

## Diabetes; Introduction

Meded101.com

## Complications

- Neuropathy
  - Falls risk
- Retinopathy
  - Falls risk
- Nephropathy
  - Drug accumulation
- CVD
  - MI/Stroke
- Infection

## Diabetes Monitoring

- A1C
- Blood sugars
- Goals in the elderly
  - 6.5-8
  - Trend toward less strict control

## Life Expectancy

- Decrease Accuchecks
- Higher Goal
- Increase Quality of life
- Reduce injections/pill burden

## Diabetes; The Medications

Meded101.com

## Metformin

- First line
- Kidney function
- GI side effects
- Low risk hypoglycemia
- B12

### Sulfonylurea's

- Hypoglycemia
- Weight gain
- Glipizide preferred
- Chlorpropamide (rarely used) SIADH risk

### DPP-4 Inhibitors

- Well tolerated
- Increases incretin
- Weight neutral
- \$\$\$
- Generally low hypoglycemia when used alone

### TZD's

- Weight Gain
- Edema
- CHF risk

### SGLT-2 Inhibitors

- Glucose loss through the urine
- Low hypoglycemia when used alone
- UTI/genital infections
- Hyperkalemia
- Kidney function
- \$\$\$

### GLP-1

- Incretin
- GI SE's
- Injection
- \$\$\$

### Insulin

- Avoidance of Sliding Scale
- Long Acting
- Rapid Acting
- Diet Changes

## Diabetes; Hypoglycemia

Meded101.com

### Hypoglycemia Challenges in the Elderly

- Emphasis on checking blood sugar if sudden changes
- Symptoms may be blunted
  - Falls
  - Dizziness
  - Confusion
  - Weak
  - Sleepy

### Treatment of Hypoglycemia

- Glucagon
  - Alertness compromised
- Sugar replacement
  - Aspiration
  - Choking

### Changes That Can Impact Diabetes

- Steroids
- Beta-blockers
- Infections
- Dementia
- Medications that suppress or stimulate appetite

## Diabetes; Compelling Indications

### Statin Use

- Recommended for majority of elderly
- Many patients at high risk
- Drug Interactions
- Factors to discontinue?
  - End of life
  - Quality of life
  - If they had a heart attack, would you start one?

**Table 1. Statin Therapy**

Intensity	Definition	Dosage
Low	Daily dose lowers LDL-C by <30%, on average	Simvastatin 10 mg Pravastatin 10-20 mg Lovastatin 20 mg Fluvastatin 20-40 mg Pitavastatin 1 mg
Moderate	Daily dose lowers LDL-C by approximately 30% to <50%, on average	Atorvastatin 10-20 mg Rosuvastatin 5-10 mg Simvastatin 20-40 mg Pravastatin 40-80 mg Lovastatin 40 mg Fluvastatin XL 80 mg Fluvastatin 40 mg bid Pitavastatin 2-4 mg
High	Daily dose lowers LDL-C by approximately ≥50%, on average	Atorvastatin 40-80 mg Rosuvastatin 20-40 mg

Courtesy:  
uspharmacist.com

## Hypertension

- ACE OR ARB
- CCB
- Thiazide

## Aspirin

- Yes, but
  - Consider risk with other medications (i.e. Warfarin, NSAIDs, etc.)
  - Past history
  - Bleeding

## Diabetic Neuropathy

- Gabapentin/pregabalin
- SNRI's
- Topical Lidoderm
- TCA's

## Gastroparesis

- Cause of GI nausea/upset in diabetes patients
- Metoclopramide
  - Parkinson's disease risk
- Erythromycin
  - Drug interaction risk

## Hyponatremia and SIADH

Meded101.com

### Causes of Hyponatremia

- Diuretics
- SIADH
- Heart Failure
- Cirrhosis
- Polydipsia

### Symptoms of Hyponatremia

- Fatigue
- Cramps
- Confusion
- Dizzy
- Seizures (rare, usually with acute changes)

### SIADH

- Oversecretion of ADH
- Water retention
- Dilutes Na<sup>+</sup>
- Resulting Hyponatremia

### Causes of SIADH

- CNS changes
  - Trauma
  - Stroke
- Cancer
- Drugs

### Medication Induced SIADH

- Carbamazepine/oxcarbazepine
- SSRI's
- Chlorpropamide

### Thyroid Disorders

Meded101.com

## Hypothyroidism - Diagnosis

- Usually elevated TSH and low T4
- Symptoms
  - Lethargy
  - Cold
  - Weight Gain
  - Constipation
  - Hair loss/Skin Dryness
  - Lack of energy

## Levothyroxine

- Usual starting dose 25-50 mcg/day
- Binding interactions
  - Consistency with administration
- Follow up – 6 weeks to 3 months

## Drugs That Can Impact the Thyroid

- Amiodarone
- Lithium

## Levothyroxine Interactions

- Enzyme Inducers
  - Phenobarbital
  - Carbamazepine
- Binding interactions
  - Calcium
  - Colestyramine
  - Sucralfate
  - Iron

## Hyperthyroidism

- PTU
- Methimazole
- Risk
  - Weight Loss
  - Tachycardia
  - Insomnia
  - Nervousness
  - Osteoporosis

## Anemia

Meded101.com

## Symptoms of Anemia

- Fatigue
- Low Hemoglobin/Hematocrit
  - Elderly often can feel normal despite levels below normal
  - WHO (men <14, women <12.3)
- Dizziness/Falls
- Skin pallor
- Weak
- Confusion

## Classic Causes of Anemia

- Blood loss
- Iron
- B12
- Folic Acid
- Chronic Disease (esp. CKD)

## B12 Deficiency Causes

- PPI
- Metformin
- ETOH
- Intrinsic Factor

## Drug Causes – Folic Acid Deficiency

- Methotrexate
- Trimethoprim
- Phenytoin

## Treatment of Anemia

- Transfusion
- ESA (i.e. darbepoetin)
- B12
- Iron
- Folic Acid
- No treatment (if asymptomatic)

## Megaloblastic Versus Microcytic

- B12/FA
  - Megaloblastic
  - MCV >100
    - Homocysteine
    - MMA
- Iron
  - Microcytic
  - MCV <80
  - Ferritin
- \*Elderly often present with mixed type of anemias and normal MCV

## Pernicious Anemia

- Lack of intrinsic factor
- Poor oral B12 absorption
- B12 toxicity rare
- B12 shots

## ESA Pearls

- Kidney produces erythropoietin
- Hold orders based on hemoglobin
- Iron shortage causes failure
- Risk of CV Event/Hypertension

## Blood Disorders

Meded101.com

## Factor V Leiden

- Mutation in gene
- Thrombophilia (clot formation likely)
- Anticoagulation (warfarin chronic, heparin type product for acute treatment)

## Von Willebrand Disease

- Von Willebrand Factor
  - Required for platelet aggregation
  - Bleed risk increased
- Treatment
  - DDAVP (desmopressin)
  - Stimulates release of VW factor

## Thrombocytopenia

- Low platelets
- Increased bleed risk
- Symptoms
  - Bruising
  - Bleeding
  - Anemia



### Medication Causes of Thrombocytopenia

- Aspirin
  - (NSAIDs)
- Clopidogrel
- Heparin
- Seizure medications
- Sulfonamides
- PCN antibiotics
- Chemo

### When to Worry - Thrombocytopenia

- 150-450k = normal
- <150k = "thrombocytopenia"
- Trends are important
- <50k severe

## Cirrhosis

Meded101.com

### Cirrhosis – Major Complications

- Edema
- Ascites
- Esophageal Varices
- Hepatic encephalopathy

### Common Medications

- Spironolactone
- Loop diuretics
- Propranolol
- Lactulose

### Edema/Ascites

- Diuretic Combo
  - Furosemide 40mg
  - Spironolactone 100mg
- Close electrolyte monitoring
- Gynecomastia

## Hepatic Encephalopathy

- Accumulation of toxins due to poor liver function
  - Toxins impact the brain
    - Cognitive symptoms (i.e. confusion, lethargy)
- Ammonia (NH<sub>3</sub>)
- Lactulose
- Neomycin, rifaximin

## Portal Hypertension

- Increased pressure in portal venous system
- Veins can swell and increase
  - Leading to rupture and possible bleed
- Non-selective beta-blocker used to treat
  - Propranolol

## Dermatologic Disorders

Meded101.com

## Dermatitis

- Contact, Atopic (Eczema)
  - Inflamed skin
  - Redness
  - Itchy
- Treatment
  - Topical Steroids
  - Calcineurin Inhibitors (i.e. tacrolimus)

## Common Steroids

- Determinants of potency
  - Drug
  - Percentage
- Table
  - <https://www.psoriasis.org/about-psoriasis/treatments/topicals/steroids/potency-chart>

## Medication Causes of Skin Disorders

- Rash
  - Anitbitotics
    - Sulfa
    - Penicillins
    - Macrolides
- SJS risk
  - Antiepileptic (i.e. carbamazepine, lamotrigine)
  - Allopurinol
  - Penicillins
- \*\*Timing, Timing, Timing

## Yeast Infection

- Candida albicans
- Risks
  - Diabetes
  - Antibiotics
  - Immunosuppression
- Treatment
  - Topical nystatin, clotrimazole
  - Systemic, fluconazole

## Pressure Ulcer

- Staging:
  - 1 – red, no breaks in skin, potentially pain
  - 2 – skin broken open
  - 3 – deeper into the skin, fat potentially showing
  - 4 – deepest, possible visual presence of bone, tendon, or muscle
- Risk of osteomyelitis or sepsis with deeper stages (3 or 4 typically)

## Dry Skin

- Xerosis
  - Common in the elderly
  - Cracks/Infection risk
  - Itching
- Common treatment
  - Moisturizers

## Electrolytes, Dehydration, and Malnutrition

Meded101.com

## Dehydration

- Changes in the older adult
  - CHF
    - Fluid restrictions
  - Urinary frequency
    - Scared to drink much
  - Reduced thirst
  - Physical disabilities
    - Challenging to drink or feed themselves

## Dehydration – Medication Risk

- Development of Kidney Failure is a big concern
  - Diuretics
  - ACE inhibitors
  - NSAIDs

### Malnutrition Concerns

- Weight Loss
- Deficiency
  - I.e. B12
- Low Albumin
  - Phenytoin
- Frailty

### Contributors to Malnutrition

- Dental Issues
- Restricted diets
- Finances
- Depression
- Taste/smell alterations
- Socially eating

### Electrolytes

- Potassium
- Sodium
- Magnesium
- Calcium

### Weight Loss – Medication Causes

- Digoxin
- Stimulants
- Acetylcholinesterase Inhibitors
- Diuretics
- \*Be aware of timing of medication changes

### Estrogen Replacement

Meded101.com

### Estrogen Risks

- Clots
- CHD
- Breast Cancer
- Endometrial Cancer

## Benefits of Estrogen

- Osteoporosis
- Colorectal Cancer
- Improve menopausal symptoms

## Goals of Estrogen Therapy

- Treat symptoms
- Limit length of use
- Minimum Effective Dose
- Avoid use
- Discontinue

## Alternatives for Menopausal Symptoms

- SSRI
- SNRI
- Gabapentin
- Clonidine
- Topical Estrogen (vaginal atrophy/dryness)

## Oncology

Meded101.com

## Breast Cancer

- Facts
  - Approximately 1/8 women will be diagnosed in lifetime
  - Most common cancer worldwide
- Recent reduction
  - Possibly due to stronger avoidance of hormone replacement therapy

## Leukemias

- Bone marrow
- Dysfunctional or abnormal blood cells
- Labs can differentiate
  - WBC (abnormal high/low)
  - Hgb/hct (anemia, RBC's)
  - Platelets

## Prostate Cancer

- Symptoms of prostate dysfunction
  - Urinary troubles
- Prostate Specific Antigen (PSA)
  - Quick increases can signal more aggressive cancer
- Prostate cancer
  - Often very slow growth
- Drugs
  - Bicalutamide
  - Leuprolide

## Skin Cancer

- 1 in 5 Americans will develop skin cancer
- Much more common than other cancers
- 5.4 million cases annually
- Melanoma
  - Life threatening

## Chemotherapy in the Elderly

- Mouth Sores
- Nausea/Vomiting
  - Weight loss
- Fatigue
- Blood disorders
  - Low WBC
  - Low Platelets
  - Anemia
- Pain
- Neuropathy

## Vaccines

Meded101.com

## Common Vaccines in the Elderly

- Pneumococcal
- Influenza
- Zostavax
- Tetanus, diphtheria, pertussis

## Zostavax pearls

- Same virus as chicken pox
- Live vaccine
  - Immunosuppressed
- Storage in freezer (fridge for 72 hours)
- Age 60-69 best benefit

## Pneumococcal (Strep Pneumoniae)

- PCV13
  - Give in elderly once
  - Aim for one year between PCV13 and PPSV23
  - Do not co-administer
- PPSV23
  - Give twice if given before age 65
  - Give 5 years apart if given twice

## Influenza

- Annually
- Inactivated injection for elderly
  - Flumist not indicated and now pulled from use
- High dose available
  - Somewhat more expensive
  - CDC not recommending high dose yet
  - Some clinicians will target high risk patients
    - I.e. COPD/Asthma
  - Probably more effective
    - [http://www.cdc.gov/flu/protect/vaccine/qa\\_fluzone.htm](http://www.cdc.gov/flu/protect/vaccine/qa_fluzone.htm)

## TDap

- Tetanus, Diphtheria, Pertussis (whooping cough)
- Revaccination
  - Every 10 years
- Inactivated
  - Immunosuppressed patients ok

## Eye Disorders

Meded101.com

## Common Eye Disorders in the Elderly

- Macular Degeneration
- Glaucoma
- Diabetic Retinopathy

## Macular Degeneration

- Clinical Pearls
  - Central vision loss
    - Reading
    - Driving
  - Use of VEGF inhibitors (Bevacizumab)
  - Smoking can increase risk
  - Dry can progress to Wet (wet is worse)

## Glaucoma Pearls

- Leading cause of blindness worldwide
- Peripheral loss
- Borderline Pressure 18-25
  - Assessment for damage
  - If damage, treatment
  - Some may argue >22
- Greater than 25 - treatment

## Drugs

- Prostaglandins
- Beta-blockers
- Adrenergic agonists
- Carbonic Anhydrase Inhibits
  - Rarely oral use (acetazolamide)

## Preventing Diabetic Retinopathy

- Blood sugar control
- Hypertension
- Regular Exams

## Ophthalmic Infections

Meded101.com

## Symptoms

- Redness
- Itching
- Discharge
- Foreign Body Sensation

## Bugs

- Staphylococcus
- Streptococcus
  - Classic gunky, yellow, mucous like discharge
- Viral infections
  - Watery discharge



## Common Antibiotics

- Erythromycin
- Ofloxacin
- Ciprofloxacin
- Trimethoprim/polymixin

## Shingles

- Reactivation of "Chicken Pox"
- Risk of vision loss
- Acute retinal necrosis
- Treatment
  - Acyclovir
  - Steroids

## Eye Drop Administration Pearls

- Don't touch tip to eye
- Avoid contact lenses
- Recommendation 5 minutes between drops
- Drops before ointment
- For more info
  - [http://www.cc.nih.gov/ccc/patient\\_education/pepubs/eyedrops.pdf](http://www.cc.nih.gov/ccc/patient_education/pepubs/eyedrops.pdf)

## Allergic Rhinitis

Meded101.com

## Allergic Rhinitis

- Make sure not from acute illness
- Reassess treatment throughout the year

## Treatment

- Nasal Steroid
  - i.e. Fluticasone
    - May take some time for max effect
- Antihistamine nasal spray
  - i.e. Azelastine
- If cognitively intact, many patients will know what works best for them

## Antihistamines

- 1<sup>st</sup> Generation
  - i.e. diphenhydramine
  - Avoid, highly anticholinergic
- 2<sup>nd</sup> Generation
  - Loratadine
  - Cetirizine

## Other Therapies

- Oxymetazoline
  - Nasal
  - Use only short term
    - Rebound congestion risk
- Pseudoephedrine/phenylephrine
  - Avoid if possible
  - Raise BP
  - BPH
  - Insomnia risk

## Asthma

Meded101.com

## Asthma Versus COPD

- Reactive
- Younger
- Reversible
- Triggers
- Wheeze
- Inflammation

## Drug Selection

- SABA
- Steroids (inhaled)
- Dose escalation
- Addition of LABA
- Singulair

## Nebulizers in the Elderly

- Albuterol
- Ipratropium
- LABA
- Budesonide

### Rule of 2 in Asthma

- < or equal to 2 times/week – use of albuterol
- < or equal to 2 nighttime awakenings/mo
- > 2 refills per year on rescue

### COPD

Meded101.com

### GOLD Classification

- 1 – mild (FEV >80)
- 2 – moderate (FEV 50-80)
- 3 – Severe (FEV 30-50)
- 4 – Very Severe (FEV <30)

### General Medication Flow

- SABA/Short Acting Anticholinergic
  - Or Combo
- Long Acting Anticholinergic
- Long Acting Beta Agonist (LABA)
- Corticosteroids
- Roflumilast
- Theophylline

### Adverse Effects Beta Agonists, Anticholinergics

- Beta Agonists (i.e. albuterol, salmeterol)
  - Tachycardia
  - Tremor
- Anticholinergic (i.e. ipratropium, tiotropium)
  - Dry mouth

### Inhaled Corticosteroids

- Reduces Exacerbations
- Not used as monotherapy in COPD
- Systemic Corticosteroids
  - Avoid long term if possible
  - OP, GERD, HPA suppression, Diabetes

## Roflumilast

- Reduces exacerbations
- \$
- SE risks
  - Weight loss
  - Psychiatric concerns

## Theophylline

- Drug levels
- Drug interactions
- Systemic effects

## Classic Medication Causes of Respiratory Issues

- Amiodarone
- Nitrofurantoin
- Beta-blockers
  - Can blunt response to medications (beta-agonists)

## Other Considerations

- Oxygen
- Vaccination
- Smoking

## Palliative Dyspnea

- Morphine
- Benzo's

## Gout

Meded101.com

### Signs/Symptoms

- Uric Acid Elevation
- Pain
- Redness
- Swelling
- Usually singular joint

### Classic Risk Factors

- Obese
- Alcohol (excessive)
- Meats/Seafood
- Drugs

### Classic Drugs That Increase Uric Acid

- Diuretic (thiazides)
- Niacin
- Cyclosporine

### Acute Treatment Options

- NSAIDs
- Steroids
- Colchicine

### Chronic Management

- Xanthine Oxidase Inhibitors
  - Allopurinol
  - Febuxostat
- Colchicine
- Probenecid

### Headache

Meded101.com

## Types of Headache

- Tension
- Migraine
- Cluster
- Medication Overuse/Rebound

## Management of Tension Headache

- Non-pharmacologic
  - Reduce stress
  - Avoid triggers
  - Rest
- Pharmacologic
  - Acetaminophen
  - NSAIDs
  - Combination with Caffeine
  - Triptans
  - Opioids

## Medication Overuse/Rebound

- Often precipitate by initial onset of headache
- Repeated use of medication over time to relieve headache
- Drug Causes
  - NSAIDs
  - Acetaminophen
  - Triptans
  - Opioids

## Migraine Treatment

- Triptans
- NSAIDs/APAP in Combo
- Dihydroergotamine
- Antiemetics
  - Prochlorperazine
  - Metoclopramide
- Dexamethasone

## Migraine Prophylaxis

- Propranolol
- Valproic Acid
- Topiramate
- Tri-cyclics
  - Avoidance of amitriptyline/imipramine

## Cluster Headaches

- Acute
  - Oxygen
  - Triptans
- Prophylaxis
  - Verapamil

## Osteoarthritis

Meded101.com

### Osteoarthritis Symptoms

- Pain after longer periods of use
- Stiffness after resting
- Potential change in the shape of ends of fingers (DIP)

### Pain Impact

- Quality of life
- Sleep
- Function/ability
- Work/Volunteerism
- Appetite
- Exercise
- Mood

### Treatment for OA

- Trial of hot/cold
- Massage
- Acetaminophen
- NSAIDs
- Opioids
- Steroid injections
- Topicals

### NSAIDs – Risk in the Elderly

- GI
- CKD
- CHF
- HTN

### NSAID Pearls

- Ibuprofen
  - OTC
  - Short ½ life
- Naproxen
  - OTC
  - Longer ½ life
- Ketorolac
  - 5 days or less (boxed warning)
- Indomethacin
  - gout

## COX-2 Inhibitor

- Celecoxib
  - Same issues as NSAIDs
  - Exception: GI bleed is less
    - Remember that elderly patients are usually on antiplatelet/anticoagulant therapy

## Opioids

- Tramadol
- Tylenol #3
- Morphine
- Oxycodone
- Fentanyl
- Hydrocodone
- Methadone

## Important Approximate Conversions

- Morphine (oral) 30 mg
- Oxycodone 20 mg
- Tramadol 300 mg
- Fentanyl (patch) 12 mcg
- Hydrocodone 30 mg

## Opioid Adverse Effects

- GI
- Constipation
- Sedation
- Cough suppression
- CNS
- Itching
- Tolerance/Dependence/Addiction risk

## Opioid Pearls

- Oxycodone
  - In combo with APAP or alone
  - Very commonly used
- Hydrocodone
  - Combo with APAP

## Opioid Pearls

- Tramadol
  - Seizure
  - Serotonin
- Morphine
  - Kidney disease
  - Gold standard
  - Hospice
- Codeine
  - Prodrug
  - Acetaminophen



## Opioid Pearls

- Fentanyl patch
  - Very potent
  - Disposal concerns
  - Slow onset/offset
  - Potential absorption issues
  - Convenient
- Methadone
  - QTC
  - Conversion sucks
  - Sometime seen in hospice

## Topical Medications

- Good option for elderly if only a few locations of pain
- Capsaicin
  - Avoid prn use
  - Substance P
- IcyHot, BenGay etc.
- Lidoderm patch
  - \$\$\$

## Steroids

- Acute inflammation
- Injection to site of pain
  - Still has systemic effects

## Glucosamine/Chondroitin

- Potential option for OA
- Takes time to work
- Be sure dose is adequate
- If beneficial continue...if not, DC

## Osteoarthritis - Medications

Meded101.com

## Acetaminophen

- Combination products
- Liver risk
- 4 gram max (possibly 3 gram max in elderly)

### NSAIDs – Risk in the Elderly

- GI
- CKD
- CHF
- HTN

### NSAID Pearls

- Ibuprofen
  - OTC
  - Short  $\frac{1}{2}$  life
- Naproxen
  - OTC
  - Longer  $\frac{1}{2}$  life
- Ketorolac
  - 5 days or less (boxed warning)
- Indomethacin
  - gout

### COX-2 Inhibitor

- Celecoxib
  - Same issues as NSAIDs
  - Exception: GI bleed is less
    - Remember that elderly patients are usually on antiplatelet/anticoagulant therapy

### Opioids

- Tramadol
- Tylenol #3
- Morphine
- Oxycodone
- Fentanyl
- Hydrocodone
- Methadone

### Important Approximate Conversions

- Morphine (oral) 30 mg
- Oxycodone 20 mg
- Tramadol 300 mg
- Fentanyl (patch) 12 mcg
- Hydrocodone 30 mg

### Opioid Adverse Effects

- GI
- Constipation
- Sedation
- Cough suppression
- CNS
- Itching
- Tolerance/Dependence/Addiction risk

## Opioid Pearls

- Oxycodone
  - In combo with APAP or alone
  - Very commonly used
- Hydrocodone
  - Combo with APAP

## Opioid Pearls

- Tramadol
  - Seizure
  - Serotonin
- Morphine
  - Kidney disease
  - Gold standard
  - Hospice
- Codeine
  - Prodrug
  - Acetaminophen

## Opioid Pearls

- Fentanyl patch
  - Very potent
  - Disposal concerns
  - Slow onset/offset
  - Potential absorption issues
  - Convenient
- Methadone
  - QTC
  - Conversion sucks
  - Sometime seen in hospice

## Topical Medications

- Good option for elderly if only a few locations of pain
- Capsaicin
  - Avoid prn use
  - Substance P
- IcyHot, BenGay etc.
- Lidoderm patch
  - \$\$\$

## Steroids

- Acute inflammation
- Injection to site of pain
  - Still has systemic effects

## Glucosamine/Chondroitin

- Potential option for OA
- Takes time to work
- Be sure dose is adequate
- If beneficial continue...if not, DC

## Rheumatoid Arthritis

Meded101.com

## Rheumatoid Arthritis

- Inflammation
- Painful
- Joint Swelling (big difference with OA)
- Typically symmetrical

Characteristic	Rheumatoid arthritis	Osteoarthritis
Age at which the condition starts	It may begin any time in life.	It usually begins later in life.
Speed of onset	Relatively rapid, over weeks to months	Slow, over years
Joint symptoms	Joints are painful, swollen, and stiff.	Joints ache and may be tender but have little or no swelling.
Pattern of joints that are affected	It often affects small and large joints on both sides of the body (symmetrical), such as both hands, both wrists or elbows, or the balls of both feet.	Symptoms often begin on one side of the body and may spread to the other side. Symptoms begin gradually and are often limited to one set of joints, usually the finger joints closest to the fingernails or the thumbs, large weight-bearing joints (hips, knees), or the spine.
Duration of morning stiffness	Morning stiffness lasts longer than 1 hour.	Morning stiffness lasts less than 1 hour. Stiffness returns at the end of the day or after periods of activity.
Presence of symptoms affecting the whole body (systemic)	Frequent fatigue and a general feeling of being ill are present.	Whole-body symptoms are not present.

Courtesy WebMD

## DMARDs

- Methotrexate
- Sulfasalazine
- Hydroxychloroquine

## DMARDs - Biologics

- Injection site reaction
- Infection risk

## Medications

- Steroids
- NSAIDs

# Delirium

Meded101.com

## Definition

- Delirium – “an *acutely* disturbed state of mind that occurs in fever, intoxication, and other disorders and is characterized by restlessness, illusions, and incoherence of thought and speech”

## Causes

- Medical
  - Infection
  - Pain
  - Electrolyte imbalances
- Prescription Drugs
- Drugs of abuse
  - Opioids
  - Alcohol
  - Methamphetamines
  - LSD

## Drug Causes

- Anything that acts on the CNS
- Classic Examples
  - Benzo's
  - Opioids
  - Anticholinergics
  - Antispasmodics
  - Z-drugs
  - Sinemet
  - Drug levels (Digoxin, phenytoin, lithium)
  - Drug interactions

## 1<sup>st</sup> Line Therapy

- Identify and solve existing problem
- Redirect Patient
- Enlist patient in an activity
- Offer snacks and beverages to patient.
- Go to the bathroom

## When Drugs Are Necessary

- Haldol
  - Most experience
  - Higher incidence of AE's
- Newer AP's
  - Risperidone
  - Quetiapine
    - Less EPS
    - Less experience

### Treatment of Delirium - Avoid

- Benzo's
  - Can aggravate
- Opioid
  - Pain can be cause of delirium
  - Use non-opioid if possible to treat delirium suspected to be caused by pain

## Dementia

Meded101.com

### Major Types of Dementia

- Alzheimer's
- Vascular
- Lewy Body

### MMSE

- \*Higher = Better
  - 24-30 Normal
  - 20-23 Mild
  - 10-19 Moderate
  - <10 Severe

### Medications

- Acetylcholinesterase Inhibitors
  - Donepezil, Rivastigmine, Galantamine, Tacrine
- NMDA Receptor Antagonists
  - Memantine
- \*Do NOT Reverse Dementia

### NMDA Antagonists - Memantine

- Moderate to Severe
- XR and Immediate release
- 28 mg to 20 mg conversion
- CrCl
- Usually well tolerated
  - CNS Changes

## Acetylcholinesterase Inhibitors

- All oral except rivastigmine patch option
  - Less GI (SS)
- Tacrine – liver toxicity
- GI (NVD)
- Weight Loss
- Low risk of bradycardia (think about Atropine)
- Mild-moderate

## The One Million Dollar Question

- When to DC?
- Questions to think about
  - Adverse Effects?
  - Function Left?
  - Family opinions?
  - What would the patient think?
  - Another problem identified?
- Risk of DC?
  - Deterioration
  - Increase in behaviors

## Dementia Related Behavioral Disturbances

Meded101.com

## Behaviors

- Wandering
- Restless
- Agitation
- Physical Aggression
  - Hit, bite, kick
- Hallucinations
- Delusions

## Behavior Identification

- Contributing factors
  - Individual person
  - Time of day
- Rule Out Causes
  - Pain
  - Infection
  - Medication changes

## Solutions

- Non-drug approaches
- Solve underlying problem
- Creativity
- Make sure problem is distressing to patient before treating
- Medications last resort
  - Drugs don't often "treat" behaviors effectively

### Common Psych Medications Tried

- Antipsychotics
- Benzodiazepines
- Mood Stabilizers
- Antidepressants

### Failure to Thrive

Meded101.com

### Failure to Thrive

- Weight Loss
- Malnutrition
- Poor intake
- Inactivity
- "Frail"

### Failure to Thrive - Associations

- Cancer
- Stroke
- GI Surgery
- Depression
- Frequent UTI's/pneumonia
- Respiratory failure

### Medication Associations

- Anticholinergics
- Opioids
- Diuretics
- More than 4 Rx's
- Antipsychotics
- Benzo's

### Falls in the Elderly



## Why do we Care About Falls?

- Mortality
- Injury
  - Fracture
  - Head injury
- Bleeding risk
- Fear of falling

## Risk Factors

- Cognition
- Balance
- Dizziness
- Orthostatic BP
- Anemia
- Medications
- Stroke

## Body Systems

- Muscle weakness/pain
- Accumulation of medications and risk of toxicity due to reduced metabolism and clearance
- Visual changes
- Disease
  - Parkinson's
  - MS
- Stiffening vessels, less responsive to body's adaptations (i.e. orthostasis)
- Loss of feeling (PVD or neuropathy)

## Common Medications Implicated with Falls

- Psych medications
  - Benzodiazepines
  - Antipsychotics
  - TCA's
  - Antidepressants
- Blood pressure medications
- Parkinson's medications
  - Dopamine agonists
  - Carbidopa/levodopa

## Environmental Considerations

- Steps
- Walking areas
  - Clutter
- Footwear

## Vertigo

- Difficult diagnosis to make for physicians
- Medications
  - Meclizine
  - Antiemetic
  - Anxiety

## Dizziness Follow Up

- Timing of Falls
  - Medication changes
- Vitals
- Diagnosis

## Orthostasis

Meded101.com

## Causes of Orthostasis

- Medications
- Dialysis
- Medical
  - Parkinson's
  - Dehydration

## Treatment of orthostasis

- Remove offending medication
- Fludrocortisone
- Midodrine

## Physiological Changes in the Elderly

Meded101.com

## GI Tract

- Decreased GI Motility
- Decreased Gastric Acid Secretion
- Higher PH

## Distribution

- Increase in body fat
  - Increased volume of distribution for lipophilic drugs
    - Example Diazepam
- Reduction in Muscle
  - Fall risk

## Kidney

- Reduced elimination of medications
- Remember muscle mass decreases
  - If creatinine stays the same, it doesn't mean kidney function does change
- Increased half-life of kidney cleared meds
  - Digoxin
  - Allopurinol

## Liver Changes

- Decrease in metabolic activity
  - CYP enzyme system
- Reduced hepatic blood flow
- Changes are complex
- Need to reduce doses, but no standard

## Albumin

- Protein in the blood
- Drugs frequently bind to it
- Less found in the elderly/malnourished
- Higher free fraction of certain medications
  - Phenytoin
  - Warfarin

## Infection Risk

- Reduced immune response
  - Example: fever
- Skin thinning
- Urinary changes
- Natural flora
- Immunosuppressant medications
- Nutrition
- Antibiotic use

## Osteoporosis

Meded101.com

### WHO Classification

- Normal; T-score greater than or equal to -1.0
- Osteopenia; -1.0 to -2.5
- Osteoporosis; -2.5 or below

### Risk Factors

- Female
- Age
- Low BMI
- T-score
- Steroid use
- Smoking
- ETOH
- Hyperthyroidism (chronic)
- Prior Fracture
- RA

### Treatment

- Bisphosphonates
- Miacalcin
- SERM
- Estrogen
- Forteo
- Prolia

### Other Considerations

- Vitamin D
- Calcium
- Exercise, strength building, weight bearing
- Fall risk

### Classic Medication Contribution

- Anticonvulsants
- Thyroid supplements
- Steroids
- PPI's
- TZD's

### Acute and Chronic Kidney Disease

Meded101.com

## Acute Kidney (Injury) Disease

- Common causes
  - Reduced blood flow to kidney
- Caused by
  - Dehydration
  - Significant acute blood loss
  - Severe N/V/D
  - Medication

## Classic Medication Causes

- ACE/ARB
- NSAIDs
- Diuretics
- AG's
- Vancomycin
- Chemo (i.e. cisplatin)
- Lithium

## Stages of Chronic Kidney Disease of all Types

Stage	Qualitative Description	Renal Function (mL/min/1.73 m <sup>2</sup> )
1	Kidney damage-normal GFR	≥90
2	Kidney damage-mild ↓ GFR	60-89
3	Moderate ↓ GFR	30-59
4	Severe ↓ GFR	15-29
5	End-stage renal disease	<15 (or dialysis)

Source: [www.kidney.org](http://www.kidney.org)

## Problem: Dosing Medications

- Many drugs are dosed by CrCl
- Lab reports GFR

## Incredible # of Medications Dose Adjusted

- Chronic medications
  - Use common sense
  - Start low go slow
  - Should you change dose if no side effects
    - Memantine
    - Ranitidine
    - Allopurinol

## Electrolytes

- Hyperkalemia
- Phosphorus
- Magnesium

## BPH

Meded101.com

### BPH Characteristics

- Enlargement of the prostate
- Impairs urination
  - Frequency
  - Incomplete bladder emptying
  - Low flow
  - Incontinence

### BPH Treatment

- Alpha Blockers
- 5-Alpha Reductase Inhibitors
- Surgery (TURP)

### Alpha-Blockers

- Tamsulosin
  - Not used for hypertension
  - Works quickly
- Non-selective agents
  - Terazosin
  - Doxazosin
- Risks
  - Orthostasis

### 5-Alpha Reductase Inhibitors

- Finasteride, Dutasteride
- Takes weeks/months to begin to work
- Actually shrink prostate
- Decreased libido
- Pregnancy risk

### Drugs That Exacerbate Frequency

- Diuretics
- Caffeine
- ETOH

### Drugs That Exacerbate Retention

- Anticholinergics
- Alpha agonists (Midodrine)
- Pseudoephedrine

### Sexual Dysfunction

Meded101.com

### Antidepressants

- SSRI's
  - Notorious cause of sexual dysfunction
- Better options
  - Bupropion
  - Mirtazepine

### BPH Medications

- Finasteride
- Dutasteride

### Antihypertensives

- Beta-blockers
- Thiazide Diuretics

### Use of PDE-5 Inhibitors

- SE's
  - Dizzy
  - Headache
  - Visual changes
  - Flushing
- Nitrate Interaction

# Urinary Incontinence

Meded101.com

## Definitions

- Incontinence
  - Go when you don't want to (can't control)
  - Weakness or loss of voluntary control of urinary sphincter
- Frequency
  - Feeling of having to go all the time
- Retention
  - "retaining" – incomplete emptying of the bladder
    - Most common cause (males) - BPH

## Types of urinary incontinence

- Stress
  - Physical exertion (i.e. sneeze, cough)
- Urge
  - Over Active Bladder (OAB)
  - Feel the need to go, but maybe don't make it in time
  - Immobility
  - MS, Parkinson's, Diabetes
- Overflow
  - Blockage (BPH)
  - May dribble urine
- Functional
  - Patient who has dementia

## Stress Incontinence Treatment

- Kegel Exercises
- Alpha agonists
- Anticholinergics tried, but may not be that effective
  - Could be mixed incontinence if beneficial

## Urge Incontinence

- Treatment
  - Anticholinergics
  - Beta agonist (mirabegron)
  - Estrogen

## Overflow

- Medication Treatment
  - Alpha-blockers
  - 5 alpha reductase inhibitors (BPH)



## Cholelithiasis

Meded101.com

## Cholelithiasis

- Gallstones
  - Located in the gall bladder
  - Possibly biliary tract

## Symptoms

- Pain
  - Upper right region of abdomen
- Treatment of pain
  - NSAIDs
  - Opioids
  - Acetaminophen

## Ursodeoxycholic acid

- Acts on cholesterol components of stones
- Dissolving action
- May not be that effective if low cholesterol composition

## Frequent Problems

- Pain Management
- Surgery
  - Removal of gall bladder

## Crohn's and Ulcerative Colitis

Meded101.com

## Symptoms

- Diarrhea
- Cramping
- Pain
- Possible blood

## Crohn's Versus Ulcerative Colitis

- Major Difference
  - Crohn's located "patches" throughout intestinal system
    - Can impact all the way through the intestine
  - Ulcerative colitis – continuous area in the colon and typically just the inner lining

## Crohn's Major Options

- 5-Asa Compounds
  - Sulfasalazine, mesalamine
  - Maybe not so great if large small intestine component
- Corticosteroids
  - Budesonide (Entocort EC)
  - Short term
- Immunosuppressive
  - I.e. Azathioprine
- Biologics
  - I.e. Infliximab, adalimumab

## Ulcerative Colitis Major Options

- 5-Asa based compounds
  - Sulfasalazine
  - Mesalamine
- Steroids

## Diarrhea and Constipation

Meded101.com

## Changes in Regularity

- Diet
- Exercise
- Fluid intake
- Drugs
- Disease

### Medical Causes of Diarrhea

- C. Diff
- Viral
- Rare bacteria (giardia etc.)
- IBS

### Medical Causes of Constipation

- Hypothyroid
- IBS
- Parkinson's
- MS
- Colon Cancer

### Medications that Cause Diarrhea

- Metformin
- Acetylcholinesterase Inhibitors
- Antibiotics
- PPI's
- GLP-1
- Laxatives

### Medications that Cause Constipation

- Opioids
- Anticholinergics
- CCB's
- Bile Acid Sequestran
- Calcium/Iron

### Diarrhea Treatment

- Identify Cause
  - Medical?
  - Drug?
- Loperamide
- Diphenoxylate/atropine
- Bile acid sequestrans

### Constipation Treatment

- Non-drug (fluid, fiber, exercise)
- Docusate (prevention)
- Stimulants
- PEG
- Lubiprostone
- Lactulose
- Enemas
- Mineral Oil
  - \*\*Avoid

## Dysphagia

Meded101.com

## Dysphagia

- Difficulty swallowing
- Regurgitation
- Cough/Gag
- Choking/vomiting
- Weight loss

## Causes of Dysphagia

- Weakening of esophageal muscles
- Narrowing (stricture) of esophagus
- GERD
- Foreign Body

## Neurological Disorders Causing Dysphagia

- Neuro Disorders
  - Parkinson's
  - MS
- Aspiration pneumonia risk

## Management

- Treat GERD
- Liquid diet
- Feeding Tube

## GERD, PUD, and Dyspepsia

Meded101.com

## GI Risk Considerations

- GI Diagnosis
  - PUD (Don't forget about H. Pylori)
  - GERD
  - Heartburn
  - Barrett's
- Length of medication use
- Reason for initiation

## Proton Pump Inhibitors

- Incredibly common medication
- Often used for prophylaxis
- Often never reassessed
- Sometimes necessary long term

## PPI Risks

- Fracture
- C. Diff
- Low Magnesium
- Pneumonia
- B12

## H2 blockers

- Kidney disease
  - Dose adjustments
- Confusion/CNS effects with accumulation
- Cimetidine – bad idea

## Antacids

- Calcium containing products
  - Constipation
  - Binding interactions
  - Work quickly
  - Don't last long
  - Rare accumulation of calcium if frequent use
    - Combination with HCTZ

## Classic Medication Causes of GI Issues

- Steroids
- Bisphosphonates
- Digoxin toxicity
- NSAIDs
- Metformin
- Acetylcholinesterase inhibitors
- GLP-1
- Antibiotics

## Irritable Bowel Syndrome (IBS)

Meded101.com

### IBS versus IBD

- Irritable Bowel Syndrome
  - Similar symptoms
    - Diarrhea
    - Cramping
    - Pain
    - Constipation
- Irritable Bowel Disease
  - Marked by inflammation/damage
    - I.e. Crohn's or UC

### Treatment of IBS

- Antidiarrheal (if diarrhea)
- Fiber/fluids
- Osmotics (i.e. PEG)
- Anticholinergics
  - Dicyclomine, hyoscamine
- TCA's or SSRI
  - Remember which symptoms your treating (i.e. diarrhea or constipation)

## Nausea and Vomiting

Meded101.com

### Causes of Nausea and Vomiting

- Chemo
- Gastroparesis
- Motion Sickness
- Drugs
- Infection
- Severe Pain
- Migraine

### Challenges in Geriatrics

- Huge diagnostic differential
- Polypharmacy
- Easy to treat symptoms and hard to identify cause

## Medications for Nausea/Vomiting

- Ondansetron
  - Serotonin activity (5-HT3)
    - Rare issues, but look out for other serotonergic meds
  - Be cautious with other QTC Prolonging agents

## Dopamine Antagonists

- Meclizine
- Prochlorperazine
- Metoclopramide
  - May have serotonin activity as well
- \*Movement disorders

## Corticosteroids

- Dexamethasone
  - Chemo
  - Risks
    - GI Upset
    - OP, Cushing's, etc.

## Classic Medication Causes of Nausea/Vomiting

- Antibiotics
- Acetylcholinesterase inhibitors
- GLP-1
- Digoxin toxicity
- Opioids
- Metformin
- NSAIDs
- Iron
- Antidepressants
- Alcohol

## Pancreatitis

Meded101.com

## Pancreas

- Major roles
  - Digestive enzymes
  - Insulin

### Causes of Pancreatitis

- Gall stones
- Alcohol
- Infection
- High Triglycerides
- Medications

### Labs

- Elevation
  - Amylase
  - Lipase

### Medication Causes (Acute)

- Azathioprine
- Thiazides
- VPA
- Sulfasalazine
- Bactrim
- Tetracycline

### Treatment

- Treat the cause
  - Gallstone removal
  - Hypertriglycerides (500 or greater)
    - Fibrates
    - Niacin
    - Fish Oil
  - Digestive enzymes
  - ETOH treatment

## Common Drug Resistant Bacteria

Meded101.com

### MRSA

- Methicillin Resistant Staphylococcus Aureus
  - Community acquired
    - Resistant to Penicillins, cephalosporins
    - Oral options: Doxycycline, Clindamycin, Sulfa/tmp
  - Hospital medications
    - Vancomycin
    - Linezolid
    - Daptomycin (non-pneumonia)



## Other Gram Positives

- Strep Pneumo.
  - Gram Positive
    - Resistance to penicillins, cephalosporins
    - Alternatives: Levofloxacin or moxifloxacin (avoid ciprofloxacin), clindamycin, vancomycin (IV only)
- Vancomycin Resistant Enterococcus (VRE)
  - Linezolid, daptomycin alternatives

## Pseudomonas Aeruginosa

- Gram negative
  - Resistant to 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> generation cephalosporin's (exception ceftazidime), non antipseudomonal penicillins
  - Common Treatment
    - Quinolones (oral)
    - Pip/tazo
    - Meropenem
    - Colistin
    - Polymixin B

## Extended Spectrum Beta Lactamases

- Klebsiella
  - Resistance to 2<sup>nd</sup>/3<sup>rd</sup> generation cephalosporins
  - Alternatives:
    - Imipenem
    - Colistin
- E Coli.
  - Resistance to Bactrim, cephalosporins, quinolones
  - Nitrofurantoin, penems

## GI Infections

Meded101.com

## Infections

- 2 Classic Infections you need to know
  - Clostridium Difficile (C. Diff)
  - Helicobacter Pylori (H. Pylori)

## C. Diff

- Watery diarrhea
- Cramping
- Pain
- Blood (severe)
- Spores can last for weeks to months
  - Horrible for healthcare facilities with possible frail, at risk patients

## Medication Risks

- Antibiotics
  - Minimize duration
  - Minimize spectrum
- PPI's
  - Assess diagnosis for use
  - Risk/Benefit

## Treatment

- Metronidazole
- Vancomycin
  - Oral ok
- Fidaxomicin

## H. Pylori

- Major cause of GI ulcers
- Able to tolerate acid environment of stomach
- Symptoms
  - N/V
  - Abdominal pain
  - Weight loss
  - Burping

## Treatment

- Typically 10-14 days
- Different regimens (see next slide for combo's)
  - Amoxicillin
  - Clarithromycin
  - Metronidazole
  - Bismuth
  - Tetracycline

## Treatment

- OAC (Prevpac contains lansoprazole instead of omeprazole)
- MOC
- BMT

## Influenza

Meded101.com

## Influenza Pearls

- Very contagious
- Institutionalized patient at high risk of transmission
- Vaccination
- Prophylaxis in an outbreak
- Mutations
- Elderly at higher risk for complications
  - Secondary pneumonia

## Medications

- Antiviral – Neuraminidase Inhibitor
  - Prevents replication
- Oseltamivir
  - Drug of choice for treatment and prevention
  - Sooner the better with treatment (less than 48 hours)
  - Expensive
  - Watch kidney function/dose adjustments
  - Lower dose for prophylaxis
  - GI, psych changes as most common AE's

## Osteomyelitis

Meded101.com

## Osteomyelitis

- Infection of the bone
- Redness/swelling/pain at site
- Fever
- Long length of treatment

## Risk Factors

- Diabetes
- Immunosuppressed
  - Chemo
  - Corticosteroids
  - Biologics
- Illicit drug use
  - I.e. dirty needles
- Recent trauma or surgery

## Procedures

- Debridement
- Improving blood flow
- Amputation

## Bacteria

- Most common: Staphylococcus
  - Need to be aware of MRSA (vancomycin, linezolid)
  - MSSA (Penicillins)
- Gram negatives possible
  - Quinolones
- Tough infections to treat
  - Likely at least 4-6 weeks on initial infection
  - Recurrent infections might require life long prophylaxis

## Effective antibiotics

- Orals
  - Pencillin(s) - MSSA
  - Clindamycin
  - Sulfamethoxazole/trimethoprim
  - Rifampin (used to prevent reinfection, prosthetic)
  - Vancomycin (inpatient, empiric gram positive)
  - Linezolid
    - MRSA/VRE
  - Quinolones (gram negative)

## Pneumonia

Meded101.com

## Common Bugs

- Strep. Pneumoniae
- H. Flu
- Staph Aureus
- M. Cat
- Atypical
  - Legionella
  - Mycoplasma

## Risk Calculator for Hospitalization

- CURB-65
  - Confusion
  - Urea >20
  - Respirations >20/min
  - BP <90 or diastolic <60
  - Age >65

## Vaccination

- Polysaccharide-23 Vaccine
- Conjugate-13 Vaccine
- Influenza

### Healthcare Associated

- Hospitalization
- Long term care
- Bugs to be fearful of
  - MRSA
  - Resistant gram negatives

### Community Acquired Treatment

- Macrolide
- Macrolide +/- beta lactam
- Doxycycline
- Respiratory fluoroquinolone

### Risk Factors – Resistant Pathogens

- Previous antibiotic use
- Hospitalization
- Immunosuppressive deficiency
- Spreading in the community

### Coverage for MDR Organisms

- Pseudomonas
  - Ceftazidime
  - Pip/Tazo
  - Cefepime
- MRSA
  - Vancomycin
  - Linezolid

### Outpatient MDR Organisms

- MRSA
  - Bactrim
  - Clindamycin
  - Linezolid
- Pseudomonas
  - Quinolones

### Skin and Soft Tissue Infections

Meded101.com

## Important Bugs

- Staphylococcus
- Streptococcus
- Pseudomonas

## Cellulitis

- Beta-hemolytic Streptococcus
- MSSA
  - Drugs
    - Cephalexin
    - Penicillin
    - Clindamycin

## Pseudomonas and MRSA Empiric

- Pseudomonas
  - Quinolones
- MRSA
  - Clindamycin
  - Sulfa/TMP
  - Tetracycline

## Animal/Insect Bites

- P. mutocida
  - Amox/clav
  - Doxycycline
- Lymes
  - Doxycycline
  - Amoxicillin

## Tuberculosis

Meded101.com

## Tuberculosis

- Latent
  - No symptoms
  - Not contagious
- Active
  - Cough
  - Fever
  - Fatigue
  - Weight loss
  - Contagious

## Immunosuppression and TB

- Most immune systems will suppress the infection
  - TB goes from latent to active in immunosuppressed
- HIV/AIDS
- Chemo
- Transplant
- Biologics
- Elderly

## Drugs

- Isoniazid
- Rifampin
- Ethambutol
- Pyrazinamide

## HIV/AIDS

Meded101.com

## HIV/AIDS Pearls

- Drug resistance
  - Frequent mutations
  - Adherence CRITICAL
- Immune Deficiency
- Rare, opportunistic infections
- Monitoring
  - CD4 counts

## Opportunistic Infections

- PCP (Pneumocystis pneumonia)
  - Sulfa/TMP
  - Glucocorticoids
- Kaposi Sarcoma
  - Chemo or radiation
- MAC
  - Macrolide
  - Ethambutol
  - Rifampin

## CD4 Count

- CD4 Count
  - 500-1500 is normal
  - Following trend
  - Lower = higher risk for infection
- If less than 200
  - PCP prophylaxis
- If less than 50
  - MAC prophylaxis

## Medications for HIV/AIDS

- NRTI (Nucleoside)
  - Abacavir, Emtricitabine, Lamivudine
  - Adverse Effects: Fat redistribution (lipodystrophy –i.e. buffalo hump), lactic acidosis, fatty liver
- NRTI (Nucleotide)
  - Tenofovir
  - Adverse Effects: lactic acidosis, fatty liver, may increase cholesterol and decrease bone mineral density

## Protease Inhibitors

- Atazanavir, Darunavir, Fosamprenavir, Lopinavir/Ritonavir
  - Lipodystrophy (buffalo hump)
  - CYP3A4 interactions
  - Rash
  - Hyperglycemia
  - (Ritonavir is a booster – increases conc. Of lopinavir)

## NNRTI's

- Efavirenz
  - Rash
  - CNS changes
    - Mood/Depression
  - Liver

## Urinary Tract Infections

### Definition

- UTIs in women are defined as at least 100,000 colony-forming units (CFU)/ml in a pure culture of voided clean catch urine
- In men, the presence of just 1,000 CFU/ml indicates a UTI

### UTIs of Special Interest in the Elderly

- Asymptomatic bacteriuria:  $>10^5$  bacteria in the urine without symptoms
- Recurrent UTIs: culture confirmed UTIs with a frequency of  $>3$  in 1 year or  $>2$  in 6 months.
  - Relapse occurs within 2 weeks of treatment and is caused by the same pathogen
  - Reinfection occurs  $>4$  weeks after an earlier UTI and usually involves a different pathogen
- Catheter-Associated UTIs



### Common Pathogens

- E. coli (70-80%)
- Proteus mirabilis
- Staphylococcus saprophyticus
- Klebsiella pneumoniae

### Pharmacologic Prophylaxis

- Regimens
  - Bactrim/Septra double strength 3x/week or single strength QD
  - Trimethoprim 100 mg QD
  - Macrobid (nitrofurantoin) 100mg QD

### Non-Pharmacologic Prophylaxis

- Cranberry juice
  - 300 ml/day of standard juice or 60 ml/day of concentrated juice
  - 400 mg QD of cranberry extract
  - Common side effect: calcium oxalate kidney stones

### Antibiotics

- Common treatment regimens include:
  - Trimethoprim/Sulfamethoxazole
  - Nitrofurantoin monohydrate/macrocrystals
  - Ciprofloxacin and other fluoroquinolones
  - Third-generation cephalosporins

### Treatment Regimens for Uncomplicated UTIs

- TMP-SMX 160/800mg BID for 3-14 days
- Trimethoprim 100 mg BID for 3-14 days
- Ciprofloxacin 250 mg BID for 3 days
- Levofloxacin 250 mg QD for 3 days
- Nitrofurantoin 100 mg BID for 7 days
- Fosfomycin 3 grams x 1 dose
- Cefpodoxime 100 mg BID for 3 days

### Treatment of Complicated UTIs

- Usually a 7-14 day treatment for mild cases
- Symptomatic cases require hospitalization and IV antibiotics
- Fluoroquinolones are preferred choices:
  - Cipro 500mg BID for 7 to 14 days
  - Levaquin 250 mg for 10 days or 750mg QD for 5 days
- Extended-spectrum beta lactams:
  - Rocefin (ceftriaxone) 1-2 grams IV/IM q24h or in divided doses twice a day
  - Fortaz (ceftazidime) 500mg IV/IM q8-12h

### Trimethoprim-Sulfamethoxazole (TMP-SMX)

- Considered 1<sup>st</sup>-line for uncomplicated UTIs
- Good activity against many pathogens (except *Enterococcus* species)
- Growing resistance to *E.coli* (20%)
- Common side effects: GI upset and rash
- Crystalluria may occur- take with a full glass of water
- Contraindicated in patients with sulfonamide allergies
- Syrup available

### Fluoroquinolones (ciprofloxacin and levofloxacin)

- Effective against gram (-) organisms, but only fair coverage against gram (+)
- Administer antibiotics at least 2 to 4 hours before or 6 hours after antacids or other products containing calcium, iron, or zinc.
- Common side effects: N/V/D
- Rare side effect: tendonitis
- Avoid excessive exposure to sunlight
- Reduce the dose by half if CrCl < 30 ml/min
- Caution: may increase effects of warfarin

### Nitrofurantoin (Macrobid)

- Provides good antibacterial coverage
- Common side effects: N/V/D
- Take with food- increases serum concentrations
- Avoid alcohol
- May discolor urine brown
- Notify physician if fever, chest pain, dyspnea, cough symptoms occur
- Contraindicated in patients with CrCl < 60ml/min

### Fosfomicin

- Studies showed equally effective to nitrofurantoin and TMP-SMX
- Can be given as a single dose
- Expensive- not generally used

### Reminder

- Warfarin does interact with antibiotics.
- Follow up with appropriate labs (INR) at least 3 to 7 days after discontinuation of antibiotic

Anxiety

Meded101.com

### What is There to Worry About?

- Death
- Finances
- Family
- Social

### Association of Anxiety

- PTSD
- Substance Abuse
- OCD

### Assessment

- GAD-7
  - 7 questions
  - Example: Feeling afraid something awful might happen
  - Scored from 0-3 for each question
    - Not at all
    - Several days
    - More than half the days
    - Nearly every day
  - Higher the score the worse
  - Obviously might not work in our dementia type patients

### Acute Treatment

- Identify underlying cause
  - Pain
  - Infection
  - Hyperthyroid
  - Medications

### Medications

- SSRI's
- Benzo's
- Buspirone
- Other antidepressants

### SSRI's

- Won't work quickly
- Preferred for long term maintenance over benzo's
- Selection based upon adverse effects

## Benzodiazepines

- Work quickly
- Controlled substance
- Avoid Long Acting
- LOT
  - Less likely to accumulate
  - Inactive metabolites

## Buspirone

- Usually well tolerated
- Takes time to work
  - Similar to SSRI's
- Not a controlled substance

## Bipolar Disorder/Schizophrenia

Meded101.com

## Acute Mania Treatment

- Antipsychotics
- Valproic Acid
- Lithium

## Lithium

- Target Concentration
  - Acute 0.8-1.2
  - Maintenance 0.6-1.0
- AE's
  - GI
  - Tremor
  - Slurred Speech
  - TSH
  - Kidney function

## Bipolar Depression

- Lamotrigine
- SSRI's
  - Can induce mania
  - Often used with mood stabilizer (i.e. Lithium, VPA, Carbamazepine)

## Schizophrenia

- Elderly Adults
  - Likely tried numerous agents
  - May be able to or have to decrease doses
- Metabolic Syndrome
- TD risk

## Antipsychotics

- Typical
  - Haloperidol
- Atypicals
  - Risperidone
  - Quetiapine
  - Aripiprazole
  - Clozapine
  - Olanzapine
  - Ziprasidone

## Side Effect Profile, Clinical Considerations

- Sedation
- Weight Gain
- EPS
- Prolactin
- Anticholinergic
- Agranulocytosis
- QTC prolongation

## Depression

Meded101.com

## Depression – Kind of a Big Deal

- Suicide (males)
- Circumstances
  - Finances
  - Living alone
  - Aging
- Loss of Family/Friends

## Common Diseases That Increase Risk of Depression

- MS
- Parkinson's
- Dementia
- Cancer
- Hypothyroid
- Nutritional factors
  - B12

### Antidepressant Pearls

- Take time to work
- Selection
  - Adverse effects
  - Compelling indications
- Monitoring
  - PHQ-9

### Common SSRI's

- Sertraline
- Escitalopram
- Citalopram
- Fluoxetine
- Paroxetine
- Fluvoxamine

### Common SNRI's

- Duloxetine
- Venlafaxine

### Trazodone/Nefazodone

- Nefazodone – rare use, hepatotoxic
- Trazodone
  - Low doses insomnia
  - Orthostasis
  - Dry mouth
  - Sedation

### Mirtazapine

- Weight gain
- Sedation
  - Lower doses

### Bupropion

- Smoking cessation
- Activating
- Caution - Seizure disorder

## TCA's – lots of them!

- Nortriptyline
- Desipramine
- Amitriptyline
- Imipramine

## Less Common Antidepressants

- Serotonin modulators and stimulators
  - i.e. vilazodone
- MAOI's
- Antipsychotic augmentation
- OTC's
  - St. John's Wort

## Insomnia

Meded101.com

## Insomnia Concerns

- Common Complaint
- Troubles
  - Getting to sleep
  - Staying asleep
- Quality of Life
- Motivation

## Non-Drug Interventions

- 1<sup>st</sup> Line Therapy
- Sleep Hygiene
  - Regular schedule
  - Snacks/warm milk
  - Avoiding Caffeine near bedtime
  - Minimize stimulation before bed
  - Exercise earlier in the day
  - Pain
  - Avoiding other stimulants

## Pharmacotherapy

- Z-drugs
- Anticholinergics
- Melatonin
- Trazodone
- Benzo's
- Ramelteon
- Mirtazepine
- Suvorexant

## Z-Drugs

- Fall risk
- Confusion
- Risk of dependence

## Anticholinergics

- Retention
- Dry eyes
- Dry mouth
- Constipation
- Fall risk
- Confusion (interacts with dementia meds)

## Trazodone and Mirtazapine

- Trazodone
  - Usually higher doses required for antidepressant effect
  - Orthostasis
  - Dry mouth
- Mirtazapine
  - Low dose
  - Weight gain

## Melatonin

- OTC
- Tends to regulate the sleep cycle
- Some patients use as needed

## Antipsychotics for Sleep

- Can be sedating
- Always avoid unless compelling indication
  - Hallucinations unresolved by other methods
  - Schizophrenia

## Substance Abuse

Meded101.com



### Most Common Substance Abuse

- Alcohol
- Prescription Drugs
  - Opioids
  - Benzo's

### Signs of Alcohol Abuse

- Higher tolerance
- Blackouts
- Concerns from friends/family
- Legal or financial issues
- Liver disease

### Alcohol Addiction

- Loss of control
- Lack of other interests
- Withdrawal symptoms
  - Sweating, shaking, anxiety
- Guilt
- Worry
- Change in relationships

### Prescription Drug Misuse

- Using for legitimate reason, but not under supervision of a healthcare provider
- Medication hoarding
- Opioids, Benzo's

### Signs of Opioid Withdrawal

- Withdrawal when stopping use
  - Nausea
  - Sweating
  - Anxiety
  - Insomnia
  - Chills
  - Irritability

### Benzodiazepine Withdrawal

- Anxiety
- Irritability
- Tremor
- Confusion
- Nausea
- \*Seizures
- Psychosis

## Multiple Sclerosis

Meded101.com

## Interferon

- Disease modifying
- Adverse drug reactions
  - Injection site reaction
    - Flu-like symptoms
    - Fever
    - Pain

## MS Complications

- Spasms/pain
  - Baclofen
  - Tizanidine
  - NSAIDs
  - Acetaminophen

## Bladder/Bowel Issues

- Spasms/Incontinence
  - Anticholinergics
- Constipation

## Other Associated Risks

- Mood disorders
  - Depression
- Epilepsy

## Parkinson's Disorder

Meded101.com

## Parkinson's Symptoms

- Tremor
- Rigidity
- Akinesia
- Postural instability
- Can be challenging to diagnose
  - Trial Sinemet

## Drugs for Parkinsons

- Sinemet
- Dopamine Agonists
- MAOI's
- COMT's

## Sinemet

- Gold Standard
- Frequent dosing
  - CR product available
- GI
- Psych AE's
- Orthostasis
- Drug/Food interaction - protein

## Dopamine Agonists

- Ropinerol, pramipexole
- RLS treatment
- Orthostasis
- Edema

## COMT's and MAOI's

- COMT's
  - Preserve levodopa
  - Need to be dosed with Sinemet
  - May need to reduce dose of Sinemet
- Entacapone, tolcapone
  - Tolcapone – liver toxicity

## Drug Induced

- Antipsychotics
  - Typicals – the worst
  - Quetiapine – the best
- Reglan
  - Used for GI problems, but DA blocking activity

## Seizures

Meded101.com

### Causes of Seizures

- CVD
- Dementia
- Trauma
- Cancer
- Withdrawal
  - Benzo's
  - Barbiturates
  - ETOH

### Medications that Increase Seizure Risk

- Bupropion
- Tramadol
- Cancer medications
- Hypoglycemia
- Antipsychotics
- Stimulants

### Common Seizure Medications

- Phenytoin
- Levetiracetam
- Carbamazepine
- Lamotrigine
- Valproic Acid
- Topiramate

### Phenytoin

- Complex Kinetics
  - Dose depending increase in concentration
  - Small doses can lead to disproportionately large increases in drug levels
- Free versus total levels
  - 1-2, 10-20
- Vitamin D deficiency
- General toxicity symptoms similar to alcohol
  - Vertical nystagmus
- Enzyme inducer
- Gingival Hyperplasia

### Carbamazepine

- Enzyme inducer
- Hyponatremia
- Bipolar and trigeminal neuralgia
- Bone loss
- Levels
  - 4-12
- Cousin \*oxcarbazepine

## Levetiracetam

- Watch kidney function
- Drug levels not routinely done
- Adjust dose based upon SE's/seizures
- Less drug interactions
- SE's; sedation, confusion, GI, behavioral changes, increase in BP

## Lamotrigine

- Very slow dose titration
- Interaction with Valproic acid and enzyme inducers
  - Quicker titration with enzyme inducers like phenytoin
  - Slower titration with VPA
- Drug induced rash (SJS)
  - Life threatening

## Topiramate

- Cognitive slowing
- Weight loss
- Migraine indication

## Valproic Acid

- Weight gain
- GI
- Hair loss
- Rare (ammonia elevations, LFTs, thrombocytopenia)
- Migraine, Bipolar indications, might also see off label for aggressive type behaviors versus use of antipsychotics

## Shingles

Meded101.com

## Shingles

- Caused by Varicella Zoster virus
  - Chicken pox
  - Reactivation
- Painful skin rash/reaction
  - Inflammation of nerve
  - Blisters

## Treatment

- Vaccination (prevention)
- Antiviral treatment
  - Get started ASAP
  - Acyclovir
  - Valacyclovir

## Antivirals

- Acyclovir dosed 5 times/day
- GI SE's
- CNS toxicity rare, but possible
  - More likely with poor kidney function

## Pain Management

- Gabapentin
- Pregabalin
- TCA
- Topical
  - Capsaicin
  - Lidocaine

## Stroke and TIA's

Meded101.com

## Types of Stroke

- Hemorrhagic
- TIA
- Ischemic
  - Local (Atherosclerotic)
- Heart (Atrial Fibrillation)

## Classic Signs

- Face drooping
- One sided arm weakness
- Slurred Speech
- Confusion
- Vision changes
- Fall

### Classic Risk Factors

- Hypertension
- Smoking
- Atrial Fibrillation
- Diabetes
- Hyperlipidemia
- Age
- Genetics

### Prevention of Stroke

- Manage modifiable risk factors
  - Hypertension
  - Smoking
  - Weight loss
  - Diabetes
  - Statins

### Antiplatelet Versus Anticoagulant

- Avoid warfarin
  - \*Major exception – Atrial Fibrillation
- Antiplatelet

### Options for Non-Cardioembolic Stroke

- Aggrenox (Aspirin/Dipyridmole)
- Clopidogrel
  - Ticlopidine - neutropenia
- Aspirin

## Tremor

Meded101.com

### Essential Tremor

- Rhythmic, consistent movement of body part
  - Often hands
- Consistent frequency
- Severity can vary
- Interfere with life activities

## Treatment

- Propranolol
  - Pulse
  - BP
  - Selectivity for beta receptors
- Primidone
  - Phenobarbital is metabolite
  - Sedation
  - Confusion
  - Fall risk

## Drug Induced Tremor

- Lithium
- Beta-agonists
- Theophylline
- Hyperthyroidism (or over supplementation)
- VPA

## Acute Coronary Syndromes

Meded101.com

## ACS

- STEMI
  - S-T Elevation
  - Biomarkers
- Non-STEMI
  - No S-T Elevation
  - Biomarkers
- Unstable Angina
  - Chest pain at rest
  - New onset, limits activity
  - Increase or worsening in symptoms
  - No Biomarkers

## Symptoms of MI

- Chest pain
- Pressure
- SOB
- N/V
- Fainting
- Women can present with atypical symptoms

## Causes of MI

- CAD
- Plaque Buildup
- Spasm
- Coronary artery embolism



## Classic Medications

- Aspirin
- P2Y12 inhibitors (i.e. clopidogrel)
- ACE or ARB
- Beta-blocker
- Statin
- Nitrates (used acutely)

## Elderly Challenges

- Adherence
- Bleed Risk
- Hypotension/Falls
- When to DC statins

## Atrial Fibrillation

Meded101.com

## Symptoms of Atrial Fibrillation

- General fatigue
- Rapid and irregular heartbeat
- Fluttering or "thumping" in the chest
- Dizziness
- Shortness of breath and anxiety
- Weakness
- Faintness or confusion
- Fatigue when exercising

## Classification of AFib

- Paroxysmal (<7 days)
- Persistent (>7 days and won't go back to normal on its own)
- Permanent (continuous Afib)

## Controlling Rate

- Beta-blockers
- Calcium Channel Blockers
- Digoxin

### Clinical Medication Pearls

- Beta-blockers
  - Usually first line
  - Generally avoid non-selective unless compelling indication
- Calcium Channel Blockers
  - Non-dihydropyridines
  - Heart failure risk
- Digoxin toxicity
  - GI symptoms, CNS, weight loss, bradycardia
  - Renal elimination
  - Target concentration <1ng/mL vs. CHF (0.5-0.8)

### Rhythm Control

- Potassium Channel Blockers
  - Amiodarone
- Sodium Channel Blockers
  - Flecainide (Tambacor\*)
  - Propafenone (Rythmol\*)

### Amiodarone Pearls

- Extremely long half life
- Liver toxicity
- Pulmonary toxicity
- Thyroid impact

### Anticoagulation

- Clot formation is one of the major risks with atrial fibrillation
- To be discussed further – see anticoagulation section

### CHF

Meded101.com

### CHF Characteristics

- Inability to effectively pump blood
- Elevated BNP (or pro-BNP)
- SOB, cough
- Fatigue, weakness
- Edema

## Medications Frequently Used in CHF

- Diuretics
  - Loops
  - K<sup>+</sup> sparing
  - Thiazide Like
- ACE/ARBs
- Beta-blockers
- Digoxin

## Loops

- Furosemide
- Mainstay of therapy
- Fluid loss
- Risks
  - Electrolyte depletion
  - Dehydration/Kidney Failure
  - Frequent urination

## Aldosterone Antagonists

- Spironolactone, Eplerenone
- Hyperkalemia
- Gynecomastia
- 100mg spironolactone/40 mg furosemide

## Thiazide Like

- Metolazone
  - Often used as needed
  - Used to augment furosemide
  - Significant hyperkalemia risk when used with furosemide
  - Sometimes only need to use once or twice/week
- True thiazides (i.e. HCTZ)
  - Generally not used for CHF/fluid loss
  - Likely not as beneficial with CrCl <30

## Beta-blockers/ACE Inhibitors

- See Hypertension for more clinical breakdown
- Generally try to push the dose
  - Not that easy in the elderly
  - Falls
  - Weakness
  - Kidney function

## Digoxin in CHF

- Increased mortality at higher levels
- Target 0.5-0.8
- Monitor closely
  - Changing renal function
  - Symptoms of toxicity

### Classic Drugs that Exacerbate CHF

- NSAIDs
  - Sodium retention
  - Also risk of Kidney damage with ACE/Diuretics on board
- CCB's
  - Increase edema
- TZD's
  - Pioglitazone

### Coronary Heart Disease

Meded101.com

### Coronary Heart Disease

- Atherosclerosis
- Plaque formation
- Hardening of the arteries

### Goal – Reduce Risk of MI/Stroke

- Platelet inhibitors
- Statins
- Smoking Cessation
- Weight loss
- Anti-angina medications
- Antihypertensives

### Antiplatelet medications

- Aspirin
- ADP inhibitors
  - Clopidogrel
  - Prasugrel

### Statin Consideration

- Adherence is critical
- Past history
- Some recommended to be dosed at night and some aren't
- Cost
- Life expectancy

### Anti-Angina Medications

- Nitrates
  - Long acting
  - Short acting
- Beta-blockers
- CCB's

### Antihypertensive Therapy

- ACE/ARB
- CCB
- Beta-blocker

## DVT/PE

Meded101.com

### Risk Factors for DVT/PE

- Patient history
- Hypercoagulable Disorders
- Immobility
- Atrial Fibrillation
- Medications
- Smoking
- Cancer

### Medications – Increased Risk of DVT/PE

- Estrogen
- Megesterol
- SERM

### Important Considerations DVT/PE Treatment

- Drug Selection
  - LMWH
  - Heparin
  - NOACs
  - Warfarin
- Acute phase versus maintenance
- Length of Therapy
  - First Episode (usually 3 months)
  - Known Cause
  - Risk Factors

## Hypertension Pearls

Meded101.com

## Complications/Risks

- MI
- Stroke
- Kidney
- Vision
- Heart Failure
- Aneurysm

## Goals

- JNC-8
  - <150/90
  - Exception: 140/90
    - CKD
    - Diabetes

## Drug Induced Hypertension

- NSAIDs
- Stimulants
- Corticosteroids
- Estrogen
- SNRI's
- ESA's

## Hypertension Medications

Meded101.com

## ACE Inhibitors

- Common Side Effects
  - Cough
  - kidney impairment
  - low blood pressure
  - hyperkalemia

### Clinical Pearls

- ACE inhibitors can exacerbate CKD, but can also help be renal protective
- Lisinopril most commonly used
- Classic medication cause of angioedema (extremely rare)
- In some cases, African Americans may not respond to ACE Inhibitors as well as other ethnicities
- Avoid ACE/ARB combo

### Compelling Indications

- Diabetes
- Stroke
- CAD
- CKD
- CHF

### Angiotensin Receptor Blockers

- Losartan
- Valsartan
- Irbesartan

### ARB Clinical Pearls

- Think ACE minus the cough
  - Hyperkalemia
  - Kidney function
  - Angioedema
  - Similar compelling indications

### Thiazide Diuretics

- Memorable Side Effects
  - Increase urine output
  - Frequent urination
  - Electrolyte depletion
  - Low blood pressure
  - Hyperuricemia
  - Hypercalcemia
  - Increased risk of kidney failure

### Use Caution

- Gout
- Poor kidney function (CrCl <30)
- Timing near night
- Hyperglycemia

### Calcium Channel Blockers

- Dihydropyridines – amlodipine, nifedipine, felodipine
- Non-dihydropyridines – verapamil, diltiazem
- Dose dependent edema
- Constipation
- Simvastatin interaction

### Calcium Channel Blockers

- Compelling Indications
  - Angina
  - Atrial Fibrillation (diltiazem, verapamil)
  - CVD risk
- Caution
  - Heart failure

### Beta-Blockers

- Cardioselective
  - Metoprolol
- Non-selective
  - Propranolol
- Alpha and Beta blockade
  - Carvedilol

### Beta-blockers

- Compelling Indications
  - CHF
  - MI
  - Angina
  - Afib

### Beta-blocker Pearls

- Asthma
- Pulse
- Hypoglycemia masking
- Non-selective uses
  - Tremor
  - Esophageal varices
  - Thyroid storm
  - Migraine

### Alpha-Blockers (for hypertension)

- Doxazosin
- Prazosin
- Terazosin



## Alpha-Blocker Pearls

- Orthostasis
- BPH compelling indication
- Typically dosed at night
- Prazosin off label for nightmares

## NOACs

Meded101.com

## Factor 10A Inhibitors

- Gaining popularity
- Drug interactions
- Less monitoring
  - Is that good or bad?
- When might you not choose them
  - Prosthetic valves
  - Adherence issues (t ½ longer for warfarin)
  - CKD

## Factor 10A Inhibitors - Differences

- Rivaroxaban
  - Once daily
  - 3A4/P-glycoprotein interactions possible
  - <30mls/min avoid use
- Apixaban
  - Twice daily
  - Possible dose adjustments based upon age, creatinine, weight
- Edoxaban
  - >95 mls/min boxed warning (stroke)
  - Once daily

## Dabigatran

- Direct Thrombin Inhibitor
- GI bleed risk >75 y/o
- Reversal agent available
- Dose adjustment in CKD
- Twice daily

## Peripheral Vascular Disease

Meded101.com

### Factors That Can Contribute to PVD

- Atherosclerosis
- Hypertension
- Clot formation
- Viscosity of the blood

### Peripheral Vascular Disease

- Ischemia
- Sharp, stabbing pain
- Pedal pulses absent
- Intermittent claudication
- Risk Amputation

### Medications

- Blood thinners
- Statins
- Pentoxifylline
- Cilostazol
- Antihypertensives

### Warfarin

Meded101.com

### Warfarin Common Indications

- Atrial Fibrillation (2-3)
- DVT/PE (2-3)
- Prosthetic Mechanical Mitral Valve
  - 2.5-3.5
- Lower goals
  - High bleed risk
  - High fall risk

### Warfarin - Pharmacokinetics

- Metabolized by
  - S-warfarin: CYP 2C9 (potent)
  - R-warfarin: CYP 1A2, 2C19, 3A4
- Bound to albumin
- Half-life = 36-42 hours

### Warfarin – Adverse Effects

- Bleeding
- Purple Toe Syndrome
- Don't load warfarin

### Warfarin –

How long does it take to work?

- Half-life of clotting factors
  - II 60 hrs (prothrombin)
  - VII 6 hrs
  - IX 24 hrs
  - X 40 hrs (reduction of II and X = prolongation of PT)
- Half-life of anticoagulants
  - Protein C 6 hrs
  - Protein S 72-96 hrs

### Causes of INR Variation

- Adherence
- Diet
- Drug Interaction
- Changes in Disease States
  - Liver
  - CHF
  - Fever

### Vitamin K

- Elevated INR and bleeding
- INR greater than 9
- Not going to work instantly
- Transfusion for acute, severe blood loss
- INR 5-9, no bleeding
  - May give vitamin K, don't have to

### Activities of Daily Living and Instrumental Activities of Daily Living

### Activities of Daily living (ADL's)

- Feeding
- Dressing
- Grooming
- Toileting
- \*necessary for survival

## Instrumental Activities of Daily Living (IADL's)

- Financial management
- Following directions/medication management
- Meal preparation and planning
- \*not necessarily required for survival, but necessary to be able to function independently in society

## Disease Progression

- IADL's will typically become more challenging before ADL's
- Inability to perform IADL's can lead patients to be very vulnerable to financial elder abuse
- ADL's will typically become more challenging with nearing end stage of the disease process
- IADL and ADL will help determine level of care needed
  - Home care
  - Assisted living
  - Nursing home care

## Advance Directives

## Advance Directives

- Patient wishes for their healthcare
- Will outline certain situations and how much and what type of care the individual will want
- Written document
- Designates an "agent"

## Medical Requests

- Must be reasonable medical practice
- Usually preference regarding common things are spelled out
  - Types and extent of medical treatment desired
  - CPR
  - Ventilation
  - Tube feedings
  - Medication use
  - Hydration

## Advance Directive

- Agent – person who carries out wishes of patient
  - MUST FOLLOW THEIR DESIRES
- In the event of an unforeseen scenario
  - Agent must follow wishes to the best of their ability as to what the patient would want
- Agent
  - Needs to be 18 years old
- Not mandatory to have advance directives

## Beer's List

### Cardiology

- Alpha Blockers
  - Non-selectives
  - Avoid for just hypertension
    - Possible role in BPH
- Central acting
  - Clonidine
- Digoxin – dose limit
- Antiarrhythmics
  - Flecainide
  - Propafenone
  - Amiodarone

### Anticholinergics

- TCA's
- 1<sup>st</sup> Generation antihistamines
- Parkinson's disease

### Analgesics/Antispasmodics

- Skeletal Muscle relaxants
  - Methocarbamol
  - Cyclobenzaprine
- NSAIDs
- Meperidine

### CNS Medications

- Antipsychotics
- Sleepers
  - Z-drugs
  - Anticholinergics
- Benzo's
- Barbituates

### Endocrine/Women's Health

- Endocrine
  - Sliding Scale
  - Sulfonylureas
    - Chlorpropamide
    - Glyburide
- Women's health
  - Estrogen replacement

## Gastrointestinal

- Metoclopramide
- Mineral oil
- Megestrol

## Basic Biostatistics 1

## Types Of Data

- Nominal
- Ordinal
- Continuous

## Hypothesis Testing

- P-value – probability that what you found in your study is not true in reality
- Ho – Null hypothesis
- Ha – Alternative hypothesis

## Example P-value

- Dementia drug improves activities of daily living scores
  - Compared against placebo
  - Ho = no difference
  - Ha = there is a difference
- P = 0.03
  - 3% chance that your study is wrong
  - P-value is less than 0.05, so Ha is accepted

## Type 1 and Type 2 error

- Alpha
  - Detecting a difference in your study when one doesn't exist (Type 1 error)
- Power
  - 1-beta
    - Beta is usually set at 0.2 or studies are usually powered at the 80% level
  - How likely are you able to detect a difference
  - Type 2 error – you didn't find a difference but one exists

## Biostatistics 2

### Clinical Literature outline

- Abstract – nutshell summary
- Intro – What are you investigating, what is the problem you are concerned with
- Methods/Materials – How did you look at trying to solve the problem
- Results – What happened, what did you learn
- Discussion – Interpretation of what your results mean

### Risk

- Absolute Risk Reduction
  - Difference in percentage reduction from each group
  - Patient on Ranitidine – 2/100 got esophageal cancer
  - Patient on placebo – 5/100 got esophageal cancer
- Relative Risk Reduction
  - 2/100 divided by 5/100
  - Or  $0.02/0.05 = 0.4$  or 40% relative risk reduction

### Number Needed to Treat and Harm

- Number needed to treat = NNT
- $NNT = 1/ARR$
- $NNH = 1/ARI$
- The higher the NNT, the less “effective” a treatment is
- The higher the NNH, the safer the medication is

### Need More on Biostatistics?

- Practice questions
- Sample scenarios
- <https://www.meded101.com/downloads/bcps-statistics-study-guide/>

### Caregiver Stress and Burnout

## Caregiver education

- Understand what the patient is going through
- Expectations
  - Based upon disease progression
- Caregiver support
- Burnout

## Caregiver Burnout

- Significant Stress
- Insomnia
- Frustration/anger
- Anxiety
- Guilt
- Risk for abuse

## Ways to Improve/minimize burnout

- Accept help/recommend help
- Identify realistic goals
  - Identify things that the caregiver can actually do
- Support groups
- Take breaks and continue to do activities that bring the caregiver enjoyment

## Elder Abuse

## Elder abuse

- Neglect
  - Social isolation
  - Ignoring needs
  - Most common
- Physical abuse
  - Includes over medicating
  - Blunt trauma/injuries
  - Restraints

## Elder abuse

- Financial scheming
  - Often done by family or caregivers
    - They often rationalize
  - Outside schemes possible
- Verbal (threats, intimidation)
  - Fear
  - Scared to speak with others
  - Isolating



## What to do if suspect elder abuse

- Call 911 if IMMEDIATE risk of harm
- Contact social services
  - Adult protective services
  - May have different name depending upon state/country/region
- If concerned in a long term care facility or assisted living
  - Contact ombudsman
- Healthcare professionals are generally considered mandated reporters
  - Report if you suspect that abuse is happening

## Hospice Care

## Hospice

- Life expectancy less than 6 months
  - Determined by usual progression of disease
  - Physician/hospice may work together to make determination
- Possible indicators that hospice care may be warranted
  - Clear disease progression (NYHA stage 4)
  - Frequent healthcare visits (particularly ER, hospitalization)
  - Weight loss
  - CHF, COPD, Dementia, Parkinson's, Renal failure, cancer, AIDS, ALS, liver disease

## Medications to Discontinue

- Statins
- Osteoporosis medications
- Herbals/supplements/vitamins
- Dementia medications
- Look at goals
  - A1C
  - Blood pressure

## Careful with Abrupt Discontinuation

- Beta-blockers
- Clonidine
- Seizure meds
- Long term corticosteroids
- Benzo's
- Opioids – likely not going to discontinue

## Patient/Team/Family Decisions

- Listen to patient/family
  - What do they want?
  - Ask open ended questions?
- Listen to nursing/caregivers
- Relax goals, minimize meds, simplify life
- Administration challenges
  - Oral intake

## Long Term Care Players

### Structure

- Administration
- Nurse leadership (Director of Nursing – DON or DNS)
  - Nurse managers/unit managers
- Medical Director (in smaller facilities may not be that engaged)

### Administration

- Pays your wages
- Important to stay on their good side
- Demonstrate your value
- Attend meetings
- Offer solutions and education
- Concern with medical director (possibly will address this with director of nursing)

### Director of Nursing

- Likely going to be the place you go first when a problem is identified
  - Exceptions
    - Immediate clinical concern that needs an order change
    - Elder abuse
    - Concern with the director of nursing

### Medical Director

- The leader of the provider team
- Ultimately makes clinical decisions for the patients/residents within the facility
  - Which influenza vaccine to give
  - How to handle our high fall rate
- Go to person if having challenges with another provider

## Geriatric Teaching

## Identifying Problems

- Care Centers (LTC/AL)
  - Report problems to nurse leadership, education leaders
- Tons of opportunities
  - Look for trends
  - Survey results
  - Community needs
  - Tabulate data if able, necessary
- Work with nursing, administration, providers, or community

## Setting Up education

- What are your objectives
- Audience
- How to show improvement, retention of knowledge

## Common Topics

- Medication errors
- Medication administration
- Psych/Dementia
- Infection/antibiotics
- Major disease states
  - Diabetes
  - Parkinson's