SARI CLINICAL CARE TRAINING

INVASIVE MECHANICAL VENTILATION FOR ACUTE RESPIRATORY DISTRESS SYNDROME MANAGE PAIN, AGITATION AND DELIRIUM

World Health Organization

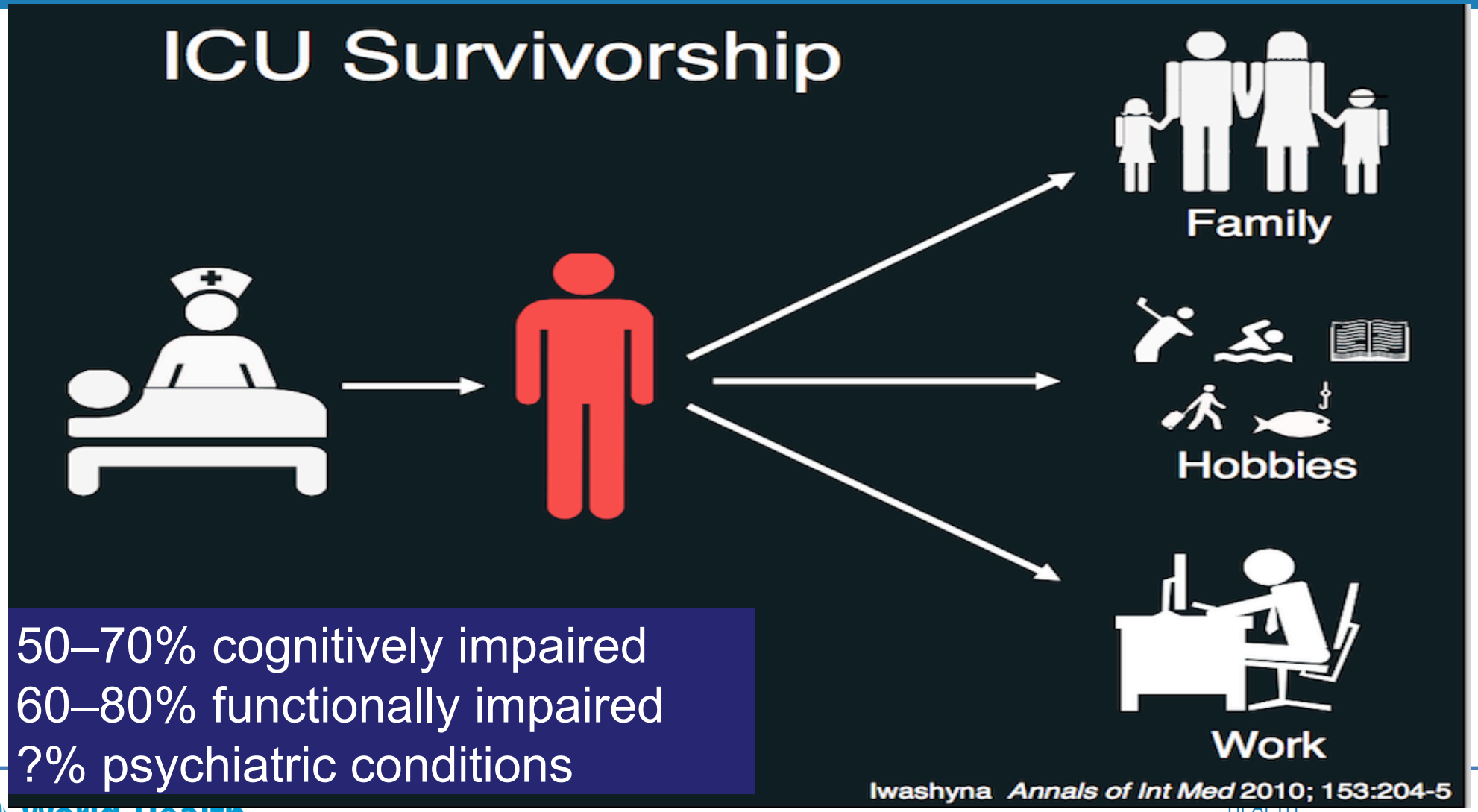
HEALTH EMERGENCIES programme

Learning objectives

At the end of this lecture, you will be able to:

- Describe the long-term complications associated with use of sedatives in critically ill patients (firstly do no harm).
- Describe the long-term benefits associated with using a protocolized management approach to pain, agitation and delirium (PAD).
- Formulate a PAD protocol adapted to your hospital setting.

ICU survivors: long term complications



50–70% cognitively impaired
60–80% functionally impaired
?% psychiatric conditions

The history of sedation

- Historically patients were deeply sedated because:
  - early generation ventilators were insensitive to patient ventilatory effort, leading to patient discomfort and asynchrony
  - belief that amnesia was desirable.

- Light/no sedation is the current standard of care for most patients:
  - modern ventilators have sensitive trigger and patients are more synchronous
  - amnesia may actually contribute to risk of PTSD
  - deep sedation may cause respiratory, CVS, neurological, psychological and immunological complications and contribute to risk of death.

Patient COMFORT should be the goal, and includes adequate pain control, anxiolysis and prevention and treatment of delirium.

Achieving the appropriate balance of analgesia, and sedation is challenging.

Implementation of PAD guidelines improves patient outcomes

- **Short-term outcomes:**
  - fewer days of delirium
  - fewer days of IMV (quicker time to extubation)
  - fewer days in the ICU
  - lower hospital costs
  - more mobilization during ICU stay
  - increased survival.
- **Long-term outcomes:**
  - better cognitive function
  - better physical mobility
  - fewer psychiatric conditions (e.g. PTSD, depression, anxiety)
  - increased survival.

Develop a PAD protocol that is adapted to your hospital.

Formulate a PAD protocol

Step 1: Assess and recognize pain, agitation and delirium using standardized scales

Step 2: Manage pain first: prevent and treat

Step 3: Manage anxiety: choose targeted sedation

Step 4: Manage delirium: prevent and treat

Step 5: Recognize special situations that may need deep sedation and neuromuscular blockade (i.e. severe ARDS)

Step 6: Monitor-record-interpret-respond

Step 7: Deliver quality care: implement as part of ABCDEF bundle.

Step 1

Recognize pain, agitation and delirium

- Routinely evaluate mechanically ventilated patients for pain, agitation and delirium:
  - i.e. once or twice a nursing shift, and as needed.
- Use standardized tools to minimize variation between various caregivers.
- Agitation is a non-specific symptom of pain, anxiety or delirium:
  - find and treat the root cause.

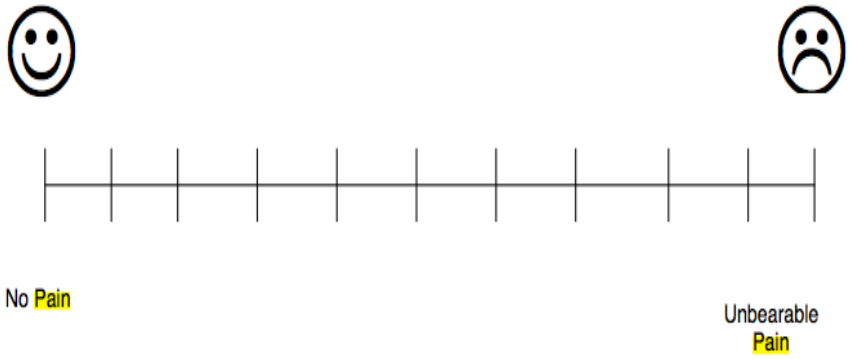
Why do ICU patients experience pain?

Pain	Patients can experience pain for may reasons: • due to critical illness itself: i.e. pleurisy, injury or surgical sites • due to secondary processes: i.e. endotracheal tube intolerance, joint stiffness, wound care, pressure areas or immobility. **Non-specific signs of pain include diaphoresis, hypertension and tachycardia. These signs are less reliable.**

Step 1a. Recognize pain

- In patients who can self-report, use a 10-point pain scale:
  - reliable and accurate (gold standard):
    - Visual Analog Scale (VAS)
    - Wong Baker Faces
- In patients that are noncommunicative or sedated, use a behavioural pain scale:
  - score based on facial expression, limb movement, muscle tension and ventilator compliance:
    - Behavioural Pain Scale (BPS) and Critical-Care Pain Observation Tool (CPOT)
    - Comfort-B scale.

Pain scales



Behavioral Pain Scale (BPS)

Item	Description	Score
Facial expression	Relaxed	1
	Partially tightened (e.g., brow lowering)	2
	Fully tightened (e.g., eyelid closing)	3
	Grimacing	4
Upper limb movements	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Compliance with mechanical ventilation	Tolerating movement	1
	Coughing but tolerating ventilation for the most of time	2
	Fighting ventilator	3
	Unable to control ventilation	4

BPS score ranges from 3 (no pain) to 12 (maximum pain).

The lower the score, the higher quality of analgesia.

Why do ICU patients experience anxiety?

Anxiety	Patients may feel an exaggerated sense of fear, nervousness or apprehension and can present with agitation or increased motor activity. Patient may also manifest with hypo-activity and be withdrawn, distrustful or have blunted affect. Due to the primary illness (i.e. sepsis) or from the care itself (i.e. medication related).

Step 1b. Recognize anxiety

- In adults and children, the Richmond Agitation-Sedation Scale (RASS) is easy to use (next slide):
  - scoring based on observing patient's response to verbal or painful stimuli:
    - body movement, eye opening, duration of eye contact.

- In children, the Comfort-B scale is commonly used:
  - scoring based on observing patient behaviours:
    - crying, facial tone, muscle tone, movement, alertness, ventilator compliance.

RASS scale (takes only 20 seconds)

Score	Term	Description	
+4	**Combative**	Overtly combative, violent, immediate danger to staff	
+3	**Very agitated**	Pulls or removes tube(s) or catheter(s); aggressive	
+2	**Agitated**	Frequent non-purposeful movement, fights ventilator	
+1	**Restless**	Anxious but movements not aggressive vigorous	
0	**Alert and calm**		
-1	**Drowsy**	Not fully alert, but has sustained awakening(eye-opening/eye contact) to voice (>10 seconds)	Verbal stimulation
-2	**Light sedation**	Briefly awakens with eye contact to voice (<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	Physical stimulation
-5	**Unarousable**	No response to voice or physical stimulation	

Why do ICU patients experience delirium?

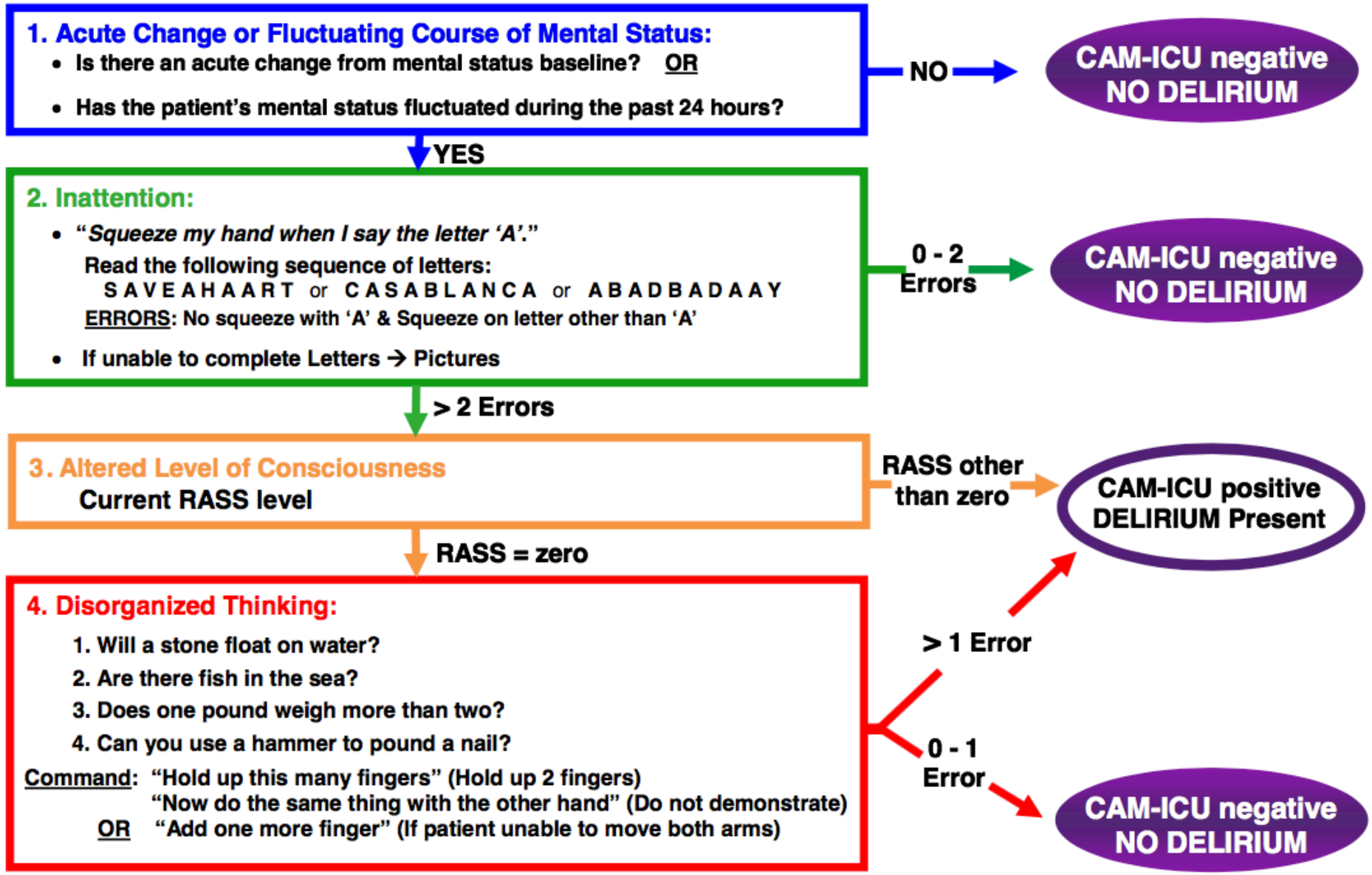
Delirium	**Patients present with fluctuation in consciousness associated with inattention and disorganized thinking or perceptual disturbance that develops over short period of time.** **Three types: hypoactive, hyperactive and mixed. Hyperactive is least common but easiest to diagnose.** **Due to a secondary condition (i.e. pain, primary intracranial process, hypoxaemia, shock, infection, electrolyte abnormalities, metabolic disturbances, medications). Benzodiazepines are a common culprit or drug withdrawal.** **Delirium is an independent predictor of death.**

Step 1c. Recognize delirium



- The Confusion Assessment Method (CAM-ICU) is well validated tool to assess for delirium in adults (CAM-ICU) and children older than 4 years (pCAM-ICU).
  - Based on presence of:
    - mental status fluctuation
    - inattention
    - level of consciousness
    - disorganized thinking.

Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet



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Step 2

Manage pain first (1/2)

- Use of analgesia-based approach may be adequate for most critically ill patients and minimize the need for additional sedatives:
  - give pre-emptive analgesia to alleviate pain prior to invasive or potentially painful procedures.

- Use opioids to treat non-neuropathic pain:
  - common agents:
    - fentanyl, morphine, hydromorphone.
  - dosing:
    - start with intermittent dosing
    - consider continuous infusions based on intermittent dose requirements or if patient is known to have chronic pain
    - avoid oversedation.

Manage pain first (2/2)

- Optimize simple non-opiate analgesics to minimize opioid use and their secondary harmful effects:
  - acetaminophen (paracetomol)
  - nonsteroidal anti-inflammatory drugs (e.g. ibuprofen) in selected patients, but **not** routinely in children < 1 month old
  - oral sucrose for procedural analgesia in neonates.

- For patients with neuropathic pain, also consider neuropathic agents:
  - i.e. gabapentin, carbamezapine, amitryptiline.

- For localized pain, consider regional anesthesia or topical local anesthetics.

Step 3

Manage anxiety (1/4)

- Set daily sedation targets:
  - based on the patient's clinical condition, management plans
  - agreed upon by the health care team.

- For most patients, target **light** sedation so the patient is awake (0), calm (-1):
  - unless this is clinically contraindicated.

- Give a sedative based to reach target sedation score:
  - always use the lowest dose necessary to reach target and reduce secondary harmful effects.

Manage anxiety (2/4)

- Choose a short-acting sedative when possible:
  - continuous infusion of very short-acting agents:
    - propofol in adults but not in children < 16 years of age
    - dexmedetomidine (if available)
  - Enteral sedatives are commonly used in children:
    - chloral hydrate
    - triclofos
  - Intermittent dosing of short-acting benzodiazepine (i.e. midazolam)
- Alternative options:
  - ketamine (where available)
  - clonidine (if dexmedetomidine not available).

Avoid continuous infusion of benzodiazepines because associated with prolonged days on IMV and increase in delirium.

Manage anxiety (3/4)

- Cautiously use continuous infusions of benzodiazepines in patients unable to receive short-acting agents.
- Preferably, use low-dose infusions and titrate down to lowest dose needed to achieve target RASS.
- If patient is oversedated from continuous infusions, then screen daily for sedation awakening trial (SAT).
- It is **safe** to stop narcotics (as long as pain is controlled) and continuous sedatives in most critically ill patients, except those with:
  - active seizures, alcohol withdrawal, severe agitation, ongoing myocardial ischaemia, elevated intracranial pressure or those receiving NMB.

Manage anxiety (4/4)

- If SAT conducted:
  - monitor patient closely for agitation, haemodynamic instability or respiratory distress
  - if these occur, then restart infusion at ½ previous dose.

- Some experts suggest a "no sedation" policy except for morphine 2.5–5mg boli as needed:
  - may be associated with shorter duration of ventilation, shorter ICU and hospital stay, less delirium
  - no increased in self extubation or other complications
  - critically dependent on nurse : patient ratio.

Coordinate the SAT with spontaneous breathing trial (SBT). When bundled together, patients spend fewer days on IMV and are more likely to survive at 1 year.

Step 4

Manage delirium (1/4)

- Treat the contributing medical conditions.
- Stop delirium producing drugs (i.e. benzodiazepines).
- Provide adequate pain control.

Delirium is an independent risk factor for mortality in the ICU and cognitive impairment in survivors.
Early recognition and treatment are appropriate.
However, clinical trial data regarding most effective treatments are lacking.

Manage delirium (2/4)

- Use non-pharmacologic interventions:
  - sleep hygiene:
    - protect patient sleep cycles by controlling light, reducing noise and stimuli at night, eye shades, ear plugs
    - cluster patient activities.
  - Orientation:
    - re-orient patient to surroundings, provide reassurance and encourage family visits, have familiar objects in room
    - provide visual aids, hearing aids, TV during the daytime, music.
  - Early mobilization and exercise.
  - Remove tubes and restrains as soon as possible.

Step 5

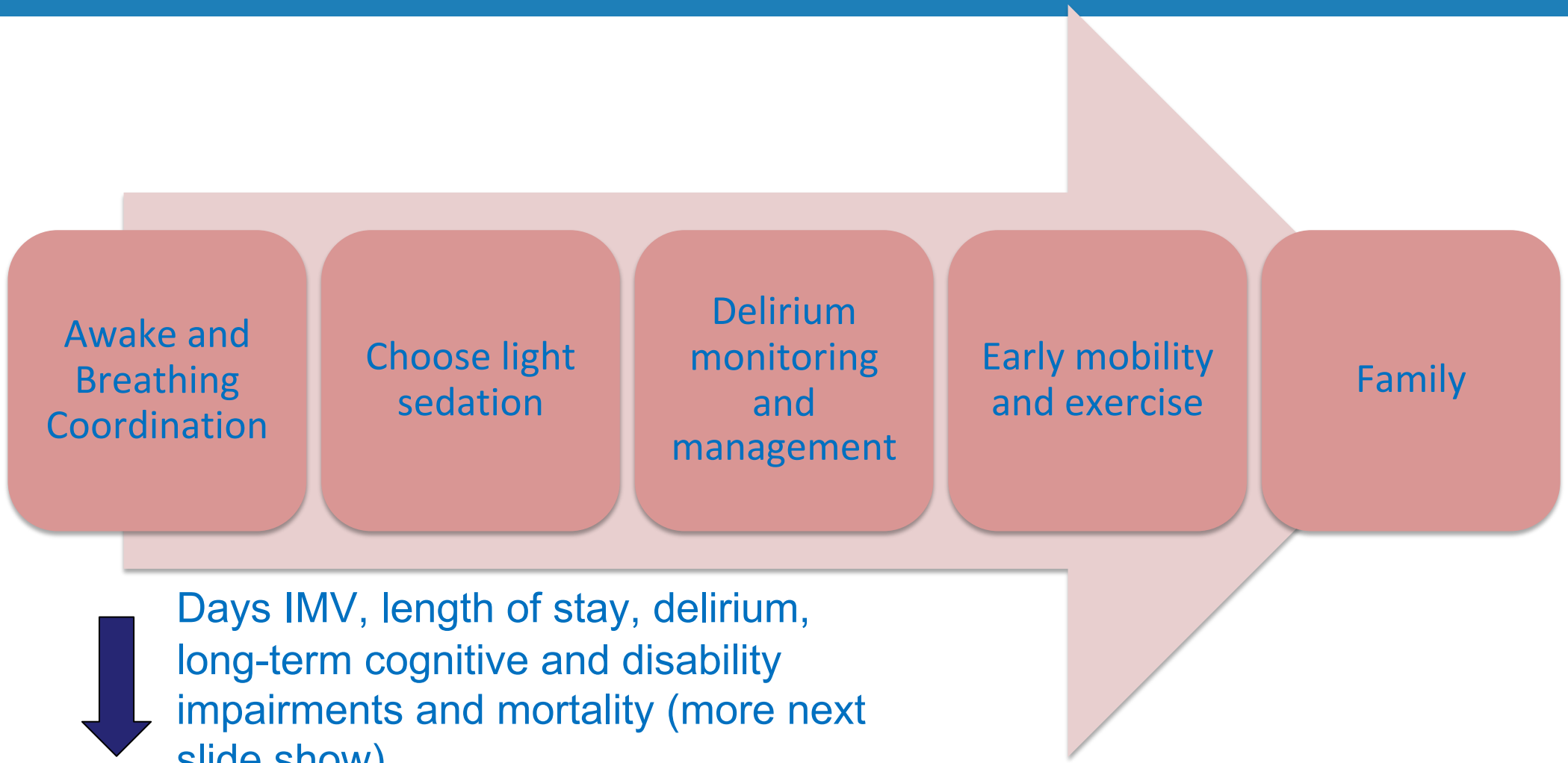
Special considerations for patients with severe ARDS

- In patients with early, severe ARDS, target deep sedation (RASS -4, -3) to optimize LPV strategy:
  - patients with severe ARDS may easily deteriorate with little movement or minor ventilator asynchrony
  - not good candidates for sedation interruption.

- Addition of early NMB for the short term (up to 48 hours):
  - associated with reduced mortality and more organ-failure free days
  - **and** not with prolonged weakness.

- NMB must be used in conjunction with continuous sedatives that provide amnesia and analgesics for pain:
  - NMB **does not** provide sedation, amnesia or analgesia.

PAD as part of the ABCDEF bundle



Useful websites

To access the PAD guidelines and additional training materials and videos, including information about the ABCDE bundles, please visit: www.icudelirium.org

Summary

- Implement a protocolized management approach to pain, agitation and delirium (PAD) to improve patient outcomes.
- Regularly assess patients using standardized, reproducible scales (i.e. VAS, RASS, CAM-ICU).
- First, treat pain (with opioids and non-opioids) to minimize the harmful effects of sedatives.
- Then treat anxiety using non-benzodiazepines sedatives (when possible) and target **light** sedation in most patients.
- Use non-pharmacologic interventions to prevent delirium.

Acknowledgements

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