REHAB SUMMIT

CROSS COUNTRY

EDUCATION

Pharmacology for Rehab Professionals

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Objectives

- 1. Identify the category of a medication based upon learning its etiology.
- 2. List at least two side effects of common meds that are used with the rehab client.
- 3. Demonstrate increased awareness of risk associated with common vitamin and mineral supplements.
- 4. Correctly identify risk factors in case studies of actual clients' medications.

Why do meds matter?

- Incidence of side effects adversely affecting rehab have not been thoroughly examined
- However, with growing numbers of patients on multiple medications, the likelihood of side effects increases
- How do you account for patient medications?

Etiology of Drug Names: Making sense of nonsense

Every drug is identified by three names:

- Chemical name
- Generic name
- Trade Name(s)

- Example:
  - Chemical name: N-acetyl-p-aminophenol
  - Generic name: acetaminophen
  - Trade name: Tylenol

What's in a name?

Suffix –ine, -one, common pain opioids

- Morhpine, oxycodone

- Suffix -en, -ib, -ac, NSAIDS
  - Naproxen, ibuprofen, celecoxib
- Suffix –cet indicates a combo med
  - Darvocet (propxyphene + acetam)
  - Percocet (oxycodone + acetam)

- -caine meds= anesthetics
  - Lidocaine, novocaine
- -olol, -pril cardiac
  - Atenol, monopril
- -or, cholesterol
  - Lipitor, crestor, zocor

Role of FDA

- Oversee drug testing/approval process
- Preclinical (animal) trials 1-2 year
- Clinical trials
- Phase 1: healthy volunteers <1 year
- Phase 2: small patient sample 2 years
- Phase 3: larger patient sample 3 years
  - Approved for marketing
- Phase 4: postmarketing surveillance

Intro to Case Studies

- Meet Joseph– 83yo male referred to physical therapy for altered gait.
  - Decreased strength in both LE, ROM is WFL
- Meds: celebrex, fluoxentine, lipitor, St John's Wort

…Case Studies

- Meet Peggy: 55yo female referred to OT s/p carpal tunnel surgery.
  - Decreased grip strength, large amount of edema, parasthesias
- Meds: percocet, cardizem, prozac

Side Effects

- Pain Meds
- Anti-inflammatories
- Cardiac meds
- Muscle relaxers
- Anti-anxiety meds

Pain Meds

- Also known as analgesics
- Two main categories
  - Opioid (narcotics): morphine, derivatives
  - Nonopioids: NSAIDS, acetaminophen

Adverse Effects

- Opoids– act directly on the spinal cord
  - Sedation
  - Mood changes
  - Confusion
  - Respiratory depression
  - Postural hypotension
  - Nausea/vomitting
  - Constipation
  - Tolerance and dependence

Anti-inflammatories

- NSAIDS: non-steroidal anti-inflammatory drugs
- Analgesic, anti-inflammatory, antipyretic, anticoagulant (aspirin)
- OTC examples: aspirin, ibuprofen, naproxen (alleve), ketoprofen (orudis)

Celebrex

- The only COX-2 inhibitor still on the market– will be released for children in 2009
- Inhibits inflammation while being less severe on the GI tract

Adverse Effects

- GI complications
- Kidney and liver toxicity in high doses
- Possible increased risk of cardiac events
- Tinnitis: common warning sign of overdose

Acetaminophen

- A drug in its own class; does NOT have anti-inflammatory properties
- Excellent analgesic and fever reducing effects
- No gastric irritation
- Liver toxic at high doses

- Due to the effectiveness, acet is frequently added to other drugs– suffix --cet
- Ex: darvocet, percocet, ultracet

Other Anti-inflammatories: Steroids

- More powerful effects with more risky side effects
- Common ex: cortisone, prednisone, dexamethasone
- Adverse effects: catabolic effect on connective tissues
- Water retention, increased BP, decreased immune response, GI, glaucoma

Cardiac Meds

- Largest area of pharmacology
- Most meds have multiple indications
- Diuretics, beta-blockers nitrates, anti-lipids

Diuretics

- Indications: hypertension, CHF
- Action is directly on kidneys to increase excretion of sodium and water– decreases fluid in vascular system
- Examples: lasix, diuril
- Side effects: electrolyte depletion, orthostatic hypotension, weakness, confusion, mood changes

Beta-blockers

- Bind to the heart blocking epinephrine and norepinephrine—decreases heart rate and contraction force
- Indications: hypertension, CHF, arrhythmias, angina, recovery from MI
- EX: atenolol, propranolol
- Side Effects: bronchoconstriction, decreased exercise capacity, ortho hypo, depression/lethargy

Nitrates

- Acts by dilating peripheral vasculature, resulting in decreased cardiac workload, decreased O2 demand
- Ex: nitroglycerin (sublingual or transdermal)
- indications: angina
- Side effects: headaches, dizzyness, orthostatic hypotension, exaggerated response to systemic heat (have drug ready before rehab)

Anti-lipids: Statins

- Rapidly becoming one of the most prescribed drug categories
- Acts to increase liver LDL breakdown and disrupt cholesterol biosynthesis
- Used to lower LDL cholesterol and triglycerides; helps increase HDL levels
- Examples: Lipitor, Zocor

Anti-lipids Side Effects

- GI: diarrhea, bloating, nausea
- Neuromuscular: weakness, parasthesias, myalgia
- Liver toxicity
- Arrhythmias

Muscle Relaxers

- Used to treat muscle spasms and spasticity
- Meds act as polysynaptic inhibitors, work in CNS to increase GABA and decrease excitatory inputs
- Ex: Diazepam/ Valium, skelaxin, flexeril

Muscle Relaxers: Side Effects

- Generalized weakness
- Rapid change in muscle tone
- Sedation

Anti-Anxiety Meds

- With economic woes and increases in stress, this category is prescribed more and more frequently
- Goals of the meds are to decrease anxiety and relax the patient
- Directly affect neurotransmitters
- Meds: diazepam, paxil, prozac

Anti-Anxiety Meds: Side Effects

- Insomnia
- Orthostatic hypotension
- Rehab concern: takes 2-6 weeks before beneficial effects become apparent
- Chance of increased depression
- Mood swings/changes

Nutritional Supplements: The Unregulated Frontier

- FDA does not oversee
- Claims do not have to be “proven” by research
- Commonly used:
  - Vitamins
  - Creatine
  - Calcium
  - St. John’s Wort

Vitamins

- Essential substances broken down from foods
- With waning diets, it may be rare for RDA to be achieved
- Without FDA oversight, is the label accurate?
- Limited research that mega-dosing is effective

Creatine

- A naturally occurring amino acid derivative
- Clinical evidence is growing to support uptake in to Type IIb muscle fibers, reduce muscular fatigue, and promote muscular hypertrophy
- Most research has been on males under 30
- No contraindications have been reported short term; long term studies ongoing
- Water retention is a side effect reported

Calcium

- Essential mineral needed for bone health
- Calcium is poorly absorbed without the help of Vitamin D
- Deficiencies are commonly associated with osteoporosis/osteopenia– noted especially in female athletes and elderly
- Small doses spread out during the day are better absorbed than mega-doses
- Greater than 2500mg is toxic to the body

St. John's Wort

- A flowering plant that is said to have medicinal properties
- Thought to increase mood, some studies indicate it may be as effective as prescription anti-depressants, others studies do not validate this
- WARNING: decreases blood concentrations of prescription meds and can cause phototoxicity

Decision Making

- Is it safe?
  - Possibility of toxicity?
  - Worth the risk?
- Is it effective?
  - Look at the research, especially meta-analysis studies
  - How strong is the research in either direction?

Back to the Case Studies…

- Meet Peggy: 55yo female referred to OT s/p carpal tunnel surgery.
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Joseph

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Connor

- 20 year old male, active student athlete
- presents with multi-joint pain which occurs when he exercises
- Reports a 15 pound weight gain in the last 30 days
- Upon initial exam, BP was 148/95, HR 88

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