Fifty Shades of Grey in Chronic Dizziness

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Please see this patient...

- Continuous sense of dizziness for the past 8 months
- Started with minor head injury
- “World feels unstable”, “Floating sensation”, “Feels like I had too much to drink”
- Worse with motion or visual stimulation (grocery store, fluorescent lighting, descending stairs)
- Bumps into things, either side, no falls
- Sx fluctuate but always present
- Complete lab testing is normal
- Exam: Normal but feels worse with DH, motion and gait testing
Goals

1. Summarize the evidence and try to provoke interest on a brutal topic
2. Suggest some possible explanations for unexplainable symptoms
3. Help understand patients symptoms
4. Suggest some ways these people can be helped

• What I won’t do.
  – Create a full understanding and dissolve all controversies
    • Too many shades of gray
    • Too many pieces of the puzzle are missing
    • I am not sure all the pieces are for the same puzzle
Differential Diagnosis

1. Chronic Subjective Dizziness / Phobic Postural Vertigo
   – Visual Vertigo / Visuo-vestibular mismatch / space and motion discomfort
   – Motorist disorientation syndrome
2. Post-concussion syndrome
3. Migraine related vestibulopathy
4. Whiplash related dizziness
5. Autonomic dysregulation
6. Other vestibular disorders (BPPV, PLF/SCDS)
7. Neurodegenerative disorders
8. Episodic Ataxias
9. Orthostatic tremor

Similar predisposing factors
Similar symptoms
Similar exam findings
Similar treatment options
Historically We Have Compartmentalized

- Otologic
- Neurologic
- Cardiac / Systemic
- Psychiatric

“Separating organic from psychogenic is deeply engrained in our medical training. Nowhere is more difficult to separate these than in the patient with chronic dizziness” (Bronstein, 2010)
History

• Karl Westphal 1891: Agoraphobia (fear of the marketplace)
  – debilitating dizziness, spatial disorientation and anxiety in the open spaces and motion-rich environments of the town square
  – Abnormal postural control, spatial orientation, and threat assessment
  – Linked to panic attacks/disorder in the 1960’s but revisited by neuro-otology in 1980’s
Phobic postural vertigo: a first follow-up

- 2nd most common form of dizziness
  1. Postural dizziness, fluctuating unsteadiness provoked by environmental or social stimuli
  2. Obsessive-compulsive personality, labile affect, and mild depression
  3. Anxiety and Vegetative disturbance (GI, Sleep)
  4. Normal exam
- 5 mos to 5 yr f/u, 72% were doing well
- Better outcome with earlier dx

Chronic Subjective Dizziness (CSD)

2000: Staab and Ruckenstein (McGill) refined PPV and renamed it Chronic Subjective Dizziness

1. Persistent non-vertiginous dizziness or subjective imbalance > 3mos
2. Hypersensitive to motion stimuli (self or visual motion)
3. Difficulty with visual tasks (computer)

- Anxiety, depression, compulsive traits are common co-morbidities, not core components
- An independent neuro-otologic condition, not a form of a psychiatric disorder
- Diagnosis of Exclusion
Chronic Subjective Dizziness (CSD)

• Non-vertiginous dizziness or a persistent sense of rocking or swaying (subjective)

• Exacerbated by:
  – standing or walking, absent when recumbent (postural, not orthostatic)
  – Active or passive motion
  – Large-field moving visual stimuli or complex visual patterns
  – Precision visual activities (computer, fine hand tasks)

Other Vest Disorders and Psych Disorders share the same exacerbations...
Ruling out the rest

- **Vestibular Disorders**: visual or self motion provokes during an exacerbation
- **CSD**: dizziness can last hrs - days after the motion is stopped
  - worried about exacerbating factors b/c they feel worse
- **Panic disorder**: Fear is predominant
  - afraid of embarrassment or being incapacitated
  - Fear of external event
Visual Vertigo (Bronstein)

- Symptoms triggered by visual stimulus
  - Supermarket syndrome
  - Motion of large objects (Clouds, river, disco lights)
  - Repetitive visual patterns
  - Flickering / fluorescent lights

- Why?
  - Visually dependant (sensory substitution)
  - Visual field contains too much information
  - Inter-sensory conflict
  - More common in migraine (Drummond, 2005)

- Is this just another shade of gray?
Chronic Subjective Dizziness

• Triggers:
  – Acute or recurrent vestibular disease (25%)
  – Mild TBI, whiplash (10-15%)
  – Anxiety, panic attacks (15-30%)
  – Adverse drug reaction or acute medical event
  – Arrhythmia, dysautonomia

• Past Psychiatric History (Stahl 2012):
  – none (25%)
  – anxiety (60%)
  – depression (25%)
Objective Testing
Chronic Subjective Dizziness

Exam normal or may reveal the trigger
Improves with distraction

Unique patterns on posturography:
  – (Krafczyk 2006, , Artificial neural networks...) Pts diagnosed with PPV showed an increased sway of 3.5 to 8Hz
    • Possibly due to co-contraction of antigravity muscles

  – (Querner 2000): Compared “sway” 17 pts with PPV to 15 controls on a foam platform with eyes open or closed, standard and tandem
    • Increased sway activity (.5-19HZ) and path for easy tasks
    • No difference during difficult balance tasks
Will Anxiety Effect the Vestibular System?

• Ohno, 2004, *The effect of anxiety on postural control in humans depends on visual information processing*
  – Healthy college students with anxiety swayed more on a posture platform with eyes open but the same w/ eyes closed
  – High-risk postural control strategies are employed in situations when not needed

• Carpenter, 2004, *Influence of postural anxiety on postural reactions to multi-directional surface rotations*
  – Anticipation of Threat changes postural control strategies
  – 10 Healthy University of Waterloo students
  – Monitored on a platform at 60cm and 160cm
  – At 160cm:
    • Stiffer and more reactive postural control strategy
    • Narrower postural motion but more corrective actions
Inducing CSD / PPV

• Holmberg 2009, Reduced postural differences between PPV patients and healthy subjects during a postural threat
  – Control pts took on postural sway pattern similar to pts with PPV when vibration was applied to the legs (reducing somatosensory input)
  – Controls than shifted into the high risk posture when they were told the vibration was about to be applied again
  – “Threat systems can alter balance performance depending on context and anxiety state”
CSD...Failure of Readaptation? (Stahl, 2012)

• The Acute Event Triggers a Threat Response...
  – Vestibular system shifts from damaged system to less damaged
  – Visual dependant and heightened vigilance about the environment
  – High frequency, low amp postural corrections and high-risk postural control strategies in routine situation

• Failure to readapt control systems
  – postural unsteadiness and hypersensitivity to motion stimuli
Predictors of CSD

1. High levels of anxiety at the onset of the trigger
2. Vigilance about vestibular symptoms
3. Catastrophic thinking about possible outcomes
4. Anxiety inhibits the emergence of more flexible postural control strategies
Post-Concussion Syndrome
Another Shade of Gray!

• ICD 10: Headache, fatigue, dizzy, difficulty concentrating

• 1991 – Lishman:
  – Initially organic factors trigger sx
    • recovers rapidly in most
  – Long-continued sx = “neurotic developments”

• Can We Predict? Prevent?

• How is this different from CSD?
What predicts Post-Concussion Syndrome? Another Shade of Gray!

• NOT SEVERITY OF INJURY
• Psychological factors present prior to the injury
• Certain Personality Traits
• Stressful Life Experiences
• Early psychological distress

20th Anniversary Article

Etiology of the post-concussion syndrome: Physiogenesis and psychogenesis revisited

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Predisposing Personality Traits

- Staab: Anxiety or an Introverted Personality
- Brandt: Obsessive Compulsive Personality
- Post-concussion syndrome: Type D Personality
  
  A tendency towards negative affectivity (e.g., worry, irritability, gloom) and social inhibition (e.g., reticence (uncommunicating) and a lack of self-assurance). The letter D stands for "distressed".
Who Gets Chronic Dizziness?

• Best (Germany) 2009
  - Prospectively followed 68 pts with acute vertigo x 1 yr
    • Battery of vestibular and psych testing @ 0,1.5,3,6,12 mos
  - BPPV (19), VN (14), Vmigraine (27), Meniere’s (8)

1. Pts with Vestibular Migraine had elevated psych strain
2. A history of psych disorders developed higher levels of strain (maladaptive coping mechanism)
3. **No relationship between vestibular deficits and emotional distress**
4. Correlation between fluctuations of vestibular excitability and psychological strain
Treatment of CSD

• Diagnose, Explain, Reassure, Predict
• Address Triggers
• Medications
• Psychotherapy
• Vestibular and Balance Rehabilitation Therapy
Medications for CSD

- 5 open label studies of SSRI, 2 of SNRI
- Symptoms of unsteadiness and dizziness were reduced by half in 60-70%
- 20% dropout (nausea, sleep disturbance, sexual dysfunction)
- Patients with or without anxiety or depression had similar response

- Start at 1/4 initial dose and titrate up to ½ recommended dose x 8-12 weeks
  - If good response – maintain for 1 yr

- Pts who did not respond or tolerate one SSRI still had a good chance of responding to another (Ruckenstein, 2009)
Psychotherapy

- 4 trials using CBT for chronic dizziness with good but variable results during the intervention
- 1 trial showing significant relapse rates in 1 year
Long Term Prognosis

- Huppert, Brandt, 2005: Retrospective questionnaire of 106 patients with PPV
  - 5-15 yr follow-up
  - Initial counseling and conservative therapy
  - SSRI or TCA (47%) and behavioral therapy in non-responders
  - Ve correlation between time before assessment and improvement rate
Staab “the interface between vestibular and psychological mechanisms is far from clear at this point in time”...but patients are having trouble waiting for us to figure it out
Vestibular Rehab

• Beginning around WWII (Cooksey and Cawthorne) – mvt better than inactivity for vest injuries

• Emergence of research in 1990s and 2000s (Telian and Shepard 1995, Whitney and Rossi 2000)

• Most studies not on CSD specifically but on mixed groups suggest 60-80% decrease in vest symptoms (inc mobility and daily func)

• Should be considered a primary therapy option c or c/out an SSRI or SNRI

• In-clinic and home-based exercise programs that are individualized are more effective
Vestibular Rehab - Goals

• Reducing frequency and severity of vestibular and balance symptoms

• Increasing safety of mobility

• Improving function

• VBRT is twice as effective (60-80 %) than rest and vestibular suppressants (30-35 %) (Telian and Shepard 1990, 1993; Yardley et al 2000)
Vestibular Rehab - Mechanism

• Initial brainstem and cerebellar processes first suppress, then retune responses of central vestibular pathways to peripheral inputs to compensate for initial injury.

• Believed to help promote CNS compensation for peripheral vestibular deficits

• At 3 months post vestibular neuronitis 10% have laboratory evidence of uncompensated peripheral deficits (Heinrichs et al 2007)

• At 1 year only 3% fail to compensate fully (Godemann et al 2005)

• However 30% report persistent dizziness
Vestibular Rehab - Mechanism

• Behavioural promotion of habituation to vest symptoms and motion sensitivity

• Nearly all studies published on VBRT have included patients with symptoms that have persisted for years

• Telian and Shepard, 1993 (first controlled trial) – subjects had symptoms averaging 8 years and 70% had no specific neuro-otologic diagnosis. Elevated VBRT from anecdotal to established Rx

• Most studies include subjects with caloric abnormalities but do not identify compensation status (Gurr and Moffat 2001, Yardley 2001)
Vestibular Rehab - Mechanism

• Yardley et al 2001, Beidel and Horak 2001
  
  – VBRT has components of behavior therapy to treat phobias
  – Graded exposure to promote desensitization to provocative stimuli (habituation)
  – Reduce anticipatory anxiety and avoidance
  – Elimination of unnecessary safety aids
  – Enhancement of self-efficacy in previously feared situations
  – For pts with dizziness> 3 mos these are the most imp elements of VBRT
Vestibular Rehab - Treatment

• Requires a gentler approach

• Initial habituation ex less intense

• Includes habituation ex, balance train, visuo-vest ex, general cond, stress management, graduated exposure to regular activities

• Anxiety management and education

• Max benefit may require 3-6 mos of diligent Rx
VBRT and Psychology

• Anxiety, depression, balance confidence, sense of disability and handicap tend to improve with VBRT (Yardley et al 2001)

• Improvements more likely with early VBRT (Bamio et al 2000)
  – Not necessarily (Cohen and Kimball 2003, Shepard et al 1995)

• Early VBRT had greater effect on anxiety than balance function (Teggi et al 2009)
5 recent studies showed psych factors strongest predictors of persistent morbidity including anxiety or body vigilence, intense worry around symptoms, belief of handicap.

Balance confidence (Hallam et al 1991) and belief in handicap (Yardley et al 1995, 2001) most importance contributors to chronicity
- Fear of falling, fainting or driving (>80 %)
- Fear of social situations ie appearing drunk (50 %)
- Fear of serious pathology (33 %)

Discomfort with heights, complex spatial cues and motion stimuli is inherent in anxiety (Jacob et al 2009)

Physical factors such as degree of vest loss had little predictive value
VBRT with CBT

- **Andersson et al 2006, Johansson et al 2001**
  - Large increases in head movement tolerability and decreases in handicap (DHI) – but no changes in psychological symptoms (anxiety, stress, confidence in ADL’s)

- **Gurr and Moffatt 2001**
  - Improvements in posturography and psychological symptoms

- **Jauregui-Renaud et al 2007**
  - Paced-breathing plus VBRT better than VBRT alone when measured with DHI
VBRT and CBT

- **Jacob et al 2001**
  - 4 weeks of CBT produced little benefit prior to 8-12 weeks of VBRT
  - VBRT alone increased motion tolerance, reduced avoidance and improved anxiety in patients with panic disorder and one or more abnormalities on vestibular testing

- **Holmberg et al 2006, 2007**
  - 8-12 weeks of CBT plus VBRT versus VBRT alone
  - Initial benefits with combined treatment were lost at one year follow up
  - CBT alone does not address balance confidence and handicap
The connection between vestibular disorders and psychiatric disorders has been described as bidirectional: vestibular disorders trigger psychiatric disorders and psychiatric disorders trigger the symptoms of vertigo and dizziness (Yardley et al., 2001b; Staab and Ruckenstein, 2003).