Acute Brain Failure

Delirium

John Hunter ICU Junior Medical Teaching. 15 Feb 2012

Lynn Choo
ICU Pharmacist. John Hunter
“The physician who is greatly concerned to protect the functional integrity of the heart, (lungs) liver, and kidneys of his patient has not yet learned to have similar regard for the functional integrity of the brain”

Does it matter?
How do we know it’s delirium?
What do we do about it?
what do we think?

Australia & NZ (2005/06)
- 23 ICUs (out of 181)
- Only 2 ICUs routinely use a delirium screening tool

US (2006/07)
- 1384 responses (70% medical)
- More than 80% agree delirium under diagnosed, impairs extubation, increase LOS
- 59% screen but only 26% use validated tool

UK (2008)
- 670 intensivists (out of 1308)
- More than 80% agree delirium increase MV, LOS
- 64% agree increase mortality
- 17% agree delirium is a risk factor for dementia
- 25% routinely screen but only 14% use validated tool

LACK OF AWARENESS

ATTITUDE AND CULTURE
why the lack of enthusiasm?

- No high tech expensive delirium detector (yet) to give us a number: \( x = \text{delirium} \)
- No cool procedure or equipment to fix delirium

Some misconceptions....
- It’s an inevitable side effect of ICU stay
- It’s temporary, patients will snap out of it when they get better
- It’s not life-threatening unlike shock or ARDS or ARF

Now a hot topic... and getting hotter
prevalence

15% to 50% in non-ventilated critically ill pts
60% to over 80% in mechanically ventilated

Number depends on
• patient case mix
• screening tool used
• intensity of screening
• training of staff
• sedation practice

Pun B and Ely EW. Chest 2007; 132: 624 – 636
outcomes

- Increase length of mechanical ventilation
- Increase length of stay and $$
- Increase long-term cognitive impairment (dementia)
- Increase mortality

Ely et al. JAMA 2004; 291: 1753 – 1762

Salluh et al. Crit Care 2010; 14: R210
Shehabi et al. (SEDCOM group) Crit Care Med 2010; 38: 2311 – 2318
outcomes

Delirium as predictor of long term cognitive impairment 2010
- Prospective cohort, single US medical ICU, outcomes evaluated for 77 ventilated pts
- At 3 months: 79% cognitive impairment (62% severe)
- At 12 months: 71% cognitive impairment (36% severe)
- Increasing delirium duration = independent predictor of worse cognitive performance

Delirium and long term cognitive impairment: review 2009
- 9 heterogenous studies after 2003, 2025 pts
- Broadly confirm link between delirium and long term cognitive impairment
Delirium predictor of 6-month mortality 2004
- Prospective cohort, single US centre, 224 ventilated medical and coronary ICU pts, 2000-2001
- Prevalence 81.7%
- Delirium independently associated with 3 x increased risk of mortality [HR 3.2 (1.4 to 7.7) p 0.008]
DECCA (Delirium Epidemiology in Critical Care) 2010
Salluh et al. Crit Care 2010; 14: R210

- 1-day point prevalence, 104 ICUs, 11 countries, 232 pts evaluated.
- Prevalence 32.3%
- Delirium *independently associated with increased ICU mortality* [OR = 3.14 (1.26 to 7.86)] and hospital mortality [OR = 2.5 (1.1 to 5.7)]
Delirium duration and 1-year mortality 2009

- Prospective cohort, single US ICU, 304 pts over 60 yo, 2002 to 2004
- Median duration of delirium = 3 days
- **Number of days of delirium independently associated with increased 1-year mortality** [HR 1.1 (1.02 - 1.18)]
**outcomes**

**Delirium duration and 30-day mortality 2010**
Shehabi et al. (SEDCOM group) Crit Care Med 2010; 38: 2311 - 2318

- Prospective cohort analysis of SEDCOM, 68 ICUs in 5 countries, 354 ventilated medical & surgical pts
- Delirium 64.4%

Mortality with delirium 30.3% vs 11.9% (p < 0.001)

When compared to patients with no delirium:
1 day delirium HR 1.7 [1.27 – 2.29]
2 days delirium HR 2.69 [1.58 – 4.57]
≥3 days delirium HR 3.37 [1.92 – 7.23]

Does it matter?

Answer: It matters

- Up to over 80% ICU patients suffer delirium
- 3 times more likely to die
- 3 times higher re-intubation rate
- 29% more likely to remain in ICU, 41% in hospital
- 1 extra day in delirium = over 10 extra days in hospital
- 1 extra day in delirium = 10% higher risk of death
- 39% higher ICU $$, 31% higher hospital $$
- 5 times lower MMSE score at 1 year
Does it matter?

**How do we know it’s delirium?**

What do we do about it?
delirium hallmarks

Acute onset or fluctuating change in mental status (last 24 hours)
Inattention
Disorganised thinking ("confused")

Altered LOC
Cognitive deficits (disorientation, memory, language)
Perceptual disturbances (hallucinations)
Psychomotor disturbances (hyperactive, hypoactive, mixed)
Sleep-wake disturbances
Emotional disturbances (anxiety, paranoia, anger, euphoria)

American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders 4th Ed (DSM-IV-TR)
Inouye S. Current concepts: delirium in the older persons. NEJM 2006; 354: 1157 - 65
“agitation”

pain?
withdrawal?
ET tube?
frustrated?
fed-up?
positioning?
personality?
Hyperactive

- “agitated”, “aggressive”
- continual movement (fidgeting, pulling at clothes, lines, tubes, moving side to side)
- disorientated to person or place
- complex commands followed less than simple ones
- language unintelligible or inappropriate responses
- call out or shout
- pain exaggerated
- abnormal vital signs
- paranoid

Hypoactive

- “pleasantly confused”
- peaceful
- smile, nod, say ‘yes’ to all questions
- flat
- lethargic
- withdrawn
- quiet
- paranoid

Mixed

- fluctuate hyperactive + hypoactive

Borthwick et al. (UKCPA) 2006
### Subsyndromal delirium

<table>
<thead>
<tr>
<th>ICDSC</th>
<th>No Delirium [ND]</th>
<th>Subsyndromal Delirium [SD]</th>
<th>Clinical Delirium [CD]</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>n = 31.5%</td>
<td>n = 33.3%</td>
<td>n = 35.2%</td>
<td>Overall &lt; 0.0001</td>
</tr>
<tr>
<td></td>
<td>2.4%</td>
<td>10.6%</td>
<td>15.9%</td>
<td>ND vs. SD &lt; 0.002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ND vs. CD &lt; 0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD vs. CD 0.1378</td>
</tr>
<tr>
<td></td>
<td>ICU mortality</td>
<td></td>
<td></td>
<td>Overall &lt; 0.0001</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>5.2</td>
<td>10.8</td>
<td>ICU LOS (day)</td>
</tr>
<tr>
<td></td>
<td>31.7</td>
<td>40.9</td>
<td>36.4</td>
<td>Hospital LOS (day)</td>
</tr>
</tbody>
</table>

differentials

Dementia

- Take history of pre-admission function
- Prolonged onset over years
- No inattention – try their best to answer, maintain eye contact
- No fluctuating LOC, alert
- Usually coherent speech
- No delusions or hallucinations

Borthwick et al. (UKCPA) 2006
differentials

Depression

- Hypoactive delirium often misdiagnosed
- Intact cognition and memory
- Orientated
- Normal LOC

Borthwick et al. (UKCPA) 2006
Psychosis

- Hallucinations usually auditory (versus visual in delirium)
- Intact memory
- Normal LOC

Borthwick et al. (UKCPA) 2006
pathophysiology

Blood brain barrier disruption

Inflammation

Neurotransmitter imbalance

Dopamine excess
Acetylcholine depletion
GABA
Serotonin
Glutamate
Noradrenaline
Neuropeptides

risk factors

How vulnerable is your patient?

- 3 or more RF = 60% chance of delirium
- Critically ill patients may = 10 or more RF

Predisposing factors
- Determines vulnerability
- Usually present pre-admission
- May be difficult to alter

Precipitating factors
- External stimuli or insult that can trigger delirium
- Potentially modifiable

www.icudelirium.co.uk
predisposing factors

**Demographics**
- old age ≥ 65
- male

**Cognitive status**
- dementia
- cognitive impairment
- history of delirium
- depression

**Functional status**
- dependence
- immobility
- low level activity
- history of falls

**Sensory impairment**
- visual
- hearing

**Decreased PO**
- dehydration
- malnutrition

**Drugs**
- multiple psychoactive
- polypharmacy
- alcohol abuse
- smoke

**Chronic medical conditions**
- severe illness
- multiple co-morbidities
- CRF
- hepatic disease
- history of stroke
- neurologic disease
- metabolic derangements
- terminal illness
- HIV

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Inouye S. NEJM 2006; 354: 1157 – 65
Van Rompaey et al. Crit Care 2009; 13: R77
precipitating factors

**Drugs**
- sedatives
- opioids
- anticholinergics
- polypharmacy
- alcohol or drug withdrawal

**Primary neurologic**
- stroke, particularly nondominant hemispheric
- ICH
- meningitis or encephalitis

**Surgery**
- trauma
- fracture

**Prolonged sleep deprivation**

**Current illness**
- shock
- infection
- hypoxia
- pain
- fever or hypothermia
- metabolic derangements (electrolyte, glucose, acid-base)
- anaemia
- dehydration
- poor nutrition
- low serum albumin

**Environmental**
- ICU admission
- isolation
- no daylight
- no clock
- noise
- no visitors
- physical restraints
- bladder catheter
- multiple procedures
- emotional stress

Inouye S. NEJM 2006; 354: 1157 – 65  
Van Rompaey et al. Crit Care 2009; 13: R77
Why use a tool?

• Bedside-o-metre only detects 25% to 30%
• Formalised screening improves detection
• Routine screening recommended

ICU Delirium screening tools

- CTD – Cognitive Test for Delirium
- Abbreviated CTD
- DDS – Delirium Detection Score
- NEECHAM – Neelon and Champagne Confusion Scale
- CAM-ICU – Confusion Assessment Method
- ICDSC – Intensive Care Delirium Screening Checklist
Richmond Agitation Sedation Scale (RASS)

Step 1: Assess Level of Consciousness

<table>
<thead>
<tr>
<th>Scale</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>COMBATIVE</td>
<td>Combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>+3</td>
<td>VERY AGITATED</td>
<td>Pulls to remove tubes or catheters; aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>AGITATED</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>RESTLESS</td>
<td>Anxious, apprehensive, movements not aggressive</td>
</tr>
<tr>
<td>0</td>
<td>ALERT &amp; CALM</td>
<td>Spontaneously pays attention to caregiver</td>
</tr>
<tr>
<td>-1</td>
<td>DROWSY</td>
<td>Not fully alert, but has sustained awakening to voice (eye opening &amp; contact &gt;10 sec)</td>
</tr>
<tr>
<td>-2</td>
<td>LIGHT SEDATION</td>
<td>Briefly awakens to voice (eyes open &amp; contact &lt;10 sec)</td>
</tr>
<tr>
<td>-3</td>
<td>MODERATE SEDATION</td>
<td>Movement or eye opening to voice (no eye contact)</td>
</tr>
</tbody>
</table>

JHH Sedation Score

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>Unmanageable; Very restless and distressed; Restriction may be required</td>
</tr>
<tr>
<td>-1</td>
<td>Agitated; Agitated and restless when disturbed; Calms with verbal reassurance</td>
</tr>
<tr>
<td>0</td>
<td>Optimal; Calm and co-operative; Easily roused</td>
</tr>
<tr>
<td>+1</td>
<td>Sugish; Dulled response to stimulation</td>
</tr>
<tr>
<td>+2</td>
<td>Unresponsive; No response to painful stimuli</td>
</tr>
</tbody>
</table>

If RASS is ≥ -3 proceed to CAM-ICU (Is patient CAM-ICU positive or negative?)

If RASS is ≤ -4 or ≤ -5 STOP (patient unconscious), RECHECK later
CAM-ICU

Step 2: Assess Content of Consciousness

- **Feature 1:** Acute change or fluctuating course of mental status
- **Feature 2:** Inattention
- **Feature 3:** Altered level of consciousness
- **Feature 4:** Disorganized Thinking

References:

- Ely, et. al. CCM. 2001; 29:1370-1379.⁴
- Ely, et. al. JAMA. 2001; 286:2703-2710.⁵
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** → Inattention:

2. Inattention:
   - "Squeeze my hand when I say the letter 'A'."
     Read the following sequence of letters: S A V E A H 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** → > 2 Errors

3. Altered Level of Consciousness
   - Current RASS level

   **RASS = zero** → CAM-ICU positive DELIRIUM Present

   **RASS other than zero** → 3. Altered Level of Consciousness

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)
   "How 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** → CAM-ICU negative NO DELIRIUM

   **0 - 1 Error** → CAM-ICU negative NO DELIRIUM

Copyright © 2003, E. Weslacy Ely, MD, MPH and Vanderbilt University, all rights reserved
<table>
<thead>
<tr>
<th>8 point checklist. Score 1 point for item if present or 0 if not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score 0 = no delirium</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>1. Altered level of consciousness</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>2. Inattentive</td>
</tr>
<tr>
<td>3. Disorientation</td>
</tr>
<tr>
<td>4. Hallucination, delusion or psychosis</td>
</tr>
<tr>
<td>5. Psychomotor agitation or slowing</td>
</tr>
<tr>
<td>6. Inappropriate speech or mood</td>
</tr>
<tr>
<td>7. Sleep-wake cycle disturbance</td>
</tr>
<tr>
<td>8. Symptom fluctuation</td>
</tr>
</tbody>
</table>

How do we know it’s delirium?

Answer

- Acute onset/ fluctuating + Inattention + Disorganised Thinking
- Hypoactive, mixed more common than hyperactive
- Identify risk factors
- Routinely screen using validated tool

An agitated patient may not be delirious
A delirious patient may not be agitated
Does it matter?
How do we know it’s delirium?
What do we do about it?
prevention: non-pharmacological

SUPPORT & ORIENTATE

- Verbal
  - obtain patient’s preferred name
  - day, time, location reminders
  - staff, relatives identity reminders

- Visual
  - clock, calendar
  - familiar objects from home

- Consistency
  - named nurse

- TV or radio

- Family and friends

UNAMBIGUOUS ENVIRONMENT

- Create day-night cycle
  - room with a view
  - lights on during day
  - dimmed or off at night

- Control excess noise

- Room temperature

Borthwick et al. (UKCPA) 2006
**prevention: non-pharmacological**

### MAINTAIN COMPETENCE

- **Sensory**
  - glasses, hearing aid, dentures
  - need for interpreter?

- **Cognitive stimulation**
  - TV or radio, newspaper, books

- **Early mobility, activity**

- **Encourage participation in tx**
  - feedback on pain, physiotherapy

- **Sleep hygiene**
  - schedule medication and procedure during waking hours

### REMOVE POTENTIAL ORGANIC DRIVERS

- Pain
- Hypoxia
- Acidosis
- Haemodynamic instability
- Dehydration
- Constipation

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Borthwick et al. (UKCPA) 2006
Cease or minimise
- Drugs that can precipitate delirium
- Drugs that affect sleep

Targeted sedation and analgesia

Benzodiazepines
Opioids
TCAs
SSRIs
Corticosteroids
Sedation

Benzodiazepines vs Propofol or Alpha-2 agonists (e.g. dexmedetomidine)
- SEDCOM: dexmedetomidine vs midazolam Riker et al. JAMA 2009; 301: 489 – 499
- Await results PRODEX and MIDEX

Targeted sedation
- Routine scoring and review of targets

Sedation holds

Sedation guidelines
Analgesia

- Pre-emptive and multimodal
- Optimise non-opioids
- Optimise opioids: Pain $\rightarrow$ delirium! Opioids $\rightarrow$ delirium!
- Routine pain scoring and titrate
Principles

- Prevention = (common sense) – (drugs)
- Treat underlying cause
- Address modifiable risk factors
- Drugs if necessary
Atypicals vs haloperidol

Receptor binding profile

Common side effects

Safety advantages of atypicals

3 prospective randomised trials

Devlin et al. Harv Rev Psychiatry 2011
<table>
<thead>
<tr>
<th></th>
<th>Haloperidol</th>
<th>Quetiapine</th>
<th>Olanzapine</th>
<th>Risperidone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominant receptor</td>
<td>Dopamine $\alpha_2$</td>
<td>Histamine $\alpha_1$</td>
<td>Histamine Serotonin</td>
<td>Serotonin</td>
</tr>
<tr>
<td>Bioavailability</td>
<td>60%</td>
<td>73%</td>
<td>60%</td>
<td>70 – 85%</td>
</tr>
<tr>
<td>Half-life</td>
<td>14 hr</td>
<td>6 hr</td>
<td>33 hr</td>
<td>3 – 24 hr</td>
</tr>
<tr>
<td>Starting dose</td>
<td>1 – 2mg</td>
<td>25mg BD</td>
<td>5mg daily</td>
<td>0.5mg BD</td>
</tr>
<tr>
<td>Dosage form</td>
<td>Oral, IV, IM</td>
<td>Oral</td>
<td>Oral, IM</td>
<td>Oral</td>
</tr>
<tr>
<td>Sedation</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>EPSE</td>
<td>Moderate</td>
<td>Very Low</td>
<td>Low</td>
<td>Low to Moderate (&gt; 4mg/day)</td>
</tr>
<tr>
<td>↑ QTc</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>NMS</td>
<td>Low</td>
<td>Very Low</td>
<td>Low</td>
<td>Low to Moderate (&gt; 4mg/day)</td>
</tr>
</tbody>
</table>

Gareri et al. Clin Drug Invest 2003; 23. online via medscape.com
AMH 2011; Drugdex®
treatment at JHH ICU

- Quetiapine first line

- Haloperidol if IV option needed

- Olanzapine if more sedation needed
  - Sublingual wafers: NOT absorbed sublingually. Formulated for small bowel absorption. Wafers to help pts with difficulty swallowing tablets. If intubated: Rx via NGT not S/L

Review daily
Weaning plan clearly charted BEFORE ICU discharge
Modifying the Incidence of Delirium Trial (MIND)

- Prospective, randomised, double-blind, placebo controlled, multicenter (US)
- Objective: to demonstrate feasibility and test primary outcome
  - 101 ventilated, medical & surgical; 49% delirium at entry
  - Haloperidol vs ziprasidone vs placebo (PO/NG) + open label rescue, max. 14 days

**NO DIFFERENCE**
- **Primary outcome**: Delirium-free or coma-free survival
- Ventilator-free days, LOS, 21-day mortality
- Adverse events: akathisia, EPSE

**Limitations**
- Small sample size underpowered to detect LOS, mortality
- Sedation protocol not standardised
- Open label rescue sedation not standardised

Prospective, randomised, double-blind, placebo controlled, multicenter (US, Can)
Objective: compare efficacy and safety
36 surgical and medical ICU; 72 – 89% ventilated; all delirium at entry
Quetiapine vs placebo + PRN IV haloperidol, max. 10 days

Quetiapine better
Primary outcome: Time to first resolution of delirium
Shorter delirium duration; Less agitation; More likely D/C
Less PRN haloperidol
No difference
Mortality; ICU LOS
Adverse effects: QTc prolongation, EPSE, somnolence (more observed with quetiapine)

Limitations
- Small sample size: adequate to detect difference in primary outcome only
- Low external validity: only 14% screened were enrolled
- ?First resolution = too early to stop treatment

why improved patient outcomes in Quetiapine Trial but not MIND?

- Presence of delirium at study entry (Q: all delirium)
- Inclusion of patients with active alcohol withdrawal (Q: excluded)
- Duration of ICU stay at study entry (Q: 5-7d  M: < 60 hrs)
- Maximum duration of treatment (Q:10d  M: 14d)
- Treatment and weaning protocol
olanzapine vs haloperidol

Prospective, randomised (even/odd days assignment), single US center
Objective: compare safety and estimate response profile
73 medical & surgical ICU; all delirium at entry
Olanzapine vs haloperidol (PO/NG) + PRN IV haloperidol +/- bzds

NO DIFFERENCE
Primary outcome: Severity of delirium
Rescue sedation
Adverse events: EPSE (Haloperidol = 6pt but rated very low vs. olanzapine = 0; [NS])

Limitations
• Odd/even randomisation
• Sample size

Randomised, open-label, parallel group pilot, single Australian center
Objective: compare efficacy in facilitating extubation
20 ventilated solely because of agitated delirium, surgical & medical
Dexmedetomidine 0.2 to 0.7 microg/kg/hr vs haloperidol 0.5 to 2mg/hr, +/- loading. Add to usual care (BZD, propofol)

**Dexmedetomidine better**
- Primary outcome: Faster time to extubation
- ICU LOS, Less propofol

**No difference**
- Adverse effects: QTc prolongation (NS trend for haloperidol), hypotension
- Re-intubation = 0 for both

**Limitations - many**

Reade et al. Crit Care 2009; 13: R75
rivastigmine as adjunct to haloperidol

- Prospective, randomised, double-blind, placebo control, multicenter (Dutch)
- Objective: establish effect of cholinesterase inhibitor on delirium duration
- 440 pts planned, delirium at entry
- Rivastigmine or placebo + standard care haloperidol

Rivastigmine longer delirium duration and may increase mortality
Trial terminated at 104 pts

DahLIA: Dexmedetomidine to Lessen ICU Agitation
Austin Hospital, VIC

To determine the effectiveness and safety of dexmedetomidine vs placebo, when added to standard care, for the treatment of ICU-associated delirium and agitation in patients currently undergoing sedation and mechanical ventilation solely because in the opinion of their treating intensivist their agitation is so severe as to make lessening their sedation unsafe.

SPICE: Sedation Practice in Intensive Care in Australia and NZ
ANZIC-RC, Monash Uni

Prospective, inception cohort observational study of 300 patients that aims to generate information regarding baseline practice with respect to the management of sedation, analgesia, agitation and delirium so as to guide the design of subsequent randomised controlled trials
What do we do about it?

Answer

- Prevention = (common sense) – (drugs)
  - optimise non-pharmacological, sedation & analgesia; remove drug cause

- Treat underlying cause, address risk factors

- Drug choice
  - Pharmacology, PK profile, formulation, pt tolerability & absorption
  - Weaning plan CHARTED BEFORE ICU DISCHARGE

- More rigorous trials needed
www.icudelirium.org

“hidden slides” on www.philippelefevre.com
(make sure you type in the right number of ‘l’s and ‘p’s)
Delirium with Dr Wes Ely

1. Organ dysfunction
2. 80% doesn’t mean OK
3. Drugs not B9
4. Not normal for brain
5. Monitor arousal + content
6. Document every 4 hours
7. Rounds
   - Sedation targets
   - Sedation actual
   - CAM-ICU positive or negative
   - Drugs
8. Seconds
9. Glass half full
10. Patient example of CAM-ICU: easy to do
Does it matter?

Answer: It matters

- Up to over 80% ICU patients suffer delirium
- 3 times more likely to die
- 3 times higher re-intubation rate
- 29% more likely to remain in ICU, 41% in hospital
- 1 extra day in delirium = over 10 extra days in hospital
- 1 extra day in delirium = 10% higher risk of death
- 39% higher ICU $$, 31% higher hospital $$
- 5 times lower MMSE score at 1 year
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*A delirious patient may not be agitated*
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- **Treat underlying cause, address risk factors**

- **Drug choice**
  - Pharmacology, PK profile, formulation, pt tolerability & absorption
  - Weaning plan CHARTED BEFORE ICU DISCHARGE

- **More rigorous trials needed**


Drugdex® database 2011


