Aviation Safety

As AME’s and regulators, we have a primary obligation to aviation safety.

Arguably, we also have an obligation to “a fair go” for the pilot.

We must exercise care in making major decisions on limited information.
Treat the test?

Treat the patient?
AME challenges—distance

- Not the primary care physician
- Snapshot view—no long term knowledge
- Long intervals between exams, time constraints

...but, the AME is the only face to face encounter with the pilot throughout life
FAA challenges

- FAA aeromedical disposition dependent upon paper records, forms and CD’s, literature

- Evidence based medicine: Best available literature *and clinical expertise*

- Absent clinical encounter and clinical experience best available literature may become a major determinant in aeromedical disposition
Sir William Osler

To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all.
Regulatory medicine challenge

Studying the literature without studying the pilot
The History
Listen to your patients. Listen to them and they will tell you what is wrong. And, if you are willing to listen long enough, they will often tell you what will make them better
Neurologic Diagnosis

- The neurological history
- The neurologic examination
- Given a choice between them, skip the examination
With this in mind....
Vasovagal Syncope

- Coined by Lewis, 1932
- Vasodepressor: most common mechanism
- Vagal: cardioinhibitory mechanism
Syncope

- **Vasodepressor syncope**: collapse of peripheral resistance—sympathetic withdrawal with relaxation of the peripheral arterial sphincter

- **Cardioinhibitory syncope**: bradycardia or cardiac standstill
Vasodepressor syncope

- Postural setting
- Prodrome duration 2-5 minutes
- Prodrome content: GI, respiratory, visual, perfusional
- Situational setting: standing, medical procedure, sight of blood, pain, fear
Syncope caveats

- 10% have urinary incontinence
- 10-15% have convulsive accompaniments—not a true seizure
- One third misdiagnosed as seizure disorder
Cardioinhibitory Syncope

- Sudden with little or no warning
- Injury not uncommon
Seizure Disorder?

- Is it a seizure (e.g. faint or fit?)

- If a seizure, is it a primary neurologic disorder?

- Extracerebral cause? Alcohol withdrawal, substance abuse, medication related (benzodiazepine, tramadol, tricyclic, etc.)

- If primary, what is neurologic diagnosis? Neoplasm, scar—two thirds idiopathic
Seizure evaluation

- General medical evaluation
- Medication/substance abuse history
- Cardiac evaluation (seizure with 20 seconds of asystole)
- Neurological examination
- MRI brain imaging
- EEG (40% of epileptics have normal EEG throughout life)
Aeromedical Disposition

- Single seizure with no risk factors and all studies normal—four years observation

- Acute symptomatic seizure (e.g. alcohol withdrawal)—one year observation

- Recurrent seizures (epilepsy): 10 years seizure-free, three years medication-free
Migraine

- Common: no aura
- Classic: Aura followed by headache
- Migraine variant (atypical, acephalgic, ophthalmic, optical, migraine equivalent)
- Complicated migraine: (sensory, speech)
Sensory “march”
Migraine aeromedical disposition

- Type (common, classic, variant)
- Frequency
- Severity
- Aura content and duration
- Degree of incapacitation
- Medication and response
- Setting
- Precipitants
Brain insult expressions...

- Focal neurological deficit
- Seizures
- Neurocognitive manifestations: intellect, memory, personality, behavior

Headache not a primary symptom, arises from extracerebral structures
Traumatic Brain Injury (TBI)
TBI Sequelae

- Post concussion syndrome
- Focal neurological deficit
- Posttraumatic epilepsy (PTE)
- Neurocognitive impairment
TBI Severity

Clinical criteria: loss/alteration of consciousness, Glasgow Coma Scale score, duration of posttraumatic amnesia, focal neurological deficit

Brain imaging criteria: Primarily the presence of intracranial blood
Posttraumatic Epilepsy (PTE)

- Direct relationship between TBI severity (dose of brain trauma) and PTE

- PTE thought to be “iron driven” through peroxidation and free-radical formation

- PTE risk diminishes with time (50% six months, 75% 12 months, 90+% 2 years)
Epidural Hematoma Alone
Epidural Hematoma Plus (EDH +)
Subdural Hematoma Alone
Tiny Falcine Subdural Hematoma
Traumatic subarachnoid hemorrhage
Intraventricular blood
Bifrontal contusions, maximal right

Thalamic contusion
Diffuse axonal injury: hemosiderin
TBI Aeromedical Disposition

- Mild TBI: weeks to several months
- Moderate TBI: “Two year rule” based upon 90+% of PTE risk having been realized
- Severe TBI: 4-5 years
- Neurocognitive more commonly associated with severe TBI
Neoplasms

- Benign extraparenchymal neoplasms eligible with recovery, observation

- Very selected parenchymal neoplasms
Extraparenchymal
Stroke
Large artery atherothrombotic stroke
Small artery (lacunar)

Common in hypertensive patients

Can be seen diabetics
Stroke Evaluation

- Risk factor analysis (sex, age, hypertension, diabetes, tobacco, alcohol, lipids, physical inactivity...)

- Hypercoagulation studies

- Cardiovascular evaluation

- Implanted monitor of undetected atrial fibrillation in cryptogenic stroke
Stroke: aeromedical disposition

- Generally two year observation
- Idealization of risk factors
- Corrected pathology (e.g. endarterectomy)
- Neurocognitive evaluation the rule
Thank you