INPATIENT DELIRIUM IN OLDER ADULTS

- Abhinav Rajpal MD, MPH

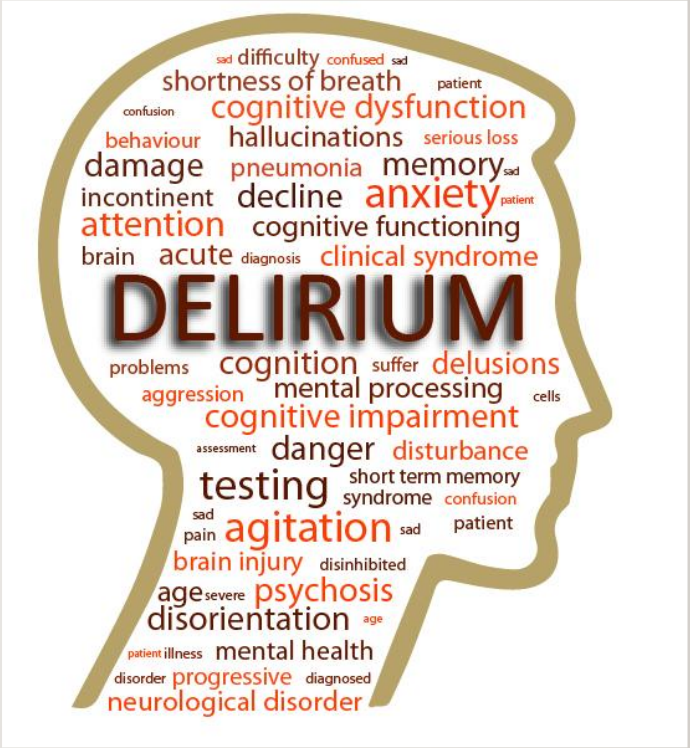
NO RELEVANT DISCLOSURES

OBJECTIVES

1. Define delirium and its different sub-types
2. Understand the causes of delirium
3. Identify non-pharmacological interventions to treat delirium in older adults
4. Learn appropriate pharmacological interventions for delirium in older adults

DELIRIUM … A.K.A.

- Encephalopathy
- Acute confusional state
- Altered mental status
- Acute organic brain failure



DELIRIUM STATS

- 11-25% of older adults have delirium present on admission
- An additional 30% will develop delirium during admission
- Risk of post-op delirium varies by surgery (highest with abdominal and cardiac surgeries ~50%)
- ICU delirium prevalence data ranges from 20% to 80+%

Vasievskis EE et al. *Best practice & research. Clinical anaesthesiology (2012)*

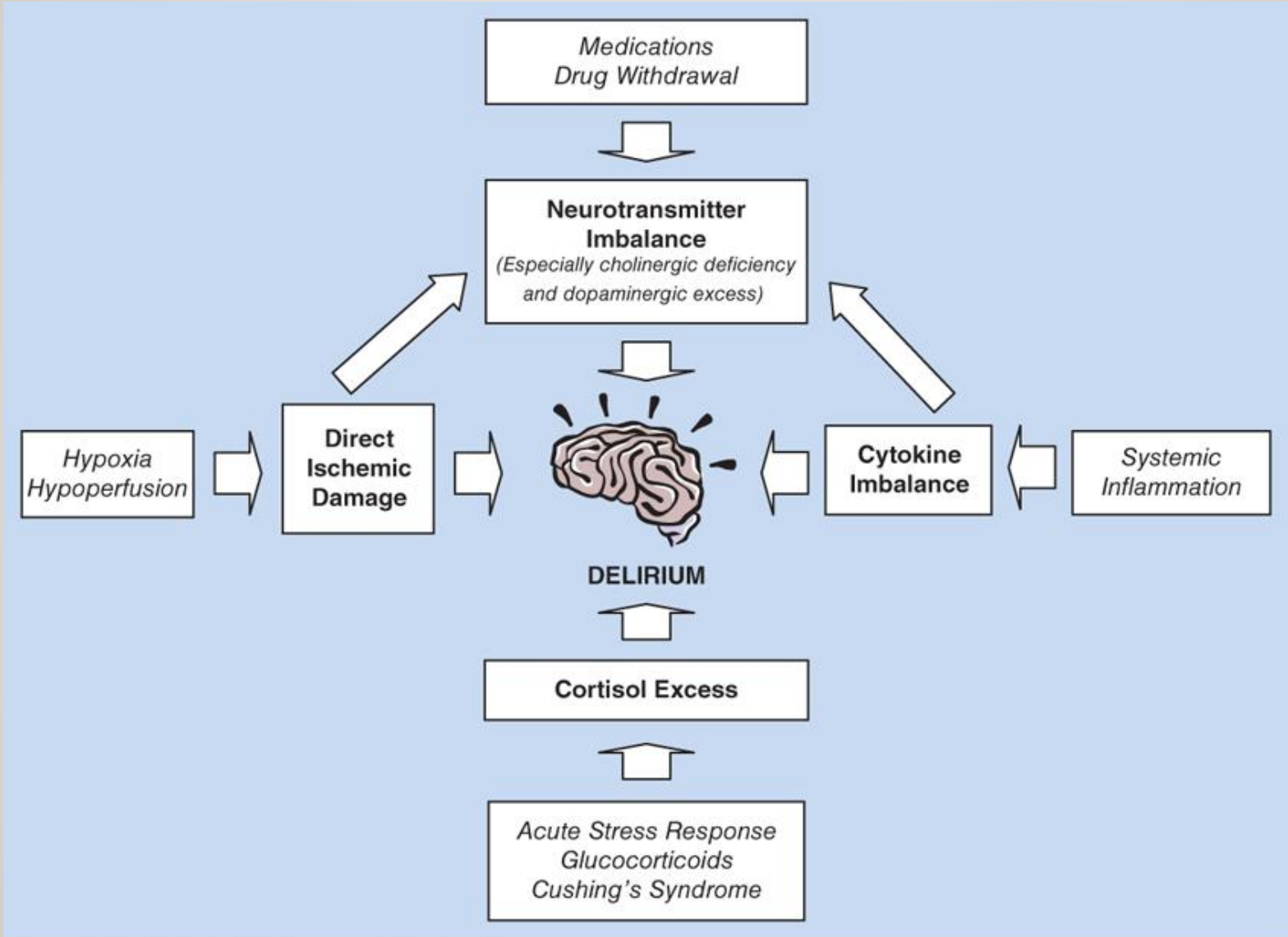
WHY DO WE CARE?

- Often not resolved by time of discharge
- Increased morbidity & mortality both inpatient and after discharge
- Worsening functional & cognitive decline
- Increased rates of dementia
- Increased length of stay
- Increased rates of readmissions
- Increased rates of use of extended care facilities
- Increased caregiver stress
- Increase costs
  - $32.9 billion per year in Medicare post-op delirium for elective surgeries alone (Gou et al 2023)

PATHOPHYSIOLOGY

- Not fully understood
- Many hypotheses exist including:
  - Neurotransmitter abnormalities
    - Acetylcholine deficiency and dopamine excess
  - Inflammatory response with increased cytokines
    - Changes in the blood-brain barrier permeability
  - Widespread reduction of cerebral oxidative metabolism
  - Increased activity of the hypothalamic-pituitary adrenal axis

PATHOPHYSIOLOGY



ETIOLOGY

- Interactions between individual's predisposing risk factors "vulnerability," and precipitating factors.
- Vulnerable older adult may easily develop delirium with a minor event such as a UTI in addition to their other comorbidities.
- Person with few or no risk factors require multiple precipitating events before cognitive reserves are overwhelmed and delirium develops.

RISK FACTORS

- Old age
- Frailty
- Dementia / decreased neurocognitive reserve.
- Multiple co-morbidities
- Dehydration
- Polypharmacy
- Alcohol excess / abuse
- Renal impairment
- Malnutrition
- Visual impairment
- Decreased hearing – pocket talkers

PRECIPITANTS FOR DELIRIUM

- Infection (PNA and UTI)
- Constipation
- Electrolyte disturbance
- Medications
- Organ failure
- Hypoxia
- Decreased PO intake
- Alcohol withdrawal
- Uncontrolled pain
- Neurological insults
- Sleep
- Malnutrition
- Surgery
- Catheters

COMMON CAUSES

Drugs	Medical Conditions	Neurological Conditions	Others
Alcohol intoxication Alcohol withdrawal Opioids Drugs with anticholinergic properties Sedatives Benzodiazepines Digoxin Diuretics Steroids	Febrile illness Septicemia Organ failure Hypo/hyperglycemia Postoperative hypoxia Thiamine deficiency	Seizures Head injury Space occupying lesion CVA Encephalitis Cerebral hemorrhage	Constipation Dehydration Pain Sensory deprivation

DELIRIUM DIFFERENTIAL DIAGNOSIS

- **D**rugs, **D**ehydration
- **E**lectrolyte imbalance, change in **E**nvironment
- **L**ack of drugs (withdrawal, uncontrolled pain)
- **I**nfection, **I**nfarction (cerebral, or myocardial)
- **R**educed sensory input (reduced vision, hearing), **R**educed movement
- **I**ntoxication.
- **U**rinary retention/constipation
- **M**etabolic (Glucose, thyroid, etc.)

DIAGNOSIS: DSM V

Disturbance in attention or cognition

Acute onset

Change from baseline

Fluctuating severity

Not fully explainable by chronic psychiatric disorder

Level of impairment does not occur in the context of coma

TOOLS FOR IDENTIFYING DELIRIUM IN PATIENTS ABOVE 65 YEARS

Confusion Assessment Method (CAM) – This is for bedside in Non-ICU patients.

- Sensitivity >94%
- Specificity >90%
- **Looks at 4 things:**

1. Acute onset and fluctuating course
2. Inattention
3. Disorganized thinking
4. Altered Level of consciousness

4 AT score – identifying dementia vs. delirium

- Sensitivity – 88%
- Specificity – 88%

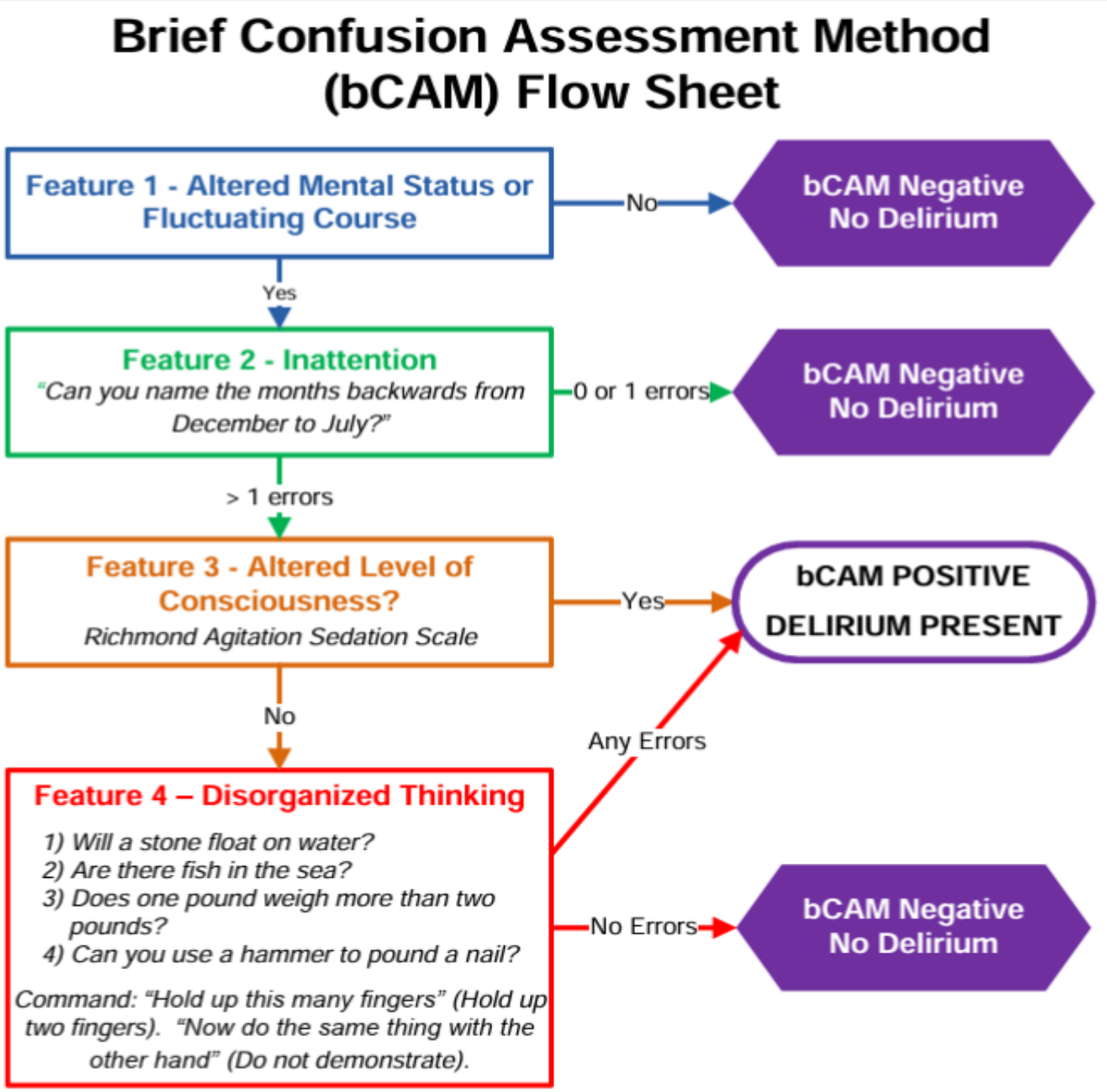
https://www.annemergmed.com/article/S0196-0644(20)31470-0/fulltext

https://pmc.ncbi.nlm.nih.gov/articles/PMC2585541/#:~:text=Delirium%20is%20a%20frequent%20problem,%25%2C%20and%20interrater%20reliability%20of%20.

https://pubmed.ncbi.nlm.nih.gov/20716741/

BRIEF CONFUSION ASSESSMENT METHOD

Specificity – 93% to 96%
Sensitivity – 65% to 86%



DELIRIUM SUBTYPES

HyPERactive Delirium
Predominantly RESTLESS and AGITATED
Increased Motor Activity
Loss of Control of Activity
Restlessness
Wandering

Mixed Delirium
Evidence of BOTH types in the previous 24 hours

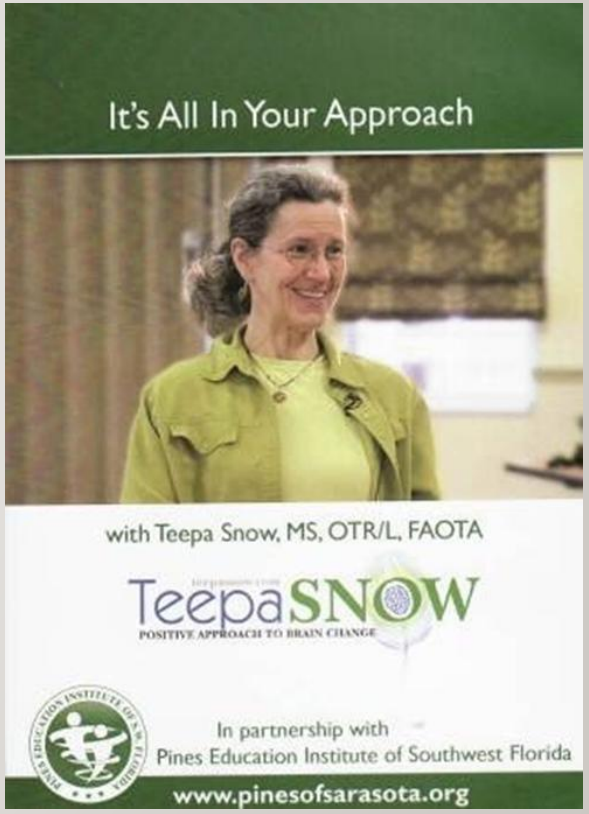
HyPOactive Delirium
Predominantly DROSWY and INACTIVE
Decreased Activity
Decreased Action Speech
Decreased Speed of Speech
Decreased Amount of Speech
Reduced Awareness of Surroundings
Listlessness

BMJ 2017; 357 doi: https://doi.org/10.1136/bmj.j2047 (Published 25 May 2017)
Cite this as: BMJ 2017;357:j2047
https://www.bmj.com/content/357/bmj.j2047/infographic

NON-PHARMACOLOGIC TREATMENT OF DELIRIUM

THE POSITIVE PHYSICAL APPROACH TO PATIENTS WITH COGNITIVE IMPAIRMENT

- Develop your relationship first
- **Have a seat in the room**
- Use visual, verbal, tactile cues
- Compliment/share something/make a positive observation
- Slow down speech
- Make eye contact
- Try saying things different ways
- Try and get family / POA involved
- Use closed ended questions, if needed



NON- PHARMACOLOGICAL MANAGEMENT

- Use orienting tools (clocks, calendar, television)
- Provide adequate socialization
- Use eyeglasses & hearing aides
- Encourage mobility
  - Up to Chair
  - Supervised ambulation regularly
- Prevent dehydration and malnutrition
  - Consider need for assistance with feeding
  - Encourage PO intake, when possible
  - Consider hand over hand feeding

NON- PHARMACOLOGICAL (CON'T)

- Monitor for constipation and decreased urine output
- Encourage family to visit often to reorient patient
- Maintain quiet, calm environment – decrease overnight vitals, if possible.
- Communicate in concise and calm manner, reassuring voice, vocabulary that patients will understand

PHARMACOLOGICAL INTERVENTIONS TO PREVENT AND TREAT DELIRIUM

Prescribing Recommendation #1 :Wean Medications that may cause Withdrawal

Alcohol
Benzodiazepines
Gabapentin/Pregabalin
Baclofen
Barbituates
Muscle Relaxants
Opioids
SSRIs/SNRIs/Tricyclic Antidepressants
Antipsychotics
Dopamine Agonists
Nicotine
Marijuana
Suspect any med that gets into CNS

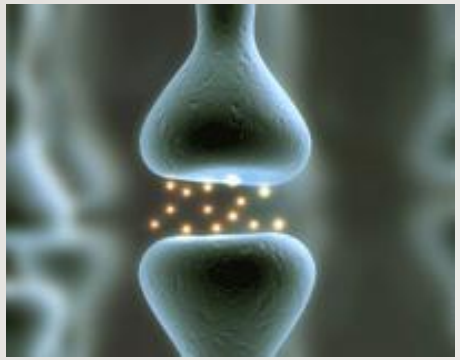
WEANING SUGGESTIONS FOR MEDICATIONS CAUSING WITHDRAWAL

1. **Benzodiazepines** –wean by 25% every 2 weeks until decreased by 50%, then 10% or less per week
2. **Gabapentin and Pregabalin** -wean by 25% every 2 weeks
3. **Baclofen**- wean by 25% every 2 weeks
4. **Muscle relaxants-** wean slowly – no data available for further suggestions – would recommend 25% every 2 weeks.
5. **SSRIs and SNRIs-** decrease dose by 50% every 3 to 5 days. Can be started on an IP basis, and continued post discharge.

Medstopper.org Accessed 7-16-23
Deprescribing.org Accessed 7-16-23
Drugs Aging. 2018 Jun;35(6):493-521.
Canadian Family Physician 2018; 64: 339-351
J Am Geriatr Soc 2013; 61: 1635-37.
Bipolar Disorder 2005 7:302-4.
The Royal Australian and New Zealand College of Psychiatrists 2011: 86-87
Pharmacotherapy 2017; 37:1231-1240
J Psychopharmacol. 2008;22:330-2.

PRESCRIBING RECOMMENDATION #2: AVOID ANTICHOLINERGIC MEDICATION USE IN PATIENTS AT RISK WHENEVER POSSIBLE

- Aggravates imbalance of brain dopaminergic and cholinergic system



Creative Commons: Accessed 9-2-16

- Anticholinergics have been associated with delirium
  - Even when tolerating prior to admission

Acta Psychiatr Scand. 2023;147(1):16-42. doi:10.1111/acps.13505JAMA. 2016;316:1775-1785.
J Clin Anesth. 2020 ;61:109632. doi: 10.1016/j.jclinane.2019.109632.
J Am Geriatr Soc 2011; 59:1477–1483
Arch Gerontol Geriatr 2007; Suppl 1: 199-206
Arch Intern Med 2001; 161: 1099-1105
Arch Intern Med 2001; 161: 2091-2097

ANTICHOLINERGICS

- Anticholinergic "Burden" or Load"
  - Over 600 medications have some anticholinergic effects
  - These anticholinergic effects are thought to be additive

Fick DM, et. al. J Am Geriatr Soc 2015
Arch Intern Med 2008; 168 (5) : 508-513.
J Pall Med 2007; 10:1089/jpm2006.0112
Am J Psychiatry 1992; 149: 1393-1394.
Am J Psychiatry 2001: 62 (suppl 2):11-14.

COMMON MEDICATIONS REPORTED TO HAVE HIGH ANTICHOLINERGIC EFFECTS

Antidepressants

amitriptyline (Elavil)

doxepin (Sinequan) >6mg/day

imipramine (Tofranil)

desipramine (Norpramin)

nortriptyline (Pamelor)

paroxetine (Paxil)

Muscle Relaxants

methocarbamol (Robaxin)

cyclobenzaprine (Flexeril)

orphenadrine (Norflex)

carisoprodol (Soma)

chlorzoxazone (Parafon)

Metaxalone (Skelexin)

Antihistamines

diphenhydramine (Benadryl)

hydroxyzine (Vistaril)

chlorpheniramine (ChorTrimeton)

Anti-emetics

promethazine (Phenergan)

prochlorperazine (Compazine)

thiethylperazine (Torecan)

trimethobenzamide (Tigan)

Antipsychotic Agents

chlorpromazine (Thorazine)

thioridazine (Mellaril)

clozapine (Clozaril)

loxapine (Loxitane)

olanzapine (Zyprexa)

perphenazine (Trilafon)

trifluoperazine (Stelazine)

atropine/belladonna (B&O supps)

hyoscamine (Levsin)

flavoxalate (Urispas)

dicyclomine (Bentyl)

benzotropine (Cogentin)

all urinary anticholinergics-

Oxybutynin

(trospium, and myrbetriq anticholinergic effects)

J Am Geriatr Soc. 2019;67(4):674-694.
J Am Geriatr Soc 2008; 56: 1333-1341
Crit Care Med. 2013 ;41:263-306
Campanelli CM, et. al. J Am Geriatr Soc. 2012 ; 60: 616–631

HYDROXYZINE USE IN OLDER PATIENTS

Not recommended for older patients due to anticholinergic effects- higher risk for cognitive decline, falls, constipation, and urinary retention

Recent increase in prescribing for anxiety

2019 American Geriatrics Society Beers Criteria Update Expert Panel J Amer Geriatr Soc 2019 Jan 29; 67(4):674-694

“Hydroxyzine for Generalized Anxiety Disorder”

Design

Cochrane Review of Double blind randomized controlled trials (RCT)

- **5 studies reviewed with 884 participants**
- **Looked at efficacy and acceptability**

Results

- **Efficacy :** Hydroxyzine is more effective than placebo for GAD OR= 0.30, (95% CI 0.15 to 0.58)
- **Tolerability:** No difference compared to placebo OR=1.00, (95% CI 0.63 to 1.58)
- **Compared to benzodiazepines and buspirone**
  - Efficacy: hydroxyzine vs chlordiazepoxide: OR= 0.75, (95% CI 0.35 to 1.62)
  - Efficacy: hydroxyzine vs buspirone OR=0.76, (95% CI 0.40 to 1.42)
- Hydroxyzine was associated with a higher rate of sleepiness/drowsiness than the active comparators OR=1.74, (95% CI 0.86 to 3.53).
- **“No recommendations in older patients can be made”**

Cochrane Database Syst Rev. 2010 Dec 8;(12):CD006815. doi: 10.1002/14651858.CD006815.pub2. PMID: 21154375.

HYDROXYZINE FOR ANXIETY IN OLDER ADULTS

Study	Design	Age Range Years old	Oldest Age Years old	Notable Exclusions
Rickets 1970	Double Blind RCT	Not known	Not known	Patients with strong character disorders, sociopathic tendencies, or evidence of schizophrenia excluded
Goldberg 1973	Double Blind RCT	18-60	60	Patients with glaucoma
Darcis 1995	Double Blind RCT	18-65	65	Patients with depression , cardiovascular, hepatic, or renal disorders, patients on opioids
Lader 1998	Double Blind RCT	18-65	65	major depression,, alcohol abuse, organic or psychotic disorders.
Liorica 2002	Double Blind RCT	18-65	65	major depressive episode, psychotic or delusional disorders within the preceding 3 years, concomitant chronic diseases, closed-angle glaucoma , central nervous system treatment within the last week preceding inclusion, need for psychotherapy.

Exclusion bias

Cochrane Database Syst Rev. 2010 Dec 8;(12):CD006815. doi: 10.1002/14651858.CD006815.pub2. PMID: 21154375.

PRESCRIBING RECOMMENDATION #3: AVOID NEW BENZODIAZEPINES IN PATIENTS AT RISK FOR DELIRIUM

- Can have paradoxical reaction
- Multiple studies show an association with prolongation and worsening symptoms of delirium
  - Two Cochrane Reviews: One states no evidence for efficacy of benzodiazepines in non-alcoholic delirium ; Newer one **found no evidence for use of benzodiazepines in delirium**
  - **2018 PADIS Guidelines:** "We suggest using either **propofol or dexmedetomidine [precedex]** over benzodiazepines for sedation in critically ill, mechanically ventilated adults."
  - **2014 Joint American Geriatrics Society and the American College of Surgeons** jointly clinical practice guidelines for postoperative delirium prevention and treatment: "The prescribing practitioner should not use benzodiazepines as a first-line treatment of the agitated postoperative delirious patient who is threatening substantial harm to self and/or others to treat postoperative or except when benzodiazepines are specifically indicated (including, but not limited to, treatment of alcohol or benzodiazepine withdrawal)."

- But….remember these are the drug of choice for alcohol withdrawal, benzodiazepine withdrawal, and status epilepticus.

Cochran Database Syst Rev 2020; Feb 28;2(2):CD012670. doi: 10.1002/14651858.CD012670.pub2.
Crit Care Med. 2018 46:e825-e873
Crit Care Med. 2018;46(9):1558-9.
Epidemiology. 2015;26(5):e52-3.
J Am Coll Surg. 2015;220(2):136-48
Annals of Long-Term Care 2013;21(3):14-15

Ann Intern Med. 2011;154(12):JC6-10.
Cochrane Database Syst Rev. 2009;(4):CD006379
Crit Care Med 2009; 37: 177-183
J Trauma 2008; 65: 34-41.
Anesthesiology 2006; 104:21-26
Crit Care Med 2009; 37: 177-183
J Trauma 2008; 65: 34-41.
Am J Psychiatry 1996; 153: 231-237

PRESCRIBING RECOMMENDATION #4:

EVALUATE AND TREAT PAIN IF PRESENT BEFORE INCREASING MEDICATIONS FOR AGITATION

2018 PADIS Guidelines:

"Management of pain for adult ICU patients should be guided by routine pain assessment and pain should be treated before a sedative agent is considered"

"We suggest using acetaminophen as an adjunct to an opioid to decrease pain intensity and opioid consumption for pain management in critically ill adults."

Crit Care Med. 2018 46:e825-e873

PRESCRIBING RECOMMENDATION #5:
USE NON-OPIOID PAIN-RELIEVING METHODS WHEN ABLE

Non-pharmacological methods

-Heat, Ice

-Massage

-Music Therapy

-Relaxation Techniques

Pharmacological

-Scheduled acetaminophen

-Topical diclofenac, topical lidocaine

-Gabapentin, Pregabalin

Crit Care Med. 2018 46:e825-e873

PRESCRIBING RECOMMENDATION #6: AVOID HIGH RISK OPIOIDS

- Meperidine (Demerol)
- Fentanyl Patch in opioid naïve patients (Duragesic)
- Pentazocine (Talwin)
- Methadone (Dolophine)- if not monitored closely

Clinical Geriatrics 2006; 14: 40-47
J Amer Geriatr Soc 2002; 50: s205-s224
Am J Psychiatry 1987; 144: 1062-1065
Anesth Analg 1986; 65: 536-538.
Annals of Intern Med 1977; 86: 738-741

PRESCRIBING RECOMMENDATION #7: USE LOW DOSES OF OPIOIDS IN OPIOID NAÏVE PATIENTS (OR CLOSE TO OPIOID NAÏVE PATIENTS)

- High doses of any opioid in opioid naïve patients may cause delirium
- Fast acceleration of any opioids may cause delirium
  - Long acting opioids and fentanyl patch accumulate and will see full effects in 3 days in young patients, up to a week in older patients
- Uncontrolled pain has also been associated with delirium
- Older patients are especially sensitive

Age and Ageing 2013; 42: i1–i57
Crit Care Med 2009: 37: 177-183
Anesth Analg 2006; 102: 1267-1273
Anesth Analg 2006; 102: 1255-1266
J Am Geriatr Soc 2002: 50: s205-s224

STARTING DOSES OF POTENT OPIOIDS IN OLDER OPIOID NAÏVE PATIENTS

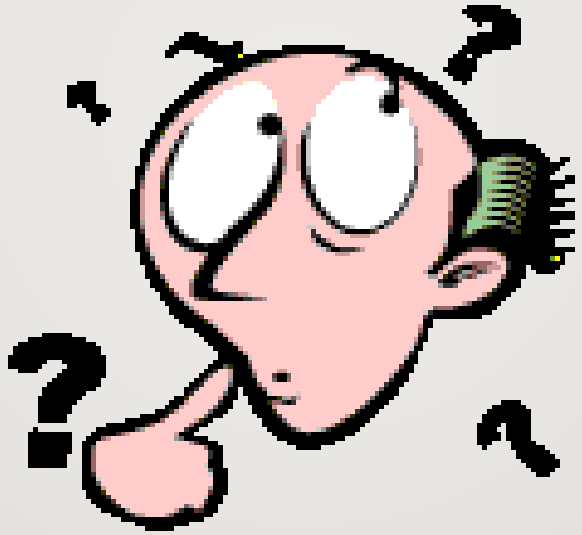
Medication	Dose
Morphine IV	**2 mg to 4 mg IV q3hrs prn**
Hydromorphone IV	**0.5 mg IV q3hrs prn**
Morphine oral	**5 mg to 10 mg po q4hrs prn**
Oxycodone oral	**2.5mg to 5 mg po q4hrs prn**

Other Opioid Considerations

1. Constipation
   - Most patients (and almost all older patients) will need a stimulant laxative while on opioids
   - Severe constipation can cause delirium in elderly patients
2. Morphine accumulates in patients with severe renal dysfunction

Age and Ageing 2013; 42: i1–i57

PRESCRIBING RECOMMENDATION #8: START WITH LOW DOSES OF ANY CNS ACTIVE MEDICATION AND CLOSELY MONITOR FOR CNS ADVERSE EFFECTS



Source : Microsoft Clipart
Accessed 3-12-11

Medications that May Precipitate Delirium in those at Risk

Anticholinergics
Sedatives/Hypnotics
New Benzodiazepines
Muscle Relaxants
New High doses of Opioids
Corticosteroids
Suspect any medication with CNS effects

JAMA. 2016;31N Engl J Med 2006; 354: 1157-1165
Age Ageing. 2011 ; 40:23-9
Curr Opin Psychiatry 2005; 18: 325-330.
J Psychosom Res 2007; 62: 371-383

N Engl J Med 2006; 354: 1157-1165
Age Ageing. 2011 ; 40:23-9
Curr Opin Psychiatry 2005; 18: 325-330.
J Psychosom Res 2007; 62: 371-383

PHARMACOLOGIC TREATING DELIRIUM

- Antipsychotics
  - FDA public health advisory
    - Boxed warning in labeling states that these medications are not approved in behavior symptoms in elderly patients with dementia due to an increase in mortality with use
    - Reserve for patients that behavior would threaten own safety or safety of others or behavior interferes with essential therapy
  - Approximately 75% of delirium patients respond to antipsychotic therapy
- Dexmedetomidine (Precedex)
  - Some evidence for both prevention and treatment
- Continue or start non-pharmacological treatment
  - Medication Review

Age Ageing. 2023 Jun 1;52(6):afad078. doi: 10.1093/ageing/afad078. PMID: 37261446

N Engl J Med. 2017;377 :1456-1466

J Am Coll Surg. 2015 Feb;220(2):136-48.e1. doi: 10.1016/j.jamcollsurg.2014.10.019

N Engl J Med 2018:27;379:2506-2516

N Engl J Med. 2017;377 :1456-1466

J Am Coll Surg. 2015 Feb;220(2):136-48.e1. doi: 10.1016/j.jamcollsurg.2014.10.019

Crit Care Med. 2015; 43: 996–1002

Am J Geriatr Psychiatry 2013; 21:1223-1238

N Engl J Med 2006; 354: 1157-65

HALOPERIDOL FOR TREATMENT OF DELIRIUM :TIPS

- Haloperidol most studied antipsychotic
  - It has low anticholinergic effects
  - If dosing for patients on Med-Surg floors: Loading dose: 0.5 mg to 1 mg, IM may repeat after 30-60 min until response (manageable but alert patient) or until dose of 5 mg is reached then maintenance dose of 0.5 mg IM or po q4-6 hours prn
  - Cautions
    - QTc Prolongation
      - Torsades de Pointes and QT prolongation
        - Especially with high doses
        - Especially with IV use
        - Discontinue if QTc >500 msec
        - Discontinue if QTc increased by >25%
    - EPS symptoms
      - Contraindicated in patients with Parkinson's disease – they already have decreased dopamine.
      - Quetiapine, clozapine, and pimavanserin are alternatives

www.FDA.gov/CDER/DRUG/InfoSheets/HCP/haloperidol.htm
Am J Geriatr Psychiatry 2013; 21:1223-1238
N Engl J Med 2006; 354: 1157-1165
Annals of Long Term Care 2000: 8: 53-59

ATYPICAL ANTIPSYCHOTICS: ROLE IN THERAPY

- Quetiapine, Risperidone, Olanzapine, and Aripiprazole have been best studied
- Dosing is not defined and variable in studies
- Starting doses in older patients
  - Quetiapine 12.5 mg q12hrs
  - Olanzapine 2.5 mg to 5 mg daily
  - Risperidone 0.5 mg q12hrs
  - Aripiprazole 2.5 mg daily
- Add prn doses if necessary

Am J Geriatr Psychiatry 2013; 21:1223-1238
N Engl J Med 2006; 354: 1157-1165
J of Psychosomatic Res 2011; 71: 277–281
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DIFFERENTIATING SECOND GENERATION ANTIPSYCHOTICS FOR USE IN DELIRIUM

Name (Higher doses)	Usual Starting Dose for Delirium	Anticholiner-gic Effect	EPS effects	Qtc Effects	Pertinent Dose Forms	Seizures	Ortho-stasis	Sedation	Glucose Abnormality
Quetiapine 400 – 800 mg	12.5 mg q12hrs	++	+	++	tablet	++	++	++	++
Risperidone 2-8 mg	0.5 mg q12hrs	+	++	++	-tablet -disintegrating tablet	+	++	++	++
Olanzapine 10 -20 mg	2.5 mg- 5 mg daily	++	+	++	-tablet -disintegrating tablet -IM injection (Warning with benzos)	++	++	+++	+++
Aripiprazole 10-15 mg	2.5 mg daily	+	+	+	-tablet	+	++	+	+
Ziprasidone 80-160 mg	20 mg q12 hrs	+	+	+++	tablet- with food IM injection	+	++	++	+

SUMMARY

- Define delirium and its different sub-types
  - Hyperactive, Hypoactive, and Mixed
- Understand the causes of delirium
  - DELIRIUM mneumonic
- Identify non-pharmacological interventions to treat delirium in older adults
  - Address Senses, bright room,
- Learn appropriate pharmacological interventions for delirium in older adults
  - Appropriate use of anti-psychotics

DELIRIUM DIFFERENTIAL DIAGNOSIS

- **D**rugs, **D**ehydration
- **E**lectrolyte imbalance, change in **E**nvironment
- **L**ack of drugs (withdrawal, uncontrolled pain)
- **I**nfection, **I**nfarction (cerebral, or myocardial)
- **R**educed sensory input (reduced vision, hearing), **R**educed movement
- **I**ntoxication.
- **U**rinary retention/fecal impaction
- **M**etabolic (Glucose, thyroid, etc.)

MEDICATION PRESCRIBING PRACTICES TO AVOID DELIRIUM

1. **Avoid abruptly stopping medications that cause withdrawal**
2. **Avoid anticholinergic use in patients at risk whenever possible**
3. **Do not start new benzodiazepines in patients at risk**
4. **Evaluate and treat pain if present before increasing medications for agitation**
5. **Use non-opioid pain relieving methods when able**
6. **Avoid high risk opioids**
7. **Use low doses of opioids in opioid naïve patients (or close to opioid naïve patients)**
8. **Start with low doses of any CNS active medication and closely monitor for CNS adverse effects**

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CASE

- Patient is an 80 y/o F with past medical history of osteoarthritis and knee replacement that presented to the emergency department (ED) for weakness.
- Patient was found to be hypoxic down to 83% by EMS and was started on nasal canula.
- Patient denied urinary symptoms.
- Patient denied having any chest pain.

VITALS AND PHYSICAL EXAM:

Vitals:

- Blood pressure: 131/69
- Heart Rate: 118
- Respiratory Rate: 18
- SpO2: 95%
- Temperature: 97.4 F

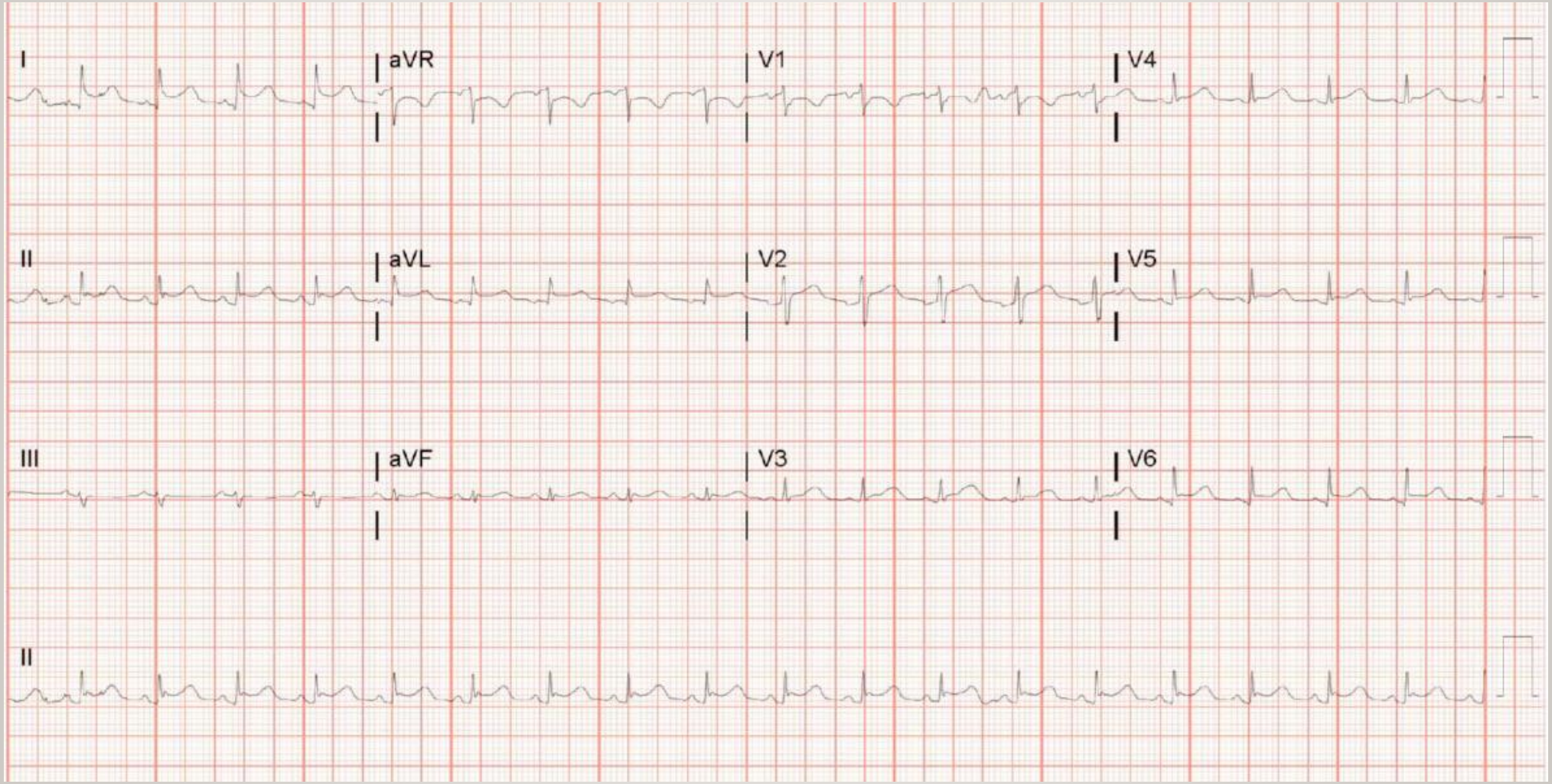
VITALS AND PHYSICAL EXAM:

Physical Exam:
Constitutional: **Altered mental status.**
HEENT: Normocephalic and atraumatic with moist mucous membranes
Cardiovascular: Regular rate and rhythm, no murmurs, **pericardial friction rub noted.** No JVD
Pulmonary: Clear to auscultation bilaterally
Abdomen: soft, non-tender, non-distended, and +bowel sounds Skin: Warm with good capillary refill and no rashes
Neuro: AAOx1, **Slurred speech**

WORKUP

- WBC – 15
- Urinalysis – (+)Nitrites, (+) Leukocytes, and WBC 50-200 / HPF, squamous epithelium 3-5
- Urine culture – E. Coli >100,000 CFU
- Lactic Acid – 3.7
- Troponin 0.092 -> 2.81 -> 2.4 -> 1.5
- CT head – no acute process.
- Echo - 1-2 cm pericardial effusion, no tamponade

WORKUP



TREATMENT AND DISPOSITION

- Patient was treated for UTI with Ceftriaxone
- Cardiology was consulted and patient was started on Colchicine.
- Patient was stabilized and discharged to a skilled nursing facility.

HOSPITALIZATION #2

- **Three days post discharge**, patient presented again to the ED with fall and altered mental status.
- WBC, Troponin and lactic acid were mildly elevated.
- CT head was within normal limits.
- Patient was started on IV vancomycin and piperacillin-tazobactam and admitted for severe sepsis.
- CT chest chowed pericardial effusion with accompanying pleural effusion.
- Cardiology was consulted and patient was started on steroids to address the ongoing pericarditis.
- Patient's mentation improved after steroids were started.
- Pericarditis was attributed to an unknown viral etiology.
- Patient was stabilized and discharged on steroids – colchicine was discontinued.

WORKUP

QUESTION

Mr X came to the ER yesterday for a fall. He was found to have fractured his arm. He has a history of CHF and Diabetes. He was on metformin 500 mg bid , furosemide 20 mg daily ,Vitamin D 1000 units daily, and lisinopril 40 mg daily prior to his admission. On admission , his home medications were continued and oxycodone 5-10 mg q 6 hrs prn and ondansetron 4 mg IV q6hrs prn is ordered. His QTc on admission is 515. He becomes agitated after being transferred to the floor – not a harm to self or others. Patient has not had a bowel movement in 3 days, which is not typical for him. He has also not What is the first line treatment?

A. Haldol, Benadryl, and Ativan (B52)
B. Seroquel 50mg + soft restraints
C. MiraLAX + non-pharmacological interventions.

https://pmc.ncbi.nlm.nih.gov/articles/PMC4633298/#:~:text=Constipation,assessing%20and%20managing%20delirious%20patients.
https://pmc.ncbi.nlm.nih.gov/articles/PMC10000263/

ALTERNATIVES TO ANTICHOLINERGICS

For :	Common Alternatives:
Spasms	Lowest effective dose for shortest effective time
Allergies	Loratadine, Saline nasal spray If acute allergic reaction: lowest effective dose for shortest effective time
Incontinence	Mirabegron, Darifenacin, Solifenacin, Trospium
Parkinson's Disease	Rasagaline, Levodopa/carbidopa
Insomnia	Non-pharmacological methods, Ramelteon, Melatonin, Suvorexant
Depression	Duloxetine, Sertraline, Mirtazapine, Venlafaxine
Anxiety	Duloxetine, Sertraline, Buspirone, Pregabalin, Gabapentin
Psychosis	Atypical antipsychotics
Pain	Acetaminophen, Diclofenac gel, lidocaine cream or patch, Capsacian cream, Gabapentin, Pregabalin, Heat, Ice
Nausea	Ondansetron; Use lowest effective dose for shortest effective time

"Pregabalin for generalized anxiety disorder: an updated systematic review and meta-analysis"

Design

Systematic Review and Meta-analysis using Prisma Guidelines

- 8 randomized placebo controlled trials comparing pregabalin to placebo for GAD
- 4 randomized trials ~~comparing pregabalin to benzodiazepines for GAD~~
- Efficacy Rating : Hamilton Anxiety Rating Scale (HAMA)
- Safety Rating : Drop Out Rates

Results

- Pregabalin vs Placebo (age range 35-72 years old)
  - Significant improvement in HAMA with pregabalin use versus placebo (Standard Mean Difference (SMD)= 0.37 (95% CI= 0.30-0.44)
  - No difference in drop out rates in pregabalin vs placebo group: 0.87 (95% CI = 0.72-1.05)
- Pregabalin vs Benzodiazepine (Age range 35-42 years old)
  - No significant difference in HAMA **with pregabalin use versus benzodiazepine** SMD= 0.04 (95% CI= -0.06-0.14)
  - Drop out rates lower in pregabalin group: 0.58 (95% CI= 0.39-0.84)

. Generoso, MB, et.al. International Clinical Psychopharm 2017;32:49–55

ALTERNATIVES TO BENZODIAZEPINES

Acute Anxiety
-Pregabalin or gabapentin?- not FDA approved

Chronic Anxiety:

A Selective Serotonin Reuptake Inhibitor(SSRI)

Sertraline (Zoloft)- not FDA approved

Serotonin-Norepinephrine Reuptake Inhibitor (SNRI)

Duloxetine (Cymbalta)

Buspirone (Buspar)

Gabapentin/Pregabalin? –not FDA approved