Internal Medicine Clerkship
Case Discussions

Altered Mental Status
Student Guide

Objectives:

1. Identify characteristics and relevant review of systems that define altered mental status including neurologic symptoms.
2. Assess past medical history for risk factors including previous history of altered mental status or seizures and causative medications.
3. Assess for social risk factors including alcohol and recreational drug use.
4. Identify key physical exam findings that determine characteristics (including a mental status exam) and assess for an underlying etiology (including focal neurologic findings).
5. Identify and interpret key laboratory and imaging tests and list indications, benefits, test characteristics, risks, and costs of testing:
    a. Assess metabolic functioning and presence of infection including basic metabolic panel and complete blood count.
    b. Determine need for further testing if diagnosis remains unclear including vitamin B12 level, RPR, and urine toxicology screen.
    c. Determine need for further testing to target signs and symptoms including electrocardiogram, chest x-ray, lumbar puncture, and electroencephalogram.
6. Develop and prioritize a differential diagnosis including common and non-to-miss diagnoses:
    a. Consider neurologic diagnoses including a cerebrovascular accident.
    b. Consider psychiatric diagnoses including mania and schizophrenia.
7. Describe a rational and evidence-based approach to treating a patient with altered mental status:
    a. Identify treatments for underlying illness including infection, drug toxicity, and fluid and electrolyte disturbances.
    b. List delirium precautions including reduce overstimulation, minimize restraint use, and improve sleep-wake cycle.
8. Describe possible complications of altered mental status including falls, aspiration, and decubitus ulcers.
9. Identify characteristics and relevant review of systems that would suggest dementia including behavior changes and time course.
10. Assess for risk factors and predisposing conditions including prior vascular disease.
11. Assess for social risk factors including substance abuse and sexual history.
12. Identify key physical exam finding including use of tools to assess cognition (including MoCA and SLUMS) and screen for neurologic abnormalities.
13. Identify and interpret key laboratory and imaging tests and list indications, benefits, test characteristics, risks, and costs of testing that determine underlying cause (including CT, MRI, and lumbar puncture) and assess for other conditions with similar presentations (including TSH and B12 levels).
14. Describe a rational and evidence-based approach to treating a patient with dementia:
    a. Describe treatments that potentially slow progression including cholinesterase inhibitors and NMDA receptor agonists.
    b. Describe treatments to prevent injuries including home safety assessment.
    c. Describe treatments to control behavior including antipsychotics.

15. Describe possible complications including eating problems and incontinence.

Clinical Case 1:

An eighty-one year old man is brought to the physician's office by his son and daughter-in-law. The patient, Mr. Ryan, lives in the lower level of a two story, two family home. Mr. Ryan's son and his wife live upstairs. They are concerned that he is increasingly forgetful. Recently, he became lost on a walk in his neighborhood. Mr. Ryan is relatively unconcerned and says: "My kids worry too much about me. After all, I am eighty years old. What do you expect?" Mr. Ryan denies depressed mood, difficulty sleeping, ruminative thoughts, concerns about death, or thoughts about taking his life. On further questioning, Mr. Ryan's son describes that over the last two years his father has had increasing difficulty managing his finances, caring for his apartment, and preparing meals. He has trouble remembering the names of his three grandchildren and has forgotten all family birthdays over the past year. He will spend most of the morning reading the paper and seems to reread the sports pages several times.

Medical history is unremarkable except for bilateral cataract replacements. There are no prescribed medications. There is no history of depression. Social history is remarkable for owning the house where his son and daughter live, a remote smoking history but no cigarettes for over thirty years, and one to two drinks a night. Mr. Ryan's wife died ten years ago.

Physical Exam:

Vital signs:	HR 70, BP 140/80
Gen:	Pleasant older man, laughing and winking as his son mentions his concerns.
HEENT:	Pupils equal and reactive, EOM's full, no evidence of head trauma
Lungs:	Clear to auscultation bilaterally
Cardiac:	RRR, soft systolic murmur heard at the right second intercostal space, no carotid bruits
Abdomen:	NABS, soft, NTND
Neuro:	CN II-XII intact, motor strength 5/5 in all extremities, sensory intact to light touch with decreased vibratory sense in both legs, and normal cerebellar exam, gait, and reflexes. Toes are bilaterally down-going on plantar stimulation.

A Folstein Mini-Mental State Exam reveals a total score of 23. Mr. Ryan missed the day, date, year, and place. He was attentive and able to spell WORLD backwards. He remembered 0/3 objects after 5 minutes.

Questions:

1. What is your differential diagnosis for Mr. Ryan and why? What parts of the history and physical aid you in your differential diagnosis?

2. Describe the different screening tools available to assess for minor or major neurocognitive impairment including the MoCA, MMSE, and SLUMS. What does the result of his MMSE test indicate?
3. What tests would you order for Mr. Ryan's work-up?

4. Is there any treatment you would offer him at this time?

5. What would you discuss with Mr. Ryan and his family about the diagnosis and planning for the future?

Clinical Case 2:

Mrs. Walker is a 73yo brought into the emergency department by her daughter. Her daughter found her in her apartment unkempt, confused, and saying that people had broken in and stolen things. Mrs. Walker's daughter had last spoken with her mother two days previously and became alarmed when she did not answer the phone earlier today. Mrs. Walker had not felt well for the past two weeks with complaints of nausea, abdominal discomfort, and worsening of her chronic pain from osteoarthritis of the knees.

In the emergency department, Mrs. Walker does not answer questions appropriately and is unable to provide a coherent history.

Mrs. Walker's only past medical history is osteoarthritis. She had been taking ibuprofen 600 mg, three times a day, for her knee pain. A friend in her building suggested she try over-the-counter cimetidine for her abdominal discomfort. Mrs. Walker takes no other medications. She is allergic to penicillin and develops hives as a reaction.

Social history is remarkable for a supportive family that lives in the surrounding community. Mrs. Walker is normally active in her local church where she volunteers at the church-run day care center. She has been independent in her activities of daily living and instrumental activities of daily living. She does not smoke and has only a rare drink. Mrs. Walker has been widowed for many years.

Physical Exam:

Vital signs:	HR 120, BP 100/80, Temp 100.5 R, RR 20.
Gen:	Frightened, thin, older woman who is unkempt, picking at her hospital gown, and not cooperative with efforts to examine her.
Skin:	There are several bruises on her back and buttocks.
HEENT:	Pupils equal and reactive, EOM's full, no blood behind tympanic membranes, oropharynx appears very dry.
Neck:	Not cooperative with exam but no clear rigidity.
Lungs:	Bibasilar crackles.
Cardiac:	Regular and rapid with no murmur or gallop.
Abdomen:	+ bowel sounds. Diffusely tender to exam without rigidity. No masses or organomegaly. Rectal exam reveals black, guaiac positive stool.
Extremities:	Bony deformity and swelling of both knees without erythema or warmth.
Neuro:	Speech is fluent but confused. Frightened that "those men will get me". Cranial nerves without gross deficit. Moves all extremities well. Sensory and cerebellar not checked.

Gait not checked. Reflexes 3+ throughout. Toes withdraw to plantar stimulation.

Folstein Mini-Mental State Exam: Impossible to do secondary to inattention. Unable to do serial sevens or spell “WORLD” backward.

Laboratory Data:
Initial laboratory tests return as follows:

Hgb 7.0, Hct 25
WBC 15,000 with 85N, 10L, 3Mo, 1Eo, 1Ba
Platelets 250,000

Na+ 153
K+ 4.5
Cl- 112
C02 30
BUN 70
Cre 2.5
Glucose 180

Urine: SG 1.020, + WBC, trace blood, many bacteria

ECG reveals sinus tachycardia with normal intervals, a poor baseline because of patient movement, non-specific ST and T wave changes, but no obvious signs of acute ischemia.

Questions:

1. Create a problem list for Mrs. Walker's acute presentation and a differential diagnosis of her mental status changes.

2. Write her admitting orders and plans for diagnosis and management over the next day or two.

3. What other laboratory tests or studies are indicated? Does she need an emergent head CT scan?

4. What plan would you make to manage her confusion? Should she be restrained? Should she receive any sedating medication?

5. Shortly after admission, Mrs. Walker’s three sons come to the hospital. They are all upset about their mother and want to know what is wrong with her and why she is “acting crazy”, will she get better, and what you will do to make her better. How will you respond?

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6. How does the information about Mrs. Walker's pre-morbid functional status influence your diagnosis?

Clinical Case 3:

William Howard is a 75 year old with a history of Type 2 diabetes mellitus, hypertension, peripheral vascular disease, and atrial fibrillation. He has a history of falls secondary to a peripheral neuropathy and decreased vision from diabetic retinopathy. You are called by Mr. Howard's wife who reports that he has been quite sluggish over the last few weeks, frequently sleeping during the day, having some difficulty walking, and occasionally confused. She is concerned since he seems to be getting worse and has had some trouble waking him this afternoon.

His medications include diltiazem extended release 180mg daily, NPH insulin 20 units in AM and 10 units in PM, and coumadin 4 mg/night. A blood test last week revealed his INR to be 2.5.

Mr. Howard will occasionally have a drink. He has a 50 pack year history of smoking but stopped five years ago.

Physical Exam:

Vital signs:	HR 60, BP 160/80, Temp 99F
Gen:	Very sleepy older man who sometimes falls asleep while being questioned
Skin:	No bruises
HEENT:	Pupils equal and reactive, EOM's full, no evidence of head trauma
Lungs:	Clear to auscultation bilaterally
Cardiac:	Irregular, 2/6 holosystolic murmur radiating from the left sternal border to the axilla
Abdomen:	NABS, soft, non-tender and not distended
Extremities:	No evidence of peripheral edema in the legs
Neuro:	Paucity of spontaneous speech. Cranial nerves are within normal limits. Motor exam is non-focal but there is poor cooperation. Gait is unsteady. Reflexes are 1+ throughout with both toes up-going on plantar stimulation.

A Folstein Mini-Mental State Exam was remarkable for disorientation to place and time, poor attention, inability to cooperate with comprehension, repetition, registration, naming, writing, and copying a diagram. A score of 10 was obtained. Mr. Howard had a score of 27 one year ago.

Questions:

1. What is your preliminary diagnosis and what should be done with respect to evaluation and management of Mr. Howard?
2. Screening laboratory tests return within normal limits. What further examinations or testing should be performed?

3. You decide to order an emergency head CT scan. The CT scan cannot be obtained after 5 p.m. without the permission of the staff radiologist. Should you call the radiologist to obtain the scan that night? How would you justify this request?

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