Cost of delirium

- Estimated to be between $38 and 152 billion
- Doubling of odds ratio for death
- Increased length of mechanical ventilation
- Increased total length of ICU and hospital stay

ENCEPHALOPATHY

- ALTERED MENTAL STATUS
- Organic brain syndrome
- CONFUSION
- DELERIUM
- AMNESTIC SYNDROMES
- NEURODEGENERATIVE CONDITIONS
Acute confusional state vs. delirium

<table>
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<tr>
<th>ACUTE CONFUSIONAL STATE</th>
<th>DELIRIUM</th>
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<td>REDUCTION IN ALERTNESS</td>
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<td>HALLUCINATIONS</td>
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ACUTE CONFUSIONAL STATE

- Develop acutely
- Multiple causes
- Remit within days to weeks
- No residual damage

DIFFERENTIAL DIAGNOSIS

- BRAIN AS THE CAUSE/CULPRIT
- CT/MRI BRAIN (VASCULAR, SPACE OCCUPYING, INFECTIOUS, DEGENERATIVE)
- ELECTROENCEPHALOGRAM (EEG)
- LUMBAR PUNCTURE
DIFFERENTIAL DIAGNOSIS

- BRAIN AS THE VICTIM (SECONDARY ENCEPHALOPATHY)
- DRUGS (INTOXICATION OR WITHDRAWAL)
- ENVIRONMENT (HEAVY METALS, PESTICIDES, OTHER TOXINS)
- LOW O2/HIGH CO2/high temperature (hypoxia/anoxia, hypercapnia)
- Infection (encephalitis, abscess)
- Retention (urine, feces)
- Ictal states (nse, post-ictal)
- Undernutrition (thiamine, zn def, cu excess, electrolyte abnormalities)
- Metabolic/malignancy/migraine/malingering
- Stroke (other vascular)

Risk factors

- Age >80
- Underlying brain injury/disease
- Severity of illness (ICU)
- Dehydration
- Fever
- Infection
- Polypharmacy (benzos, opiates, psychotropic drugs, antibiotics, w/d)
- Pain
- Malnutrition
- "pre-existing dementia
- Post-surgical
- Urinary retention/fecal impaction

Diagnostic testing

I. Afebrile, no meningeous, no focal neurological signs
   A. Endogenous metabolic disorders: glucose, sodium, calcium, BUN, PAO2, PCO2, Na+, TSH, special tests (porphyria, autoimmune assays)
   B. Exogenous toxic states: urine +/- blood toxicology screen
II. Fever or signs of meningial irritation
   A. Systemic infection: CBC, chest XRAY, U/A and culture, blood cultures, ESR
   B. Meningitis/encephalitis: LP
III. Focal neurological signs or seizures
   A. CT or MRI
   B. EEG
Psychiatric emergencies

- Agitated (hyperactive) delirium: antipsychotic, possibly dexmedetomidine
- Neuroleptic malignant syndrome: d/c dopamine blockers, benzos, dantrolene, dopamine agonists. **Restart dopamine agonists if d/t stopping PD meds**
- Serotonin syndrome: d/c serotonergic agents, benzos, serotonin 2A antagonist
- Psychiatric drug overdose: d/c drug, judgment on whether to restart agent

Caramboxin

- Nausea, vomiting
- Hiccups
- Severe encephalopathy, agitation, seizures
- Chronic kidney disease patients are susceptible
- ½ fruit or <8 oz. juice
- Treated with hemodialysis and supportive care
Cefepime/ceftazidine neurotoxicity

- Confusion, twitching, somnolence, myoclonus, seizures
- Mechanism not well understood (competitive inhibition of GABA binding due to drug accumulation in the CNS, decrease in GABA levels or increase in excitatory nts)
- Risk factors: impaired kidney function, excessive dosing, meningitis, extreme ages
- Management: stopping drug, benzos/barb
• Posterior reversible encephalopathy syndrome
• Encephalopathy (50-80%)
• Seizure (60-75%)
• Headache (50%)
• Visual disturbance (33%)
• Focal neurological deficit (10-15%)
• Status epilepticus (5-15%)

• Risk factors: renal failure, blood pressure fluctuations, cytotoxic drugs (tacrolimus, cyclosporine), autoimmune disorders (sle, ttp, uc/crohn’s, ra, sjogren’s, scleroderma…), eclampsia/pre-eclampsia
• Radiographic findings do not correlate with severity of clinical presentation
• Vasogenic edema predominantly involving bilateral parieto-occipital regions and d/t endothelial injury related to abrupt bp changes or direct effects of cytokines on the endothelium
• Treatment: treat precipitating cause, no rct’s assessing therapeutic interventions have been undertaken, bp management (25% reduction within first few hours and avoid major fluctuations)
• Stop offending medication, at least temporarily
• Favorable prognosis*

Acute confusional states are not inevitable

• Prevention (modify environment to promote normal sleep/wake cycles, reduction of noise/nighttime interruptions, avoiding room changes, gentle handling, early mobility, patient-tailored analgesia)
• Screen (be aware of risk factors)
• Talk about it in rounds and search for reversible causes
• Consult neurology ☺
references

- Delirium: a review of its use for management of pain, agitation, delirium in the ICU. Anger, S. E. current pharmaceutical design 19 (22): 4052-4073. (2013)