EDITORIAL
THE MAGIC OF SPELLS
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*“Those who suffer from frequent and strong faints, without any manifest cause die suddenly”
~Hippocrates (460-373 BC)*

A spell is a brief period where a person is dissociated from the world around them or loses consciousness. There are many possible causes of spells (Table 1) (1). The two major causes of spells are seizures and syncope. Often making the diagnosis is elusive (2). The approach to the differential diagnosis is given in Table 2.

Table 1
Causes of Spells

Syncope	
Seizures	
Dizziness	
Anxiety	
Pulmonary embolus	
Cerebral vascular accident	
Drop attack	
Migraine	
Narcolepsy	
Metabolic	-hypoglycemia
	-hypoxemia
	-hypocalcemic tetany
	-Alkalotic tetany
	-Acidosis
	-hypercapnia
	-low carbon dioxide (hyperventilation)

Seizures

The incidence of seizures increases exponentially after 60 years of age (3). In older persons it can take up to 17 years to make the diagnosis. Seizures may be either generalized (tonic-clonic, absence, myoclonic or atonic) or partial, where they are unilateral and consciousness can be preserved. Complex partial and generalized tonic clonic seizures make up over half of seizures (4). Fyodor Dostyevski (1821-1880) was the prototypic example of complex partial seizures where he

presented with ecstasy or anguish followed by convulsions. Complex partial seizures can present with hallucinations (visual, auditory or olfactory), psychomotor (dysphagia, chewing, taking off clothes) or temporal (dreamy state, memory problems, fear or déjà vu). Diagnostic clues include elevated prolactin for a 20 to 60-minute window following the seizure and, in some cases, elevated CPK or lactate (5, 6). The diagnosis of seizures is made by electroencephalogram. Artificial intelligent techniques are being developed to enhance the diagnosis (7).

Syncope

There are multiple common causes of syncope (Table 3) and a number of much less common causes of syncope (the black swans or zebras) (Table 4) (8). The mechanisms of syncope are:

- Cardiogenic syncope – heart fails as a pump
- Orthostatic syncope – reduced venous return
- Abnormal arterial vasodilation – inappropriate arterial vasodilation
- Atherosclerosis

Cardiac syncope can be due to tachycardia, bradycardia, asystole, prolonged QT, hypertrophic obstructive cardiac myopathy, amyloid cardiac infiltration, or Brugada syndrome. Brugada syndrome is right bundle branch block with ST segment elevation in V1 to V3 (9). It occurs predominantly in middle aged persons. Persons with this syndrome have a propensity to develop sustained ventricular arrhythmias. Carotid sinus hypersensitivity occurs in 40% of adults over 65 years (10). It results in abnormal cerebral autoregulation. It is a common cause of falls in older individuals. Diagnosis is made by doing carotid sinus massage. If there is a pause of greater than 7 seconds in older persons, this is diagnostic. It should be avoided in persons with a carotid bruit, recent stroke or myocardial infarction or a history of ventricular tachycardia (11). The work up for cardiac syncope is outlined in Figure 1. Persons with autonomic neuropathy are at high risk of having lethal arrhythmias (“death in the bed syndrome”) (11). If no obvious cardiac causes, orthostasis or postprandial hypotension are present, an elderly person with syncope should be considered for a subcutaneous implantable loop recorder (12). Ambulatory recorders rarely are useful as usually the next syncopal episode occurs months after the previous one.

THE JOURNAL OF NUTRITION, HEALTH & AGING

Table 2
Differential Diagnosis of Seizures and Syncope

	Seizure	Syncope
Onset	Sudden	Prodrome (nausea, palpitations, dizziness, visual disturbances, flushing)
Muscle activity	Tonic/clonic activity	Floppy
	Automatism	Slump
	Unusual posturing	
Incontinence	Common	Rare
Injury	Tongue biting	Rare
	Lacerations	
	Dislocations	
	Bruises	
Acidosis	Metabolic acidosis	None
Recovery	Event not recalled	Event may or may not be recalled
	Delirium/Confusion	
	Headache	

Table 3
Common Causes of Syncope

Vasovagal	
Cardiogenic syncope	Tachycardia
	Bradycardia
	Asystole
	Prolonged QT
	Myxoma
	Hypertrophic obstructive cardiac myopathy
	Brugada Syndrome
	Amyloid myopathy
	Carotid sinus hypersensitivity
Dehydration	
Anemia	
Vasodilation	
Autonomic dysfunction	
Postural hypotension	
Postprandial hypotension	
Drug induced	
Valsalva maneuver	Weight lifting
	Trumpet blowing
	Tussive syncope
	Micturition syncope
	Deglutition syncope

Orthostatic syncope occurs when there is greater than 20% of the blood volume pooling in the extremities on standing.

It is often associated with excessive loss of water or blood, failed vasoconstriction (varicose veins), sarcopenia (lack of muscle contraction) increased chest or abdominal pressure (e.g., abdominal corset), drugs, neuropathy or vasodilation due to spending time in a jacuzzi (13). Orthostasis is not always associated with dizziness so standing blood pressure needs to be measured in all older persons and in all persons with diabetes mellitus. Table 5 lists the treatment approaches for orthostatic hypotension (14).

Table 4
Rare Causes of Syncope (Black Swans and Zebras)

Pheochromocytoma
Systemic mastocytosis
Addison's disease
VIPoma (Verner-Morrison Syndrome)
Vagal paraganglionomas
Giant cell arteritis
Paraplegic induced cerebral syncope
Eagle syndrome (elongated styloid process)
Acupuncture induced syncope ("Yun-Cheng" phenomenon)

Postprandial Hypotension ("Big Mac Attack")

Thirty to 120 minutes following a meal blood pressure can drop fairly dramatically. This postprandial hypotension is variable and occurs more often in the morning (15). It occurs in about a quarter of older persons and results in falls, syncope, stroke, myocardial infarction and death. The fall in blood pressure is mainly due to carbohydrates in meals. The fall in

THE MAGIC OF SPELLS

blood pressure is due to the vasodilatory of calcitonin gene related peptide (16). Postprandial hypotension can be treated with coffee in the morning only, small meals, fiber with the meals and alpha-1 glucosidase inhibitors, e.g., acarbose and miglitol, which slow gastric emptying by increasing glucagon-like peptide 1.

Table 5
Management of Orthostasis

Eliminate medication	
Add salt	
Elevate head of bed	
Bedside commode	
Get up slowly	
Exercise training for orthostasis	
Leg crossing	
Coffee in morning	
Drugs	-Midodrin (alpha-1 adrenergic antagonist)
	-Nonsteroid anti-inflammatory drugs 'e.g., Motrin
	-Fludrocortisone
	-Erythropoietin
	-Desmopressin
	-3,4 di-threo-diphenoxypheyl serine
	-Droxidropa – prodrug to norepinephrine

Figure 1
Diagnosis of Syncope

Dizziness (Vertigo)

With vertigo “the external world seems to revolve around the individual or the individual seems to revolve in space.” Like syncope there are multiple causes of dizziness (19). These include benign paroxysmal positional vertigo (BPPV), Meniere’s disease, labyrinthitis, vestibular neuronitis, acoustic neuroma, arteriosclerosis, ototoxicity and osteoarthritis.

BPPV occurs in the fifth to seventh decades of life and is responsible for 20% of all cases (20). It is bilateral in 10%. It

can be treated with the Epley maneuver.

Meniere’s disease occurs when endolymph cannot be drained from the inner ear (21). It presents with episodes of dizziness and tinnitus. There is fluctuation in sensorineural hearing and a feeling of pressure in the ear. Table 6 lists possible treatments for Meniere’s disease.

Superior semicircular canal dehiscence occurs in 0.4% to 1.5% (22). It presents with disequilibrium that can be triggered by noise, gaze or pressure and can be associated with nystagmus. Treatment consists of a pressure equalization tube or surgical repair (23).

Finally, a number of exercises have been developed to treat dizziness (24). These include Brandt-Baroff Habituation exercise, the Sermont (Liberatory) Maneuver, Gaze Stabilization exercises and Crawthorne-Cooksey exercises. These exercises are variably effective.

Conclusion

Spells are very common in older persons. They result in falls, frailty, disability and death. The diagnosis is often difficult to make. With the exception of postprandial hypotension, treatment success is variable.

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