Know your Enemy: Aging and Arthritis

William M. Schnitz, MD

LiveStream: http://OState.TV
Case Study

- PG is a 69 yo man
- Neck pain
- Osteoporosis
- Stage 3 renal disease
- History of MI and stents
Learning Objectives

• Explain how to prescribe NSAID by assessing a patient’s risk for cardiovascular and gastrointestinal disease.

• Describe expected changes of the musculoskeletal system as a person ages.

• Explain how to minimize the negative effects of arthritis.
Learning Objectives

• Describe common types of arthritis diseases among seniors

• Explain how to manage the common types of arthritis

• Explain how to recognize conditions associated with arthritis in seniors (65+)
Case Study - Questions

• What are options for treating osteoarthritis?

• Is there a safe NSAID for the geriatric patient?

• What are risks and benefits of drug management of OA in geriatric patient with comorbidities?
“Many doers jump in and do, reading the directions only if something goes wrong. It’s much smarter to start with knowing what to do and planning the process, step-by-step.”
How to set a post

1. **Depth** = \( \frac{1}{3} - \frac{1}{2} \) of post height above ground
2. **Width** = 3x post size
3. **6" gravel layer** for drainage
4. **Option** for sandy or loose soil
5. **Post Anchor**
How to manage joint pain
Decisions, decisions
ANALYSIS PARALYSIS

With enough reflection, even the most straightforward problem can be turned into an unsolvable conundrum.
NSAID Risks

- Cardiovascular
- Gastrointestinal
- Renal
NSAID side effects - GI

- The major side effect of NSAID is gastrointestinal
  - Dyspepsia
  - Serious GI complications
    - Around 2000 people a year die from complications of NSAID
Patients at increased risk of GI toxicity

- High Risk
  - History of complicated ulcer
  - Multiple risk factors
- Moderate Risk (one to two risk factors)
  - Age >65 yo
  - High dose NSAID therapy
  - History of uncomplicated ulcer
  - Concurrent use of aspirin, glucocorticoid or anticoagulant
- Low Risk
  - No risk factors

Paralysis by analysis - GI

- The difference of an individual NSAID to cause stomach injury varies in one of the most toxic, Ibuprofen, to one of the least, Celebrex by over 20x

- The addition of even a low dose of Aspirin adds to GI risk

- Risk of stomach problems with Naproxen is high, about 25% more toxic to stomach lining than Ibuprofen
NSAID - GI Risk

Ketoprofen
Ibuprofen
Indomethacin
Naproxen
Piroxicam
Ketorolac
Nabumetone
Etodolac
Celecoxib
Selectivity for COX-2 and potency in inhibiting gastric COX activity

<table>
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<tr>
<th>NSAIDS</th>
<th>COX-2 selectivity</th>
<th>Gastric IC50</th>
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<tbody>
<tr>
<td>Ketoprofen</td>
<td>0.1</td>
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<tr>
<td>Ibuprofen</td>
<td>0.6</td>
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</tr>
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<td>Indomethacin</td>
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<td>Naproxen</td>
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<td>Piroxicam</td>
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<td>Ketorolac</td>
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<td>Nabumetone</td>
<td>1.7</td>
<td>0.48</td>
</tr>
<tr>
<td>Etodolac</td>
<td>7.9</td>
<td>3.20</td>
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<tr>
<td>Celecoxib</td>
<td>9.2</td>
<td>11.14</td>
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<tr>
<td>Mefenamic acid</td>
<td>12.1</td>
<td>0.70</td>
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<tr>
<td><strong>Other analgesics</strong></td>
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<tr>
<td>Aspirin</td>
<td>0.3</td>
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PPI Drugs and Misoprostol prevent ulcers

Ulcer Prevention in Long-term Users of Nonsteroidal Anti-inflammatory Drugs: Results of a Double-blind, Randomized, Multicenter, Active- and Placebo-Controlled Study of Misoprostol vs Lansoprazole
Risk of Fracture with PPI drugs

Figure 2. PPIs or H$_2$RAs use and the combined risk of any fracture in a random-effects model meta-analysis of case-controls studies and cohort studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>OR or RR (95% CI)</th>
<th>Weight (%)</th>
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<td>Vestergaard et al, 2006</td>
<td>1.18 (1.12-1.43)</td>
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<td>Yang et al, 2006</td>
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<td>Kaye and Jick, 2008</td>
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<td>Targownik et al, 2008</td>
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<td>Yu et al, 2008</td>
<td>1.30 (1.10-1.53)</td>
<td>11.18</td>
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<td>Roux et al, 2009</td>
<td>3.10 (1.14-8.44)</td>
<td>0.74</td>
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<tr>
<td>Gray et al, 2010</td>
<td>1.25 (1.15-1.36)</td>
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<tr>
<td>Pouwels et al, 2011</td>
<td>1.20 (1.04-1.40)</td>
<td>12.08</td>
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<td>Corley et al, 2010</td>
<td>1.30 (1.21-1.39)</td>
<td>16.58</td>
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<td>Chiu et al, 2010</td>
<td>2.11 (1.45-3.07)</td>
<td>4.22</td>
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<tr>
<td>Overall ($I^2 = 69.8%$)</td>
<td>1.29 (1.18-1.41)</td>
<td>100.00</td>
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NSAID Side Effects - Cardiovascular

- NSAID drugs block the ability of ASA to work as a blood thinner
- NSAIDs increase risk of heart attack and stroke*
- NSAIDs elevate BP
Platelet cyclooxygenase-1

Catalytic site

Serine residue at position 529

Channel of access

Arachidonic acid

With aspirin

Acetyl serine

With ibuprofen and aspirin

Ibuprofen

Aspirin

NSAID Plus ASA
Guidelines for Treatment of Hand Osteoarthritis

Nonpharmacologic treatment

- Evaluate the ability to perform activities of daily living (ADLs)
- Instruct in joint protection techniques
- Provide assistive devices, as needed, to help patients perform ADLs
- Instruct in use of thermal modalities
- Provide splints for patients with trapeziometacarpal joint OA
Guidelines for Treatment of Hand Osteoarthritis
Pharmacologic management

- Use
  - Topical capsaicin
  - Topical NSAID, including trolamine salicylate
  - Oral NSAID, including cox-2 selective inhibitor
  - Tramadol

- Do not use:
  - Intraarticular therapy
  - Opioid analgesics
  - >75 yo should use topical rather than oral NSAID
Guidelines for Treatment of Knee Osteoarthritis - Nonpharmacologic

- Cardiovascular (aerobic) and/or resistance land-based exercise
- Aquatic exercise
- Lose weight (if overweight)
- Self-management programs
- Manual therapy in combination with supervised exercise
- Psychosocial interventions
- Patellar taping
- Medially wedged insoles if they have lateral compartment OA
- Laterally wedged subtalar strapped insoles if they have medial compartment OA
- Use thermal agents
- Walking aids, as needed
- Tai Chi programs
- Traditional Chinese acupuncture
- Transcutaneous electrical stimulation
Guidelines for Treatment of Knee Osteoarthritis - Pharmacologic

- We conditionally recommend:
  - Acetaminophen
  - Oral NSAIDs
  - Topical NSAIDs
  - Tramadol
  - Intraarticular corticosteroid injections

- We conditionally recommend that patients with knee OA should **not** use the following:
  - Chondroitin sulfate
  - Glucosamine
  - Topical capsaicin

- No recommendations regarding
  - use of intraarticular hyaluronates, duloxetine, and opioid analgesics
Changes of Aging on the Musculoskeletal System

- Muscle
- Bone

http://davidebonadonna.it/?p=83
Muscle

• Muscle mass decreases in relation to body weight by about 30 to 50 percent

• Sex hormone status is an important factor in men but not in women

• Physical activity is an important predictor of muscle mass in both sexes

• Loss of muscle mass from the legs is greater than from the arms.
• Type I slow-twitch fibers are less affected by age than fast-twitch fibers

• Sarcopenia or loss of skeletal muscle mass (0.5-1% loss per year after age 25)

• From age 30 to 80, grip strength decreases 60 percent

• The recovery of older muscle after injury is slowed and frequently incomplete
Bone

- The rate of repair is slowed once fracture occurs.
- The increased proinflammatory environment in healthy elders promotes bone loss.
- There is a progressive decline in osteoblast number.
- Aging in both men and women increases the probability of fracture.
Bone (cont.)

- Decline in bone mass is approximately 0.5 percent per year in healthy older people.
- Vitamin D deficiency, common in older people, further accelerates bone loss.
- Increasing weight bearing time or increasing loading forces may increase bone mineral and prevent age-related bone loss.
- Once bones fracture, in older animals, fractures require at least twice as long to regain prefracture biomechanical properties.
Common Types of Arthritis

- Osteoarthritis
- Rheumatoid arthritis
- Gout
Osteoarthritis (US)

- Knee OA affects
  - 28% of adults older than 45 years
  - 37% of adults older than 65 years
- Radiographic osteoarthritis of the knee affects about 25% of adults aged 50 years and over
Managing Osteoarthritis

• National clinical guideline for care and management in adults

• Paracetamol in early pain management

• Early consideration of topical non-steroidal anti-inflammatory drugs (NSAIDs) for knee and hand arthritis

• Systemic NSAIDs or cyclooxygenase-2 (COX-2) inhibitors should be coprescribed with cover from a proton pump inhibitor (PPI)

• The positive role of exercise is emphasized in contrast to the natural inclination to rest when a joint is affected by osteoarthritis.
Managing Osteoarthritis (Pos)

- The positive role of exercise is emphasized in contrast to the natural inclination to rest when a joint is affected by osteoarthritis.
Managing Osteoarthritis (Neg)

- Arthroscopic lavage and debridement is not suitable therapy for osteoarthritis
- Use of intra-articular hyaluronans is not recommended
- Restricted support for the use of acupuncture
How Older Patients Make Decisions About Analgesics for Osteoarthritis

• Due to different safety profiles most guidelines recommend a stepped care approach to OA, with acetaminophen used as initial pharmacologic therapy after trials of nonpharmacologic interventions

• Guidelines suggest that an NSAID may be a suitable alternative to acetaminophen, depending on the individual patient’s risk profile

• There is underutilization of acetaminophen and an inappropriately high usage of NSAIDs

• Understand the factors contributing to this usage given the high prevalence of OA and the potential of serious NSAID-induced toxicity in the elderly
Perceived effectiveness of, reliance upon, routine, and perceived pill load associated with the use of NSAIDs, acetaminophen, and CMs for osteoarthritis

<table>
<thead>
<tr>
<th>Feature of analgesic class</th>
<th>NSAID</th>
<th>Acetaminophen</th>
<th>CMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived effectiveness</td>
<td>High</td>
<td>Low to moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Degree of reliance</td>
<td>Strong</td>
<td>Low to moderate</td>
<td>Low to moderate</td>
</tr>
<tr>
<td>Strength of routine</td>
<td>Strong</td>
<td>Very low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Perceived pill load</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Overall effect on behavior</td>
<td>Regular use</td>
<td>Use at less than maximum dose or nonuse</td>
<td>Regular use</td>
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<tr>
<td>Treatment</td>
<td>Pain</td>
<td>Short-term pain</td>
<td>Long-term pain</td>
</tr>
<tr>
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<tr>
<td>Education</td>
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<tr>
<td>Aerobic</td>
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<tr>
<td>Aquatic</td>
<td>Neg</td>
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<td>Proprioception</td>
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<td>Strength</td>
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<td>Tai Chi</td>
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<td>Electrical Stim</td>
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<tr>
<td>Pulsed Electrofields</td>
<td>Neg</td>
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</table>
Osteoarthritis

Physical Therapy Interventions for Knee Pain Secondary to Osteoarthritis: A Systematic Review

Shi-Yi Wang, MD, PhD; Becky Olson-Kellogg, PT, DPT, GCS; Tatyana A. Shamliyan, MD, MS; Jae-Young Choi, PhD; Rema Ramakrishnan, MPH; and Robert L. Kane, MD
Rheumatoid Arthritis

- A symmetric, inflammatory, peripheral polyarthritis of unknown cause
- Leads to deformity through the stretching of tendons and ligaments and destruction of joints through the erosion of cartilage and bone
Rheumatoid Arthritis

• Inflammation and joint destruction lead to loss of physical function, inability to carry out daily tasks of living, and maintenance of employment.

• Early recognition and treatment with disease-modifying antirheumatic drugs is important in achieving control of disease and prevention of joint injury and disability.
## RA vs. OA

**Clinical distinction between rheumatoid arthritis and osteoarthritis**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Rheumatoid Arthritis</th>
<th>Osteoarthritis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary joints affected</strong></td>
<td>Metacarpophalangeal</td>
<td>Proximal interphalangeal</td>
</tr>
<tr>
<td><strong>Heberden’s nodes</strong></td>
<td>Absent</td>
<td>Frequently present</td>
</tr>
<tr>
<td><strong>Joint characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stiffness</strong></td>
<td>Worse after resting (eg, morning stiffness)</td>
<td></td>
</tr>
<tr>
<td><strong>Laboratory findings</strong></td>
<td>Positive rheumatoid factor</td>
<td>Positive rheumatoid factor</td>
</tr>
</tbody>
</table>
Gout

- Estimates of the prevalence of gout in the United States range from less than 3 million to 8 million or more individuals.

- Both the incidence and prevalence of the disease appear to be increasing in the United States and worldwide.
Arthritis syndromes specific to the elderly

- PMR
- GCA
- RS3PE
PMR

- Disease of adults over age 50 prevalence increases progressively with advancing age
- Average age at diagnosis is over 70 years
- Common, with a prevalence of about 700 per 100,000 persons over 50 years of age. That is about 1 in 150.
- Women affected two to three times more often than men
The cause of PMR is unknown; both environmental and genetic factors appear to play a role.

Characterized by subacute or chronic onset of aching and morning stiffness in the shoulders, hip girdles, neck, and torso in patients over the age of 50.

Symptoms are usually symmetric.
PET in PMR

Active PMR

Remission
Giant Cell Arteritis (GCA)

- Chronic vasculitis of large- and medium-sized vessels.
- Mean age at diagnosis is 72 years, and never occurs younger than 50
- Among older than 50, the prevalence is 1 in 500
- Systemic symptoms are characteristic and vascular involvement may be widespread
- Blood vessel inflammation most frequently involves the cranial branches of the arteries that originate from the aortic arch
- The most feared complication of GCA is visual loss
Fig 1.—Pitting edema, noted at first clinic visit of patient 1, present since onset of arthritis eight weeks earlier.
<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age</th>
<th>Sex</th>
<th>Race</th>
<th>Until diagnosis</th>
<th>Until remission</th>
<th>Initial</th>
<th>Initial</th>
<th>Remission</th>
<th>Diff</th>
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<td>50</td>
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<td>M</td>
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In Summary

• There is no “safe” option for treating osteoarthrits in geriatrics

• Apply treatment guidelines for OA

• Changes of aging can be modified

• Differential diagnosis in geriatric patients presents some unique chances to “cure” arthritis