



Enhancing Inter-professional Teamwork and Systems Approaches to Reduce Delirium in the Hospital

Elizabeth Eckstrom, MD, MPH

Division of General Internal Medicine and
Geriatrics, OHSU
eckstrom@ohsu.edu



Why delirium?

- Delirium is a medical emergency that causes permanent brain damage if not managed quickly and correctly
- Most providers currently under-recognize delirium, potentially harming our patients
- Prevention and treatment of delirium requires a true inter-professional approach, and is worth the effort...**it saves lives!**





How common is delirium?

Delirium Rates

Hospital:

- Prevalence (on admission) 14-24%
- Incidence (in hospital) 6-56%

Postoperative: 15-53%

Intensive care unit: 70-87%

Nursing home/post-acute care: 20-60%

Delirium Mortality ...

In-hospital mortality: 22-76%

One-year mortality: 35-40%



What causes delirium?

Dementia

Electrolytes

Lungs, liver, heart, kidney, brain

Infection

Rx (especially medications)

Injury, pain, stress

Unfamiliar environment

Metabolic



What about predicting delirium in pre-op patients?

Risk Factor	Points
Age >70	1
Alcohol abuse	1
Cognitive Impairment	1
Severe physical impairment	1
Abnormal pre-op electrolytes/ glucose	1
AAA surgery	2
Noncardiac thoracic surgery	1

Delirium Risk:

0 Points= 2%

1-2 Points= 11%

3 or more points= 50%





Mrs. Gates

- *3 hour Mohs surgery*
- *Given vicodin in PACU with vomiting*
- *Got phenergan*
- *Sent home with percocet and phenergan*
- *Daughter called me at 8 pm- mom confused, seeing angry men*



Mrs. Gates

Mild dementia

Mild renal insufficiency

85 years old

Drinks two cocktails daily

**What could you do to
prevent delirium?**



Delirium in surgical patients

- Over 50% of all surgeries done in people over 65
- Post-op delirium 15%-53% in people over 50 (30% still have symptoms 6 months later)
- Delirium leads to increased mortality, MI, pulmonary edema, pneumonia, respiratory failure, length of hospital stay, and discharge to long term care facilities
- Complicates pain management
- Delirium increases rate of cognitive impairment-
 - Study of 200 hip fx patients: >50% cognitive decline in delirious patients compared to 4.4% after 3 years
 - » Flinn, et al, J Am Coll Surg 2009



Preventing versus Treating Delirium

- Delirium complicates 2.3 million hospitalizations annually and accounts for 49% of all hospital days
- 20% of hospitalized patients over 65 develop delirium
- Mortality rate in older patients with delirium is 22-76%
- We spend over \$8 billion annually on delirium
- 30% of patients with delirium **STILL HAVE SYMPTOMS** 6 months later
- **GOOD EVIDENCE** that we can prevent delirium
- **NO EVIDENCE** that we can change the course of delirium once it develops

We really need to focus our attention on prevention!



Preventing Delirium: Things to do on Admission

Assessing for risk of delirium

Medical Doctor	Pharmacist	Registered Nurse	PT/OT
High risk medications	High risk medications	Underlying dementia Tool: Mini-cog	Poor functional status
Alcohol use Tool: CAGE	Risk of withdrawal; Paxil if NPO	Functional impairment	Poor physical performance



Drugs most likely to cause delirium

Direct Medication Effects:

- *Anticholinergics* (e.g., diphenhydramine), TCAs (e.g., amitriptyline, imipramine), antipsychotics (e.g., chlorpromazine, thioridazine)
- Anti-inflammatory agents, including prednisone
- Benzodiazepines or alcohol — acute toxicity or withdrawal
- Cardiovascular (e.g., digitalis, antihypertensives)
- Diuretics
- Histamine blockers (e.g., cimetidine, ranitidine)
- Lithium
- Opioid analgesics (especially meperidine)

Medication/Substance Withdrawal syndromes

- Clozapine, Paxil, alcohol are biggest offenders



What should you use instead?

- Nausea- suggestive evidence that ondansetron is better
- Sleep- No drugs are truly safe in older people
 - Back rub, warm milk, relaxing music
 - Rozerem may help sleep/wake cycle
 - Trazodone mildly anticholinergic, try 12.5-25 mg
- Pain- acetaminophen and oxycodone scheduled (1 gm q8 and 2.5-5 mg q 8)
- GI prophylaxis: ONLY PPIs
- Citalopram or lexapro



CAGE Questions for Alcohol Use

- Have you ever felt the need to **Cut** down on drinking?
- Have you ever felt **Annoyed** by criticism of your drinking?
- Have you ever had **Guilty** feelings about your drinking?
- Do you ever take a morning **Eye opener** (a drink first thing in the morning to steady your nerves or get rid of a hangover)?

*NOTE: 2 Positive answers yields →
75% sensitivity & 95% specificity for alcoholism*



Cognitive Impairment Screen

- **MINI-COG** Scanlan et al, Int J Geriatr Pshcy 2001;16:216.
 - 99% Sensitivity
- **3-Item Recall**
 - Ask the patient to remember the names of three objects (pencil, truck, book)
 - The patient fails the screen if she is unable to remember at least 2 of 3 objects in one minute
- **Clock Draw**
 - Ask patient to draw a large circle, fill in the numbers on a clock face, and set the hands at 11:10
 - **Tests memory, visual spacial, executive function, and abstraction**



Clock Draw

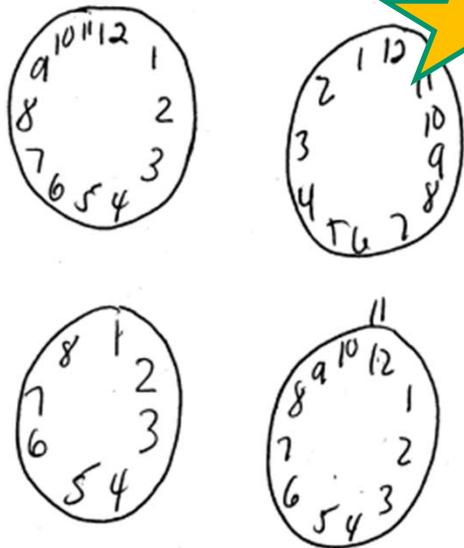
Abnormal Face



Abnormal Hands



Abnormal Numbers



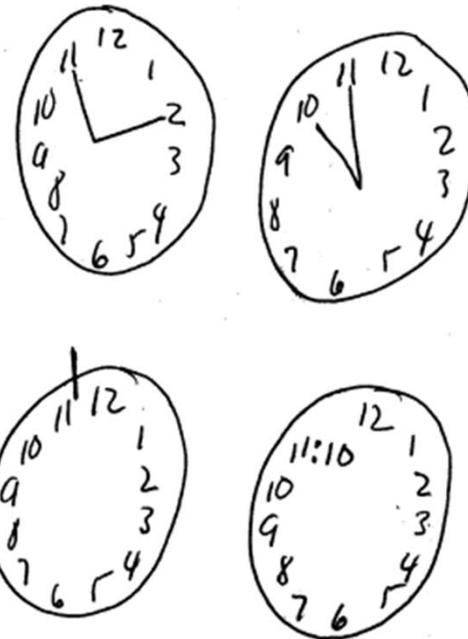


Clock Draw

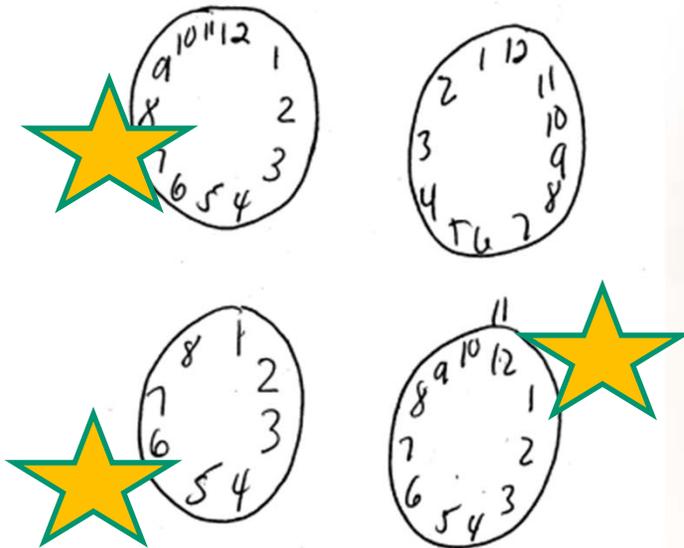
Abnormal Face



Abnormal Hands



Abnormal Numbers





Clock Draw

Abnormal Face



Abnormal Hands



Abnormal Numbers





Functional Assessment

- Poor functional status increases risk of delirium
- Easy to perform
 - Timed Up and Go
 - Activities of Daily Living
- Impairment may be minimized by PT and OT
- If impairment present or likely after surgery or medical illness, early planning for short term rehab can optimize hospital length of stay
 - Melani, JAMA 2009



MD/ RN Strategies to prevent/ manage delirium

- Adequate oxygenation
- Maintain fluid and electrolyte balance
- Frequent orientation
- Ensure hearing aids and/or glasses always on
- Maintain bowel and bladder- scheduled PEG (no MOM!)
- Manage sleep
- Keep active during day; minimize lines; avoid restraints
- Treat pain adequately- scheduled acetaminophen plus oxycodone or morphine
- Maintain acetylcholinesterase inhibitors (suggestive evidence for delirium prevention)
- Continue carbidopa/levodopa for Parkinson's



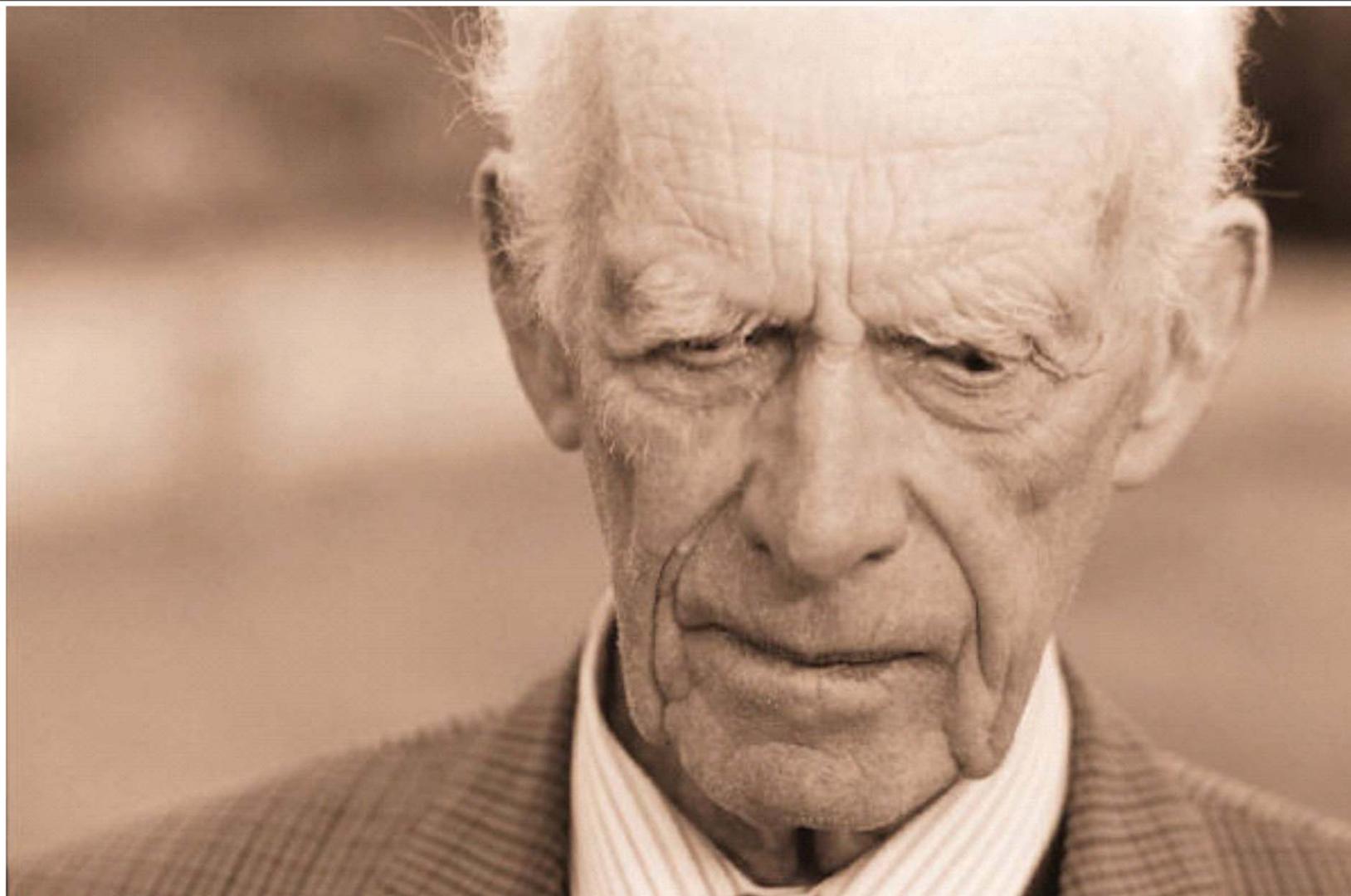
Avoiding a hospitalization

- Change Pain meds
 - NSAIDs unsafe
 - oxycodone 2.5 mg
- No anti-cholinergics
- Low dose antipsychotic
 - Quetiapine 12.5 mg
- Family member spends the night, frequent orientation, keep hearing aid in

Next day, Mrs. Gates is much better



Mr. Drew





Assessing for delirium using the CAM

Applicable to patients in any hospitalized setting
(Different versions used in acute care and ICU)

Can be done in one minute conversation with the verbal patient or with specific assessments for the non-verbal patient

CAM assessment has four features:

1. Is there an acute change in mental status over baseline? Does it fluctuate over time – are there periods of lucidity? Does it increase and decrease in severity?
2. Does the patient exhibit inattention?
3. Is the patient's thinking disorganized?
4. Does the patient have an altered level of consciousness?



Feature 1: *Acute Onset/Fluctuating Course**

Is there evidence of an acute change in mental status from the patient's baseline?

Does the (abnormal) behavior fluctuate over time – are there periods of lucidity? Does it come and go during the day or increase and decrease in severity?

This feature is best obtained from someone close to the patient or at the patient's bedside. Positive responses indicate the presence of Feature 1.

*Assessed in the same way for both verbal and non-verbal patients.



Feature 2: *Inattention*

Does the patient exhibit inattention?

For verbal patients:

Does the patient have difficulty focusing attention, for example, being easily distractible, or having difficulty keeping track of what was being said?

Have the patient spell WORLD backwards or name the days of the week backwards. Inability to do these things indicates inattention

For non-verbal patients, use the ASE Letter test:

- ASE letters
 - Directions: Say to the patient “I am going to read you a series of 10 letters. Whenever you hear the letter “A” indicate by squeezing my hand.”
Read letters from the following letter list in a normal tone.
S A V E A H A A R T
 - Scoring: Errors are counted when patient fails to squeeze on the letter “A” and when the patient squeezes on any letter other than “A”.
 - > 3 errors indicates inattention**



Feature 3: *Disorganized thinking-Verbal Patients*

Is the patient's thinking disorganized?

Verbal patients

This feature is shown by a positive response to the following question:

Was the patient's thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?



Feature 3: *Disorganized Thinking-Non-verbal Patients*

Part A:

Directions: Say to the patient “I am going to read you a series of questions. Whenever you agree with the statement indicate ‘yes’ by squeezing my hand.”

Yes/No Questions (Use either Set A or Set B, alternate on consecutive days if necessary)

Set A

Will a stone float on water?

Are there fish in the sea?

Does 1 lb. Weigh more than 2 lbs?

Can you use a hammer to pound a nail?

Set B

Will a leaf float on water?

Are there elephants in the sea?

Do 2 lbs weigh more than 1 lb?

Can you use a hammer to cut wood?

Score: ____ (Pt earns 1 point for each correct answer out of 4)

Part B: Command

Say to pt: “hold up this many fingers” (Examiner holds two fingers in front of pt)

“Now do the same thing with the other hand” (Not repeating the number of fingers.)

** If pt is unable to move both arms, for the second part of the command, ask pt “add one more finger”

Score: ____ (Pt earns 1 pt if able to successfully complete the entire command)

Combined Score (part A + part B): ____ (out of 5)

Disorganized Thinking is present for any score < 4



Feature 4: *Altered Level of Consciousness*

Does the patient have an altered level of consciousness?

Non-ICU patient

This feature is shown by any answer other than “alert” to the following question:
Overall, how would you rate this patient’s level of consciousness?

- Alert [normal]
- Vigilant [hyperalert]
- Lethargic [drowsy, easily aroused]
- Stupor [difficult to arouse]
- Coma [unarousable]

ICU patients

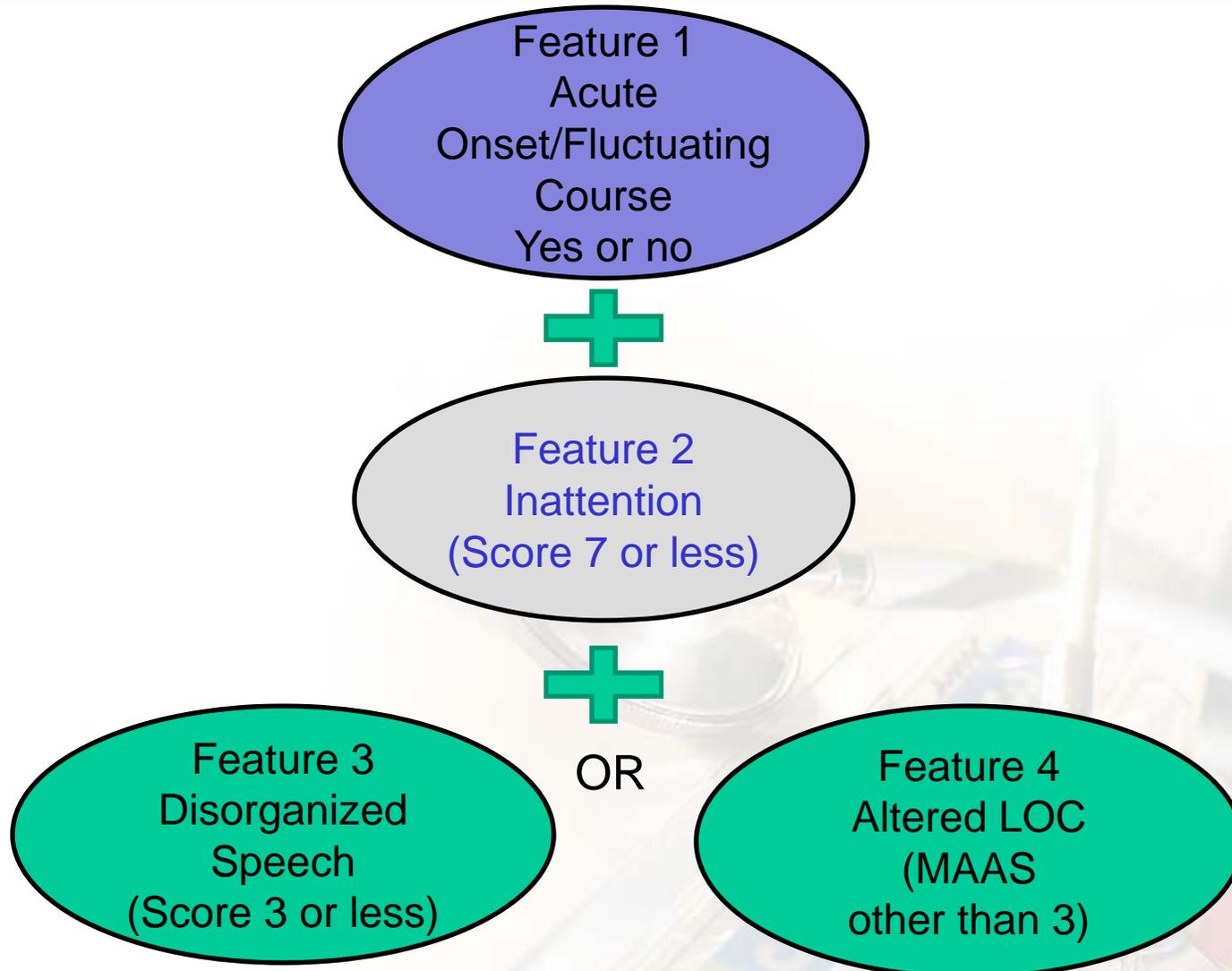
Use the Motor Activity Assessment Score (MAAS) – **any score other than 3** indicates altered level of consciousness

(MAAS) Motor Activity Assessment Score		
Value Range for Row		
Back	Next	Clear
0=unresponsive		
1=responsive only to noxious stimuli		
2=responsive to touch or name		
3=calm & cooperative		
4=restless & cooperative		
5=agitated		
6=dangerously agitated, uncooperative		
Back	Next	Clear



A POSITIVE CAM

Must have feature 1 and 2 and either 3 or 4





Recognition of Delirium

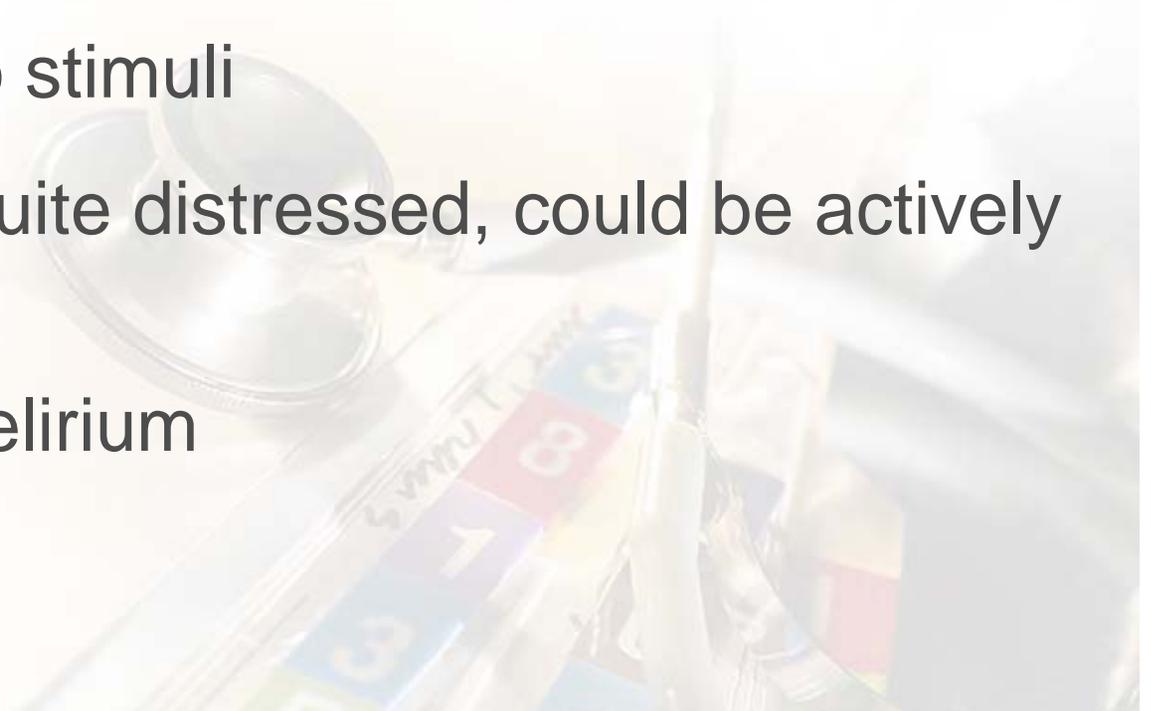
- 32-66% of patients with delirium are unrecognized by physicians
- 69% of patients with delirium are unrecognized by nurses
- Risk factors for under-recognition: hypoactive delirium; advanced age, vision impairment, dementia

Ref: Inouye SK, Arch Intern Med. 2001;161:2467-2473



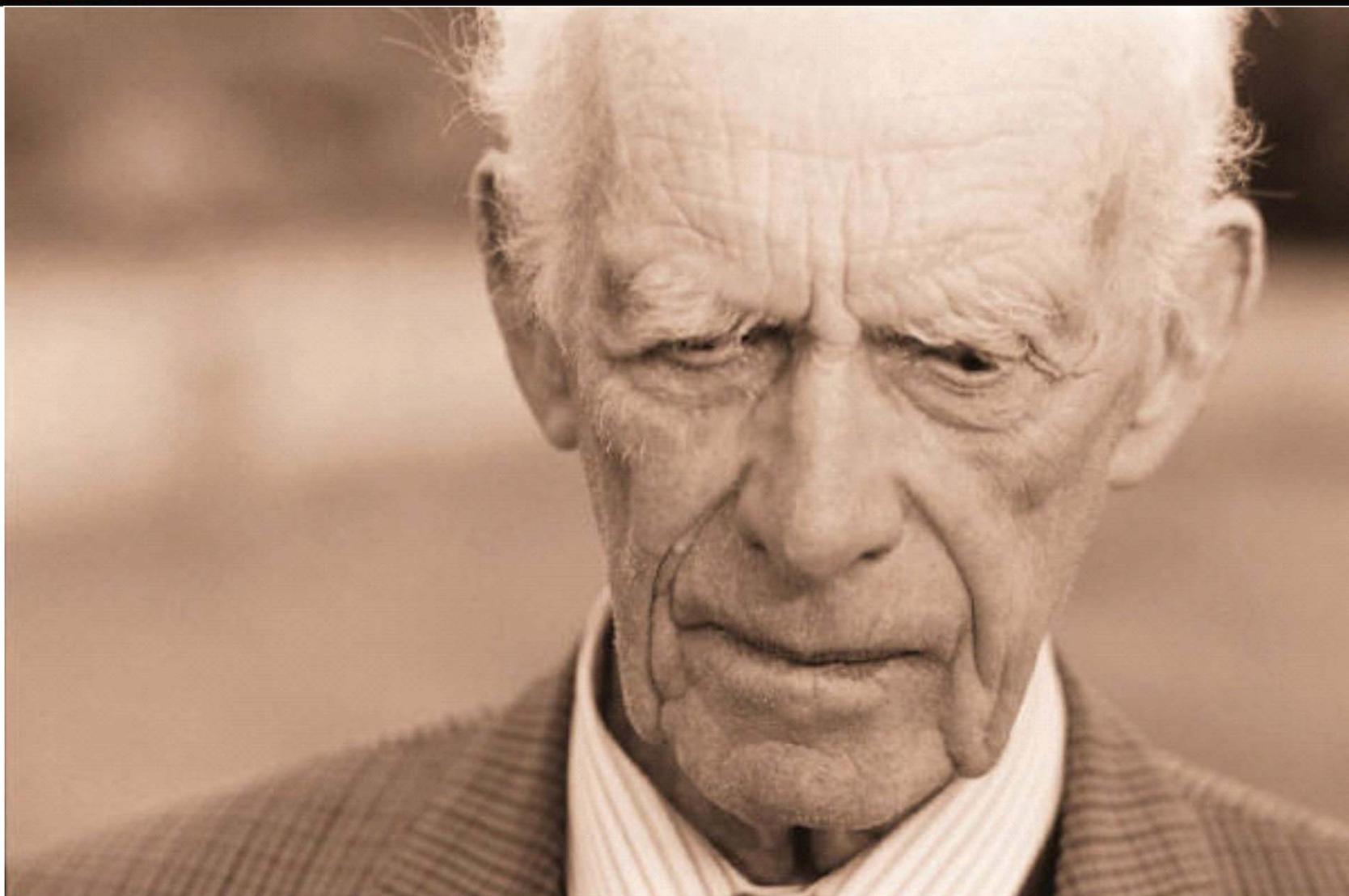
What is the Hypoactive-Hypoalert Variant of Delirium?

- Often confused with depression
- Quiet, speaks little
- Listless
- Responds slowly to stimuli
- Internally may be quite distressed, could be actively hallucinating
- Meets criteria for delirium





Mr. Drew (continued)





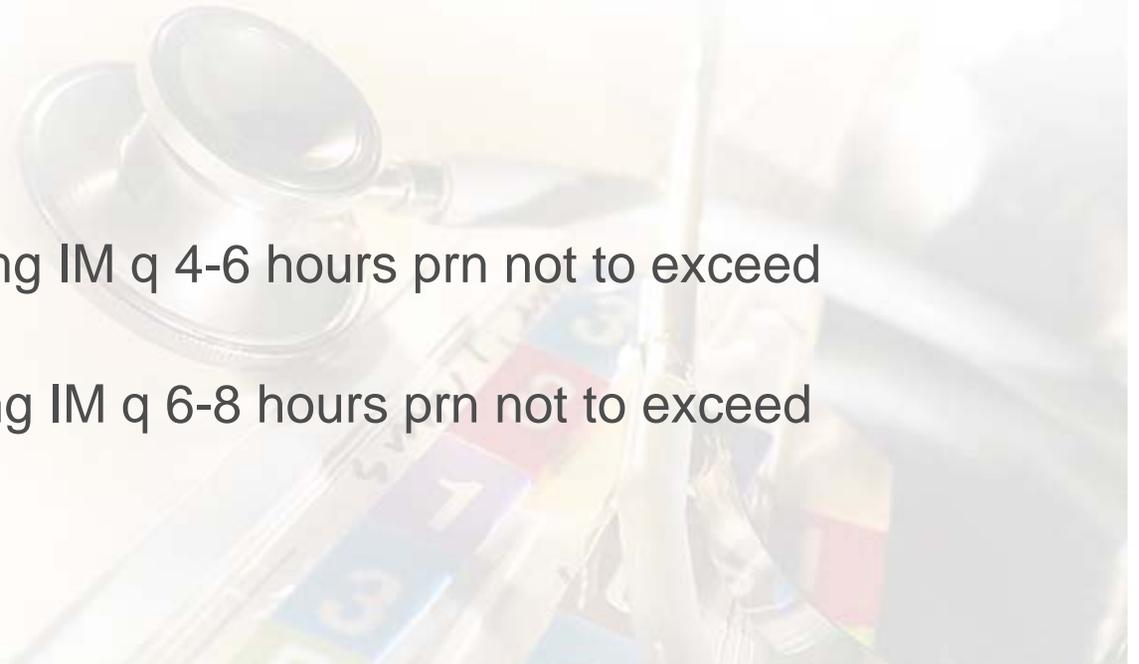
Why is haloperidol usually the first choice?

- First line agent in psychiatry and critical care practice guidelines – but not FDA approved, and no RCTs for efficacy and safety in critically ill patients to date
- Reasons it is first line:
 - Minimal anticholinergic side effects
 - No active metabolites
 - Can be administered IV - less Extra Pyramidal Side Effects (EPS) when given IV (**Rule of thumb: Patients over 65 should never get more than 4.5 mg haloperidol daily due to EPS**)
 - Less sedation than other neuroleptics/ benzodiazepines
 - Rare CV side effects – prolonged QT interval, may lead to torsades – usually high doses (>35mg/day) – obtain baseline ECG and monitor QTc interval



Can I use Atypical Antipsychotics?

- Studies suggest they are as efficacious as haloperidol
- Possibly less EPS especially when compared with haloperidol dosages of $> 4.5\text{mg/d}$
- Not available IV
- IM options:
 - Olanzapine 2.5 - 5mg IM q 4-6 hours prn not to exceed 20mg/d
 - Ziprasidone IM 10mg IM q 6-8 hours prn not to exceed 30mg/d





Treatment with Antipsychotics

- Can start with prn but if being used frequently - consider adding low dose standing order:
 - Haloperidol 0.5-1 mg po qd - q4 hr up to 10 mg/d (best to stay below 4.5 mg/d if patient is over 65)
 - Quetiapine 12.5-25 mg po qd - q 4hr up to 150 mg/d (best choice for Parkinson's or Lewy Body)
 - Risperidone 0.25-0.5 mg po qd- q 4hr up to 2 mg/d
 - Olanzapine 2.5-5 mg po qd - q 4hr up to 10 mg/d
- Break through: haloperidol 0.25-1 mg IV or 0.5-2 mg IM or PO q1-2 hr prn
- Baseline and repeat EKG - for QT interval



How do I ensure accurate coding and billing for patients with Delirium?

- Documented low prevalence & incidence of delirium may be due to under-documentation of delirium at admission & during the hospital stay
- Accurate diagnosis of delirium ensures proper case mix adjustment for your patients
- Coders must see specific provider documentation
 - Must call it “ACUTE Delirium”
 - Must note if “Drug or Alcohol Induced”, or Other Specified Condition
 - **Don’t call it** agitation, confusion, altered mental status, or combativeness if the patient really is delirious



OHSU Inter-professional Program to reduce delirium

- On-line module for MD, RN, PA, NP, OT, PT, Nutrition, Patient safety attendants, Pharmacists
- RN completes most risk assessments, aided by EMR prompts
- Pharmacist reviews meds if patient deemed “at risk”
- CAM performed every 12 hours for at risk patients
- MD notified if CAM positive, has “delirium order set”



OHSU Inter-professional Program to reduce delirium

Results so far:

- Over 2000 care team members have completed the module.
- 60% of patients being appropriately screened for “at risk”
- About 60% of at risk patients being given CAM
- Delirium rates UP for 4.4% to 8.6% over the last 3 months



Restraints Used in Hospitalized Patients

- Restraint use increases risk of
 - Worsening or developing delirium
 - Unsafe events (eg. falls) in hospitalized patients
- Before using restraints, try first to remove the offending agent (NG tube, foley, IV line, etc.)
- Mobilize the patient- increased activity may lessen risk of delirium and need for restraints



Restraint Use

- Restraints are used as many as 500,000 x a day
- Frequency of restraint use in the nursing home varies between 36% and 85%, in acute care hospital between 3.4% and 18.5%, and as high as 60% for hospitalized nursing home residents
- Since 1990, approx. 47% decrease in restraint use across the country





These are all restraints!

- Vests
 - Locked Geri chairs
 - Pelvic or waist restraint attached to standard chairs or to geriatric recliner-chairs
 - Raised side rails
 - Hand mitts
 - Lap boards fixed to geri-chairs
 - Sheets tucked in too tightly
- 



The Side Rails Debate

- In hospitals, use of bed rails is a nursing decision
- In nursing homes, physician's order is required
- Most injuries occur trying to climb over rails

When is a side rail not a restraint?

- Used on a patient functionally incapable of making either voluntary or non-voluntary movement
- Wishes to and can competently use the side rail as a mobility aid
- Requests them as an environmental cue



In Acute Care Setting

- Physician's written order valid for 24 hours
- Type of restraint must be identified
- Use restraints for the shortest possible time
- Evaluation of possible discontinuation on each shift
- Release patients from restraints every 2 hours





How to Write Orders

Inaccurate

- Restrain wrists x 24 hours
- Posey at night
- Restrain prn
- Restrain while intubated

Accurate

- “Vest restraint for up to one day while disoriented to prevent patient from falling”



When Monitoring, Look For.....

- Signs of injury
- Nutrition/hydration
- Circulation and range of motion
- Vital signs
- Hygiene and elimination
- Physical and psychological comfort





Mrs. Bond

- 70-year old woman with bipolar disorder and hypothyroidism admitted for acute exacerbation of psychosis.
- Found to be delirious, febrile, dehydrated, and delusional. She was hostile and refused to answer questions.
- The patient received IVF resuscitation, and appropriate antibiotics. Her temp returned to normal on the second day



Mrs. Bond continued

- She was transferred to psychiatric unit
- Soft 4-point restraints were applied owing to agitation and impulsive behavior
- The following day restraints were removed.
- On the fourth day, staff escorted her from bathroom to bed, whereupon her eyes suddenly rolled up and she became unresponsive
- CPR was unsuccessful
- Autopsy revealed PE due to venous stasis in the lower extremities

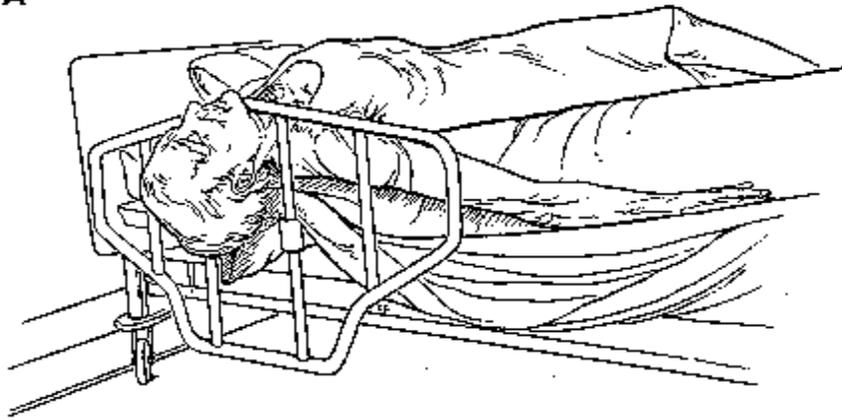


Physical Consequences of Restraint Use

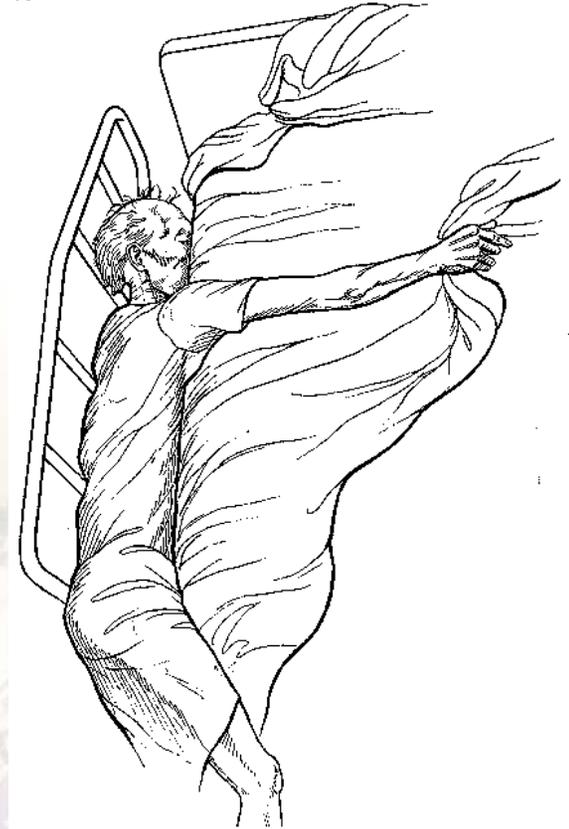
- Constipation
- Pressure ulcers
- Nosocomial infections
- Muscle weakness, low endurance
- Contractures, loss of range of motion
- Exacerbation of gait abnormalities
- Bone demineralization , disuse osteoporosis
- Compressive neuropathy
- Strangulation
- Death



A



A





Emotional Consequences of Restraint Use

- Depression
 - Social withdrawal
 - Anger, defiance
 - Loss of self esteem
 - Fear of abandonment
 - Combativeness or aggressiveness
- 



Physiology: Hazards of Immobility

- Change in fluid balance begins within hours causing weakness, exercise intolerance, postural hypotension and falls.
- Vertebral bone loss accelerates to 50 times the usual rate.
- Ten days of bed rest results in bone loss that will take 4 months to replace.
- Muscle fibers shorten and strength decreases by 5% per day, occurring most rapidly in the lower extremities, due to absence of muscle contractions necessary to maintain strength and normal joint architecture.
- The ability to oxygenate the blood, already compromised by a decreased capacity of the thorax to expand, is exacerbated when the chest is compressed from being in a recumbent position. Such decreased oxygenation can result in mental confusion.



Summary

- Delirium is a common, severe illness
- Team approach is essential
- Assess upon admission and routinely throughout hospitalization for patients at risk
- Avoid restraints; utilize team to find alternate strategies for agitation