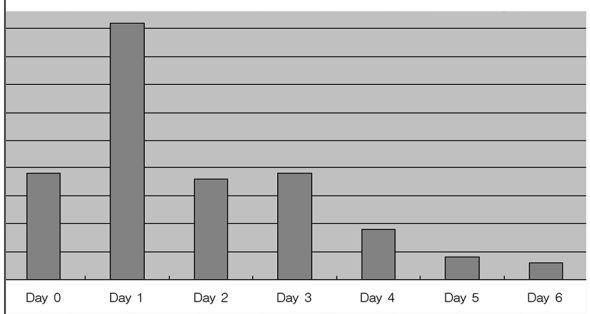
Age distribution (n=861)

mean age = 53 years (7-91)



Prodromal dizziness

- Incidence : 146/665 (22.0%)



Days prior to event date

Duration of the prodromal dizziness

국내 전정신경염 임상양상

- Nausea (83.7%), Vomiting (70.4%), Headache (25.0%)
- Right and left ear were equally affected
- 91% of vertigo & 82% of nystagmus resolved in a week

	외국연구들	평형학회기획 과제 2007 (n=861, 14 centers)
평균연령	41.5 y	53.5 y
남녀비	55 : 45	45 : 55
일주일내 선행 어지럼	8.6%	22.0%

Treatment

- Steroids
- Antiviral agents
- Antiemetics and vestibular suppressants
- Vestibular rehabilitation

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Methylprednisolone, Valacyclovir, or the Combination for Vestibular Neuritis

BACKGROUND

Vestibular neu
Its assumed ca
corticosteroids
come in patien

METHODS

We performed a prospective, randomized, double-blind, two-by-two factorial trial in which patients with acute vestibular neuritis were randomly assigned to treatment with placebo, methylprednisolone, valacyclovir, or methylprednisolone plus valacyclovir. Vestibular function was determined by caloric irrigation, with the use of the vestibular paresis formula (to measure the extent of unilateral caloric paresis) within 3 days after the onset of symptoms and 12 months afterward.

RESULTS

Of a total of 141 patients who underwent randomization, 38 received placebo, 35 methylprednisolone, 33 valacyclovir, and 35 methylprednisolone plus valacyclovir. At the onset of symptoms there was no difference among the groups in the severity of vestibular paresis. The mean (±SD) improvement in peripheral vestibular function at the 12-month follow-up was 39.6±28.1 percentage points in the placebo group, 62.4±16.9 percentage points in the methylprednisolone group, 36.0±26.7 percentage points in the valacyclovir group, and 59.2±24.1 percentage points in the methylprednisolone-plus-valacyclovir group. Analysis of variance showed a significant effect of methylprednisolone ($P<0.001$) but not of valacyclovir ($P=0.43$). The combination of methylprednisolone and valacyclovir was not superior to corticosteroid monotherapy.

CONCLUSIONS

Methylprednisolone significantly improves the recovery of peripheral vestibular function in patients with vestibular neuritis, whereas valacyclovir does not.

vestibular suppressants & Antiemetics

Vestibular suppressants

- Antihistamine
  - dimenhydrinate (Dramamine, Bonaring)
- Benzodiazepine
  - diazepam (Valium), lorazepam (Ativan), clonazepam (Rivotril)
- Anticholinergic
  - scopolamine (키미테 transdermal patch)

Antiemetics

- Metoclopramide (Maxolon, Macperan) & domperidone
- Chlorpromazine & haloperidol
- Ondansetron (Zofran)

Agents of uncertain efficacy or mechanism

- Ginkgo biloba
- Baclofen & amantadine
- Piracetam (Nootropil)
- Flunarizine, Nimodipine, Verapamil

Vestibular rehabilitation

- **Goals**
  - **improve functional balance**
  - **decrease oscillopsia**
- **Candidate**
  - **not fluctuating vestibular hypofunction (eg. Meniere's disease)**
- **When to start**
  - **no critical period documented**

Vestibular rehabilitation

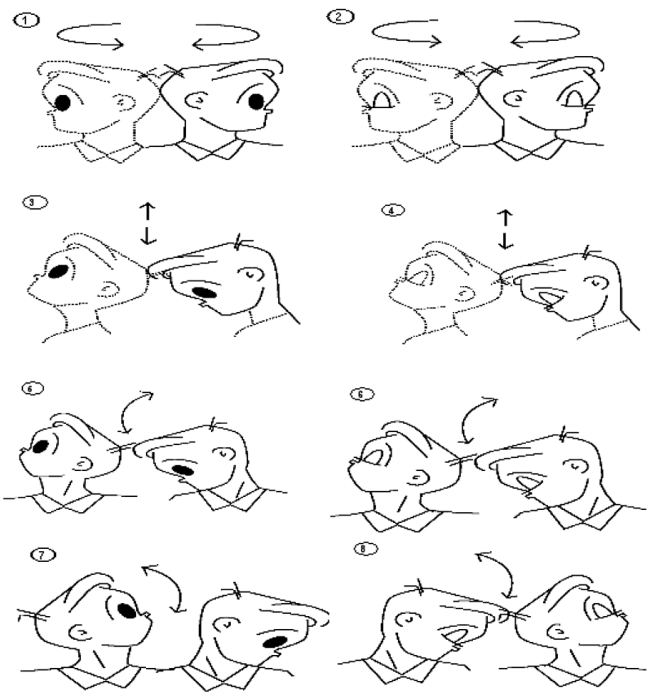
- **Vestibular exercises improve central VOR/VSR comp ensation after vestibular neuritis**

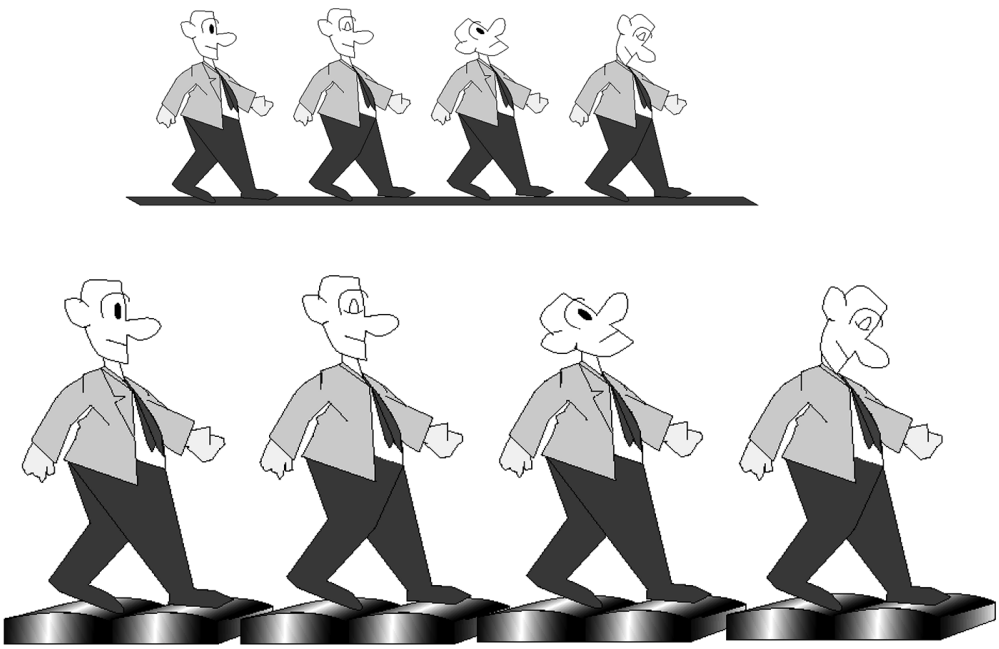
(1) Visual, oculomotor, and optokinetic systems (smooth pursuit, saccadic, a nd optokinetic eye movements)

(2) Vestibular system (repetitive head and body rotations and tilts)

(3) Somatosensory systems (standing, walking and running, cervico-ocular reflex)

Strupp. NEUROLOGY 1998;51 29





노인에서의 BPPV 특징

- 나이가 들수록 유병률이 높아진다
- 전형적인 유발자세를 잘 인식 못한다
- 어지럼의 지속시간이 길다
- 자세불균형을 호소하는 경우가 흔하다
- 재활치료가 어려울 수 있다

-> 60세 이상 모든 어지럼환자는 유발검사를 시행해야!

전정편두통의 진단기준

A. At least five episodes with Vestibular symptoms of moderate or severe intensity, lasting btw 5 min & 72hrs

B. A current or past history of MO or MA

C. At least 50% of episodes are associated with at least one of the following three migrainous features

1. headache with at least two of the following four:
   a) Unilateral location
   b) pulsating quality
   c) moderate or severe intensity
   d) aggravation by routine physical activity
2. photophobia and phonophobia
3. visual aura

D. Not attributable to another ICHD-3 or vestibular disorder

메니에르병의 진단기준

1. Definite MD

A. Two or more spontaneous[1] episodes of vertigo, each lasting 20 minutes to 12 hours[2]

B. Audiometrically documented low- to medium-frequency sensorineural hearing loss[3,4] in the affected ear on at least one occasion before, during or after one of the episodes of vertigo[5,6]

C. Fluctuating aural symptoms (hearing, tinnitus or fullness) in the affected ear[7]

E. Not better accounted for by another vestibular diagnosis[8]

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2. Probable MD

A. Two or more episodes of vertigo or dizziness, each lasting 20 minutes to 24 hours

B. Fluctuating aural symptoms (hearing, tinnitus or fullness) in the reported ear[1]

D. Not better accounted for by another vestibular diagnosis[2]

비전정성 어지럼

- **Psychogenic vertigo**
- **Pre-syncope**

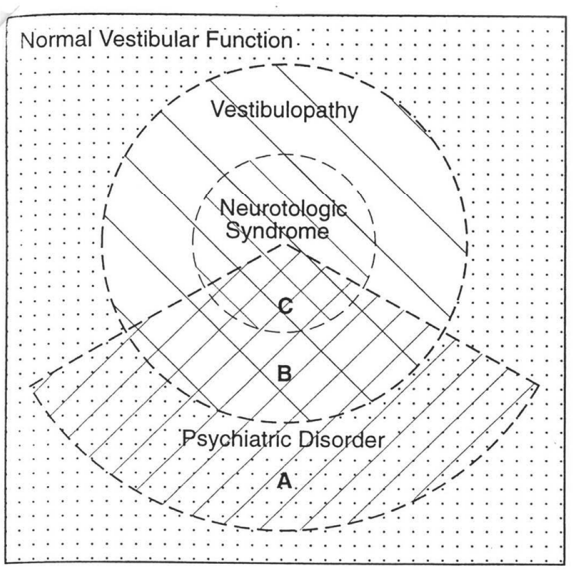
Psychogenic dizziness

- psycho-physiologic dizziness
- psychiatric dizziness
- psychic dizziness
- functional dizziness
- somatoform disorder
- subjective dizziness
- hyperventilation syndrome
- phobic postural vertigo

정신과질환과 어지럼의 연관성

- 어지럼이 주증상인 정신과 질환들
  - **agoraphobia**
  - **visual vertigo**
  - **panic attacks**
- 어지럼으로 인하여 발생하는 정신과 질환들
  - **anticipatory anxiety**
  - **phobic avoidance**
  - **depression, anxiety, panic attacks**

Framework for classifying patients with dizziness (Furman & Jacob, 1997)



A. Pure psychogenic dizziness

B. Unspecified vestibulopathy (multisensory dizziness, presbyastasis)

C. Well-recognized syndrome (Meniere's, BPPV)

B+C: psychogenic overlay

Panic disorder (DSM-V criteria)

Intense fear in which ≥4 of following symptoms reach a peak within 10 min

1. palpitations,
2. sweating
3. trembling
4. shortness of breath
5. feeling of choking
6. chest pain
7. nausea
8. **feeling dizzy, unsteady, lightheaded, or faint**
9. feeling of unreality
10. fear of losing control
11. fear of dying
12. paresthesia
13. chills or hot flushes

Agoraphobia (DSM-V criteria)

Diagnostic criteria

A. Anxiety about being in place or situations (eg. outside home alone; in a crowd; standing in a line; on a bridge; traveling in a bus, train, automobile)

B. Situations are avoided or endured with marked distress

C. Anxiety of phobic avoidance is not from other mental disorder (social phobia, space phobia, acrophobia, OCD, separation anxiety, posttraumatic stress disorder)

Epidemiology

- Lifetime prevalence: 1.5-3.5%
- Age of onset : adolescence – mid thirties
- Women and men : 2:1
- Risk factor: female, poorly educated
- 80% with depression

Visual vertigo (Bronstein, 2004)

- Dizziness provoked by large scale environment, visual motion stimuli or repetitive visual patterns.
  - crowed area with full field visual motion stimuli
  - large stores with complex visual pattern
- Improvement of symptom with eye closure
- Mechanism: visual dependency after vestibular insult

Phobic postural vertigo (Brandt, 1994)

monosymptomatic subjective imbalance without fall rather than anxiety

Characteristic features

1. Non-rotational vertigo and **subjective disturbance of balance while standing or walking**, despite normal balance test
2. **Fluctuating unsteadiness,** often the form of attack lasting sec to mins
3. **Anxiety** during or after vertigo (but it also occurs without anxiety)
4. Often **in specific situation** such as bridge, street, or crowd
   -> Phobic avoidance behavior
5. Mainly in **obsessive-compulsive personality**
6. **Onset of disease** : **emotional stress, vestibular insult (21%), or medical illness**

Incidence/age/sex

- Second most common cause of vertigo
- Peak in fourth and fifth decades in both sex

Psychogenic dizziness should be suspected if

- Dissociation between objective and subjective disequilibrium
- Certain stimuli (bridge, staircase, empty room, street) or social situations (department store, crowd, restaurant, concert) are main causes

- **Unusual features of Psychogenic dizziness are**
  - Rotational vertigo
  - Direction-specific falls
  - Nausea and vomiting

Treatment

- Reassurance

- Desensitization
  - exposure to triggers
  - regular exercise

- Behavioral therapy

- SSRI, TCA

요약

- 회전성 현훈의 가장 흔한 원인은 BPPV
- 전정신경염의 진단에 필요한 신경이과적 진찰을 숙지한다.
- 원인불명의 어지럼환자에는 편두통의 병력을 확인하고 예방약제를 시도해 본다
- 심인성과 전정성어지럼이 같이 있는 경우가 흔하다