SECONDARY OSTEOPOROSIS

FLAME LECTURE: 50

BAILEY 9.13.20

LEARNING OBJECTIVES

- To understand common causes of secondary osteoporosis including diseases and medications so that patients with risk factors may be better screened
- To learn initial and secondary work up of secondary osteoporosis
  - Prerequisites:
    - Osteoporosis Pathophysiology
- See also – for closely related topics
  - FLAME LECTURE 48: Osteopenia vs Osteoporosis
  - FLAME LECTURE 52: Dexa and FRAX

SECONDARY OSTEOPOROSIS

- Osteoporosis in the presence of an underlying disease or medication
  - Can be present in pre- and post-menopausal women and in men
  - Treatment of patients with secondary causes of osteoporosis can differ than primary osteoporosis
  - Response to treatment is limited if underlying disorder is unrecognized and left untreated

SECONDARY OSTEOPOROSIS

UNDERLYING CONDITIONS

- Celiac disease
- Inflammatory bowel disease
- Gastric bypass surgery
- Anorexia nervosa
- Hemochromatosis and chronic liver diseases

- Hematological disorders
  - Monoclonal gammopathy of uncertain significance
  - Multiple myeloma
  - Systemic mastocytosis
  - Beta thalassemia major

- Renal Disorders
  - Idiopathic hypercalciuria
  - Renal tubular acidosis
  - Chronic kidney disease

- Autoimmune Disorders
  - Rheumatoid arthritis
  - Systemic lupus erythematosus
  - Ankylosing spondylitis
  - Multiple sclerosis

SECONDARY OSTEOPOROSIS

OTHER

- Premature Ovarian Failure
- Cigarette Smoking
- Osteogenesis Imperfecta
- Cystic Fibrosis
- Pregnancy and lactation-associated osteoporosis (PLO)
  - Rare, third trimester or early postpartum presentation of fractures, typically vertebral

SECONDARY OSTEOPOROSIS

DRUG-INDUCED OSTEOPOROSIS

- Glucocorticoids
- Thyroid Hormone
- Hypogonadism-inducing agents
  - Aromatase Inhibitors
  - Medroxyprogesterone Acetate
  - GnRH Agonists
- Thiazolidinediones
- Antidepressants-SSRI/SNRI
- Anticonvulsants
- Calcineurin Inhibitors
- Antiretroviral Therapy
- Heparin
- Loop diuretics
- Proton Pump Inhibitors

SECONDARY OSTEOPOROSIS

- Evaluate patients with osteoporosis for underlying disease
- Review medication list of patients with osteoporosis
- Modification of factors contributing to the bone loss may reverse the bone loss and fracture risk
- Suboptimal calcium and vitamin D deficiencies are easily correctable
- Consider basic laboratory evaluation in all patients
  - Further testing can be done based on clues from history and initial evaluation to look for causes of bone loss
  - When medication is found to be cause-use lowest dose required to minimize bone loss and fracture risk

SECONDARY OSTEOPOROSIS

INITIAL WORKUP

- Detailed history-identify risks
- Bone mineral density
- X-ray lumbar + thoracic spine (if height loss >1.5 in)
- CBC w/diff
- Serum calcium, phosphate, creatinine, albumin and 25-hydroxy Vit D
- Serum protein electrophoresis
- Serum total and free testosterone, FSH, LH, prolactin
- Bone resorption and formation markers
- 24 hour urine calcium, creatinine and sodium

SECONDARY OSTEOPOROSIS

FURTHER WORKUP

- Serum parathyroid hormone
- Serum thyroid stimulating hormone
- Serum tissue transglutaminase antibodies
- Serum ferritin and liver function tests
- Serum electrolytes
- Serum tryptase levels
- 24 h urinary cortisol or dexamethasone suppression test
- Nuclear bone scan (if bone turnover is high)

SECONDARY OSTEOPOROSIS

- BMD as a predictor of fractures has NOT been established in patients with secondary osteoporosis
  - The clinical significance of isolated low bone density in young women is unknown
  - Fractures may occur at near normal BMDs
- Underlying cause influences response to therapy
- Whereas therapies directed to the tx of osteoporosis may be effective, treating the underlying disease!

IMPORTANT LINKS / REFERENCES

1. Mirza F, Canalis E. Management of endocrine disease: Secondary osteoporosis: pathophysiology and management. *Eur J Endocrinol*. 2015;173(3):R131–R151. doi:10.1530/EJE-15-0118
2. https://www.uptodate.com/contents/epidemiology-and-etiology-of-premenopausal-osteoporosis
3. https://www.iofbonehealth.org/secondary-osteoporosis