

PAT HENSON's FALL: CASE 4

Delirium

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CASE HISTORY

Pat Henson is a 73-year-old female who is brought into the emergency department by EMTs with a right ankle injury sustained after tripping and stumbling.

In the course of her evaluation for ankle injury, subtle changes are noted suggesting a behavioral change. Upon more complete assessment, including mental status, a diagnosis of delirium is made. The cause of Mrs. Henson's delirium is a drug effect secondary to a toxic drug interaction.

This case allows the student to review the emergency department approach and workup of an elderly patient with mental status changes, including a discussion of differential diagnosis. Assessment tools for the diagnosis and classification of mental status changes are described and demonstrated. The importance of delirium as a marker for serious disease such as drug toxicity or sepsis is emphasized.

The topic of drug use in the elderly is reviewed, including patterns of use, changing pharmacokinetics with aging and the problems encountered with the use of multiple drugs.

LEARNING OBJECTIVES

1. Demonstrate the initial approach to the stabilization and management of an elderly patient with a change in mental status.
2. Describe and demonstrate assessment tools used to help differentiate among potential causes of mental status change.
3. Describe the diagnosis, etiology and prognosis of delirium.
4. Differentiate delirium from other causes of mental status change, especially dementia.
5. Describe the ED management of the patient with a diagnosis of delirium.
6. Describe the changes in pharmacokinetics and pharmacodynamics with aging and how these affect the activity and toxicity of various drugs.
7. List important paradoxical reactions which may occur with commonly used drugs.
8. Describe the scope and pattern of drug use in the elderly.
9. Describe the problem of multiple drug use (polypharmacy), including drug interactions.
10. List several drugs that are not recommended by some experts for use in the elderly.
11. Demonstrate use of the geriatric emergency care model in the evaluation and management of the elderly patient presenting with a change in mental status.

PREPARATION

Prior to a classroom presentation of this material, the instructor should be familiar with the content of Chapter 6, Principles of Care and Application of the Geriatric Emergency Care Model, in the textbook. In addition, Case 4 draws upon material in Chapter 3, Pharmacology and Aging, Chapter 7, Functional Assessment, Mental Status and Case

Finding, and Chap-

should be re-

ter 8, Altered Mental Status, which

viewed.

TRANSPARENCY

NOTES TO INSTRUCTOR

PREHOSPITAL ASSESSMENT AND INTERVENTIONS

1 CASE HISTORY

- 73-year-old female injured ankle
- EMTs found patient awake & alert
- Ankle appeared swollen, patient in pain
- BP 150/70, P 90 occasionally irregular, R 22

TEACHING QUESTION

Is there any other information needed or intervention required at this time?

CASE HISTORY

Transparency #1: Case History

Pat Henson is a 73-year-old female who is brought to the ED on a stretcher with a splint in place on the right foot and ankle.

Mrs. Henson had called her daughter who lives a few miles away saying she had tripped and injured her ankle and was in a lot of pain. The daughter immediately called the local ambulance for assistance. EMTs arrived at Mrs. Henson's apartment and found her sitting on the couch awake and alert. Her right ankle appeared swollen and she seemed to be in a lot of pain. The EMTs splinted the ankle and foot and brought the patient to the emergency department. The daughter accompanies them into the ED, having arrived at the mother's apartment just as the EMTs were leaving for the hospital. The ED physician stands by the stretcher as the patient is being placed on it by the EMTs. The daughter is brought by one of the nurses to the registration area to provide information for the ED chart.

The EMTs state that the patient tripped without falling and injured her ankle.

VS: BP 150/70
pulse 90 occas irreg
RR 22

DISCUSSION POINTS

1. In the geriatric care model, it is important that as much information about the incident be obtained not only from the patient, but from the caregivers and pre-hospital personnel as well. The physician should ask the EMTs to remain to provide additional history and other pertinent information. Also, consideration should be given to the issue of elder abuse/neglect.

CASE 4 - DELIRIUM

TRANSPARENCY

NOTES TO INSTRUCTOR

INITIAL ASSESSMENT AND STABILIZATION

2 INITIAL ED ASSESSMENT

- VS - BP 160/ 70
 - P 96 occasionally irregular
 - R 20
 - T 98° F oral
- Patient in pain
- Uncooperative

TEACHING QUESTION

Does the patient need any intervention?

Transparency #2: Initial ED Assessment

DISCUSSION POINTS

1. The physician observes the patient's general appearance:
The patient is an elderly, mildly obese female awake, clothed in a clean housecoat. Her eyes are closed, she is moving back and forth on the stretcher and is attempting to find a comfortable position.
There is no respiratory distress. She appears to be in a great deal of pain. When asked what's wrong she states, "I'm in pain, can't you see." The ED physician asks her what happened, and she continues to moan and does not cooperate with further questioning.

Vital signs are repeated:

BP 160/70
pulse 96 occasionally irregular
R20
Temp 98 PO

3 INITIAL PHYSICAL FINDINGS

- Moderate lateral swelling
- No gross deformity or instability
- DP pulses I+ and equal bilaterally
- Motor function grossly intact
- Sensory function appears intact

TEACHING QUESTION

What information should the physician obtain next?

oximetry shows an O₂ satu-

Transparency #3: Initial Physical Findings

DISCUSSION POINTS

1. At this point, the chief complaint appears to be the ankle injury. It is important to assess first the status of the injury. The splint is carefully removed. The extremity is checked for any gross deformity, instability or neurovascular compromise.
2. The splint is replaced, ice is applied and the extremity is elevated.
3. An irregular pulse is also noted. The patient is placed on a cardiac monitor and 2L O₂, by nasal cannula is administered. NSR with a rate approximately 96 with an occasional unifocal PVC is noted. Pulse

ration of 99% on 2LNC.

EMERGENCY CARE OF THE ELDER PERSON: INSTRUCTOR'S MANUAL

TRANSPARENCY

NOTES TO INSTRUCTOR

HISTORY AND PHYSICAL

4 PATIENT STATUS

- Denies head trauma, LOC, lightheadedness, vertigo, headache, chest pain, SOB, history of falls, incontinence, or seizure
- Usually alert and appropriate
- Occasional outbursts
- Minor lapses in memory
- Recently "distracted," "not herself"

Transparency #4: Patient Status

CASE DEVELOPMENT

The physician again attempts to obtain additional history.

1. He asks Mrs. Henson what happened.

"I was walking in my living room and I tripped over my cat. I stumbled and twisted my ankle." She denies falling or hitting her head. She denies LOC, lightheadedness, vertigo, headache, chest pain, shortness of breath. She denies any history of falls, any incontinence, any seizures. As the physician ends this questioning of the events surrounding the accident, the daughter arrives at the bedside.

2. The physician asks the EMTs and the daughter about the home environment.

The apartment is neatly kept, carpeted, well lit, and uncluttered.

3. The physician questions the daughter about the patient's baseline mental status and functional status.

The patient is usually alert, oriented and appropriate, except for occasional outbursts during arguments. ("She has always had a short fuse") and occasional minor lapses in memory. She lives alone and is able to cook simple meals for herself and ambulates with out aids. Her daughter shops for her and does her laundry. A house cleaner comes in once a week to clean. When asked about any change in her baseline mental function the daughter states "not really, although she did appear 'distracted' when I visited her several times this week. She really wasn't acting like herself. One or two evenings when I was over there this week she seemed a little off I had trouble having a conversation with her, her mind would wander and she wouldn't make sense. She also seemed a bit sleepy."

CASE 4 - DELIRIUM

TRANSPARENCY

5 PAST MEDICAL HISTORY

- Mild "Heart Failure"
- Hypertension
- Chronic bronchitis
- NIDDM
- "Poor circulation"
- NKA
- Non-smoker
- No ETOH
- ROS - (+) for 1 block DOE and claudication

6 MEDICATIONS

- Digoxin
- Furosemide
- Chlorpropamide
- Baby aspirin
- Theophylline extended release
- Pilocarpine 1 % ophthalmic solution
- Ciprofloxacin and diphenhydramine for a recent URI
- Propoxyphene with APAP, prn for "leg cramps"
- Chlordiazepoxide prn for insomnia

TEACHING QUESTION

Is any further intervention needed at this point?

NOTES TO INSTRUCTOR

Transparency #5: Past Medical History

CASE DEVELOPMENT

1. The physician asks the daughter about Mrs. Henson's past medical history:
The patient has a history of mild "heart failure" and high blood pressure, chronic bronchitis, NIDDM, "poor circulation" and glaucoma.

Transparency #6: Medications

CASE DEVELOPMENT

1. Compliance: Daughter has arranged pills in labeled boxes, and mother takes pills as directed with no apparent difficulty.
2. The physician returns to the stretcher and attempts again to speak to the patient. She still appears to be in pain, although less so, and is lying back on the stretcher with her eyes closed. He begins to ask Mrs. Henson further questions about the incident, but she cuts him off saying "Oh, I don't know, go ask my daughter." The physician returns to the daughter to review the history. He says 'Just so I'm not missing anything - again, she told me she tripped over her cat and stumbled, but did not fall and didn't lose consciousness . . . ' The daughter interrupts, "She said she tripped over her cat? She doesn't have a cat!"

DISCUSSION POINTS

1. Given the history of diabetes and the apparent change in behavior, the physician checks a blood glucose by glucometer. The physician also considers Naloxone. This, however, might further worsen the patient's agitation and pain, given the possibility of narcotic abuse (Propoxyphene) and narcotic withdrawal.
2. Glucose - 180 mg/dl
Naloxone deferred. If given, no change.
Thiamine considered, but since the patient has no history of ETOH use and no evidence to suggest a thiamine deficiency, not given. If given, no change.

EMERGENCY CARE OF THE ELDER PERSON: INSTRUCTOR'S MANUAL

TRANSPARENCY

7 PHYSICAL EXAMINATION

- VS - BP 150/70, pulse - 90 occas. irreg., Resp - 22, Temp 99 (R)
- Skin - warm and dry
- HEENT - no signs of head trauma, pupils pinpoint and nonreactive, mm slightly dry.
- Neck - supple, nontender
- Chest - few basilar crackles bilat.
- Heart - II/VI flow murmur, aortic area
- Abd - Soft, non tender. No masses, rectal sphincter tone good. Stool brown, heme neg.
- Ext - DP pulses 1+ bilat., good cap. refill, warm, pink. Anterior talofibular ligament on right moderate tenderness, swelling, ecchymosis. Good stability, N/V intact. No other signs of external trauma noted

TEACHING QUESTION

What further physical examination would be performed?

8 NEUROLOGIC EXAMINATION

- Mental status
- No facial asymmetry
- Good gag reflex
- Normal tone
- Moves all four extremities equally (with splint in place)
- Withdraws symmetrically to pinprick
- Patellar and biceps reflexes 1+ and symmetric
- No Babinski
- Cerebellar function and gait not tested

TEACHING QUESTION

What would you do next?

NOTES TO INSTRUCTOR

Transparency # 7: Physical Examination

CASE DEVELOPMENT

Review results of physical exam and importance of thorough exam because of concern about mental status. Look for evidence of head trauma; any physical signs of abuse or neglect; fever; dehydration; medication effect/ toxidrome; focal neurological findings; cardiovascular disorder.

Transparency #8: Neurologic Examination

DISCUSSION POINTS

1. Patient difficult to assess because of lack of cooperativeness, but the following are noted:
 - mental status (discussed next)
 - no facial asymmetry
 - good gag reflex
 - normal tone
 - moves all four extremities equally (with splint in place)
 - withdraws symmetrically to pinprick
 - patellar and biceps reflexes 1+ and symmetric
 - no Babinski
 - cerebellar function and gait not tested

CASE 4 - DELIRIUM

TRANSPARENCY

NOTES TO INSTRUCTOR

DIFFERENTIAL DIAGNOSIS

9 ASSESSMENT OF COGNITIVE IMPAIRMENT

- High incidence of impaired cognition in patients > 70 years of age
- Abnormalities subtle and easily missed
- Reliability of history depends on normal cognitive function
- Acute confusional state or subtle change in mental status may be only indication of serious disease process
- 11 % of cognitive impairment thought to be reversible
- Mental status evaluation provides information needed for evaluation, treatment and discussions about disposition

Transparency #9: Assessment of Cognitive Impairment

DISCUSSION POINTS

1. In this patient, there are clues to a behavioral change that require further assessment. Even if none were present, however, in the elderly patient (>70 year old or frail elderly, such as Mrs. Henson) cognitive or other mental status changes should routinely be assessed.
This assessment should be routine because of reasons listed.

TEACHING QUESTION

Discuss possible etiologies for behavioral change and how to differentiate among them.

10 ALTERED MENTAL STATUS: DIAGNOSTIC CATEGORIES

Delirium

Transient organic mental syndrome characterized by global disorder of cognition and attention

Dementia

Disorder characterized by impairment in short- and long-term memory, abstract thinking and judgment and by other disturbances of higher cortical function

Acute Psychosis

(including mood disorders with psychotic features) A major disorder of psychiatric or emotional origin characterized by derangement of personality or loss of contact with reality

Transparency #10: Altered Mental Status: Diagnostic Categories

DISCUSSION POINTS

1. In the elderly patient with an altered mental status, the most important diagnostic categories to consider are delirium, dementia and acute psychosis or mood disorder.

11 DIFFERENTIAL DIAGNOSIS OF ALTERED MENTAL STATUS IN THE ELDERLY

	Delirium	Dementia	Acute Psychosis/Mood Disorder
Onset	Acute	Insidious	Acute
Progression	Fluctuating	Stable	Stable or progressive
Attention	Globally	Normal, except	Usually
disordered	in severe cases	intact	
Hallucinations	Usually visual	Often absent	Usually auditory
Delusions	Fleeting/poorly systematized	Often absent	Sustained/systematized
Cognition	Globally disordered	Impoverished	May be selectively impaired

Transparency # 11: Differential Diagnosis of Altered Mental Status in the Elderly

DISCUSSION POINTS

1. At times, the differentiation among these possible etiologies may be difficult, especially if the patient has an underlying dementia. Features which help distinguish among the diagnostic categories include:
 - One of the most prominent features of delirium is the decrease in ability to attend to external stimuli. In dementia and acute psychosis or mood disorders, attention is often intact.
 - Hallucinations in delirium are predominantly visual, while they are predominantly

TEACHING QUESTION

How do you assess mental status in older patients?

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TRANSPARENCY

NOTES TO INSTRUCTOR

auditory in psychosis. Hallucinations are only rarely seen in dementia.

- Delusions, if present in delirium, are fleeting or poorly systematized. In psychosis, they are typically sustained and systematized. Delusions are only rarely seen in dementia.
- Delirium is of acute onset with typically a fluctuating course. Dementia in most cases is insidious and progressive, with a stable course, and acute psychosis, even if of recent onset, usually does not fluctuate in severity and degree.
- In delirium, cognition is globally impaired and difficult to assess. This cognitive impairment is usually less marked or more selective in acute psychosis. In dementia, cognition may be impoverished, but is easier to assess.

12 CONFUSION ASSESSMENT METHOD (CAM)

Figure 7-2 from SAEM Textbook

Transparency #12: Confusion Assessment Method (CAM)

DISCUSSION POINTS

1. One assessment method has been shown to be both sensitive and specific in the diagnosis of delirium in the elderly. It is known as the Confusion Assessment Method (CAM). The CAM assesses four cardinal features of delirium.

1. Acute onset or fluctuating course
2. Inattention
3. Disorganized thinking
4. Altered level of consciousness

Source: Inouye SK, et al. Clarifying Confusion: The Confusion Assessment Method. *Ann Int Med.* 1990;113:941.

2. A test is considered positive if *both* 1 and 2 are present and *either* 3 or 4 is present.

Assessment of disorganized thinking, can be aided by other screening tests such as the three-item recall. This test measures short term memory, impairment of which is a sensitive indicator of cognitive dysfunction. If the patient fails this quick screening test, then more formal testing can be done using an instrument such as the Folstein Mini-Mental State Exam (MMSE). The MMSE is sensitive for diagnosing moderate to severe impairment, but can miss a substantial percentage of patients with mild impairment. Also, in the delirious patient, attention may be so impaired that completion of these tests is not

CASE 4 - DELIRIUM

TRANSPARENCY

NOTES TO INSTRUCTOR

possible. In this instance, other features of disorganized thinking such as hallucinations or rambling, illogical flow of thinking must be assessed.

Source: Folstein MIT, Folstein SE, McHugh PR. Mini mental state. A practical method for grading the cognitive state of patients for the clinicians. *J. Psychiatr Res.* 1975, 12: 189-198.

3. Although the CAM may be a useful assessment, the test has limitations. The initial studies of the use of the CAM involved mostly hospitalized elderly patients.
4. A few recent studies have utilized the CAM to assess patients in the ED, and more work must be done to validate this method in the ED setting.

Source: Lewis LM, Miller DK, Morley, JE et al. Unrecognized Delirium in the ED Geriatric Patients. *Am J. Emer. Med.* 1995;13(2):142.

Naughton, BJ et al. Delirium and other Cognitive Impairment in the Older Adults in the Emergency Department. *Ann. Emer. Med.* 1995: 25 (6):751.

Complete CAM with group.

CASE DEVELOPMENT:

1. The ED physician completes the CAM on Mrs. Henson
2. Follow the diagnostic algorithm for the CAM for Mrs. Henson
 - 1A. Acute onset?
Yes, over the past week or so according to daughter
 - 1B. Fluctuating course?
Yes, over the past week or so according to daughter.
Uncertain at the time of ED presentation, but there is a suggestion of fluctuation in level, of attentiveness (at times difficult to elicit history).
2. Inattention?
Present by history over past week, and present in mild form at time of interview.
3. Disorganized thinking?
Yes, by history according to daughter. Also, is having visual hallucinations (cat).
If You attempt 3 item recall, remembers 1 object at 5 minutes.
You attempt Folstein MMSE, but Mrs. Henson is unable to attend sufficiently to complete the exam.
4. Level of consciousness
Minimally decreased - mild drowsiness alternating with periods of agitation.

EMERGENCY CARE OF THE ELDER PERSON: INSTRUCTOR'S MANUAL

TRANSPARENCY

NOTES TO INSTRUCTOR

13 CAUSES OF DELIRIUM

- Medications (most common cause of reversible delirium)
- Primary CNS disorders (ischemic stroke, subdural hematoma)
- Cardiovascular disorders (CHF, MI, arrhythmia, hypo- or hypertension)
- Disorders of temperature regulation
- Fluid, electrolyte and metabolic imbalance, including hypoglycemia
- Dehydration
- Infections (most common is UTI)

TEACHING QUESTION

What are the unique problems associated with delirium in the elderly person, particularly related to etiology, predisposing factors, and prognosis?

14 DELIRIUM: PRESENTATION & PROGNOSIS

- 10%-50% of elderly hospitalized patients
- 10% of elderly ED patients
- Diagnosis often missed in the ED
- Dementia important predisposing factor
- Associated with high morbidity & mortality
- Important to pursue aggressively & treat reversible causes

TEACHING QUESTION

Given the diagnosis of delirium, what would be the next steps in the etiologic diagnosis and management of this patient?

3. By the CAM criteria a diagnosis of delirium is made. Regarding other possible diagnoses, dementia is unlikely as the primary disorder given the acute onset, fluctuating course and attentional deficit. Acute psychosis or mood disorder also is not likely in that hallucinations or delusions, although present in Mrs. Henson (the cat), are not a prominent component of her presentation.
4. The cardinal features of delirium are demonstrated in SAEM's video entitled: Recognizing Delirium in the Elder Person; Perspectives for the Emergency Care Professional.

Transparency #13: Causes of Delirium

DISCUSSION POINTS

1. The elderly patient is uniquely prone to delirium because of anatomic, physiologic, psychiatric, cognitive and metabolic senescent changes. Any condition which impairs cerebral metabolism even modestly may precipitate delirium. A few important causes include those listed on the transparency.

Transparency #14: Delirium: Presentation & Prognosis

DISCUSSION POINTS

1. An important predisposing factor in delirium is dementia. Twenty five to fifty percent of patients with delirium have been shown in some studies to have associated dementia, and delirium is 2-3 times more likely to occur in the presence of dementia.
Source: Francis J. Delirium in Older Patients. JAGS 1992;40:829
2. The incidence of delirium in elderly patients varies from 10-50% of admitted elderly patients. A recent study reported an incidence of delirium of 10% in the elderly population presenting to the ED, and also noted that the diagnosis is often missed in the ED setting.

CASE 4 - DELIRIUM

TRANSPARENCY

NOTES TO INSTRUCTOR

Source: Lewis LM, Miller DK Morley JE, et al. Unrecognized Delirium in ED Geriatric Patients. *Am J Emerg Med...* 1995;13(2):142.

3. Several studies have shown a high morbidity and mortality associated with delirium. In-hospital mortality is increased significantly, and patients with delirium stay longer in the hospital, and are at greater risk for complications after procedures.

Source: Francis J. Delirium in Older Patients. *JAGS* 1992;40:829.

Although few studies show an increased risk with delirium independent of underlying disease and co-morbid illness, it seems important that the diagnosis of delirium be aggressively pursued in the elderly population and reversible causes be discovered and treated.

In general, elderly patients diagnosed with delirium should be admitted. It is the *rare* circumstance that delirium can be managed in the outpatient setting.

DIAGNOSTIC TESTS

- 15 **APPROACH TO THE ELDERLY PATIENT
WM ALTERED MENTAL STATUS**
Figure 8-1 from SAEM Textbook

Transparency #15: Approach to the Elderly Patient with Altered Mental Status

DISCUSSION POINTS

1. The physician must search for and treat the etiology of Mrs. Henson's delirium:
The most likely etiologies for Mrs. Henson's delirium include:
 1. electrolyte/ acid-base disturbance
 2. infection
 3. medication effect or other toxin
 4. CNS structural lesion, either CVA or sub-dural hematoma.
2. The physician orders laboratory tests including a CBC, SMA 7, an arterial blood gas, U/A as well as an ECG, a chest radiograph, and an ankle radiograph. The physician also orders a digoxin and theophylline level. He considers a CT scan of the head, although a structural lesion is less likely given the absence of focal neurologic findings.

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TRANSPARENCY

16 FINDINGS FROM DIAGNOSTIC TESTING

- CBC - Hg 12.3, Hct 37, Plt 190,000
WBC 9,000, Diff WNL
- SMA 7 - Na 131, Cl 92, BUN 24, Glucose 194
K 3.9, HCO₃ 26, Cr 0.7
- ABG (on 2L) 7.45/34/91
- U/A negative
- Drug Levels
- Digoxin 1.2 mg/ml (therapeutic 0.9-2.0 mg/ml)
- Theophylline 28 mg/ml (therapeutic 10-20 mg/ml)
- ECG - NSR, non-specific ST-T changes, rate 110, occasional unifocal PVCs
- Chest & Ankle radiographs - neg

TEACHING QUESTION

What is the physician's next step in management of this patient?

MANAGEMENT PLAN

17 MANAGEMENT ISSUES

- Elder abuse
- Ankle injury
- Delirium
- Theophylline toxicity
- Dehydration
- Disposition

NOTES TO INSTRUCTOR

Transparency #16: Findings from Diagnostic Testing

CASE DEVELOPMENT

1. Review results of diagnostic tests and implications for management.
2. There is evidence of mild dehydration and byponatremia, as well as an elevated theophylline level. Sinus tachycardia and PVCs are also of concern in this elderly patient.

Transparency #17: Management Issues

DISCUSSION POINTS

1. In regard to the issue of elder abuse, the physician feels that the explanation of the injury is plausible; the affect of the daughter as well as her interaction with the patient are appropriate. There is no evidence of injury other than to the ankle. The diagnosis of elder abuse/neglect is dismissed at this point.
2. Given the evidence of theophylline toxicity-delirium, PVCs and an elevated theophylline level, the physician gives charcoal and admits the patient to a monitored setting for careful observation. A second theophylline level is ordered at the time of admission.
3. Rehydration fluids are ordered.
4. A compressive dressing is laced on the ankle sprain.

CASE 4 - DELIRIUM

TRANSPARENCY

18 MEDICATIONS IN ELDERLY PERSONS

- Average 4.5 prescription drugs, 2.1 OTC drugs
- Adverse reactions twice as likely
- Almost 1/2 of hospital admissions for adverse drug reactions are for patients > 60 years of age

ALTERED PHARMACOKINETICS & PHARMACODYNAMICS

- Decreased functional reserve in major organ systems
- Increased or decreased volume of distribution
- Drug clearance impaired
- Paradoxical reactions occur

TEACHING QUESTION

What problems do elderly persons have with medication use?

19 DRUGS IMPLICATED IN DELIRIUM

- Digitalis
- Sedatives
- Antidepressants
- Steroids
- Alcohol
- Barbiturates
- Anticonvulsants
- Neuroleptics
- Antihistamines
- Diuretics
- Antihypertensive agents

NOTES TO INSTRUCTOR

*Transparency #18: Medications in Elderly Persons
Altered Pharmacokinetics & Pharmacodynamics*

DISCUSSION POINTS

1. The average elderly American takes 4.5 prescription drugs and 2.1 over-the-counter drugs, and suffer a disproportionately high incidence of adverse drug reactions. These persons are twice as likely as their younger counterparts to have adverse outcomes related to medication. Almost 1/2 of hospital admissions for adverse drug effects are in patients >60 years of age.

Source: Fox FJ, Auestad AE. Geriatric Emergency Clinical Pharmacology. Emer Clin N. America. May 1990:221.

2. These adverse reactions are not only due to the larger number of drugs taken by the elderly and the proportionately higher likelihood of adverse drug interactions, but also to the pharmacokinetic and pharmacodynamic changes that occur as a person ages.
3. Functional reserve in major organ systems decreases, leading for instance, to renal failure in the elderly outpatient with marginal renal function given NSAIDs. The volume of distribution changes, leading to variable changes in drug availability. Drug clearance in many instances is impaired, leading to the prolongation of the half life of elimination. The half life of chlorpropamide, for instance, is about 24 hours in a younger patient, but may increase to up to 99 hours in the older patient.

Transparency #19. Drugs Implicated in Delirium

DISCUSSION POINTS

1. Paradoxical reactions can occur with certain drugs, for instance, agitation with narcotics.
2. Finally, a large number of drugs can cause delirium in the elderly. These include neuroleptics, anticholinergics such as diphenhydramine, antihypertensives such as methyldopa or propranolol, anticonvulsants and digitalis.
3. Some have suggested that certain other drugs are to be avoided in the elderly patient for various reasons: long-acting benzodiazepines such as diazepam, because of the extremely long half life; amitriptyline, because of the prominent anticholinergic side effects; muscle relaxants such as cyclobenzaprine because of the

EMERGENCY CARE OF THE ELDER PERSON: INSTRUCTOR'S MANUAL

TRANSPARENCY

20 DRUGS TO CONSIDER AVOIDING IN ELDERLY PERSONS

- Drugs with:
 - long half life
 - prominent anticholinergic side effects
 - questionable efficacy at low doses and toxicity at higher doses
- Muscle relaxants
- Certain nonsteroidal anti-inflammatory agents: indomethacin, phenylbutazone (all NSAIDs should be used with caution in the elderly)

21 PATIENT STATUS

- Alert, attentive, cooperative
- Diagnosis: Delirium secondary to theophylline toxicity associated with ciprofloxacin interaction and anticholinergic effect of diphenhydramine
- APAP for pain of ankle sprain
- Propoxyphene discontinued
- Oral hypoglycemic changed to glipizide
- Plan for outpatient evaluation for evidence of peripheral vascular disease and Alzheimer's disease
- Social work consult

NOTES TO INSTRUCTOR

potential for drowsiness and orthostatic hypotension.

Sources: Beers MH, et al. Explicit Criteria for Determining Inappropriate Medication Use in Nursing Home Residents. *Arch Int Med* 1991; 151:1825.

Bowen, JD, Larson EB. Drug Induced Cognitive Impairment: Defining the Problem and Finding Solutions. *Drugs and Aging*. 1991;3(4):349.

Transparency #20: Drugs to Consider Avoiding in Elderly Persons

DISCUSSION QUESTIONS

1. Review listed recommendations.

Transparency #21: Patient Status

CASE DEVELOPMENT

After 24 hours of observation, the patient becomes alert, attentive and cooperative. A diagnosis of delirium secondary to theophylline toxicity is made.

Ciprofloxacin is known to increase theophylline levels, and the toxic level of the latter was felt to be secondary to this interaction. It is also felt the anticholinergic effect of the diphenhydramine contributed to her delirium and this is discontinued. Acetaminophen is recommended as an analgesic for the ankle sprain and propoxyphene is discontinued for the "leg cramps.,, Her oral hypoglycemic medication is changed from chlorpropamide to glipizide, a drug with a much shorter half life. Plans are made for outpatient evaluation for evidence of peripheral vascular disease.

As part of her outpatient evaluation the patient is also to be assessed for early evidence of Alzheimer's disease.

Social work services is consulted on several issues:

1. Assessment of the home situation regarding the patient's ability to ambulate in her apartment with a walker, and her ability to otherwise care for herself with the ankle injury.
2. Assessment of the daughter's relationship with the patient to determine any improvement which can be made in daughter's ability to more closely monitor and care for her mother.

CASE 4 - DELIRIUM

TRANSPARENCY

NOTES TO INSTRUCTOR

3. Referral to visiting nurse services regarding follow-up with a physical therapist.

TEACHING QUESTION

Transparency #22: Principles of Geriatric Emergency Medicine

What principles of Geriatric Emergency Medicine were illustrated in this case?

DISCUSSION POINTS

22 PRINCIPLES OF GERIATRIC EMERGENCY MEDICINE

- 1. The patient's presentation is frequently complex**
2. Common diseases present atypically in this age group
3. The confounding effects of co-morbid diseases must be considered
- 4. Polypharmacy is common and may be a factor in presentation, diagnosis, and management**
- 5. Recognition of the possibility for cognitive impairment is important**
6. Some diagnostic tests may have different normal values
7. The likelihood of decreased functional reserve must be anticipated
8. Social support systems may not be adequate, and patients may need to rely on caregivers
- 9. A knowledge of baseline functional status is essential for evaluating new complaints**
10. Health problems must be evaluated for associated psychosocial adjustment
11. The emergency department encounter is an opportunity to assess important conditions in the patient's personal life

1. Emphasize those principles illustrated by this case.

EMERGENCY CARE OF THE ELDER PERSON: INSTRUCTOR'S MANUAL

TRANSPARENCY

SUMMARY POINTS

The presentation of altered mental status may be subtle and can be missed if not specifically assessed. The differential diagnosis of change in mental status may be difficult in the elderly patient, especially in one with a baseline dementia. The most useful findings to differentiate delirium from dementia are acute change and fluctuation in mental status, as well as inattention. Delirium is not uncommon in the elderly patient and has a wide variety of presentations and etiologies. Delirium can be a marker for serious disease, and the diagnosis and etiology must be aggressively pursued. Multiple drug use is a significant occurrence and may cause serious problems, even altered pharmacokinetics and pharmacodynamics and the potential for paradoxical reactions, as well as the potential for adverse drug interactions.

NOTES TO INSTRUCTOR

Transparency #23: Summary Points

DISCUSSION POINTS

1. Review summary points