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ACOFP / AOA's 121st Annual Osteopathic Medical Conference & Exposition

Joint Session with ACOFP, AAO and OIA: Meds, Meds, Meds: Polypharmacy, Medication Risk Management, and Delirium in the Geriatric Patient

Ronna D. New, DO, FACOFP

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Dates and Location of CME Activity: September 17-20, 2016 – Anaheim Convention Center, Anaheim, California

Topic: Joint Session ACOFP, AAO and OIA: Geriatrics and Palliative Care

Name of Speaker/Moderator: Ronna D. New, DO, FACOFP

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MEDICAL EDUCATION COLLABORATIVE
Mountain States Health Alliance
Johnston Memorial Hospital
Family Medicine Residency

Meds, Meds, Meds: Polypharmacy, Medication Risk Management, and Delirium in the Geriatric Patient

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Objectives

At the conclusion of this session, the participant will:

- understand the physiologic changes of aging, the impact on pharmacodynamics and the risk of medication-related problems
- define polypharmacy and understand key issues in geriatric pharmacology
- know risk factors for adverse drug events in the geriatric patient
- understand medication risk management and principles of prescribing to the geriatric patient
- understand the diagnosis of delirium and recognize subtypes
- identity risk factors and causes of delirium
- know the assessment, diagnosis, prevention and treatment of delirium

Physiologic Changes of Aging and How They Affect Pharmacotherapy

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Kidney

- Decrease in kidney size
- Decrease in renal blood flow
- Decrease in functioning nephrons
- Decreased renal tubular secretion
- Resulting in decreased GFR

- Most drugs exit the body by the kidneys
- Reduced elimination = drug accumulation and toxicity
- Besides aging, other common geriatric disorders affect the kidneys

Creatinine Clearance

- Always calculate before prescribing!
- Assume serum Cr=1.0 in age over 65yo
- Use Cockcroft-Gault equation

Creatinine Clearance (mL/min)=

140-age(yrs) x weight (kg)/ 72 x (SCr mg/dL)

For women multiply by 0.85

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Liver

- Most common site of drug metabolism
- Aging decreases liver blood flow, size, and mass
- Thus metabolic clearance of a drug by the liver may be reduced
- This is especially noted with drugs that have an extensive first pass effect

Aging, Absorption, and the GI Tract

- The amount absorbed is pretty much stable
- However, the increased gastric pH may increase or decrease the availability
- PPI use will increase stomach pH which may lead to enteric coated tablets dissolving in the stomach rather than the gut. This can cause issues such as a local irritant effect with ASA and cramping from bisacodyl.
- Many solid pills that depend on gastric acid to dissolve them may not be absorbed well
- Decreased gastric motility may prolong the time the drug is available for absorption (gastroparesis, CHF)
- Decreased intestinal blood flow

Protein Binding

- Decrease in albumin and protein is common in the elderly due to multiple mechanisms
- Drugs that are highly bound to proteins (dilantin, benzodiazepines, coumadin, digoxin, aspirin) will have increased serum concentration
- A normal total serum concentration of the drug may be seen with clinical toxicity

Polypharmacy

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Polypharmacy

- There is no single definition.
- Concurrent use of 5 or more medications.
- The use of more medications than is clinically warranted.

Statistics:

- 41% of seniors report taking five or more Rx meds
- More than 50% of seniors have two or more physicians
- Management of multiple chronic diseases
  - Multiple prescribers
  - Multiple pharmacies
  - Long term use of meds for acute conditions

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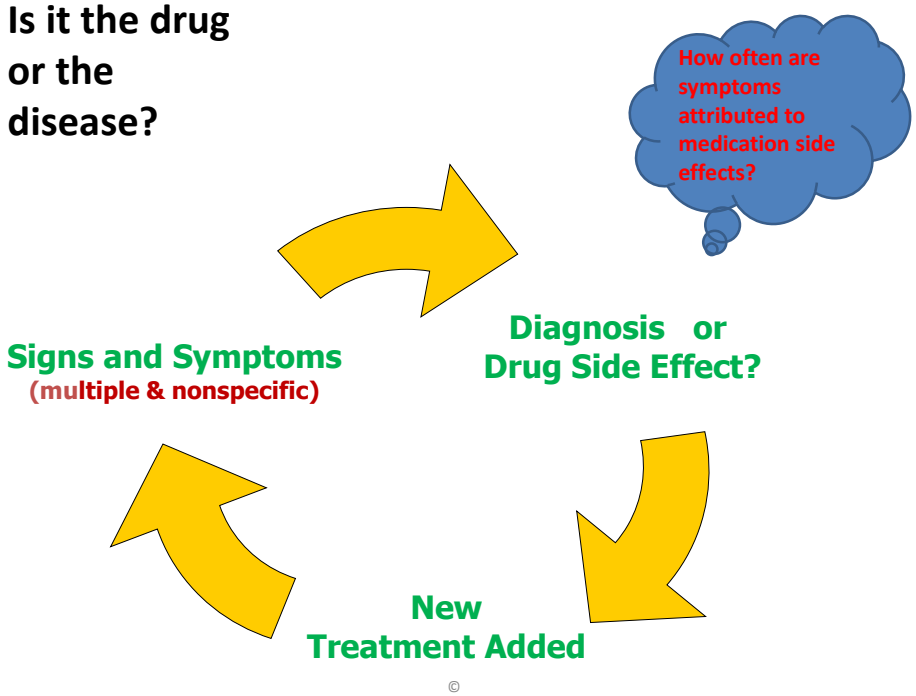
Is it the drug or the disease?



What about drug toxicity?

Think Meds, Meds, Meds….

"When an elderly patient presents with a status change, unless proven otherwise, it should be assumed to be a medication related problem."

» *Jerry Gurwitz MD, director of Meyers Primary Care Institute, @ UMASS: nationally recognized expert on the safe use of medications in the elderly*

Adverse Drug Events

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Adverse Drug Events, Demographics:

- People of the age of 65+ are 12-13% of the present population
- They buy 33% of the drugs prescribed
- 20% of people over the age of 70 take 5 or more drugs
- By 2040, people of the age 65+ will be 25% of the population
- They will buy 50% of the meds prescribed
- OTC drugs account for 2/5 of the drugs taken by the elderly
- Adverse drug events (ADEs) account for 5-28% of acute geriatric admissions
- ADEs in the hospital - 26/1000 hospital beds
- In the nursing home, $1.33 is spent for ADEs for every $1.00 spent on meds

Adverse Drug Events, Risk Factors:

- 6 or more concurrent medical conditions
- 12 or more doses of drugs in a day
- 9 or more meds
- Prior adverse drug events
- Low body weight or low BMI
- Age 85 or older
- Estimated creatinine clearance of less than 50

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Adverse Drug Events, Drug-Drug Interactions:

- May lead to adverse drug events (ADEs)
- Likelihood increases as the number of meds increases
- Most common are cardiovascular and psychotropic drugs
- Absorption can be increased or decreased
- One drug can diminish or increase the effect of another
- Drug metabolism may be changed
- Remember to ask about herbal preparations and OTC meds (especially “PM” agents)

Adverse Drug Events,Common Drug-Drug Interactions:

• ACEI + Diuretic	• Hypotension, Hyperkalemia
• ACEI +KCl	• Hyperkalemia
• Antiarrhythmic + Diuretic	• Electrolyte abnormalities and arrhythmias
• Benzos + Antidepressants, Antipsychotics	• Falls, confusion, sedation
• Calcium channel blocker + Diuretic or Nitrate	• Hypotension

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Adverse Drug Events, Drug-Disease Interactions:

- Thiazides may worsen glycemic control, and increase uric acid
- Calcium channel blockers may increase leg swelling (peripheral edema), thus worsening stasis changes, CHF,etc
- Calcium channel blockers may cause/worsen constipation
- NSAIDS may increase blood pressure and fluid retention
- Dopamine blockers (anti-emetics) may precipitate or exacerbate Parkinson's disease
- Obesity alters volume distribution of lipophilic drugs
- Drugs with anticholinergic side effects may increase confusion
- Ascites may alter distribution of hydrophilic drugs
- Dementia increases sensitivity to drugs with CNS effects
- Renal or hepatic dysfunction may impair detoxification and/or excretion

Adverse Drug Events, The "Prescribing Cascade":

Examples:

- NSAID ->HTN->**antihypertensive therapy**
- Dihydropyridine Ca Channel Blockers -> edema ->**Furosemide and potassium supplement**
- Pseudoephedrine ->urinary retention ->**alpha blocker**
- Antipsychotic ->akathisia, activation, agitation ->**more psychoactive meds**

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Principles of Prescribing to the Geriatric Patient

Avoid unnecessary drugs.

"Start low, go slow……"

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Prescribing to the Geriatric Patient, Think About Treatment Alternatives:

- Dietary changes and exercise for DM II
- Low fat diet for hyperlipidemia
- Decreased ETOH and salt, weight loss and exercise for mild hypertension
- Psychologic approaches to depression
- Behavioral approaches and education for insomnia
- Physical therapy for OA, heat therapy, capsaicin cream, etc
- Alternative treatments for chronic pain

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Prescribing to the Geriatric Patient, Adherence and Compliance Issues:

- Up to 50% of elderly do not take their medications
- 25 – 50% of those who do take their meds are making mistakes
- This is directly related to the number of meds prescribed
- Watch out for crushing drugs that are la/xr/sr
- Insure all meds are brought to each office visit, including herbals/vitamins/OTCs
- Know your patient's physicians – multiple meds from multiple physicians
- Ask about taking medications from others (friends/family)
- Patient may be taking meds "as needed"
- If your patient cannot draw a clock (Clock Drawing Test), they probably cannot manage their meds

Prescribing to the Geriatric Patient, Modifications in Prescribing:

- Avoidance of unnecessary drugs
- Stop any current drugs that are not indicated (always reconcile meds)
- Alternative treatments and quality of life
- Consideration of compliance/adherence
- Awareness of comorbidities
- Use of a lower starting dose with slow dose titration
- Regular medication review

Prescribing to the Geriatric Patient, Modifications in Prescribing:

- Awareness of potential side effects
- Use simple drug regimen and review each visit
- Try to use once daily or once weekly formulation
- Limit the number of people prescribing for the patient
- Avoid drugs, if possible, that have known deleterious side effects

Case Example:

- 85yo female presents to you to establish with a primary care physician. She was diagnosed with Alzheimer's dementia five years ago.
- Her additional PMH includes COPD, CAD, HLD, HTN, CHF, urinary incontinence, depression, OA, and chronic constipation.
- You review her "brown bag" of medications.

"The Brown Bag Assessment"

1. Amlodipine 10mg Q am
2. Atorvastatin 10mg Q pm
3. Fluticasone/Salmeterol 100/50 bid
4. Oxybutynin XL 15mg q am
5. Donepezil 10mg Q am
6. Fluoxetine caps 20mg Q am
7. Fluoxetine tabs 10mg (cut in half) Q am for aggravation
8. Meloxicam 7.5mg Q am
9. Ranitidine 150mg bid
10. Ibuprofen 200mg q 4 hrs prn
11. ASA 81mg daily
12. Albuterol rescue inhaler
13. Ipratropium / Albuterol Inhaled Solution nebulizer 2-4 times per day
14. MVI Q am
15. Vit C Q am
16. Polyethylene glycol q am 1 tsp in 8oz H20
17. Hydrocodone/Acetaminophen 5/325 tid
18. Lisinopril 40mg dailiy
19. Metoprolol 25mg bid
20. Furosemide 40mg daily
21. KCl 20meq daily
22. Acetaminophen PM qhs

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DE~L~I~R~I~UM

"Sundowning, confusion, agitation, madness…… "

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Case: "She slept well all night, not a peep."

Source: http://www.womansday.com/food-recipes/g1480/peeps-products/?slide=1

Case: Would you recognize this as delirium?

- Geriatric medicine team consulted by Ortho for "medical management."
- Patient was an 89-year-old female, admitted 3 days ago after a fall that resulted in an intertrochanteric hip fracture.
- She underwent open reduction internal fixation in the OR within 24 hrs of admission.
- Operative course went well, no complications.

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Case: Would you recognize this as delirium?

- Prior to hospitalization, she was living alone in her own home. Minimal assistance needed from son for IADLS (shopping/finances). Retired college professor.
- PMH: OA. Meds: Acetaminophen prn.
- Nurse hx: Awake briefly in recovery room, been sleeping since.
- VSS, routine labs unremarkable.
- Review of hospital meds: Had not received any meds in two days as nurses were holding all meds due to her somnolence.

Delirium, Defined:

- Common geriatric syndrome, underdiagnosed, and carries great risk (increased mortality)
- 1.5 million patients with delirium present to ER each year[1]
- Emergency physicians fail to diagnose delirium 75% of the time[1]
- Failure to diagnose spans across all specialties with delirium missed in up to 32-66% of cases[2]

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Delirium: DSM-5

According to the *Diagnostic and Statistical Manual of Mental Disorders*, fifth ed (DSM-5)[4]:

Acute syndrome characterized by:

- Inattention
- Cognitive changes that may not be attributed to dementia
- Acute onset (usually developing over hours to days) with fluctuation
- Cause derived from a precipitating factor such as an underlying medical condition, intoxicating substance, adverse drug event, or multifactorial causes

Delirium, Derivation:

- Derived from three Latin roots, *de* which means "away from", *lira* which means "furrow in a field", and *ium* meaning "going off the ploughed track, a madness".[3]
- **"Sundowning"** – term commonly used, describes the time period when delirium is most often detected (at night) or after "sundown"
- There is less structure and routine at night in the care setting and more negative stimulation (beeping alarms, hallway traffic, etc)

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Delirium, Subtypes:

- **HYPERACTIVE** – most easily recognized, patients are truly "hyperactive" demonstrating increased psychomotor activity (restless, anxious, agitated, behavioral disturbances, combative[6], etc), loud/fast speech, swearing, singing, laughing, anger, wandering[2]…. **These are the patients that the nurse calls you about at night.**
- **HYPOACTIVE** – the "quiet delirium" that often goes unrecognized[6,] decreased psychomotor activity and may appear to be sleeping all the time or sedated, thought to be depressed or possibly even lethargic[6], may appear to be staring blankly, have little conversation, slow speech[2]….**These are the patients that often do not cause any disturbance at night, appear to be resting comfortably, and do not evoke clinical concern.** Older patients tend to commonly experience hypoactive delirium.[2]
- **MIXED** – the most commonly diagnosed subtype, characteristics of both hyperactive and hypoactive with fluctuating levels of psychomotor activity[6]

Characteristics of Delirium Subtypes[2,3,6]

Hyperactive	Hypoactive	Mixed
Increased psychomotor activity	Decreased psychomotor activity	Characteristics of both hyperactive and hypoactive
Restlessness/Anxious	Decreased alertness/Sleepy	Fluctuating levels of psychomotor activity
Loud or Fast Speech	Slow or little speech/Quiet	
Agitation/Combativeness/Anger	Unawareness/Staring blankly	
Laughing, Singing, Swearing	Apathy/Appear Depressed	
Hypervigilance	Lethargy	
Distractability		
Tangentiality		
Persistent thoughts		
Wandering		

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Delirium, Risk Factors – Age:

- Patients older than age 65 and of the male sex are at increased risk[2]
- **Procedures** - Up to 50% of elderly patients suffer delirium post-operatively.[7]
- **Orthopedic procedures** – Patients who have undergone orthopedic procedures (as in the introductory case), are more likely to develop delirium than patients who have undergone general surgery procedures.[7]
- 28% to 61% of geriatric patients with a hip fracture will experience delirium.[2]
- It should be recognized that **older age alone is a known risk factor**.
- Chronologic age may not correlate to biologic age.

Delirium, Risk Factors – Comorbidities & Psychiatric Illness:

- Patients with **multiple acute or chronic medical conditions** are more likely to suffer from delirium.
- The average medical ICU patient has 11 or more risk factors.[8]
- Other risk factors: history of **alcoholism**, use of **intoxicating substances**, and **psychiatric illness**
- **Long-term care patients** – high risk of delirium as residents in long-term care tend to have more comorbidities and are more likely to have cognitive and physical impairments.[2]

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Delirium, Risk Factors – Cognitive Disorders & Geriatric Syndromes:

- **Baseline cognitive disorders** (ex: mild cognitive disorder, dementia or history of memory impairment secondary to stroke) increase the risk of delirium.[3]
- Risk of delirium increases with the severity or stage of dementia.[6]
- **Geriatric syndromes** as a whole have been shown to be a predisposing factor for delirium.
- **Geriatric syndromes include**: dementia, immobility or decrease in function, sensory impairments (ex: hearing loss/visual disturbances, malnutrition, depression, frailty and falls, polypharmacy, and previous history of delirium as well as others.[2,6]
- Others: History of elder abuse, pressure ulcers[2,6]

Risk Factors for Delirium[2,6]

Age greater than 65	Terminal illness
Male sex	Polypharmacy
Comorbidities	Immobility/functional decline
Alcoholism/substance abuse	Sensory impairments including hearing/vision loss
Depression and history of psychiatric illness	Malnutrition
History of chronic pain	Advanced illness/end-stage organ disease
Dementia and other cognitive disorders	Geriatric syndromes (including those not listed within this table)

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Delirium, Causes:

- Typically multifactorial
- Often the first indicator of an underlying acute illness
- Geriatric patients may demonstrate delirium prior to changes in vital signs (such as fever, tachycardia, tachypnea, or hypoxia).[6]

Delirium, Causes – Infection:

- One of the most common causes of delirium
- Of patients who develop delirium due to infection, UTIs and pneumonia account for 34% to 43% of these cases.[6]
- **Assessing for infection should always be part of the diagnostic evaluation for delirium.**
- In the geriatric patient, **delirium may be the first clinical indication of infection** (vital sign changes and other clinical signs may present later).

Delirium, Causes – External Devices, Environmental Factors, and Sleep:

- Any changes from the norm
- The more **transitions** that occur, the greater the likelihood of delirium.
- The average ICU patient carries 11 or more risk factors for delirium.[8] (The ICU is far from the norm.)
- Patients are often in isolation and with many **"tethers"** (bladder catheter, telemetry, pulse ox, ET tube, bp monitor, etc).
- What happens? Overstimulation and increased risk of delirium.
- **Sleep** – Several studies have found a correlation between lack of sleep and delirium.
- The average amount of sleep in ICU patients is approximately 1 hour and 51 minutes in a 24-hour time period.[3]

Delirium, Causes – Meds, Meds, Meds Until Proven Otherwise:

- Medications should be considered to be a cause of delirium in the geriatric patient until proven otherwise.
- As the number of meds increases, so does the risk of delirium.
- The highest incidence of medication-induced delirium is noted in patients taking more than three medications.[3]
- Medications with anticholinergic properties are the most notable.
- These include: diphenhydramine, promethazine, hydroxyzine, meclizine, amitriptyline among others.[6]
- Review the medication list daily to look for meds that may cause delirium. Some are more obvious than others.

Medications Likely to Induce Delirium[2,3,9]

Class	Examples
Antibiotics	Quinolones, Macrolides, Linezolid, Antimalarials
Antidizziness, Vertigo	Scopolamine, Meclizine
Antihistamines	Diphenhydramine, Hydroxyzine
Antiemetics	Promethazine
CNS System/Psych	Benzodiazepines, Anticonvulsants, Sedatives, TCAs
Cardiovascular	Amiodarone, Digoxin, Diltiazem, Beta blockers, Clonidine
Gastrointestinal	Metoclopramide, Cimetidine, Ranitidine, Atropine
Pain/Anti-Inflammatory/Musculoskeletal	Corticosteroids, NSAIDs, Muscle Relaxants, Narcotics

Delirium, Other Causes[2,6]:

- Inadequate pain control
- Dehydration
- Metabolic abnormalities
- Cerebrovascular accident
- Acute MI
- Seizure
- Subdural/epidural hematoma
- Meningitis/encephalitis
- Hypoxia/respiratory failure
- Hypotension
- Hypoperfusion
- CHF
- Trauma
- Shock
- Constipation
- Urinary retention

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Delirium, Assessment and Diagnosis:

- Assessment should begin on initial evaluation (ER, or first contact) and should be ongoing.
- Several tools exist, **the Confusion Assessment Method (CAM)** is most widely embraced by healthcare providers.[6]
- **The CAM has 4 features:**

1. **Acute mental status change and fluctuating course**
2. **Inattention**
3. **Disorganized thinking**
4. **Altered level of consciousness**

Patient **MUST have features 1 AND 2 AND EITHER feature 3 OR 4.[6]**

- CAM has been found to have sensitivity of 94%-100% and specifity of 90%-95% in screening hospitalized patients.[6]

Delirium, Assessment and Diagnosis:

- Geriatric patients with delirium should be admitted to the hospital for further investigation as geriatric patients who are discharged from the ED have higher death rates than patients without delirium.[6]
- **Diagnostic evaluation should be focused on finding the underlying cause**.[6]
- **Assessment should include:** complete history (including meds/med changes, history of drug/alcohol use), a thorough physical examination (including neurological), laboratory and perhaps radiologic studies.
- Clinical judgment must be used to determine studies appropriate for each patient.

Delirium, Assessment and Diagnosis:

Laboratory	Radiologic/Other
CBC	12-lead EKG
CMP	Chest X-ray
Ammonia	CT of the head
UA/Urine Culture	EEG (if seizure is expected or delirium is unclear)
Cardiac biomarkers	
Lumbar puncture	
Blood cultures	
TSH	
Vitamin B12 & Folate	
Urine drug screen	
ABG	
RPR	

Delirium, Treatment and Prevention:

- Many of the treatment measures are also good preventive measures.
- Maintain a regular schedule for the patient and create a surrounding that is like home.
- Out of bed for meals, early mobility, OT/PT, day/night and sleep/wake schedule, positive cognitive stimulation during the day (turn on the lights, open the blinds), limit interruptions at night, surround the patient with familiar items and family/friend visitors.[9]
- Does the patient wear glasses and/or hearing aids? They should be wearing them (even in the ICU).
- Avoid ordering frequent checks of vital signs, procedures, lab draws, and radiologic studies (especially at night) unless absolutely needed for patient safety.[2]
- Give regular meds during daytime hours when at all possible.

Delirium, Treatment and Prevention:

- Physical restraints are not recommended for managing delirium or for use in patients at risk of delirium.
- **The use of physical restraints increases the risk of a patient developing delirium and have also been found to increase the severity of delirium.[10]**
- Physical restraints do not prevent injury from falls.
- Studies have demonstrated an increased fall rate with the use of physical restraints.[10]
- Does the patient have pain? Patients with hypoactive delirium and/or cognitive decline may not be able to voice their pain.
- Non-pharmacologic treatment should be taken and the underlying cause treated before considering pharmacologic treatment.

Delirium, Treatment and Prevention:

- If the underlying medical condition has been treated and non-pharmacologic interventions have been taken, pharmacologic management may be needed.
- In general, **benzodiazepines should be avoided as they are known to not only cause but also exacerbate delirium.**
- American Psychiatry Association advises only using benzodiazepines in the setting of alcohol and benzodiazepine withdrawal, not as monotherapy.[6]
- Antipsychotic medications are recommended.

Delirium, Treatment and Prevention:

- **Haloperidol is the "agent of choice"** but **must be prescribed with caution** (as with all antipsychotics) due to possible adverse effects including extrapyramidal, prolonged corrected QT interval/torsades de pointes, and others.[2]
- Haloperidol should be avoided if a patient has underlying parkinsonism, withdrawal syndrome, hepatic insufficiency, or neuroleptic malignant syndrome.[2]
- Must evaluate risks/benefits to the patient and discuss this openly with the patient (if possible) and the family/health care surrogate.
- Pharmacologic treatment for delirium should be the last option chosen in treatment and used only when there is concern about the patient's safety or that of others.[2]

Delirium, Long-Term Effects and Death:

- Only 14% of patients with delirium have returned to their baseline level of cognitive functioning at discharge.[3]
- This often results in the need for placement in long-term care as opposed to discharge to home.
- Delirium is a strong prognostic indicator and is associated with increased morbidity and mortality.[6,7]
- Post-operative delirium is linked to increased morbidity as well as a 1 year mortality of 40%.[7]
- Delirium in geriatric patients in the ER is an independent predictor of increased 6-month mortality.[1]

Delirium, Cost and Distress:

- Patients with delirium stay hospitalized for an average of 5-10 days longer than patients who have the same medical problems but have not had delirium.[3]
- Patients in the ICU with delirium have health care costs that are 31% higher than patients with the same medical problems but without delirium.
- The national burden of delirium on the health care system is somewhere between $32 billion to $152 billion per year.[3]
- The experience of delirium distresses the patient. Patients report at least a moderate level of distress post-delirium.[11]

"Not a Peep"

- The introductory case should raise concern for hypoactive delirium.
- For this post-operative patient, treatment involved a scheduled regimen of pain medication and nursing staff was educated about the clinical signs of hypoactive delirium and the importance of not holding the patient's doses.
- The patient's cognition slowly improved.
- With time, she only required pain medication prn and was discharged to sub-acute rehab.

Source: harlequincandy.blogspot.com (see complete detail in references)

References

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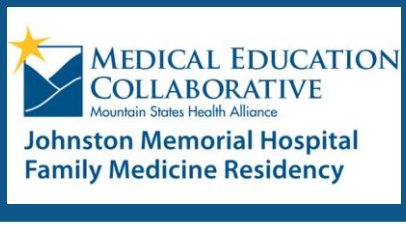
Thank you!



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