

Resident corner: Episodic imbalance

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Case vignette

A 70-year-old woman with hypertensive cardiomyopathy was referred to the neurologist because of increasing episodic imbalance during standing and walking. In fact, for two weeks she could only ambulate with a walker. Two days ago, she misstepped and fell on her left shoulder, which has hurt since then. A bone fracture was excluded. Otherwise the patient's past medical history was unremarkable.

Question 1:

Which of the following clinical tests has the most immediate therapeutical consequence?

- A Halmagyi-Curthoys head impulse test
- B Alternating cover test
- C Provocation maneuvers for positional vertigo
- D Romberg test
- E Head shaking nystagmus

Answer: C

The initial clinical investigation by the neurologist aimed to exclude a neuro-otological disorder. Visual fixations were conjugate in all directions. There was no spontaneous or gaze-evoked nystagmus during normal viewing and with Frenzel glasses. Saccadic, smooth pursuit, and vergence eye movements were normal. There were no pupillary abnormalities. The horizontal head impulse test revealed no catch-up saccades on either side. There was no nystagmus during vibration of the mastoids or after head shaking with Frenzel glasses. Five seconds after positioning the patient in the right head-hanging Dix-Hallpike (Dix and Hallpike 1952) position, a strong geotropic vertical-torsional nystagmus developed and lasted about 30 seconds, during which the patient complained of strong rotatory vertigo.

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Question 2:

What is the most likely diagnosis?

- A Vestibular neuritis
- B Benign paroxysmal positional vertigo
- C Chiari malformation
- D Midline cerebellar infarct
- E Infantile nystagmus syndrome (= congenital nystagmus)

Answer: B

Question 3:

After noting vertigo and nystagmus in the right Dix-Hallpike position, how should the neurologist proceed?

- A Stop investigations and order immediate imaging
- B Stop investigations and perform a liberation manoeuvre
- C Continue investigations with the other provocation manoeuvres
- D Continue investigations with tests probing cerebellar function

Answer: B

The neurologist kept the patient in the right Dix-Hallpike position for one minute and then continued with the Epley repositioning manoeuvre (Epley 1992). However, due to the pain in her left shoulder, the patient could not completely roll over to the third position of the Epley manoeuvre, i.e., with the head pointing down on the left side. After sitting up, the patient complained of strong vertigo. When she was positioned again in the right head-hanging Dix-Hallpike position, a strong geotropic horizontal nystagmus occurred without latency. Because of massive vertigo, the patient was immediately put back in the sitting position.

Question 4:

What was the cause of the vertigo and horizontal nystagmus after the Epley manoeuvre?

- A Dislocation of the canaloliths into the horizontal semicircular canal of the right labyrinth
- B Acute ischemia of the right labyrinth
- C Spell of vestibular migraine
- D Uvular compression due to Chiari malformation

Answer: A

Question:

Now how should the neurologist proceed?

- A Stop investigations and order immediate imaging
- B Perform a liberation manoeuvre for the right horizontal semicircular canal
- C Give anti-migraine medication
- D Repeat the Epley manoeuvre for the right side

Answer: B

Comments

Every patient with dizziness or imbalance, even in the absence of typical complaints of benign paroxysmal positional vertigo, should be tested with provocation manoeuvres to detect canalolithiasis or cupulolithiasis. The two manoeuvres that should be performed are:

- 1 The Dix-Hallpike manoeuvre to detect canalolithiasis of a posterior semicircular canal (Dix and Hallpike 1952). Hereby the patient is placed from the sitting in the head-hanging position with the head rotated about 45 deg relative to the trunk. Typically, in the presence of posterior canalolithiasis, nystagmus occurs after a few seconds, is geotropic, i.e., directed towards the center of the earth, and shows both a vertical and a torsional component.
- 2 The supine-roll manoeuvre to detect a canalolithiasis or cupulolithiasis of the horizontal semicircular canals (McClure 1985; Pagnini et al. 1989). Hereby the patient is lying in supine position with the head elevated by about 20–30 degrees. Then the head is quickly rotated to the right-ear-down or left-ear-down position. In the case of horizontal canalolithiasis or cupulolithiasis, horizontal nystagmus with a minor torsional component occurs, whereby the nystagmus beats either geotropically or apogeotropically in both ear-down positions, i.e. the nystagmus changes its direction in the head. Many times, nystagmus appears without latency. Persistence of nystagmus points to a cupulolithiasis (Baloh et al. 1995).

The treatment for posterior canalolithiasis is performed with the Epley manoeuvre (Epley 1992); whereby the head is rotated from the Dix-Hallpike position, in which vertigo and nystagmus occurred, by 90 degrees to the other side and by another 90 degrees in the same direction. To enable the latter head rotation, the body is rolled to the side position. Finally, the patient is brought to the sitting position. In all four Epley positions, the head is kept still for at least 30 seconds or as long as the nystagmus lasts.

Canalolithiasis of the ipsilateral horizontal canal can sometimes occur after the Epley manoeuvre. It is our experience that this happens especially if the head is not suffi-

ciently directed towards the floor in the third Epley position or if the head is not moved along the plane of the affected posterior canal during sitting up. After the Epley manoeuvre, one should repeat the Dix-Hallpike manoeuvre as a control. If there is no positional nystagmus in the head-hanging position, the Epley manoeuvre was successful; if, however, there is horizontal nystagmus in the head-hanging position, posterior canalolithiasis was transformed into horizontal canalolithiasis during the Epley manoeuvre. In this case the neurologist should immediately perform the liberation manoeuvre for the horizontal semicircular canal, if the patient is not too nauseated. This can be done either with the Gufoni manoeuvre or the Lempert manoeuvre.

- 1 Gufoni manoeuvre (Gufoni et al. 1998; Casani et al. 2010): The patient is first brought from the upright position to the side position with the unaffected ear down. After 1–2 minutes in this position, the head is rotated about the jaw axis towards the unaffected ear such that the head points downward by about 45 degrees. After another 1–2 minutes in this position, the patient is brought back to the sitting position and then the head is rotated back to the straight ahead position.
- 2 Lempert manoeuvre (Lempert 1994): The patient is rolled from the supine position in the direction of the unaffected ear by 270 degrees. Rotations are in steps of 90 degrees. At each position, the patient rests for 30–60 seconds. From the last position, the patient is brought up to the sitting position. This manoeuvre is also called barbecue manoeuvre for its similarity to movements on the grill. Some authors advocate rolling the patients stepwise by 450 degrees or more in the direction of the unaffected ear (e.g., Waespe 1997, Fife 1998).

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