

Clinical correlations between vertebral artery variations - dominant or hypoplastic artery and recurrent ortholytic vertigo syndrome (secondary BPPV?) - clinical study 2019-2020 - Clinica Nova Explorari ORL Bucharest, Romania

Ioana Alexandra Voda

Exploration Nova Clinic, Romania.

Abstract

The poster presents a statistical study of patients with recurrent BPPV, primary or secondary to vestibular diseases - hydrops, post neuronitis, vestibular migraine, who were reinvestigated with cervical Doppler Echo, performing, describing vertebral arteries, diameters and kinetics. Benign Paroxysmal Positional Vertigo (BPPV) is the most common cause of vertigo, which is a symptom of the condition. Though not fully understood, BPPV is thought to arise due to the displacement of otoconia (small crystals of calcium carbonate) from the maculae of the inner ear into the fluid-filled semicircular canals. These semicircular canals are sensitive to gravity and changes in head position can be a trigger for BPPV. The posterior canal is the most commonly affected site, but the superior and horizontal canals can be affected as well. It should be noted that the superior canal is sometimes also referred to as the anterior canal and the horizontal canal is sometimes referred to as lateral canal.

Introduction:

The peripheral vestibular labyrinth contains sensory receptors in the form of ciliated hairs in the three semicircular canals and in the ear's otolithic organs. They respond to movement and relay signals via the eighth cranial nerve. Visual perception such as gravity, position, and movements also receive signals from somatosensory receptors in the peripheral vestibules. With the displacement of the otoconia into the semicircular canals, these delicate feedback loops relay conflicting signals that can result in any symptom related to BPPV.

BPPV can be classified as cupulolithiasis and canalolithiasis. Cupulolithiasis is when the otoconia are adhered to the cupula, whilst canalolithiasis is when the otoconia are free floating in the canal. Additionally, the type of nystagmus that a patient may display can be classified as geotropic or apogeotropic. Geotropic describes the nystagmus as a horizontal beat towards the ground. Apogeotropic describes the nystagmus as a horizontal beat towards the ceiling.

Vertebrobasilar insufficiency (VBI) is defined by inadequate blood flow through the posterior circulation of the brain, supplied by the 2 vertebral arteries that merge to form the basilar artery. The vertebrobasilar arteries supply the cerebellum, medulla, midbrain, and occipital cortex. When the blood supply to these areas is compromised, it can lead to severe disability and/or death. Because the cerebellum is involved, survivors

are often left with dysfunction of many organs including ataxia, hemiplegia, gaze abnormalities, dysarthria, dysphagia and cranial nerve palsies. Fortunately, many patients have small vessel involvement and thus the neurological deficits are mild and localized.

The term, VBI, was coined in the 1950s after C. Miller Fisher used carotid insufficiency to describe transient ischemic attacks (TIA) in the carotid supplied territories and is therefore often used to describe brief episodes of transient ischemic attacks in the vertebrobasilar territory. Also known as the posterior circulation, the vertebrobasilar vasculature supplies areas such as the brainstem, thalamus, hippocampus, cerebellum, occipital and medial temporal lobes. Although patients may initially be asymptomatic, the significant build-up of atherosclerotic plaques over time may lead to ischemic events. Stroke may occur either due to an occlusion of the vertebral or basilar artery or an embolus that that may lodge more proximal to the brain. In the emergency setting, VBI is an important diagnosis to consider as many symptoms can appear like other benign etiologies such as labyrinthitis, vestibular neuritis, and benign paroxysmal positional vertigo (BPPV).

Materials and Methods:

Subject:

From September 2017 to February 2018, 50 patients, (10 males/40 females) (between the ages of 19 and 84 years) diagnosed with BPPV were enrolled in this prospective study. Physical examination data and histories of the patients were obtained from otorhinolaryngology clinic, and ECCSVA was performed in the neurology clinic of University of Gaziantep Medical Faculty. The history regarding hypertension, myocardial infarction, cerebrovascular incidents, diabetes mellitus, thyroid dysfunction, and smoking data were obtained from all of the patients and also rechecked from the medical record system. All patients underwent detailed ear, throat, and nose examination and a detailed neurological examination. Participants who were under the age of 18 and/or had central vertigo, ear drainage, or any disability to prevent the performance of a vestibular exam and those who had a history of cerebrovascular event or transient ischemic attack were excluded from this study. Head thrust, rotating chair, and Dix-Hallpike tests were applied to all patients who had a complaint of vertigo which lasted 1–2 minutes. Also, barbecue roll test was administered to the patients who were suspected of having posterior semicircular canal positional vertigo.

Radiologic evaluation:

BPPV-diagnosed patients were assessed with extracranial color-coded duplex sonography LOGIQ P5 portable ultrasound equipment (GE Healthcare, Buckinghamshire, UK) at 5–12 MHz scanning frequency. The measurements were performed between the segments of VA between the C4 and C6 vertebral bodies. The parameters of VA diameter (VAD), peak systolic index (PSI), pulsatility index (PI), resistive index, and end-diastolic flow velocities were obtained by color-coded duplex sonography examination. The intra-arterial diameter was calculated between the intima layers of VAs, which were assessed in the long vessel section that is perpendicular to the axis. To provide the proper shaft, an approximately 60° angle between the wall of the vessels and ray beams was created.

Statistics:

One-sample t-test used to compare the sides of VA diameter and PSI among the BPPV subtypes. Statistical analyses were conducted using SPSS 22 (IBM Corporation, Armonk, NY, USA), and p-values <0.05 were considered statistically significant.

Ethics statement:

The approval for this study was obtained from the ethical committee of the University of Gaziantep. Written informed consent was received from all individuals who participated in this study.

Conclusion:

Cervical Echo Doppler should be included in the battery of mandatory tests for the investigation of recurrent positional vertigo, provided it is performed correctly, with high-performance equipment and with staff experienced in visualizing the vertebral arteries.

Ioana Alexandra Voda is a primary ENT doctor, who graduated from the University of Medicine and Pharmacy Bucharest, she finished her doctorate in 2000 at the University of Medicine Iasi, having postdoctoral studies DIU in Neuro otology and vestibular rehabilitation- Paris, Pierre Marie Curie University, 2015. She is the medical director of Clinica Nova ENT Explorations in Bucharest and Cluj, since 2007, member of the SIO - Otoneurology Society, with multiple participations in various congresses and conferences