Vestibular Office Tests: A Battery Approach to Guide the Diagnosis of Dizzy Patients

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By

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بسم اللة الرحمن الرحيم

"قالوا سبحانك لا علم لنا الا ما علمتنا انك انت العليم الحكيم "

صدق اللة العظيم

سورة البقرة – الاية (٣٢)

List of Abbreviations

- **ABC scale:** Activities Specific Balance Confidence Scale.
- **ADT:** Adaptation Test.
- **CDP:** Computerized Dynamic Posturography.
- **CS:** Composite Score.
- **CTSIB:** Clinical Test of Sensory Integration and Balance.
- **BPPV:** Benign Paroxysmal Positional Vertigo.
- **DHI:** Dizziness Handicap Inventory.
- **DVA:** Dynamic Visual Acuity Test.
- **ENG:** Electronystagmography.
- **EOG:** Electrooculography.
- **FRT:** Functional Reach Test.
- **HIT:** Head Impulse Test
- **HTT:** Head Thrust Test.
- **HSN:** Head Shake Nystagmus.
- **HST:** Head Shake Test.
- **MLB:** Medial Longitudinal Bundle.
- **MS:** Multiple Sclerosis.
- **OPK:** Optokinetic.
- **OTR:** Ocular Tilt Reaction.
- **PPRF:** Para-pontine Reticular Formation.
- **SCC:** Semicircular Canal.
- **SCM:** Sternocledomastoid Muscle.
- **SHA:** Sinusoidal Harmonic Acceleration Test.
- **SOT:** Sensory Organization Test.

- **SVV/ SVH:** Subjective Visual Vertical/ Subjective Visual Horizontal.
- **UVH:** Unilateral Vestibular Hypofunction.
- **VEMPs:** Vestibular Evoked myogenic Potentials.
- **VOR:** Vestibulo-ocular reflex.
- **VAR:** Vestibular Autorotation Test.
- **VNG:** Videonystagmography.
- **VBRT:** Vestibular and Balance Rehabilitation Therapy.
- **VSR:** Vestibulo- spinal reflex.
- **VCR:** Vestibulo- colic reflex.

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Introduction & Rationale

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Vertigo and dizziness are common complaints encountered in clinical practice **(Fretter, 2000).** However the term dizziness encompasses a variety of different sensations each points in distinct diagnostic direction; vertigo, imbalance, tilt illusion, oscillopsia, etc **(Halmagyi, 1996).**

Dizziness may be due to vestibular or non-vestibular causes. Vestibular causes of dizziness is classified Peripheral vestibular disorders as Ménière's disease, benign paroxysmal positional vertigo, acute vestibulopathy (vestibular neuritis) etc. which is encountered as the most common causes of vertigo, Central vestibular disorders as CNS trauma, multiple sclerosis and cerebellar atrophy, etc. and mixed disorders. Other non-vestibular causes of dizziness must be considered including psychogenic causes, anemia and cardiovascular disease, etc. **(Delany, 2003; Ojala & Palo, 1991)**

The principle purpose of balance-function evaluation is detection of the site of vestibular lesion (peripheral, central, or mixed) also helps to estimate its extent, and functional disability experienced by the patient, finally the possible etiology could be reached **(Shepard, 2002).**

Currently, with the evolution of high technology advances, a battery of laboratory tests used for evaluation of the balance system includes: VNG/ENG test battery which is the gold standard in evaluation of the vestibular system. It can assess the site of lesion and its extent focusing mainly on examination of the occulomotor system, vestibule-ocular reflex (VOR). Rotatory chair and VORtq tests are also used to evaluate VOR through expanding the range of frequencies (up to 2 KHz) **(Shepard, 2000).**

Currently Vestibular Evoked Myogenic Potential (VEMP) is considered as objective test that evaluates the Otolith function; the saccular part, inferior vestibular nerve and the central connections (angular VOR) **(Brantberg and Franson, 2000)**

Computerized dynamic Posturography involves a battery of tests that helps to assess the functional capacity of the balance disorder patients, rather than provide information about extent and site of lesion **(Shepard and Telien 1996)**

The use of this high technology vestibular laboratory testing provides adequate information about localization and quantification of vestibular abnormalities. However, it is expensive, needs expert physician for its interpretation, and not available in a wide scale.

While, with the basic understanding of vestibular physiology and proper examination techniques, correct diagnosis can generally be made at the office.

The bedside vestibular examination includes evaluation of static vestibular balance which involves the assessment of vestibule-ocular and vestibule-spinal systems e.g.; spontaneous nystagmus (VOR), assessment for ocular alignment (VSR mediated by lateral SCC), Romberg tests (VSR mediated by vertical canals), etc.While assessment of a VOR response to head rotations provides a measure of dynamic vestibular function e.g. Head Thrust test, Head Shake test, etc.

Additional occulomotor testing is an essential part of the neuro-otologic evaluation e.g: Range of motion, Smooth Pursuit testing, Optokinetic Nystagmus etc **(Walker & Zee, 2000).**

The bedside vestibular examination should also include the effect of provocative maneuvers, example: Positioning (Dix-Halpike) & positional testing which are useful in the diagnosis of BPPV **(Walker & Zee, 2000).**

Information regarding functional compensation, sensory input cues for the postural control could be accessed through CTSIB **(Shepard 2002).**

So in order to achieve best results of management, it is of utmost importance to reach highly refined approach to diagnose dizzy patients. Since laboratory vestibular tests are expensive and are not available in every clinic, on the other hand, office tests can be easily performed and of low-cost. Accordingly, this study is designed with the goal of developing a test battery office approach that would be able to detect peripheral versus central vestibular disorder, also unilateral versus bilateral lesion, and evaluation of the functional disabilities experienced by the patient.

Aims of the work

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1- To select the appropriate Vestibular office battery approach to diagnose vestibular disorders in dizzy patients.

2- To measure the sensitivity and specificity of this battery in fulfilling these goals.

3- To standardize and develop Arabic version of Activities-specific Balance Confidence Scale (ABC).