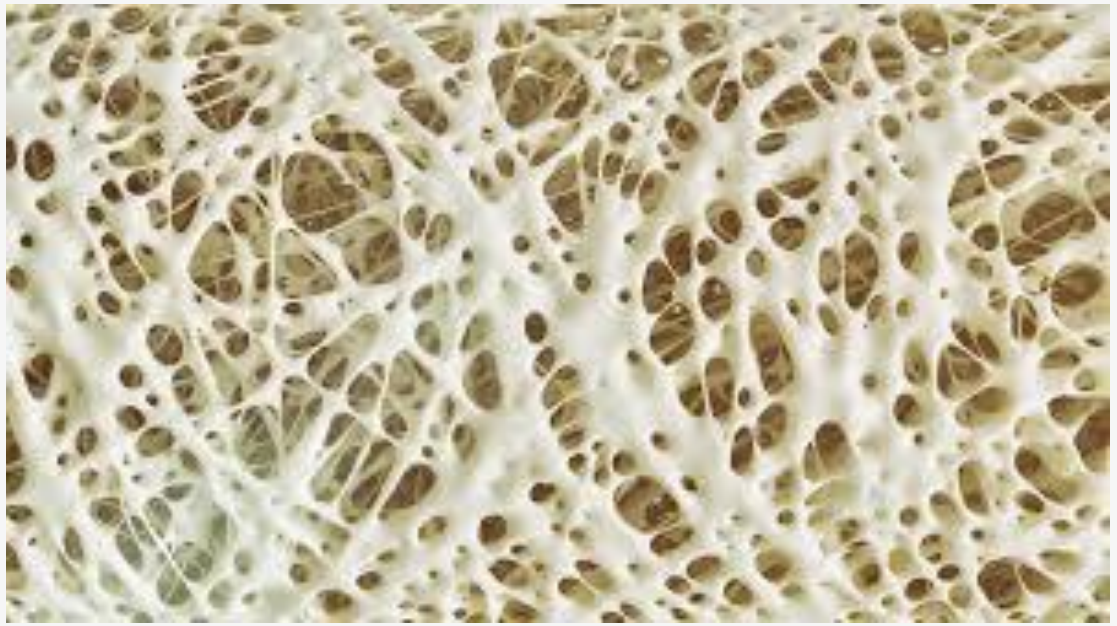
Osteoporosis...a Silent Disease



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Introduction

Osteoporosis predisposes patients to low impact, fragility fractures.

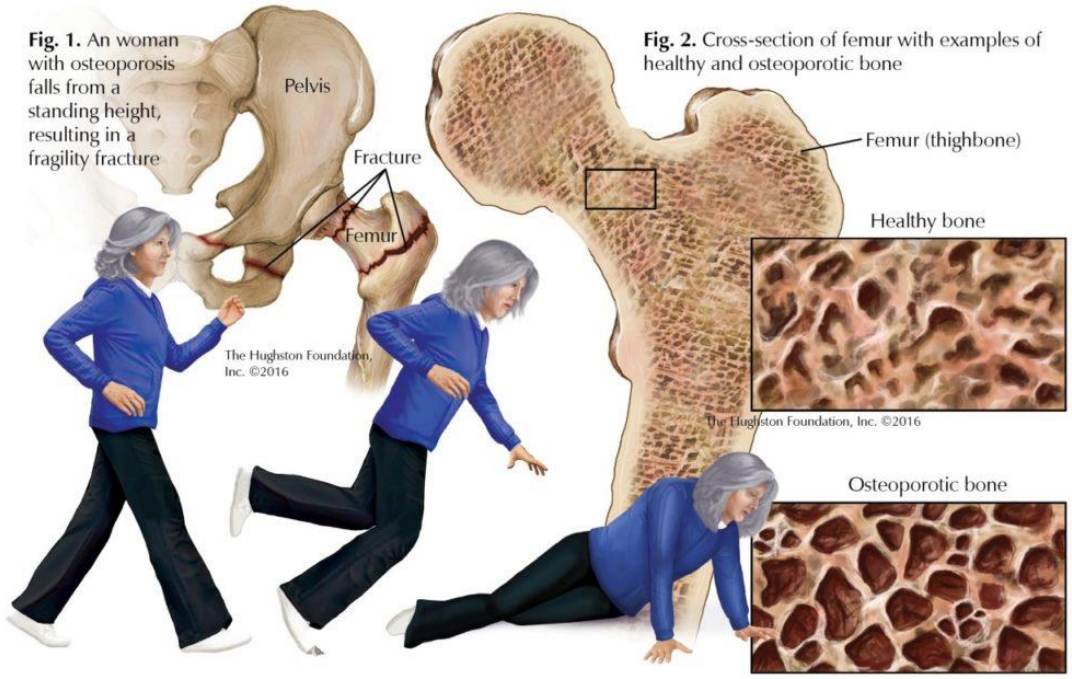
10 million Americans live with osteoporosis.

43 million Americans live with low bone mass.

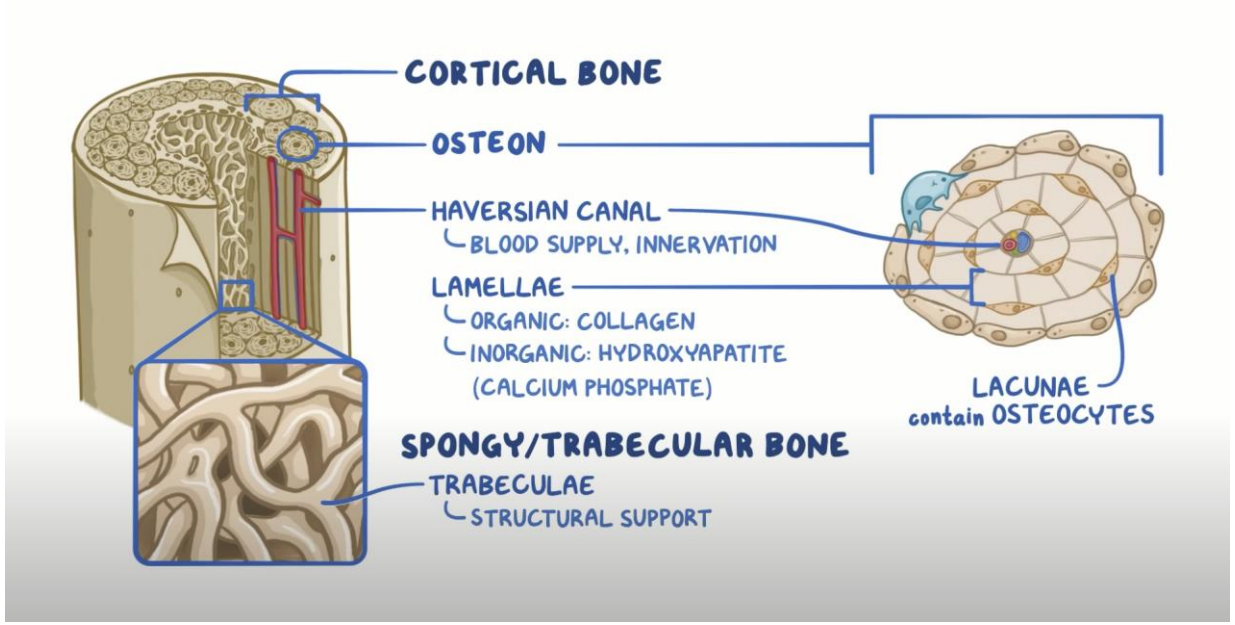
Lifetime risk of osteoporotic fracture for a woman is about 50%.

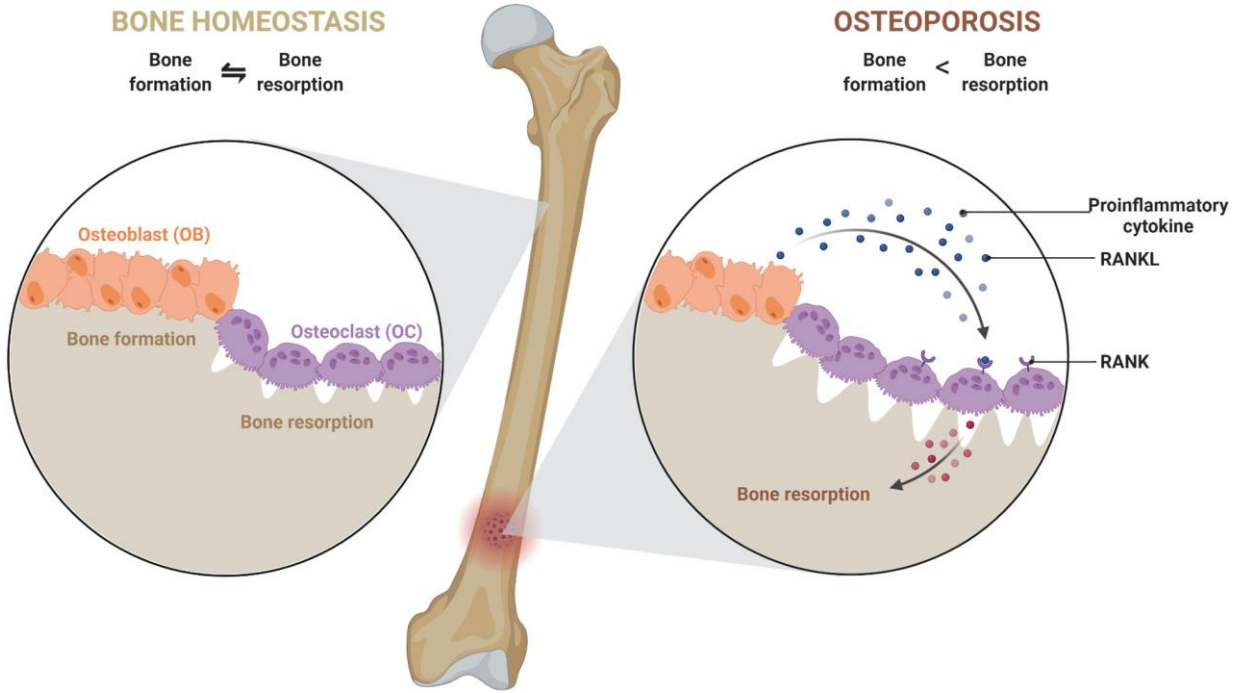
Lifetime risk of osteoporotic fracture for a man is 20%.

By 2025, it will cost Medicare $25 billion to care for patients presenting with osteoporotic related fractures.



Pathophysiology





Risk Factors

Primary Osteoporosis

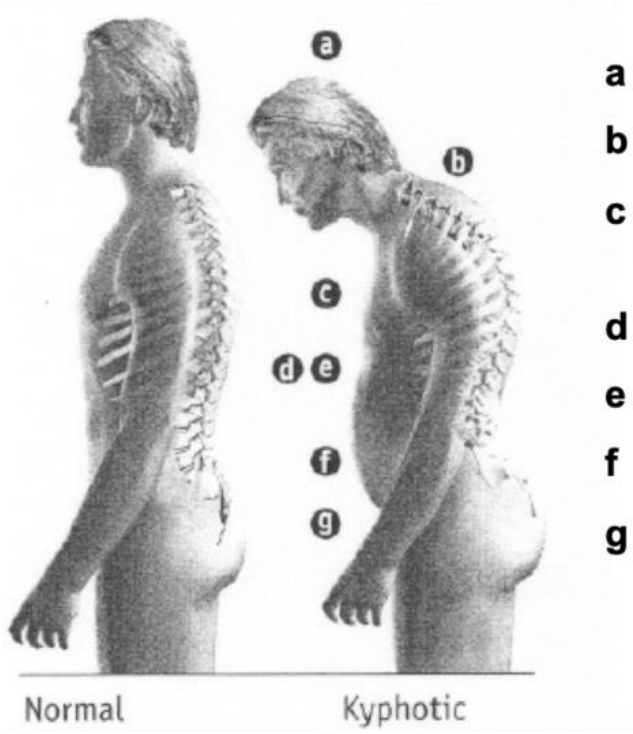
- Fracture History (personal and family)
- Low body weight (less than 57.6 kg)
- Early menopause (before age 45)
- Race (White or Asian)
- Lifestyle choices: alcohol use, smoking, physical activity

Secondary Osteoporosis

- Associated medical conditions
  - Alcoholism, CKD, COPD, hyperthyroidism, RA, DM (type 1 and type 2), Vitamin D deficiency, malabsorption disorders, ankylosing spondylitis, hyperparathyroidism
- Medication induced
  - Glucocorticoids, Depo-Provera, PPI SSRI, Thiazolidinediones, Thyroid hormones, Lithium, Heparin, GNRH agents, Aromatase inhibitors, Antiepileptics

Symptoms and Physical Exam Findings

There are rarely any symptoms, and many times people are diagnosed with osteoporosis after they experience a fracture.



a Height loss

b Upright posture becomes impossible

c Pulmonary volume loss due to anterior wedging of the spine

d 12th rib rests on the iliac crest

e Narrowed gap between ribs and ilium

f Protruding abdomen

g Distension, constipation, early satiety, eructation

Diagnostic Criteria

Osteoporosis is diagnosed with BMD testing, through a DEXA scan, or the presence of a fragility fracture even without a DEXA scan.

Table 6
2020 AACE Diagnosis of Osteoporosis in Postmenopausal Women

1. T-score –2.5 or below in the lumbar spine, femoral neck, total proximal femur, or 1/3 radius
2. Low-trauma spine or hip fracture (*regardless of bone mineral density*)
3. T-score between –1.0 and –2.5 **and** a fragility fracture of proximal humerus, pelvis, or distal forearm
4. T-score between –1.0 and –2.5 **and** high FRAX® (or if available, TBS-adjusted FRAX®) fracture probability based on country-specific thresholds

Abbreviations: AACE = American Association of Clinical Endocrinologists; FRAX® = fracture risk assessment tool; TBS = trabecular bone score.

Once the diagnosis of osteoporosis made, it remains even if treatment results in a T-score less than -2.5.

Diagnosis: Bone Mineral Density (BMD) Testing

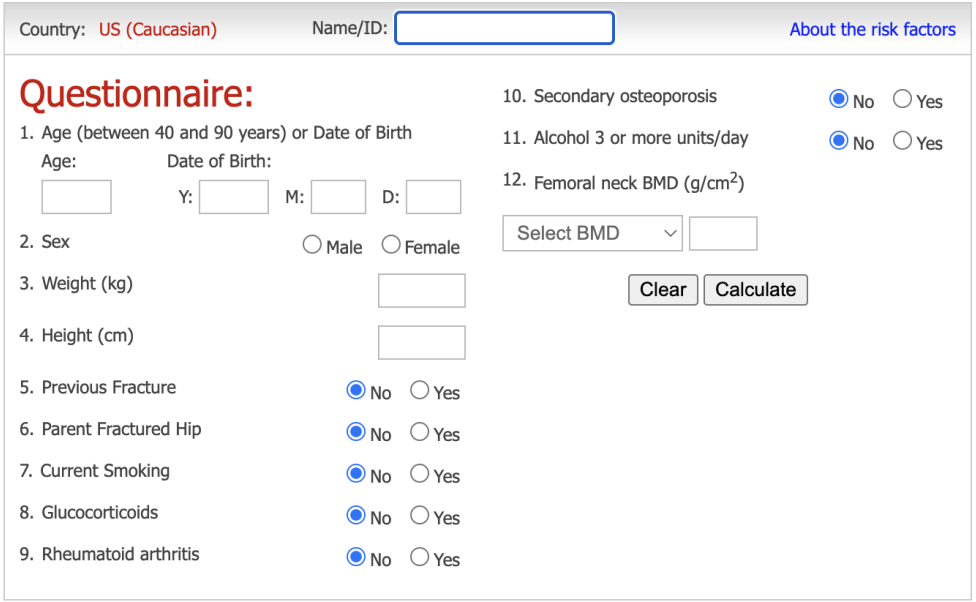
In individuals without risk factors:

- USPSTF & AACE: Screen all women 65 years and older with a dual x-ray absorptiometry (DEXA) scan. There is no recommendation for men.
- Bone Health and Osteoporosis Foundation: Screen all men 70 years and older

Repeat screening every 2-3 years

In individuals less than 65 years old with risk factors:

- Risk assessment using the fracture risk assessment tool (FRAX).



Interpretation of DEXA scan results

DEXA results:

- T score: > -1 is normal
- T score: -1 to -2.5 is osteopenia
- T score: < -2.5 is osteoporosis
- Z score: < -2 work up for secondary causes of osteoporosis

Low bone density of the hip has the highest predictive value of future fracture

Evaluation to Rule Out Secondary Causes

Initial labs may include:

- Complete Blood Count
- Complete Metabolic Panel
- Serum Chemistry
  - Calcium, Phosphate, Total protein, Albumin, Alkaline Phosphatase
- 24-hour collection for Calcium, Sodium, Creatinine
- 25-hydroxyvitamin D

Additional labs, if clinically indicated:

- TSH and free T4
- Intact PTH levels
- Free testosterone level
- Celiac antibodies (serum or electrophoresis)

Management: Lifestyle Modifications

Bone Healthy Lifestyle

- Exercise (weight bearing, balance)
- Supplements (Calcium and Vitamin D)
- Alcohol and Smoking Cessation
- Limiting caffeine intake
- Fall Prevention
- Modified activity (spine flexion)

Management: Pharmacotherapy

Start if:

1. T-score is <-2.5 at the femoral neck, hip or lumbar spine
2. T-score is between -1 to -2.5 with a 10 year risk of at least 20% for major osteoporotic fracture and at least 3% for hip fracture based on FRAX tool

Two types of therapy

1. Antiresorptive therapy
   - Bisphosphonates
   - Denosumab
2. Anabolic agents
   - Teriparatide, Abaloparatide and Romosozumab

Pharmacotherapy: Antiresorptive Agents

Bisphosphonates

- Alendronate PO 10 mg daily OR 70 mg weekly
- Risedronate PO 5 mg daily, 35 mg weekly OR 150 mg monthly
- Zoledronic Acid 5 mg IV yearly
- Benefits:
  - Decreased risk of vertebral, hip and other types of fractures
  - Cheapest therapy
- Side Effects:
  - Osteonecrosis of the jaw
  - Atypical femoral or subtrochanteric fractures
- Drug holiday

Denosumab

- 60 mg by subcutaneous injection every 6 months
- Benefits:
  - Decreased risk of vertebral, hip and other types of fractures
- Side Effects:
  - Osteonecrosis of the jaw
  - Atypical femoral or subtrochanteric fractures

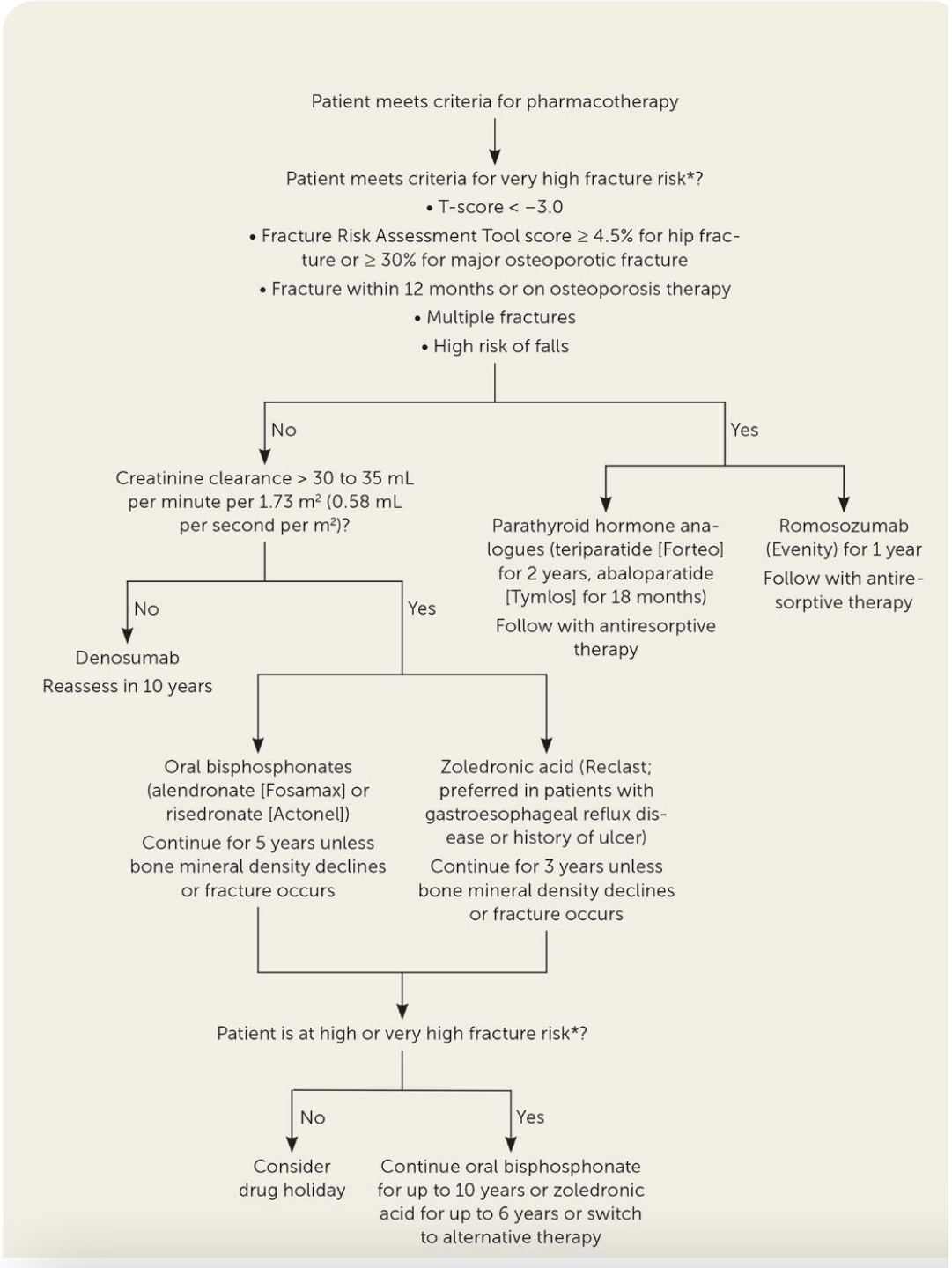
Pharmacotherapy: Anabolic Agents

Parathyroid Hormone Analogues

- Teriparatide 20 mcg daily by subcutaneous injection for 2 years
- Abaloparatide 80 mcg daily by subcutaneous injection for 18 months
- Benefits: Rapid bone growth
- Side Effects:
  - Nausea and vomiting
  - Dizziness
  - Headache
  - Palpitations
  - Leg cramps
- This is the most expensive treatment option

Sclerostin inhibitor

- Romosozumab 210 mg monthly by subcutaneous injection for 1 year
- Benefits: Rapid bone growth
- Side Effects: increases risk for cardiovascular events



AAFP Treatment Algorithm

Monitoring Therapy Compliance and Efficacy

Ask about recent fractures at every visit.

Recommended labs

- Monitoring bone formation
  - Serum procollagen type 1 N-terminal propeptide (PINP)
  - Serum bone specific alkaline phosphatase
- Monitoring bone resorption
  - Serum C-terminal telopeptide
- Order 3-6 months after initiation of therapy and every 6 months after that.

Imaging

- DEXA scan every 1-2 years

Treatment is successful if :

- T-score and FRAX score improves
- Fractures are decreased

Referral to Clinical Endocrinologist or Other Osteoporosis Specialist

If your patient meets the following criteria:

- Normal BMD and fracture without major trauma
- Recurrent fractures and bone loss while on therapy without obvious causes
- Patients with a history of less common secondary conditions
  - Hyperthyroidism, hyperparathyroidism, hypercalciuria, or elevated prolactin
- Young age or abnormal labs
- Patients with conditions that complicate management
  - Decreased kidney function, hyperparathyroidism, or malabsorption

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