Assessment of the patient with Acute Vestibular Syndrome

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OBJECTIVES:
1. Identify an Acute Vestibular Syndrome
2. List key questions that need answered when taking a history of the patient with AVS.
3. Define five bedside physical assessments to aide in appropriate management of the dizzy patient.
4. Able to distinguish between peripheral vs. central causes in the patient with AVS and treatment

There are 2.6 million US Emergency Department visits for dizziness and vertigo each year. When a patient complains of dizziness, there are a myriad of possible diagnosis. By providing a tailored nursing assessment we can secure information leading to quicker diagnosis, appropriate management, and potentially rapid patient improvement.

Our patient’s may describe dizziness as... light headedness, spinning sensation (vertigo), rocking on a boat, unsteady, imbalanced, near fainting, etc.

Thus when a patient states he/she is dizzy, further investigation must occur.

Nurses play a vital role in caring for the dizzy patient!
When a patient presents with an Acute Vestibular Syndrome (AVS)—sudden onset of dizziness, vertigo, nausea, vomiting, motion intolerance, nystagmus, and imbalance—the need to differentiate central vs. peripheral causes is essential.

Obtaining a detailed history (past medical history, time of onset, triggers, and medication), along with present symptoms, checking nystagmus characteristics, testing skew deviation, head impulse test, ocular lateropulsion, and head tilt are quick bedside tools that aide in diagnosing.

### Possible peripheral causes of Acute Vestibular Syndrome

- Benign Paroxysmal Positional Vertigo
- Vestibular Neuritis/Labrynthitis
- Meniere’s episode

### Possible Life threatening Central causes of Acute Vestibular Syndrome

**STROKE**

Other potential central causes include Multiple Sclerosis, Cerebellar Pontine angle lesion (acoustic neuroma), Paraneoplastic Syndrome

### Time of onset.

When did your symptoms start?

Exact time and date is ideal.

Document when you are seeing the patient since time of onset.

eg. Mr. Smith states he “became dizzy at 7:00 am yesterday” 10-19-12 and I am seeing him at 0600 10-20-12, 23 hours post symptom onset.

### Are symptoms episodic?

- benign paroxysmal positional vertigo
- migraine
- superior canal dehiscence
- meneire’s syndrome
- orthostatic hypotension
- Postural orthostatic tachycardia

### Are they continuous?

- Acute vestibular syndrome: neuritis vs stroke
- Mal de desembarcamento
- med effect
- MS lesion
- Paraneoplastic syndrome
- Cerebellar pontine angle tumor

### Precipitating Factors

- What was the patient doing prior to symptom onset?

  - Right before, day of, day before.

  - Head position
    - Up, down, right, left

  - Body position
    - Supine, sitting, standing

  - How does the patient feel best?
    - Lying flat, sitting perfectly still with eyes closed
Past medical history

It is important to know past medical history and medications patient is taking, both prescribed and over the counter. Make a mental note of patients with diagnosis that have an increased risk for stroke. Some medications may have a side effect of dizziness or can cause ototoxicity.

Associated Symptoms

What are the symptoms the patient is experiencing in present illness?
- nausea
- vomiting
- diplopia (double vision)
- blurry vision
- hearing loss or change in hearing
- ringing in ears
- headache
- light headedness
- spinning sensation (true vertigo)
- imbalance
- ataxia

The Physical Assessment

The physical exam includes checking nystagmus characteristics, skew deviation, head impulse, ocular lateropulsion, and head tilt which aid in differentiating peripheral (Benign Paroxysmal Positional Vertigo, vestibular neuritis, labyrinthitis) versus potentially life-threatening central causes (stroke).

Anatomy and Physiology of the vestibular system.

Any disruption with the balance organs in the inner ear, brain (cerebellum, medulla, pons), or proprioceptors in the spinal column can cause dizziness and imbalance.

Incorporate the easy mnemonic HINTS as part of your Nursing Assessment of the Acute Vestibular Syndrome patient.
- H: head impulse
- I: nystagmus
- N: test skew
Nystagmus

Nystagmus is an involuntary eye oscillation. It usually has two phases (slow and fast). It is named by the direction of the fast phase.

- Horizontal nystagmus
  - Right beating
  - Left beating
- Vertical nystagmus
  - Up beating
  - Down beating
- Rotary nystagmus or torsional nystagmus

Note if nystagmus is continuous or fatigues and if it is unidirectional or direction changing.

Horizontal Nystagmus

From Hotson and Baloh. NEJM 1998; 339: 680-5

- Primary gaze Right beating nystagmus that does not fatigue
- Horizontal left beat nystagmus that fatigues.
- Sustained non fatiguing vertical or torsional nystagmus is a central cause.
- Direction changing nystagmus is Central
Not every dizzy patient will have nystagmus.

Some may only have nystagmus when they lie down (head hanging positions). If this is the case make note the nystagmus fatigues. If it does, this is likely BPPV and a maneuver to displace the otocoria can be performed by a trained staff member.

Others may have nystagmus in primary gaze sitting up and is continuous. If so the patient should not go home until seen by Neurology, Stroke team, or Neuro-vestibular staff.

Primary gaze nystagmus needs further investigation!

BPPV and EPLEY

Skew deviation
Skew deviation is a vertical misalignment of the eyes in primary gaze position.

Skew deviation assessment can be performed at bedside by covering one eye at a time as patient focuses on target and assessing if uncovered eye “jumps”. If it does, it is likely a central finding.

Skew deviation can be related to lateral brainstem lesions, most often ischemic strokes in the medulla or pons.

Head Impulse Test (HIT)
The head impulse tests the vestibular ocular reflex.

The head impulse test is performed by placing your hands on each side of the patient’s head. Move patient’s head slowly back and forth to make sure the head and neck are flexible. Once established patient is able to relax neck and you can support head, move patients head slightly, but quickly from center to right and center to left as patient focuses on a target. You can also move from left to center and right to center. Either way pay attention to the patient’s eyes.

If the patient’s eyes “catch up” to look at the target this is considered a “positive” Head Impulse test.

You state it is positive to the right if you see the catch up when you are moving the head toward the right shoulder of patient. It is positive to the left if you see the catch up when you move head toward patient’s left shoulder.

A positive HIT is a likely sign of an inner ear issue.
You may do the HIT and not see a “catch up” this would be a negative HIT.

Negative HIT on a patient with primary gaze nystagmus is likely a central cause and further evaluation and testing is recommended.

The MD may order a MRI/MRA of head and neck as this is the gold standard. Some strokes that present with dizziness, nausea, vomiting, and/or imbalance do not show on MRI immediately and a repeat MRI days later (48-72 hours) show the stroke predicted by clinical findings.

This is why continuous nursing assessments are so important. We can contribute to early identification of changes noted in our patients.

When vestibular afferents are underactive as a result of a lesion, the signal prompted by the rapid acceleration of the head to oculomotor nuclei is decreased.

As a result the eyes cannot fixate on the target and a corrective saccade is needed

The corrective saccade may occur during the head movement (covert) or after (overt).
Ocular Lateropulsion

Ocular lateropulsion is associated with full lateral gaze deviation.

Ask the patient to close his/her eyes gently (for 5 seconds) and open and look at a target, ie. your nose.

If eyes are deviated to one direction then move center, ocular lateropulsion is present.

Ocular lateropulsion is a central finding.

Head tilt

Head tilt is a compensatory mechanism.

If the lesion is above the pons the head tilts to the opposite side of the lesion.

If the lesion is in the medulla or vestibular (ear) the head tilts toward the lesion, affected ear.

May help with localization but does not necessarily differentiate central vs peripheral.
Putting it all together…

Primary gaze nystagmus in a sitting position is NOT Likely BPPV!

Primary gaze nystagmus needs further evaluated and patient should not go home until seen by Neurology to rule out central causes.

No nystagmus in primary gaze in sitting position, but when patient lies down complains of dizziness and you note a fatiguing nystagmus. This is a peripheral cause; likely BPPV, and needs seen by a trained staff member to do repositioning maneuvers.

Continuous nursing assessments are so important. We can contribute to early identification of changes noted in our patients. The nurse CAN make a difference and advocate for the patient!

Case Study 1

51 YEAR OLD MALE
PRESENTED TO ED
INTERMITTANT SPINNING SENSATION
NAUSEA AND VOMITTING
SYMPTOMS BECOMES WORSE WITH SITTING, STANDING, AND POSITION CHANGE
SYMPTOMS IMPROVE WITH LAYING DOWN
PMH
HTN
GERD
MALIGNANT MELANOMA

PERTINENT ASSESSMENT-
Felt best lying down at rest. Symptoms worsened upon sitting or standing.

Symptoms—dizziness, nausea, vomiting, imbalance—AVS

H+—POSITIVE HEAD IMPULSE TEST (HIT) to the right
N— Left beating nystagmus in light and dark primary gaze, right gaze, left up and down gazes. Increased velocity in left gaze
TS—No Skew deviation or ocular lateropulsion noted (See Video of nystagmus)

LAB AND IMAGING
NO metabolic abnormalities
MRI BRAIN—no acute abnormalities

What do you think diagnosis is?

Positive Head Impulse without other central signs likely peripheral-ear.

Negative Head Impulse with other central signs (skew, nystagmus, diplopia, ocular lateropulsion, etc) likely stroke in AVS.

Negative Head Impulse and only nystagmus when lie down and nystagmus fatigues likely BPPV.
VESTIBULAR NEURITIS
INFLAMMATORY PROCESS AFFECTING THE VESTIBULAR PORTION OF THE 8TH CRANIAL NERVE - POSSIBLE FROM VIRAL INFECTION
PRESENTS WITH:
- VERTIGO, NAUSEA, AND VOMITING. GAIT INSTABILITY WILL FALL TOWARDS OPPOSITE SIDE OF THE FAST BEAT NYSTAGMUS
- NYSTAGMUS THAT CAN BE UNIDIRECTIONAL AND HORIZONTAL, POSITIVE HIT
SYMPTOMS IMPROVE WITH TIME WITH THE WORST SYMPTOMS BEING THE FIRST FEW DAYS OF SYMPTOM ONSET
- OWE HAVE RESIDUAL IMBALANCE AND NONSPECIFIC DIZZINESS FOR MONTHS AFTER SYMPTOM ONSET
- USUALLY ONLY GET ONCE IN A LIFETIME
- Have seen BPPV later in affected ear
TREATMENT: STEROID WITH TAPER

Case Study 2

63 year old female with a 2-day history of left eye pain
This was followed by an acute vestibular syndrome (AVS)
Hiccups
Unable to sit without support
Eventually developed diplopia

Examination
Unable to sit, fell left
Primary gaze right beat nystagmus - unidirectional
Ocular lateropulsion to left
Skew deviation
Normal h-HIT

Case 2: Primary gaze right beat nystagmus. OL to left and conjugate ocular torsion to left

Case 2 Acute Vestibular Syndrome with a normal head impulse test LEFT Head Impulses

How did the HIT Device help here? The normal h-HIT is now available to any frontline provider unfamiliar with vestibular testing.

Case 2 Right Head Impulses

Case Study 2 video
Case 2

Left lateral medulla stroke

FLAIR

DWI

Further reference and research

Quantitative Video-Ocugraphy to Help Diagnose Stroke in Acute Vertigo/Exacerbations of Chronic Vertigo

Published online March 5, 2013.

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://neurology.org/content/76/11/ST978656.full.html

Data Supplement/supplement.pdf

References


Contact information

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• Office:309-655-7841
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• Consults: Call Vertigo Clinic/Audiology (309)655-7841 or call me directly through PALS
• Must have an order placed even if D/C patient, order needs placed in EPIC and call to Clinic. Cannot see if only on DC instructions Need Order!
• Vestibular Assessment+ RN or Audiologist (1-2 weeks)
• Vertigo Clinic+ Dr Kattah not available~3 months.
• You can always call with questions or if wish to review what's best for patient.