Delirium in the Trauma Patient Michigan Trauma Coalition

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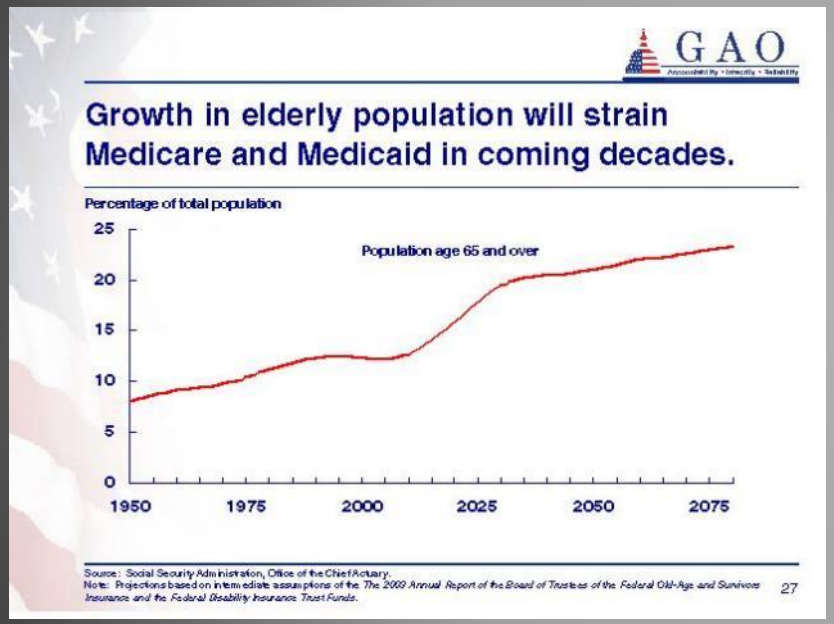
1. Identify the risk factors for delirium in the geriatric trauma patient

2. Discuss the management of the geriatric patient experiencing delirium

Disclosures

- I have no financial disclosures but I want you to know that
  - I am passionate about geriatric patients having good outcomes
  - I am positive that application of the evidence will help us advocate for our geriatric patients so that they don't become more debilitated
  - I hope I can persuade you to join me

Geriatric Demographics

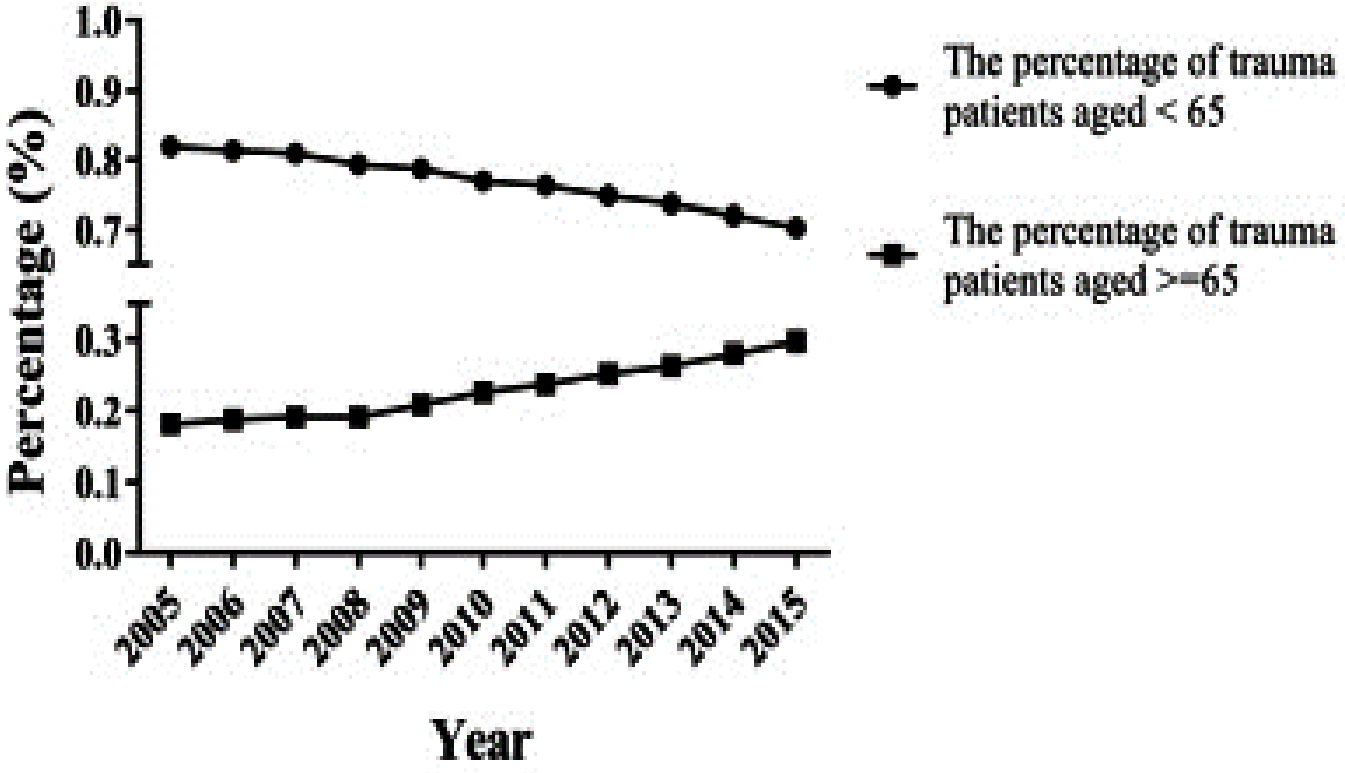


- According to the US Census Bureau
  - By 2030 – 1/5 Americans will be ≥ 65 yrs of age
  - ~18 M Americans (double the current population
- By 2050 ~40 of all trauma patients will be ≥65 yrs of age
- (Ortman & Hogan, CDC 2014)

The Geriatric Trauma (GT) Patient

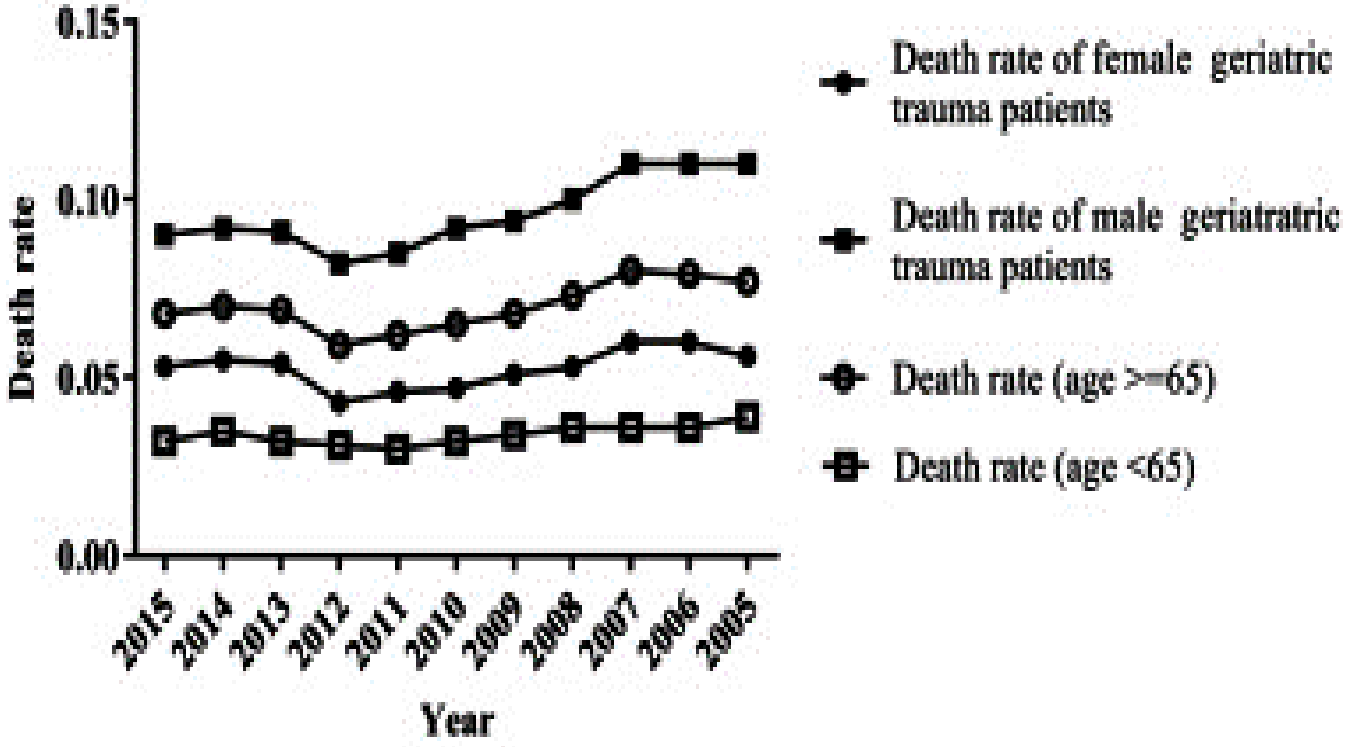
- Percentage of GT patients in the US rose from 18 to 31% between 2005 and 2015 and will continue to ↑ as the population continues to age
- Mortality ↑ after age 70 when adjusting for injury severity score
- $34 Billion spent on geriatric trauma per year in the U.S. (Reske-Nielsen & Medzon, 2016)
  - Trauma care much more costly for an elderly person compared to a younger person (Brooks & Peetz, 2017)
  - 1/3 of all trauma dollars

Geriatric Trauma Admission



(Jiang, Zheng & Zang 2020)

Geriatric Trauma Deaths



(Jiang, Zheng & Zang 2020)

HH – Case Study #1

- 91-year-old M with PMH of HTN, IDDM, CKD stage II that presented as a trauma after a fall from standing position
- Reports he fell after losing balance picking up a medicine bottle and landed on his RT hip
- He denied any recent falls
- He is on Xarelto -does not recall the indication for the medication and some other meds (which he can't remember at the others
- Baseline -Able to walk in the grocery without SOB, however unable to walk 1-2 blocks or a flight of stairs.

HH- Case Study #1

- Denied CP, SOB, cough, abd pain, N/V, fevers, chills, any new numbness/tingling or weakness of any extremity upon presentation.

- PSH: "neck surgery", penile prosthesis, inguinal hernia repair

- Social history: remote history of tobacco and alcohol use, denies current use. Lives at home with wife and grandson who takes care of both.

HH's Injuries

- CT H demonstrates a very small RT SDH
- RT greater trochanter fracture
- RT non displaced wrist fracture
- RT 3rd, 4th and 5th non displaced rib fractures

HH's Hospital Course

- He undergoes an ORIF of the RT hip on HD #1
- RT SDH – admitted to ICU for q1 Neuro checks (non op at this time)
- RT wrist fx is non op
- Rib fx –supportive care

HH's Hospital Course

- On HD #3 (POD #2) he begins to exhibit some change in mentation and becomes very restless and agitated. He pulls out his IV and is trying to get his SCDs off because he has to go to the bank!!

- His HR is 110, BP 120/70, RR 24, SpO2 94% on RA

Things that make you go Hmmm

- Why is HH agitated?
- Quick, should we get the Ativan or Versed????

Agitation

It's not Versed or Ativan Deficiency

- Hypoxia must always be ruled out as cause
- Worsening brain injury must be ruled
- Delirium is an important cause of agitation in acutely ill patients
- Pain is the most common cause of agitation in patients that can verbalize pain

Why is HH Agitated?

- Could his SDH be getting bigger?
- Is he septic?
- Is he having a cardiac event? Or stroke?
- Does he have an electrolyte abnormality?
- Did he miss an important med?

Case Study Continued

- **Did we cause his agitation? – Maybe**
- What is wrong with HH ?
- Could he be delirious? Or is he just withdrawing from something?

Through The Years in the ICU…

- Treat patients with the “best possible care”
- Prevent pain, anxiety and cause amnesia to the ICU experience
- Sedate them so they sleep
- Restrain them “so they don’t pull anything out”
- Decrease the metabolic rate to decrease stress to the heart, lungs & brain

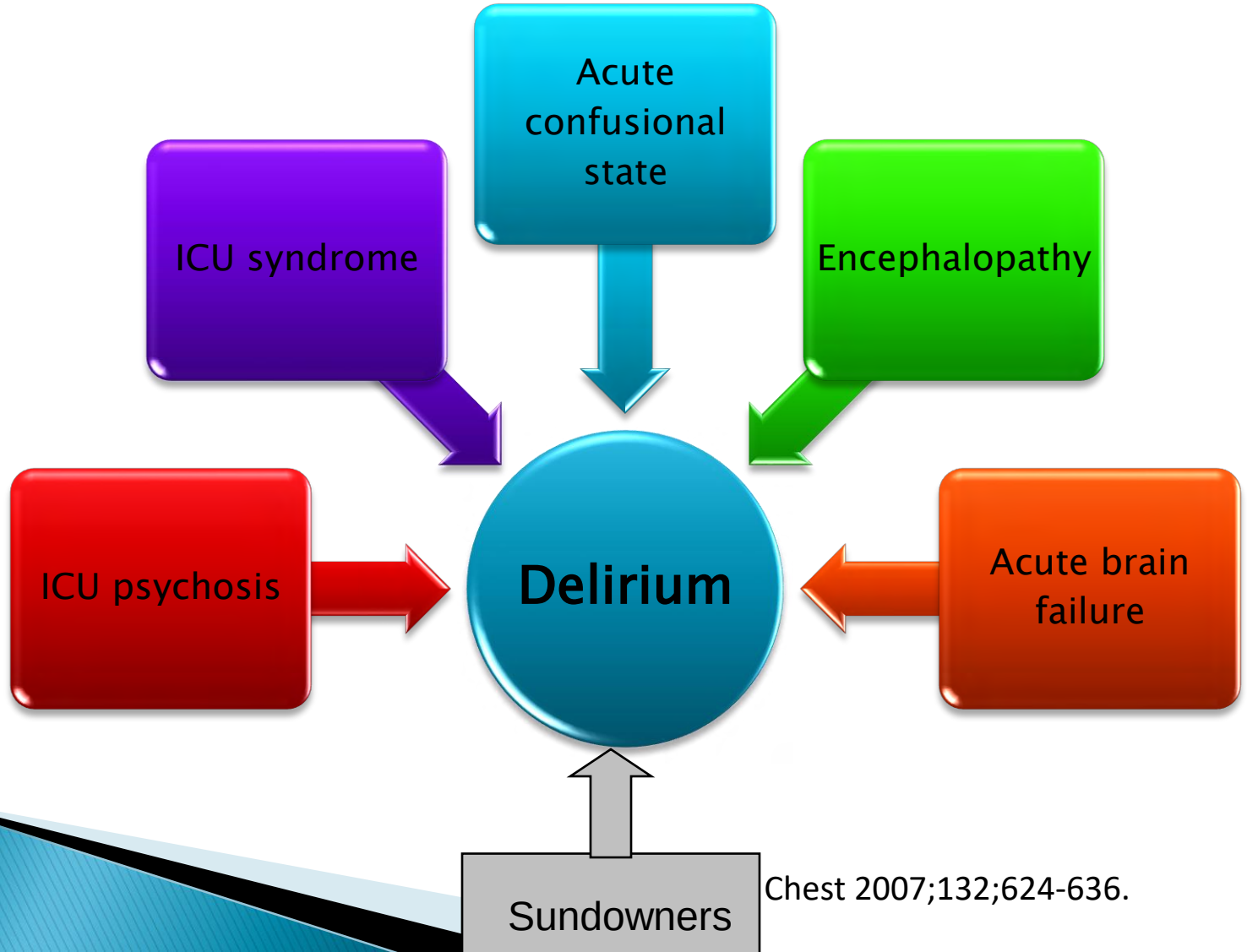
(IHI, 2012)

Or is it ??????

“Possession”

So this is how our ICU & Acute care patients sometime look

Our Patients Have…….



Chest 2007;132;624-636.

Case Study Continued

- Did we cause his agitation?
- **What is wrong with HH ?**
- **Could he be delirious? Or is he just withdrawing from something?**

Key Features of Delirium – *DSM-5*

Delirium is a disturbance of attention awareness and a change in baseline cognition

- Consciousness
- Attention
- Cognition
- Perception

- **that develops over a short period of time & fluctuates during the course of the day**

American Psychiatric Association, 2016

Hyperactive Delirium

Characterized by:

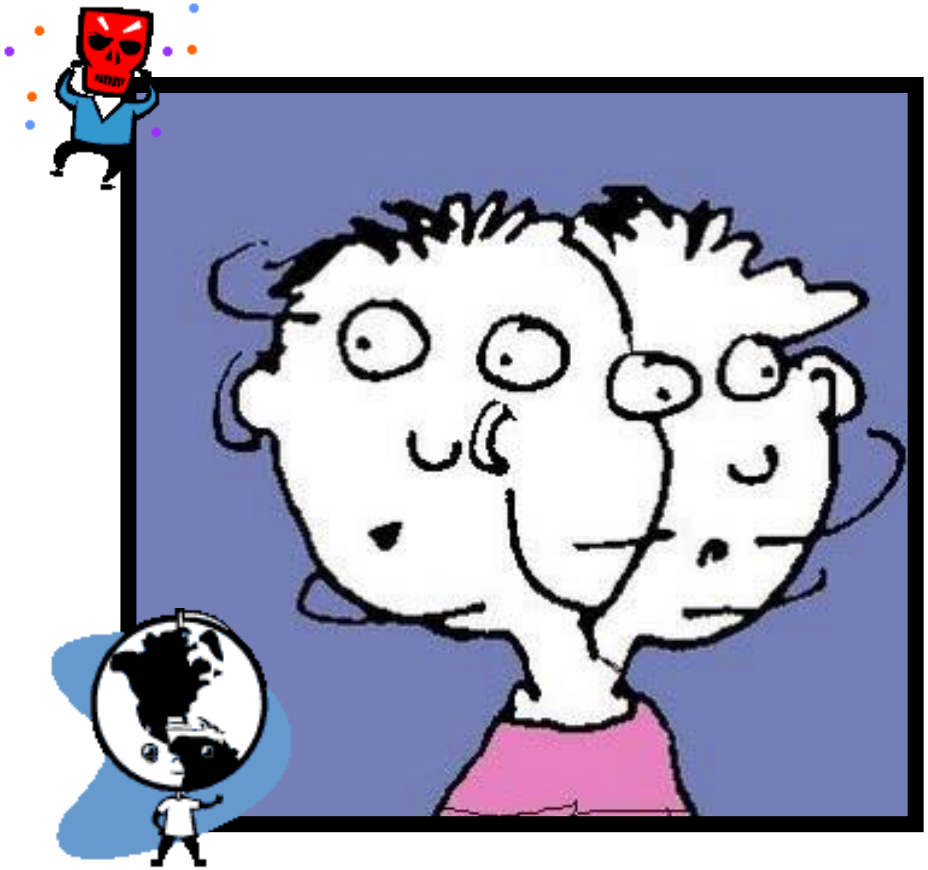
- Agitation
- Restlessness
- Hyper-vigilance

With frequent

- non-purposeful movement

or

- attempts to discontinue treatment



Hypoactive Delirium

- Most prevalent
- Withdrawal, flat affect, & ↓responsiveness
- More likely to go unrecognized – subtle presentation, patient does not interrupt treatment
- Misdiagnosed as dementia or depression in 75% of cases, without use of valid and reliable screening tool
- Associated ↑incidence of negative outcomes:
  - PE, pressure ulcers, aspiration
  - Longer length of stay & higher rate of mortality

Mixed Delirium

- **Fluctuation between both subtypes**
  - Common after receiving benzodiazepine for hyperactive delirium
  - Patient may awake in a hypoactive state


Delirium
IS NOT
Dementia
Although dementia is a risk factor for developing delirium

Differential Diagnosis of Delirium

	Delirium	Dementia	Depression
Onset	Abrupt	Slow & Insidious	Variable
Daily Course	Fluctuating	Usually stable	Usually Stable
Length	Hours to weeks	Years	Variable
Consciousness	Reduced	Clear	Clear
Alertness	↑ or ↓	Usually normal	Normal
Activity	↑ or ↓	Variable	Variable
Attention	Impaired	Usually Normal	Usually normal
Orientation	Impaired	Impaired	Normal

HH's Case Continues

- The resident orders 1mg of Ativan IVP for " his agitation"
- Would you give it? – **NO!!!**
- **Does he have delirium?**
- **How would you assess him for delirium?**

Recognition of Delirium

Who does the best job of recognizing Delirium?

1. ER physicians
2. Non ER physicians
3. Nurses

Delirium Assessment Tools

Confusion Assessment Method (CAM)

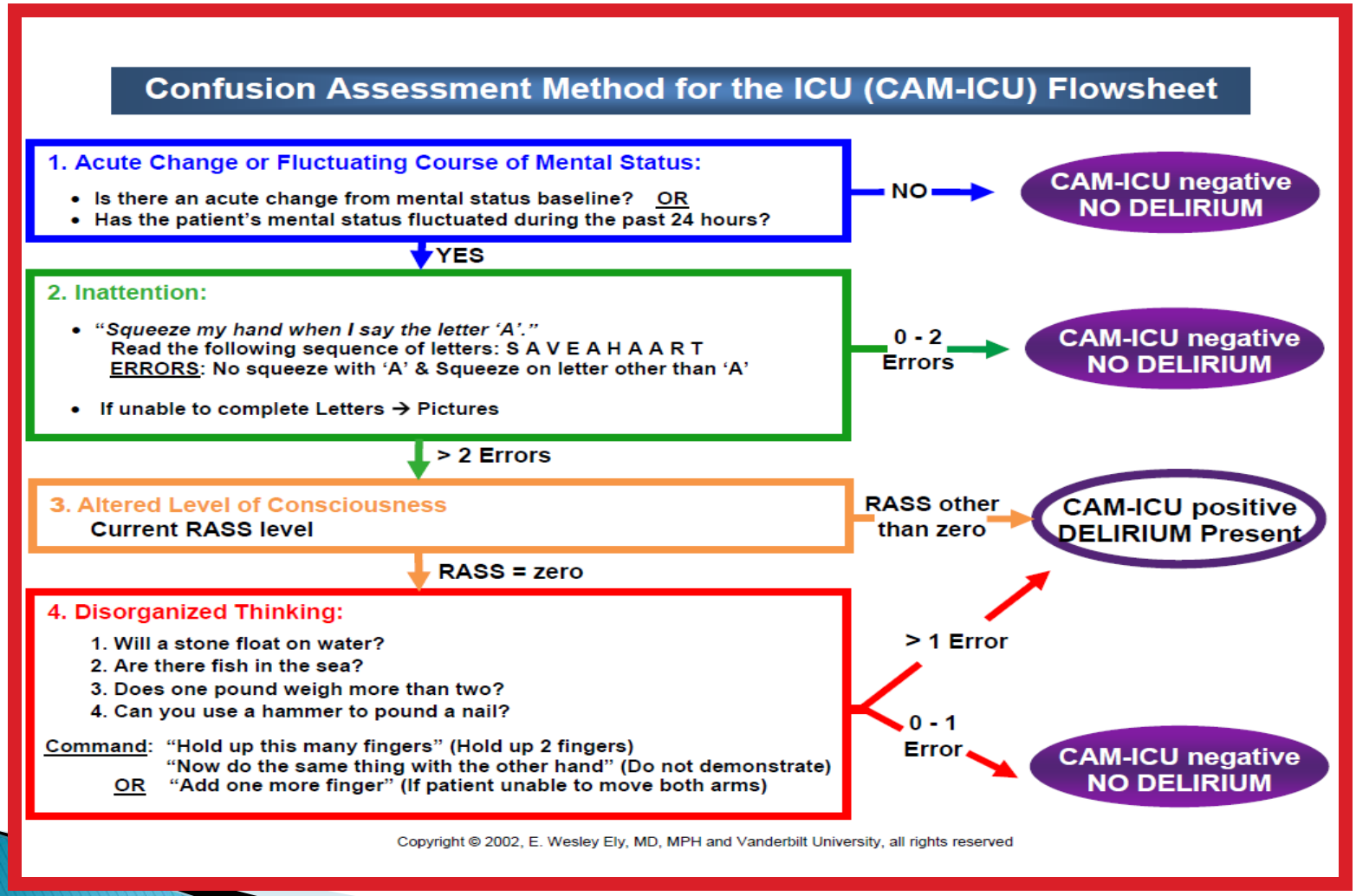
Table 6: Confusion Assessment Method (CAM) Diagnostic Algorithm

1) Acute onset and fluctuating course
2) Inattention, distractibility
3) Disorganized thinking, illogical or unclear ideas
4) Alteration in consciousness

The diagnosis of delirium requires the presence of both features 1 AND 2, plus EITHER feature 3 or 4.

Adapted from: Inouye S, van Dyck C, Alessi C, et al: Clarifying confusion: The confusion assessment method. Ann Intern Med 113:941, 1990.

CAM–ICU

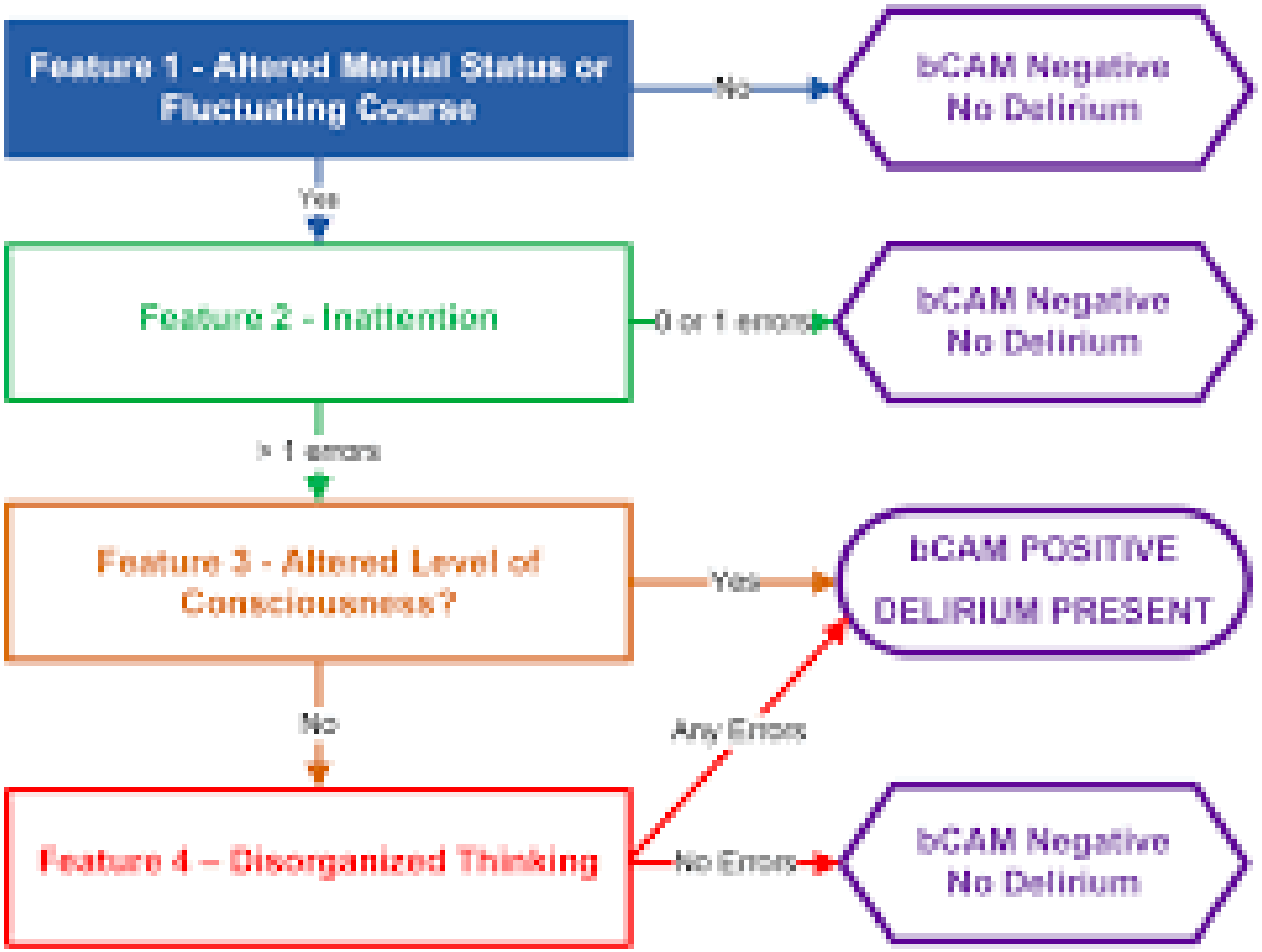

Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet
1. Acute Change or Fluctuating Course of Mental Status:
• Is there an acute change from mental status baseline? OR
• Has the patient's mental status fluctuated during the past 24 hours?
NO
CAM-ICU negative NO DELIRIUM
YES
2. Inattention:
• "Squeeze my hand when I say the letter 'A'."
Read the following sequence of letters: S A V E A H A A R T
ERRORS: No squeeze with 'A' & Squeeze on letter other than 'A'
• If unable to complete Letters → Pictures
0 - 2 Errors
CAM-ICU negative NO DELIRIUM
> 2 Errors
3. Altered Level of Consciousness
Current RASS level
RASS other than zero
CAM-ICU positive DELIRIUM Present
RASS = zero
4. Disorganized Thinking:
1. Will a stone float on water?
2. Are there fish in the sea?
3. Does one pound weigh more than two?
4. Can you use a hammer to pound a nail?
Command: "Hold up this many fingers" (Hold up 2 fingers)
"Now do the same thing with the other hand" (Do not demonstrate)
OR "Add one more finger" (If patient unable to move both arms)
> 1 Error
0 - 1 Error
CAM-ICU negative NO DELIRIUM
Copyright © 2002, E. Wesley Ely, MD, MPH and Vanderbilt University, all rights reserved

ICDSC

Item	Score
Altered level of consciousness (if A or B, do not complete patient evaluation) A: No response B: Response to intense and repeated stimulation (loud voice, pain) C: Response to mild or moderate stimulation D: Normal wakefulness E: Exaggerated response to normal stimulation	 0 0 1 0 1
Inattention	0 to 1
Disorientation	0 to 1
Hallucination-delusion-psychosis	0 to 1
Psychomotor agitation or retardation	0 to 1
Inappropriate speech or mood	0 to 1
Sleep/wake cycle disturbance	0 to 1
Symptom fluctuation	0 to 1

Intensive Care Med 2007;33:929-940.

Brief CAM (bCAM)



Etiology of Delirium

- Identify the underlying cause
  - Common causes
    - Medications
    - Medical Conditions
    - Substance intoxication
    - Substance withdrawal

HH's Case Continues

- **Does this patient have delirium?**
- How common is delirium?
- Can you predict if he will get delirium?
- What risk factors does he have for delirium?
- How do you evaluate for delirium?

Is HH Delirious?

- On HD #3 he begins to exhibit some change in mentation and becomes very restless and agitated. He pulls out his IV and is trying to get his SCDs off because he has to go to the bank!!
- Labs, CT Head, Cxray, UA are ordered

HH's Work Up

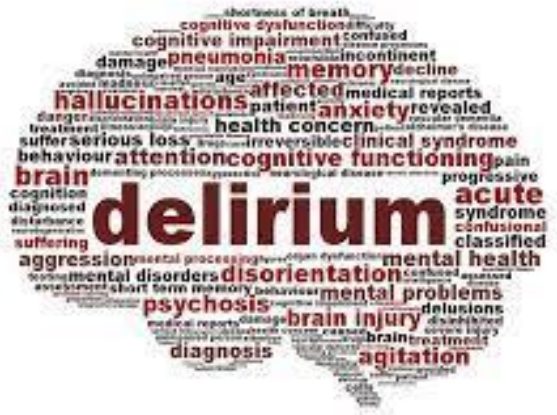
Diagnostic Findings

- CT Head stable
- VSS, SpO2 100% on 2L NC
- CBC, BMP – WNL
- LFTs – WNL
- Cardiac enzymes & EKG WNL
- Pcxray-negative
- UA – positive for LE & nitrates

Is HH Delirious? – YES

- CAM is positive

- ICDS score 4

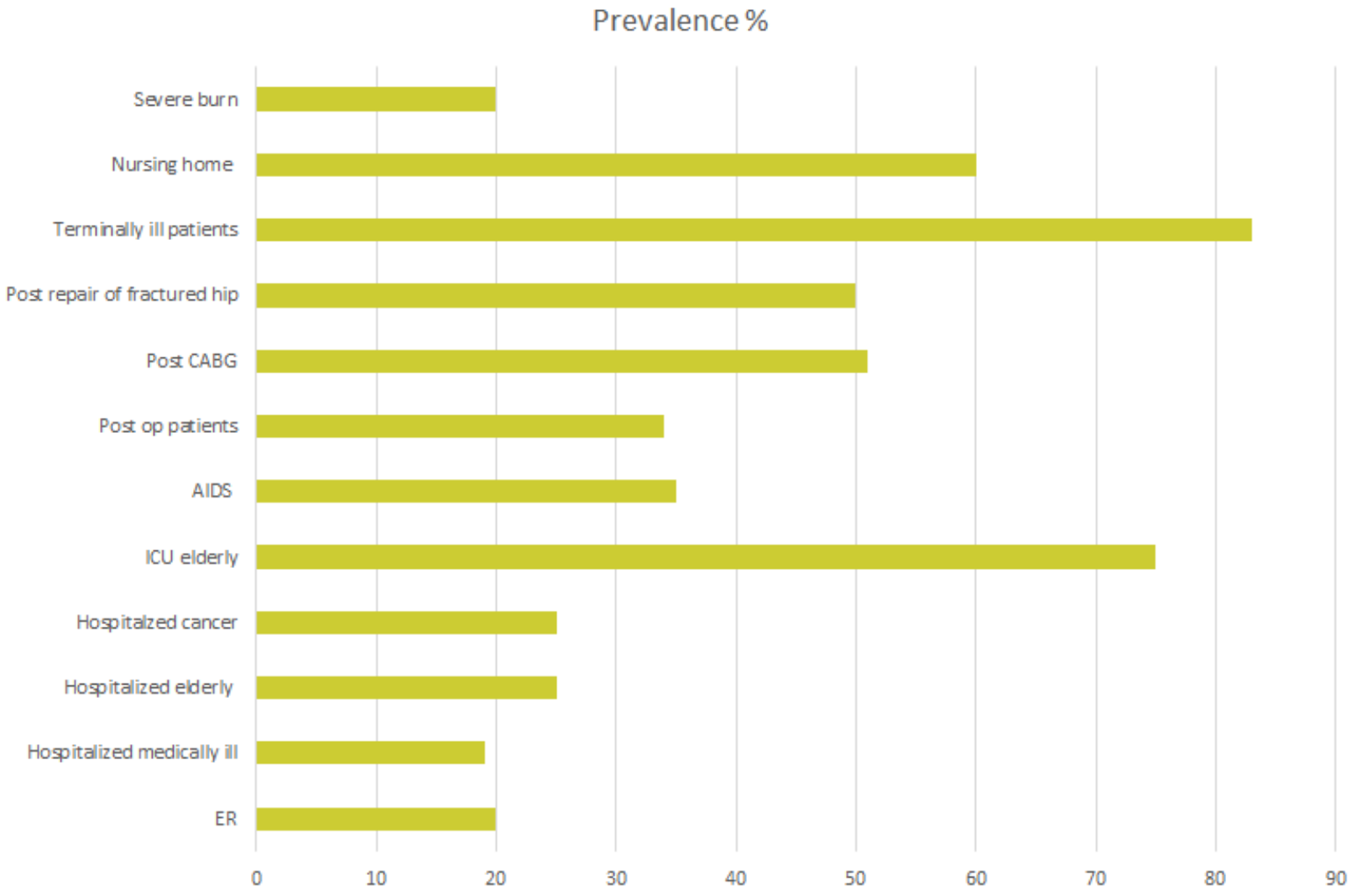


HH's Case

- Does this patient have delirium?
- **How common is delirium?**
- Can you predict if he will get delirium?
- What risk factors does he have for delirium?
- How do you evaluate for delirium?

The scary facts

- ~2.6M adults ≥ 65 yrs of age develop Delirium annually
- Accounts for $164 billion in annual health care expenditures
- Affects ~20% of hospitalized older adults
- Post op delirium is between 15 – 53% but ICU pts 70 -87%


Prevalence %
Severe burn
Nursing home
Terminally ill patients
Post repair of fractured hip
Post CABG
Post op patients
AIDS
ICU elderly
Hospitalzed cancer
Hospitalized elderly
Hospitalized medically ill
ER
0
10
20
30
40
50
60
70
80
90

Delirium

- **Approximately 50% frequency in ICU patients**

- **Associated with:**
  - Threefold increase in 6-month mortality
  - An extra 5 days on mechanical ventilation
  - An extra 8-10 days of hospitalization costing on average $15,000 per patient
  - 50% have cognitive impairment at hospital discharge
    - Long-term cognitive impairment in 1 in 3 patients

HH's Case

- Does this patient have delirium?
- How common is delirium?
- **Can you predict if he will get delirium?**
- What risk factors does he have for delirium?

Predicting Delirium

- Predictive models that include delirium risk factors at ICU admission & within the first 24hrs are validated tools
- PRE-DELIRIC & E PRE-DELIRIC
- https://www.evidencio.com/models/show/981

Predicting Delirium

	Within 24hs after ICU admission (Van den Boogaard, 2014)	At ICU admission (wassenaar, 2015)
Predictors	• Age • APACHE II • Urgent Admission • Infection • Coma • Sedation • Morphine Use • Urea level • Metabolic acidosis	• Age • Hx of cognitive impairment • Hx of ETOH abuse • BUN • Urgent admission • MAP • Steroids • Respiratory Failure

HH's Case

- Does this patient have delirium?
- How common is delirium?
- Can you predict if he will get delirium?
- **What risk factors does he have for delirium?**
- Can we prevent delirium

Risk Factors For GT Delirium

- Hx of Dementia or lack of capacity to make decisions
- **Age >65yrs of age
- Poor vision/hearing
- Severe illness affecting ADLs
- Infection
- General anesthesia
- Emergency surgery
- Dehydration
- Polypharmacy
- Inadequate pain control
- EToH abuse hx
- Electrolyte abnormalities
- Mild to moderate frailty

(Ditillo, Saljuqui & Asmar, 2020)

HH's Case

- Does this patient have delirium?
- How common is delirium?
- Can you predict if he will get delirium?
- **Can we prevent delirium?**

Prevention & Treatment of Delirium

- Education of healthcare providers
  - Prevention strategies
  - Epidemiology
  - Assessment
- UK – Prevention of Delirium System of Care
  - Optimizing hydration & nutrition
  - ↓ environmental threats
  - ↑orientation to person, place & time
  - Early mobility
  - Enhancing communication
  - Better pain management
  - Infection prevention
  - Medication management

(Ditillo, Saljuqui & Asmar, 2020)

Prevention of Delirium Risk Factors

Modifiable

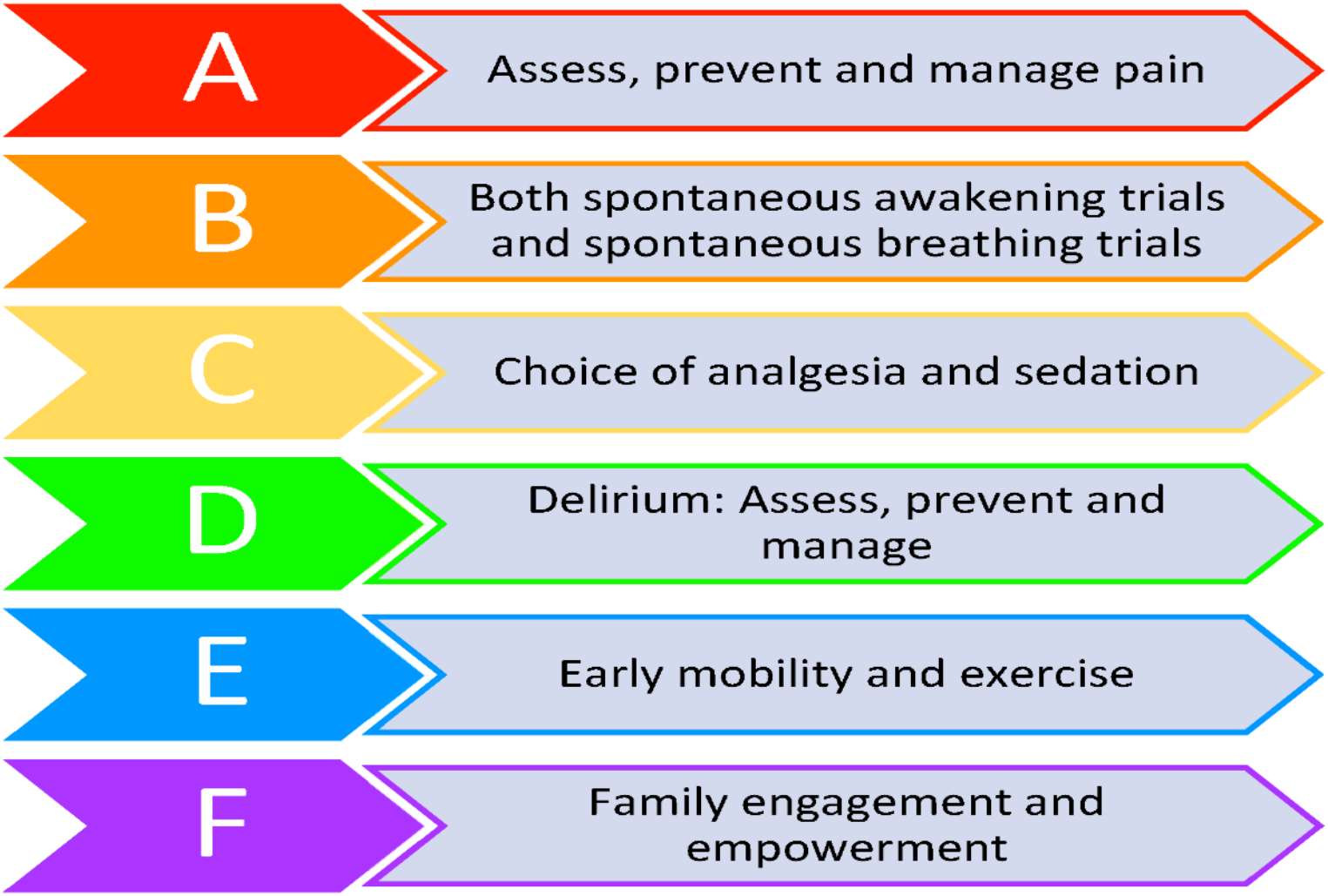
- Benzodiazepine Use
- Blood transfusion

Nonmodifiable

- Age
- Pre-existing dementia
- Prior coma
- Pre-ICU emergency sx or trauma
- Increasing APACHE and ASA scores

(PADIS, 2020)

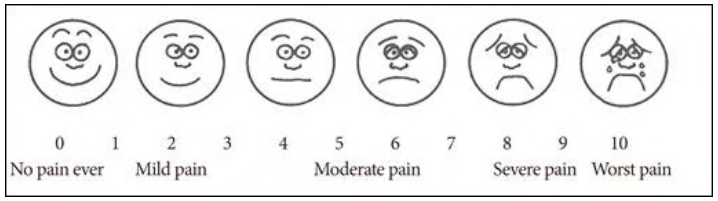
Prevention & Treatment of Delirium for the ICU patient

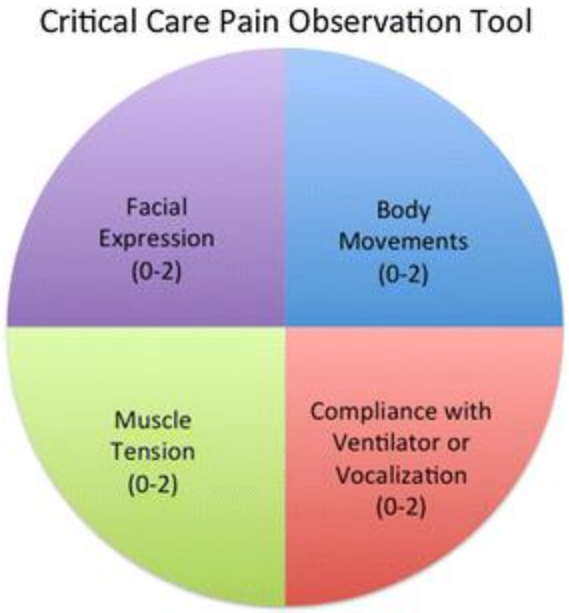


(PADIS, 2020)

"A" = Asses, Prevent & Manage Pain

- Assess Pain
  - Visual Analog Scale (VAS) – goal <5
  - Critical Care Pain Observation tool –goal ≤2
- Prevent pain with premedication for painful procedures
- Use non pharmacologic adjuncts





Pain Medications

- Multimodal – Tylenol/Codeine ATC + narcotics, can add muscle relaxers or Gaba analog if neuropathic pain
- Opioids
  - Fentanyl– primary medication used in mechanically ventilated patients for analgesia and sedation
  - Alternatives
    - Hydromorphone (Dilaudid)
    - Morphine (if hemodynamically stable and no renal failure)

Dosing of medications

- Least dose necessary to make patient comfortable
  - Intermittent dose (IVP PRN) before continuous IV drips
  - Use objective scale and target
  - Weight based dosing

"B" = Breathing

- **Daily Spontaneous Awakening & Breathing Trials if not contraindicated**
  - ↓vent-dependent days
  - May prevent or modify occurrence due to risk factor modification (mechanical ventilation)
  - Must be coordinated with daily SAT for patients receiving continuous sedation

(PADIS, 2020)

"C"= Choice of Analgesia & Sedation

- Sedation/ agitation: Richmond Agitation Sedation Scale (RASS)
  - Q4 hr, Target – 1 to 0

Table 2
The Richmond Agitation-Sedation Scale[6,39,40]

Score	Behavior	Description
4	Combative	Combative, violent, immediate danger to staff
3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive
2	Agitated	Frequent nonpurposeful movement, fights ventilator
1	Restless	Anxious, apprehensive, but movements not aggressive or vigorous
0	Alert and calm	Alert, calm
-1	Drowsy	Not fully alert, but has sustained awakening to voice (eye opening and contact >10 seconds)
-2	Light sedation	Briefly awakens to voice (eye opening and contact <10 seconds)
-3	Moderate sedation	Movement or eye opening to voice (but no eye contact)
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Pun BT, Ely EW. *Primary Psychiatry*. Vol 11, No 11. 2004.

Medications

- Sedatives
  - Only after analgesics have been started and are not adequate
  - Options
    - Dexmatomadine (Precedex) – great for EtOH withdrawal – watch for hypotension & bradycardia
    - Midazolam (versed) IVP PRN then IV drip if unable to sedate
    - Lorazepam– especially if expected to be long term
    - Propofol– Used primarily in the NS population.
      - Not an analgesic so must have something for pain

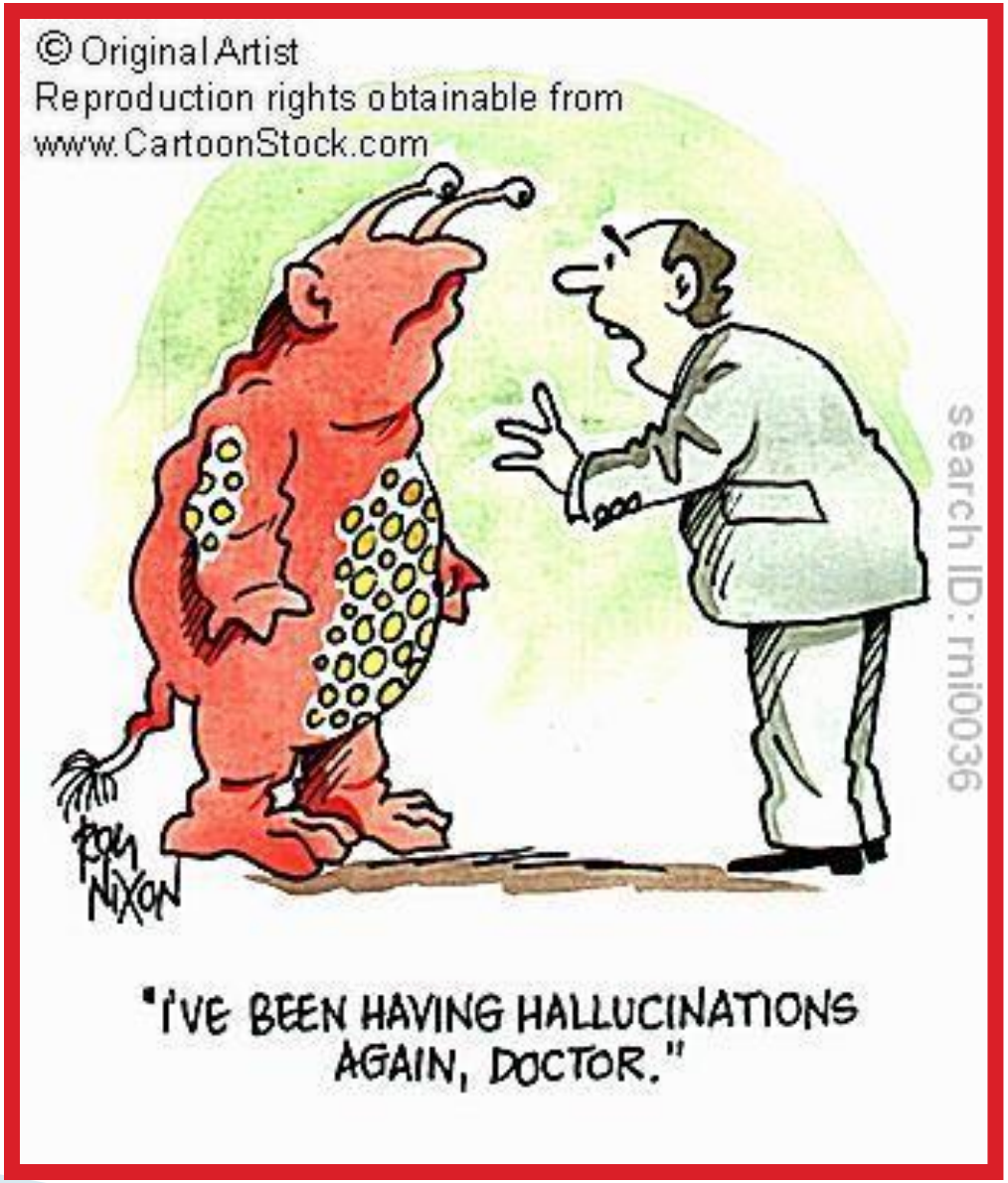
Goals

Light sedation versus deep sedation

- Frequent assessment and tight titration, actively reduce dose to meet goal RASS -1.
- Administer minimal dose required to meet RASS goal
- Avoid oversedation

Achieving the Right Balance

Patient
Oriented
&
Goal Directed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"I'VE BEEN HAVING HALLUCINATIONS AGAIN, DOCTOR."

"D" = Delirium

- **Delirium is a red flag for an underlying pathological process**
- Despite the high risk of delirium & ↑ negative outcomes, delirium goes undetected if it is not screened for
- Without a validated tool delirium is undetected by healthcare providers in > 65% of ICU pts)
- NO screening = NO prevention or treatment
- All pts benefit from being screened
- Risks of screening < potential negative effects associated with missed opportunities

"E" = Early Mobility
Mobilization = Less Delirium

Variable	Intervention n = 49	Control n=55	P value
ICU / Hosp Delirium Days	2 days	4 days	0.03
Time in ICU with Delirium	33%	57%	0.02
Time in Hosp with Delirium	28%	41%	0.01

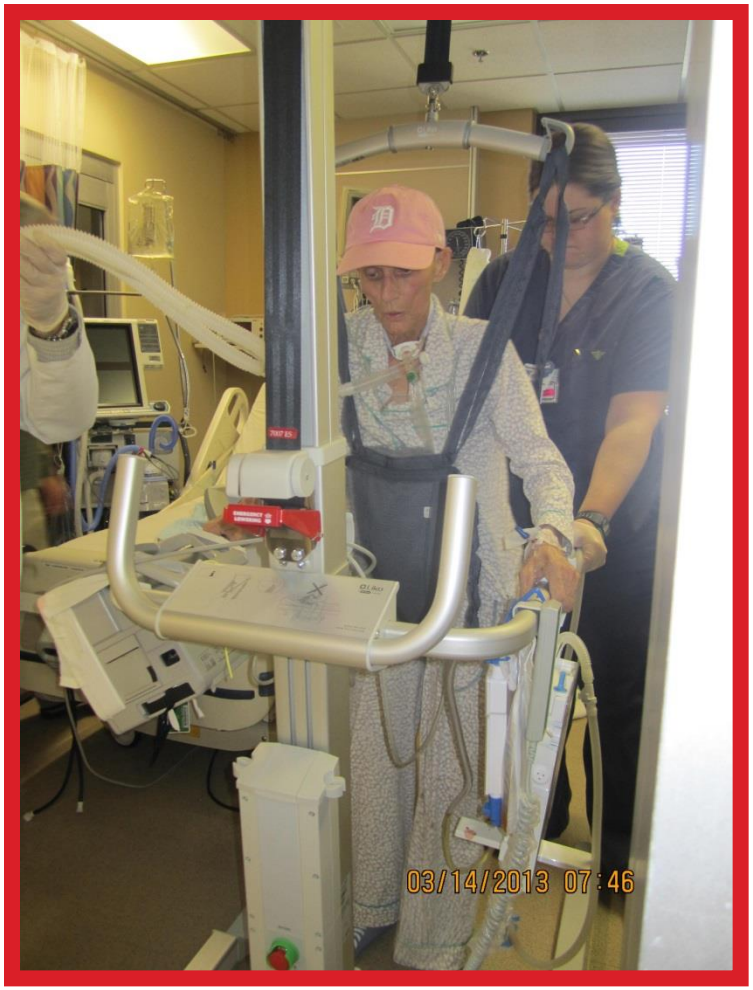
Schwelckert et al, 2009

Goals of Early Mobility

- Decreased amounts of physical disability after discharge
- Prevents additional neuromuscular complications
- Promotes positive psychological outlook
- Patients who do not achieve early mobility show no improvement in their physical dependence up to one year after discharge from the ICU
- Reduce ICU and Hospital LOS
- Reduce delirium

Today…

- Implementing an interprofessional approach to early, progressive, and ***aggressive*** mobility protocol combats the effects of bedrest in the critically ill patient



“F” – Family

Treatment of Delirium

- There are more things that cause delirium than those that treat it ☹☹

Delirium Management

- **Treat Underlying Physiological Cause**
  - Investigations with physician, eg lab work,
  - Review medication profile
  - Antibiotics (if infection)
  - Stabilization of disease
  - Treat constipation, urinary retention
  - Pain management
  - Pharmacological interventions

Delirium Management

- Prevention is superior to treatment
- Non-pharmacologic management is preferred
- Early identification is key
- Pharmacologic
  - Haloperidol (Haldol)
  - Quetiapine (Seroquel)
  - Olazapine (Zyprexa)
  - Dexmedetomidine (Precedex)

Additional measures to reduce Delirium

- Promote circadian rhythm – sleep hygiene
- Timely discontinuation of catheters and restraints
- Noise control
- Early mobility
- Patient and family centered environment
- Communication/explanation/orientation
- Early- appropriate- discharge from ICU
- Daily review of medications
- Music therapy

Treatment of Delirium

- **Supportive**
  - Consistent caregiving staff
  - Speak in clear, short, simple phrases
  - Inform – this is a short-term condition
  - Validate fears and concerns
  - Encourage regular visits from family,
  - Familiar items
  - Implement coordinated routines appropriate to functioning level
  - Exercises / walking
  - Consider expert consultation

Treatment of Delirium

- **Environmental**
  - Wear hearing aides, glasses, dentures
  - Calm soothing atmosphere
  - Provide sunlight during the day
  - Regular routine, including rest periods
  - Alternatives to restraint
  - Promote regular toileting
  - Minimize sudden changes in
  - environment
  - Cues for orientation (clocks, calendar, photos)

Treatment of Delirium

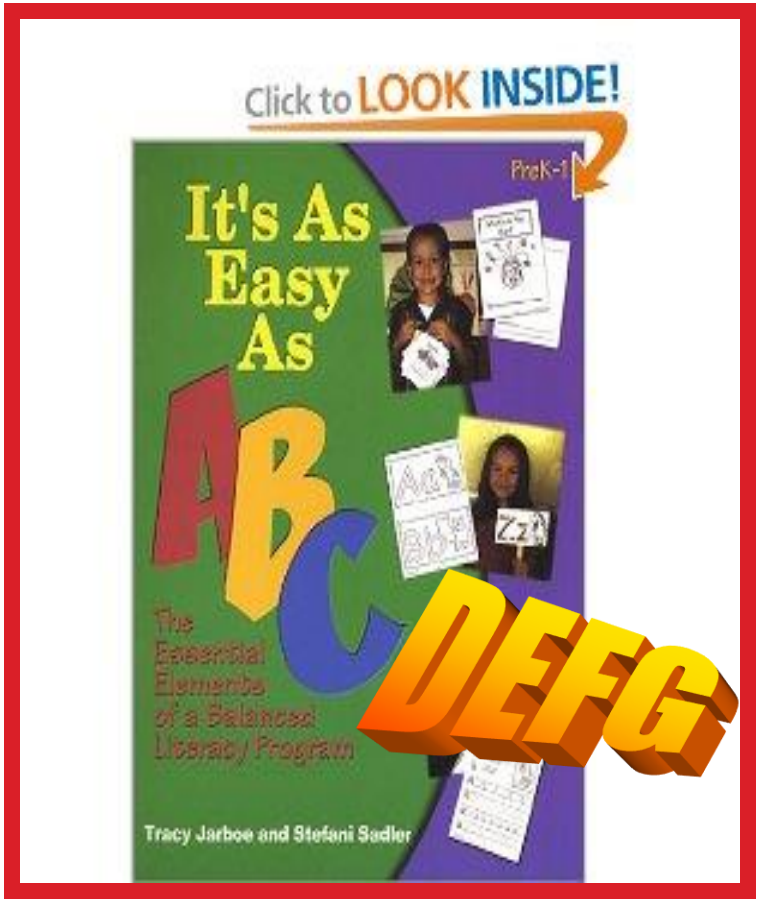
- Sleep/Hygiene
  - Keep regular bedtime
  - Reduce light / noise stimuli
  - Bedtime voiding

HH's Case

- How did we manage his Delirium?
- HH had not slept in 3 days
  - Low dose seroquel 12.5 mg is started qHS to promote sleep
- His UC grew Ecoli
  - He is now day #2/7 of Ceftriaxone for his UTI
- His pain is now controlled with some Tylenol ATC & low dose oxycodone
- He has been ambulating well with PT
- He never got that ATIVAN!!!!

Improving Delirium is As Easy AS:

Easy As ABCDEFG



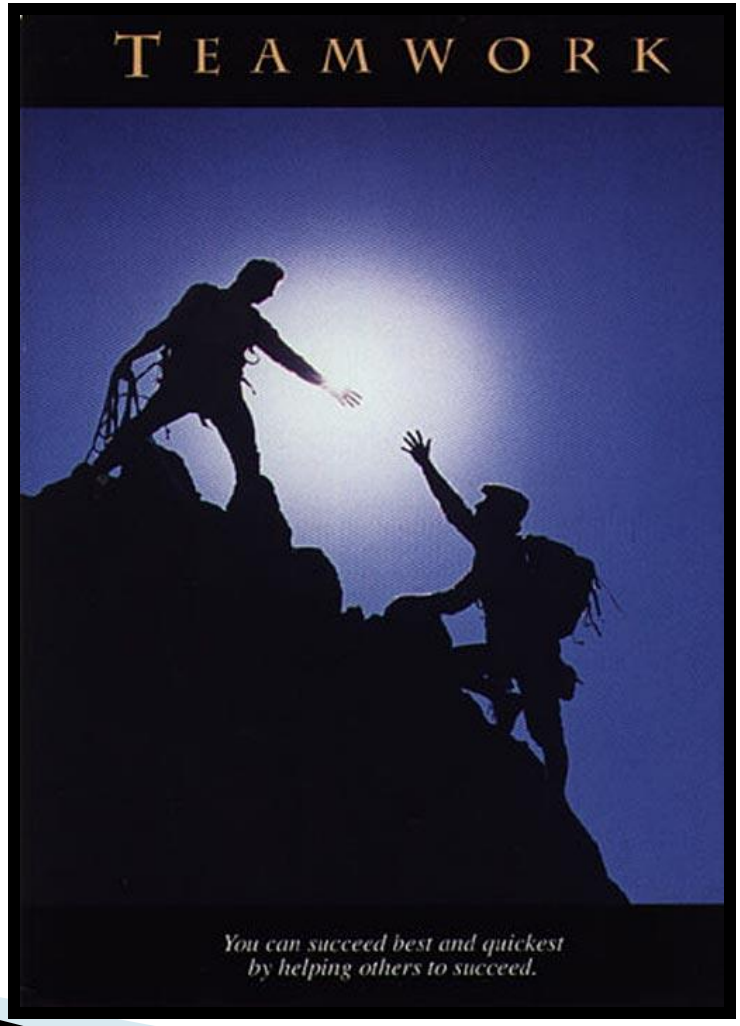
"F" –Feeding
"G" –Get your lines & Tubes Out

"It is no longer a matter how we keep them alive…"

"but rather *how well* we keep them alive."

WES ELY, MD, MPH

No one is alone in the effort to accomplish these goals….



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