Approach to Altered Mental Status in the Hospitalized Patient

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Case 1

- An 80yo man presents to your office for the evaluation of recent short-term memory loss
- His wife states he often forgets his keys and asks repetitive questions
- He no longer takes care of the family finances (2 yrs prior) and is seldom left alone
- The pt and wife believe this is “old age”

Which of the following evaluations is your next step?
A. TSH, B12, RPR
B. Head Imaging
C. Formal Neuropsychiatric testing
D. No testing, begin donepezil
E. Test screening labs for delirium
The Major Dementias

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<td>Diffuse or focal</td>
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*Mixed AD and vascular “strangely” common*

Alzheimer’s Therapy

- Cholinesterase Inhibitors
- Memantine
- Behavioral Therapies lacking which is a key element of inpatient hospitalization
  - Antipsychotics?
  - Cholinesterase Inhibitors?
- Current Trials
  - Mainly amyloid-directed
    * Likely start way to late*

Alzheimer’s Diagnosis:

New Frontiers

- CSF Aβ/Tau levels
- PET imaging with PiB and other compounds
Mild Cognitive Impairment (MCI)

- NOT normal aging
- Preservation of function with abnormal cognitive complaints and/or symptoms
- Amnestic MCI becomes AD 10% per year
- Is there anything we can do to prevent AD?
  - Vitamin E?
  - Ginkgo?
  - Cholinesterase Inhibitors?

Case 2

- A 71 year-old previously healthy man comes to the ER with two days of new progressive confusion according to his family. He has no PMH and takes no meds.
- General physical exam is normal except for a T=38.8. Neurologic exam is notable for disorientation, confusion, and visual hallucinations.

What is the most likely etiology of the patient’s AMS?

A. Heroin overdose
B. Stroke
C. UTI
D. Seizure
E. DKA
**Delirium Defined**

(DSM-IV-TR) criteria for delirium

(a) Disturbance of consciousness (that is, reduced clarity of awareness of the environment, with reduced ability to focus, sustain, or shift attention)

(b) A change in cognition (such as memory deficit, disorientation, language disturbance) or the development of a perceptual disturbance that is not better accounted for by a pre-existing established or evolving dementia

(c) The disturbance developed over a short period of time (usually hours to days) and tends to fluctuate during the course of the day

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**Delirium: Really Defined**

- Relatively acute onset (hours to days)
- Cognitive change
  - Attentional deficit the hallmark
  - All domains may be impaired
- Fluctuations
- Associated symptoms that may be present
  - Hallucinations, delusions, altered sleep-wake cycle, changes in affect, autonomic instability

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**Clinical Spectrum of Delirium**

- Hyperactive Subtype
  - Classically with alcohol withdrawal
- Hypoactive Subtype
  - Classically with narcotic or benzodiazepine administration
  - More likely to be missed by clinicians
  - Associated with a worse outcome?
- More accurately a spectrum of presentations
Delirium vs. Dementia

• “This distinction is easy”:

• Not so easy…
  – Dementia is the major risk factor for development of delirium
  – Some degenerative illness can present with symptoms resembling delirium

Dementia with Lewy Bodies (DLB)

• Common Neurodegenerative disorder
• Parkinsonism
• Dementia
• Fluctuating Course
• Prominent Visual Hallucinations
• Extremely sensitive to antipsychotics
• Cholinergic Deficit:
  – TREATMENT WORKS!!!

Delirium: A Stress Test for the Brain
Treatment of Delirium

- Treat underlying precipitant first!
  - Correct lytes, treat infection, remove offending medications, etc…
- Then use environmental methods proven to help in delirium management
  - Turn off lights to establish sleep-wake cycles at night
  - Remove all physical restraints (key contributor in multiple studies of delirium)
  - D/C unnecessary monitors and catheters
  - Provide reorientation frequently
  - Maintain adequate hydration
  - Daytime mobilization and exercise
  - Make sure hearing aids, glasses used at home are present
  - Familiar pictures, objects, visitors can help

Treatment of Delirium: Evidence for These Simple Measures

The New England Journal of Medicine

Randomized trial showed that these simple measures decrease incidence of delirium in hospitalized elderly

Treatment of Delirium

- As last resort, consider medical management
  - Antipsychotics common first-line (caution with risk of death in elderly recently demonstrated)
    - Start with low qhs dosing
  - Avoid benzodiazepines
- Formal studies of drugs to boost cholinergic tone underway
Case 3

• A 50 year-old man is brought in to the ED by his girlfriend with several days of paranoia and unusually aggressive behavior.
• General physical exam is normal. Neurologic examination shows a disoriented man threatening the staff
• Labs: Lytes, CBC, BUN/Cr, LFTs, ABG, Utox all Normal
• CT head negative, CXR negative, U/A negative

What is the next test you would like to order?
A. MRI Brain
B. LP
C. Blood Cultures
D. Urinary Porphyrins
E. EEG

Lumbar Puncture

• Opening Pressure 19 cm H₂O
• 18 WBCs (94% Lymphocytes)
• CSF Protein 58
• CSF Glucose 70
• Gram stain negative

• Empiric treatment begun
HSV-1 Meningoencephalitis

- Diagnosis
  - CSF lymphocytic pleocytosis (can be normal)
  - EEG (can be normal)
  - MRI (can be normal)
  - CSF HSV PCR
- If suspected, start IV acyclovir 10-15mg/kg q 8 hours

Lumbar Puncture in AMS Workup

- Perform immediately after imaging if any CSF infection suspected
- Useful information:
  - Inflammatory Conditions (e.g. CNS vasculitis)
  - Neoplastic Conditions (e.g. CNS lymphoma)
  - Hepatic Encephalopathy
- Likely should occur in any patient with an unexplained delirium after initial workup

Case 4

- A 45 year-old woman with a PMH only of gastric bypass 6 months earlier presents with 3 days of confusion and inability to walk.
- General physical exam is normal. On neurologic examination the patient is somnolent but arouses to voice. She has deficits in attention and is oriented only to person. Her gait is ataxic.
- Labs: Lytes, CBC, BUN/Cr, LFTs, Utox all nl
- CT head negative, CXR negative, U/A negative
Deficits of Attention

- Neuropsychologic hallmark of delirium
- Diffuse localization
- Diagnose during the history
  - Tangential speech, fragmented ideas
- Test at bedside with digits forward task
  - Four digits or less signifies lack of attention
- MMSE often not helpful

Wernicke’s Encephalopathy

- Caused by thiamine deficiency leading to interruption of mammillothalamic tract
- Classically in alcoholics, now seen mainly in vitamin deficient states
- Triad: confusion, ataxia, ophthalmoparesis
- Thiamine 100mg IV daily if even suspected
  - Consider in any case of unexplained delirium

Case 5

- An 86 year-old woman with a history of stroke presents with 2 days of confusion.
- General physical exam is normal. On neurologic examination the patient is somnolent and will not arouse to voice. The rest of the neurologic examination is normal except for fine nystagmus in all directions of gaze.
- Labs: Lytes, CBC, BUN/Cr, LFTs, Utox all nl
- CT head negative, CXR negative, U/A negative
What is the next test you would like to order?
A. MRI Brain
B. LP
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D. Urinary Porphyryns
E. EEG

Seizure-Related AMS
• Non-convulsive status epilepticus
• Post-ictal states that may be prolonged
  – Coma
  – Focal Neurologic Deficits (Todd’s phenomena)
  – Psychosis
  – Confusion
• Can only diagnose with EEG

Case 6
• A 30 year-old man with no PMH presents with 6 hours of stupor. He is on no medications.
• General physical exam is normal. On neurologic examination the patient is unarousable. He has vertical bobbing movements of both eyes. He does not spontaneously move any extremities
• Labs: Lytes, CBC, BUN/Cr, LFTs, Utox all nl
Structures involved in coma

- Either localizes to…
  - Brainstem (reticular activating system)
  - Bilateral hemispheres
- Coma exam focuses on brainstem
  - Pupils, corneals, oculocephalic, gag, cough, etc.

Basilar Artery Thrombosis

- Carries a high mortality
- Common from cardioembolic disease or vertebral artery dissection (in young)
- Embolectomy successful out to 12-16 hours
- Clues on exam
  - Coma with cranial nerve abnormalities
  - Asymmetric cerebellar signs

CT Brain in the ED: (not) Negative
Take-Home Points

• Delirium signifies a serious underlying disorder and should be viewed as heralding the onset of a neurologic disease
• Spinal fluid examination (LP) is underutilized and should be obtained frequently
• Thiamine 100mg IV should be initiated in AMS nearly always

Take-Home Points

• EEG can rule out rare causes of AMS
• Structural brainstem disease can lead to AMS and clinicians should have a high index of suspicion
• Treatment for AD will likely change dramatically in the next few years