The Dizzy Patient

Cincinnati, OH

October 29, 2008
8:00 AM – 9:00 AM
Session 1: The Dizzy Patient

Learning Objectives

- Recognize at least 2 major diagnostic categories of patients presenting with dizziness.
- Conduct an appropriate work-up of the patient complaining of dizziness, and initiate a management plan for common causes of dizziness.

Faculty

Martin A. Samuels, MD, DSc (hon), FAAN, MACP
Chairman, Department of Neurology, Brigham & Women’s Hospital
Professor of Neurology, Harvard Medical School
Boston, Massachusetts

Teaching and Education

Dr Martin A. Samuels is one of the most well-known and respected teachers of medicine. Born and raised in Cleveland, he is a 1963 graduate of Cleveland Heights High School. He received his bachelor of arts degree from Williams College in Williamstown, Massachusetts, where he acquired his love for liberal education and learned the vital role of the great charismatic teacher. After training first in internal medicine and then in neurology, he joined the faculty of the Harvard Medical School (HMS) and rose to the rank of full professor, one of the first to be promoted to that rank at Harvard by teacher-clinician criteria. This model has now spread to virtually every medical school.

At the national meetings of the American Academy of Neurology (AAN), Dr Samuels has created the only one-person full-day course ever presented at the society, in his area of neurological medicine. He frequently delivers the update in neurology at the annual meeting of the American College of Physicians (ACP), a presentation that has repeatedly been ranked the best presentation at this major meeting of internists after which it is generally published in the society journal, the *Annals of Internal Medicine* (the latest of these was published in January 2005). He is also the major neurological contributor to the national meetings of emergency physicians (the American College of Emergency Physicians) and family physicians (the American Academy of Family Physicians), has appeared at the American College of Rheumatology, and is a regular contributor to the continuing education offerings in anesthesiology, obstetrics and gynecology, and neurosurgery. Dr Samuels has participated in virtually all of the Pri-Med conferences around the country and abroad, delivering memorable lectures on an array of topics, including the neurological examination, movement disorders, dizziness, stroke, peripheral neuropathy, epilepsy, and headache. He delivered the keynote address at the first Pri-Med conference in Houston, cosponsored by Harvard and Baylor Medical Schools. He has been honored three times by his alma mater, The University of Cincinnati (UC) College of Medicine, by being asked to deliver the Charles D. Aring and Distinguished Alumni Lectures, and to receive the Daniel Drake Medal in 2005, the highest award given by UC. He delivered the Guy Williams Lecture at the Cleveland Clinic Foundation in 2005 and was named the 2006 recipient of the A. B. Baker Award for Lifetime Achievement in Neurologic Education by the AAN.

He has written and edited several books that have had a major educational impact. Dr Samuels is the neurological editor for *Stein’s Internal Medicine*, one of the leading textbooks of internal medicine. He is co-editor, with his colleague, Steven K. Feske, of *Office Practice of Neurology*; co-author with Bernard Shevlin and Karl Misulis of *Shared Care for Neurology*; editor of *Hospitalist Neurology*; medical neurology section editor of *Noseworthy’s Neurological Therapeutics*; and editor of *The Manual of Neurologic Therapeutics*. He is the founding editor of *Journal Watch Neurology*, a monthly newsletter of important advance in neurology published by the Massachusetts Medical Society, publisher of the *New England Journal of Medicine*, and a member of the editorial boards of *The Neurologist* and *European Neurology*. He is also a regular peer reviewer for *Neurology*, the *New England Journal of Medicine*, and *World Neurology*. All of these publications amplify his educational impact far beyond his local environment.

Dr Samuels was the long-standing director of the Harvard Longwood Neurology Residency and is the co-founder of the Harvard Partners Neurology Residency, widely regarded to be the most sought-after program of its kind. He has been awarded numerous prizes by the residents and is the clear clinical leader of this prestigious program.

Clinical Skill

Dr Samuels has repeatedly been cited as one of the leading neurologists in the United States, having been fully trained and board-certified in both internal medicine and neurology. He is the only neurologist cited in all 5 editions of the prestigious Castle & Connolly *Best Doctors in America*. His unique training includes a full residency in internal
medicine at Boston City Hospital. He served as chief resident in medicine at Boston City Hospital after his first year of
neurology training at the Massachusetts General Hospital (MGH), followed by a year of neuropathology fellowship and
a senior residency in neurology at MGH. His broad knowledge of general internal medicine as well as neurology has
made him a legendary consultant for difficult or complex problems, particularly in the interface between internal
medicine and neurology. He has been the discusser in a record 9 New England Journal Clinical-Pathologic Conferences,
owing to his extraordinary clinical skill combined with his synthetic and pedagogical abilities.

Despite his heavy administrative load, he maintains an active ambulatory neurological consultative practice where he
sees patients referred from all over the world for expert advice on complex problems. Dr Samuels personally conducts
morning reports each day with the neurology residents and students in which he is presented the most complex
problems faced in the prior 24 hours. He also functions regularly as the attending neurologist on the busy inpatient and
consultation services of the Brigham and Women’s Hospital. During his numerous visiting professorships he always
makes it a practice to see patients with difficult or complex problems with the local neurologists, residents, and students
in addition to delivering formal lectures in contexts such as grand rounds.

Based on his clinical skills and impact on the fields, Dr Samuels has been honored with fellowship in the AAN and
mastership in the ACP.

Original Contributions
Dr Samuels is the foremost expert in the world in the interface between neurology and the rest of medicine. He has
articulated numerous innovative concepts in the areas of neurocardiology, neurohematology, neurohepatology,
neuromephrology, neurorheumatology, and the neurological aspects of organ transplantation and acid-base and
electrolyte disturbances.

His most well-known intellectual contribution involves the mechanisms and prevention of neurogenic cardiac disease.
Dr Samuels has created a unifying hypothesis that explains the mechanisms whereby the nervous system can produce
cardiac arrhythmias and myocardial necrosis in a number of clinical contexts including subarachnoid hemorrhage,
intracerebral hemorrhage, cerebral infarction, brain tumor, epilepsy, and psychological stress. These creative ideas,
which were culled from case material gleaned from his broad experience in both internal medicine and neurology, are
summarized in his well-known lecture entitled “Voodoo Death Revisited: The Modern Lessons of Neurocardiology.”
The material has been published in a series of papers in various medical journals over the quarter century during which
he evolved his theories regarding neurovisceral damage. The basic unifying concept involves catecholamine toxicity
that induces receptor-operated calcium-channel activation followed by free radical–mediated cellular damage. The
concept, best articulated in neurocardiac damage, is an important contribution in that it applies broadly to the field of
psychophysiologic medicine and probably explains many of the instances of visceral damage of neurological origin
such as neurogenic pulmonary edema and neurogenic gastrointestinal bleeding.

For his career-long work on the interface between neurology and the rest of medicine, Dr Samuels received the H.
Houston Merritt Award of the AAN for clinically relevant research in 2007.

Faculty Financial Disclosure Statement
The presenting faculty reported the following:
Dr Samuels has no relationships to disclose.

Drug List
There is no drug list for this presentation.

Suggested Reading List
There is no suggested reading list for this session,
Dizziness

Martin A. Samuels, MD
Chairman, Department of Neurology
Brigham & Women’s Hospital
Professor of Neurology
Harvard Medical School

Types of Dizziness

- Vertigo: illusion or hallucination of motion
- Near syncope: cerebral hypoperfusion
- Dysequilibrium: gait disorder
- Ill-defined lightheadedness: anxiety

History in the Dizzy Person

- Take an open-ended history-no suggestions
- Know the synonyms (e.g. giddy, woozy)
- Beware of medicalized history (e.g. vertigo)
- Pace of the illness (acute, subacute, chronic)
- Listen for neighborhood symptoms
  - Hearing loss, tinnitus suggests peripheral
  - Diplopia, dysarthria suggests central

Epidemiology of Dizziness:

More dizziness than dizzy people

- 1.5 dizzy complaints per dizzy person
- Half of all dizziness is vertigo
- Half of all dizziness is divided among:
  - Near syncope
  - Dysequilibrium
  - Ill-defined lightheadedness

Potential Conflicts of Interest

- Editor-in-Chief, Journal Watch Neurology
- Chief Medical Officer, Primed, a continuing education company (about 10% effort)
- No pharmaceutical or device company relationships
Examination of the Dizzy Person

- Orthostatic BP and heart rate
- Carotid sinus massage by expert only
- Hearing testing
  - Pure tone hearing loss
  - Neural hearing loss (air vs bone conduction)
  - Cochlear vs retrocochlear hearing loss (speech discrim)
- Vestibular testing
  - Spontaneous nystagmus
  - Induced nystagmus (Dix-Hallpike maneuver)
- Proprioception testing (Romberg test)
- Cerebellar testing, including gait

Dix-Hallpike Maneuver

VIII Nerve Anatomy & Physiology

- Three semicircular ducts (angular acceleration)
  - X,Y,Z planes (roll, yaw and pitch)
- Utricle and saccule (linear acceleration)
- Cochlear duct (hearing)
- Perilymph (extracellular [spinal] fluid)
- Endolymph (intracellular fluid)
- End organ is a force transducer obeying F=MA
Pathogenesis of Benign Paroxysmal Positional Vertigo

- Canalolithiasis is the most common cause
- Posterior canal is the most likely offender
- Affected canal becomes gravity sensitive
- Characteristics of the nystagmus and vertigo
  - Brief latency
  - Torsional in dependent eye
  - Vertical in other eye
  - Transient (less than 60 seconds)
  - Reverses on return to upright posture
Repositioning Maneuvers for BPPV
All based on the principle of moving the calcium from the semicircular canal back into the utricle from whence it came
Methods:
Epley
Semont
Brandt-Daroff exercises
Semont Maneuver

Brandt-Daroff Exercises

Later Canal BPPV Maneuver
Perilymphatic Fistula
- Rare cause of positional vertigo
- Perilymph leak at round or oval window
- Conductive hearing loss may be present
- Variable history of trauma, often remote
- Positive fistula test
- Confirmation with radionuclide study
- Surgical repair of rent in window may work

Superior Canal Dehiscence
- Noise induced vertigo (Tullio phenomenon)
- Usually spontaneous, but may be traumatic
- Oscillopsia is common
- Usually resolves spontaneously

Labrynthitis, Vestibular Neuritis and Cochlear Neuritis
- Acute vertigo and/or hearing loss
- May be viral or post-viral
- Pulsed steroids shorten the course
- Antiviral agents add no additional benefit
- Improves substantially in 6-12 weeks

Meniere Disease
- Episodic vertigo and/or hearing loss, usually with prominent tinnitus
- Over time, hearing deteriorates
- May be immune mediated
- Pulse steroids may help acute attacks
- No good evidence that any treatment works
- Symptomatic therapy during attacks
- Diuretics are of questionable value

Traumatic Vertigo
- Usually major trauma with basilar skull fx
- Vertigo and/or hearing loss with nystagmus
- Overall good prognosis
- Substantial improvement in 3-6 months
- Symptomatic treatment

Postconcussion Syndrome
- Delayed onset symptoms after head trauma
- Often associated with “whiplash” symptoms
- No nystagmus or objective hearing loss
- Beware of drug induced nystagmus
- Related to an ulterior motive
- No medical treatment is effective
- Return to work and end of litigation are best
Vestibulo-cochlear tumors

- Usually Schwannomas or meningiomas
- Vestibular Schwannoma is most common
- Progressive retrocochlear hearing loss
- Variable and often mild vertigo
- Tinnitus is not usually prominent
- Magnetic resonance imaging is very useful
- Usually treatable with surgery or focal RT

Vertebro-Basilar Ischemia

- Pure vertigo is almost never a symptom of main stem basilar disease
- Listen carefully for neighborhood symptoms (e.g. diplopia, dysarthria)
- Look carefully for neighborhood signs (e.g. Horner syndrome, facial weakness, ataxia)
- Always test gait (cerebellar lesions affect gait more than peripheral vestibular ones)

Migrainous Vertigo

- Probably quite common
- About 10% of migrainous attacks include vertigo; more in younger patients
- About 10% of vertiginous attacks are associated with headache
- Motion sickness (physiological vertigo) is strongly associated with migraine

Near Syncope

- Pathogenesis: global cerebral hypoperfusion
- Usually orthostatic
- Inadequate volume or failure to adequately vasoconstrict in the upright posture
- Exercise induced is worrisome for cardiac cause
- Long-term loop recorders of HR and BP helpful
- Common causes:
  - Neurally induced (bradycardic; vasodepressor)
  - Volume depletion
  - Cerebral vasoconstriction (e.g. hyperventilation)
  - Vasodilation (e.g. alcohol, anti-hypertensives, heat)

Dysequilibrium (Gait Disorder)

- Extra-pyramidal (e.g. Parkinsonism)
- Spasticity
- Cerebellar ataxia
- Sensory ataxia (proprioceptive trouble)
- Hydrocephalus (“magnetic gait”)
- Psychogenic (conversion & malingering)

Ill-Defined Lightheadedness

- The core problem is anxiety, but general unwellness may be described in this way
- Dizziness is meant metaphorically
- Depression may be a component
- Panic disorders
- Agoraphobia
- Treatment may include psychotherapy, anxiolytics, antidepressants and cognitive behavioral therapy
Drug Treatment of Vertigo

- Most or all drugs work as centrally acting anti-cholinergic substances
  - Diphenhydramine 25-100mg daily
  - Diphenhydramine 25-100mg daily
  - Meclizine 25-100mg daily
  - Promethazine 25-100mg daily
  - Atropine patch
- Benzodiazepines are weak anti-vertigo drugs, and are mainly useful for associated anxiety
- Sympathomimetics improve anticholinergic efficacy and reduce soporific side effects
  - Modafinil 200mg daily
  - Methylphenidate 15-60mg daily

The Brigham Department of Neurology
Martin A. Samuels, MD, Chairman
Brigham & Women’s Hospital, Boston, Massachusetts