

# Bullet Point Nursing

## Musculoskeletal pharmacology

*Disclaimer: These notes are designed to provide the key points of each topic and may not contain all necessary information. Every effort is made to ensure this content is up to date and accurate at the time of writing. No liability is assumed for the content or its relation to current standards and practices. This should not replace comprehensive nursing educational resources.*

## Pathophysiology review

- Calcium is the primary component in bone formation
  - PTH increases serum calcium (decreases bone calcium)
  - Calcitonin decreases serum calcium (increases bone calcium)
  - Vitamin D (from diet and the sun) are needed for the body to absorb calcium
    - Cholecalciferol is inactive vitamin D
    - Calcitriol is active vitamin D
- Rheumatoid arthritis (RA) is in a group called autoimmune diseases
  - SLE, RA, Hashimoto's, Celiac, Crohn's, UC, Psoriasis, and more
- Osteoarthritis (OA) is the most common type of arthritis
  - Gout is a build up of uric crystals in the joint (another type of arthritis)
- Osteoporosis is caused by a decrease in bone mass
  - Calcium and vitamin D are common recommendations to prevent this
- Disease modifying antirheumatic drugs (DMARDs) slow progression of a disease
- Start with and/or include non-pharm interventions

## Drug name: Methotrexate

- MOA: Unknown for RA. Blocks folate acid thereby inhibiting DNA synthesis
- Indication: Tumors, autoimmune disease (Psoriasis, SLE, RA, etc.) Induction of abortion
- Onset of action is several weeks for RA
- Often used as first line for RA after NSAIDs
- Teratogenic
- SE/AE: Can cause adverse effects across many systems,

## Drug class: 5 Aminosalicylates

- Drug:
  - Sulfasalazine
- MOA: Reduces inflammation
- Indications: Ulcerative colitis, rheumatoid arthritis
- SE/AE: GI effects, blood dyscrasias
- Onset of action is several weeks

## Drug name: Hydroxychloroquine

- MOA: Unknown
- Indications: Autoimmune disease, malaria
- Onset of action is several weeks for RA

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- Requires regular eye exams

## **Drug class: Monoclonal antibodies**

- Drugs:
  - Etanercept (Enbrel)
  - Adalimumab (Humira)
- MOA: Biologic agent, varies by medication
- Indications: Autoimmune disease (RA, UC), tumors, hyperlipidemia, asthma, IBD, infections
- Also used to reverse digoxin and dabigatran toxicity
- Black Box warning: Malignancy, serious infections
- Parenteral only
- Most generic names end in -mab
- Onset of action is several months
- Classified as a biologic DMARD

## **Drug name: Colchicine**

- MOA: Blocks action of neutrophils associated with gout symptoms
- Indications: Gout
- SE/AE: GI symptoms
- Narrow therapeutic index. Toxicity can lead to adverse effects such as hepatic and renal issues
- Steroids, NSAIDS, and colchicine are the first line agents for gout flares

## **Drug class: Xanthine oxidase inhibitors**

- Drug:
  - Allopurinol
- MOA: Reduces uric acid levels
- Indications: Gout prevention, nephrolithiasis
- Onset is several days, peak effects are in 1-3 weeks
- SE/AE: SJS,
- May exacerbate gout upon initial pharmacotherapy
- Patient education: Take with food

## **Drug class: Uricosurics**

- Drug:
  - Probenecid
- MOA: Reduces uric acid levels
- Indications: Gout prevention
- May exacerbate gout upon initial pharmacotherapy

*Educate patients with gout to avoid triggers (i.e. alcohol)*

## **Drug class: Bisphosphonates**

- Drug:

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- Alendronate (Fosamax)
- Ibandronate
- Zoledronic acid / Zoledronate (IV only)
- MOA: Decreases bone turnover, increases bone density
- Indications: Osteoporosis, Paget disease
- Bisphosphonates are first line for osteoporosis
- SE/AE: GI effects, metallic taste, hypocalcemia (serum)
- Zoledronate is first line for Paget disease
- Not recommended in pregnancy
- Patient education:
  - Alendronate should be taken before first meal of the day with a full glass of water. Remain sitting or upright for 30 minutes following administration.
  - Ensure the patient has adequate intake of calcium and vitamin D

## Drug class: Selective estrogen receptor modulators

- Drug:
  - Raloxifene (Evista)
- MOA: Similar to estrogen
- Indications: Prevent and treat osteoporosis in post-menopausal women
- Patient education: Ensure the patient has adequate intake of calcium and vitamin D
- Teratogenic
- Black Box warning: Increased risk of embolic events

## Drug name: Calcium

- Available PO, IV
- “MOA”: Required for nerve impulses, bone health, muscle contractions, and more
- Dietary sources: Dairy products, fortified foods and juices
- Indications: Hypocalcemia
- S/S:
  - Hypocalcemia - spasms, increased DTRs, seizures, dysrhythmias, anxiety
  - Hypercalcemia - confusion, ECG changes, anorexia, nausea, vomiting, fatigue
- PO version is bound to various ingredients that do not have equivalent concentrations
  - Calcium carbonate, calcium, citrate, calcium gluconate, calcium acetate
  - Always consider vitamin D with anyone needing to supplement calcium
- Available IV in calcium gluconate and calcium chloride
  - Calcium chloride is three times more concentrated
- May be given to protect the heart in the presence of severe electrolyte imbalances
- Steroids reduce calcium absorption

## Drug name: Calcitonin

- MOA: Increases calcium excretion, decreases calcium loss from the bones
- Indications: Hypercalcemia, post-menopausal osteoporosis, and Paget disease
- Parenteral or intranasal

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## References

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