Bone Mineral Densitometry

Introduction and Patient Considerations

MRT Program

Bone Mineral Densitometry

- Purpose
  1. Measure BMD.
  2. Detect bone loss.
  3. Establish the diagnosis of osteoporosis.
  4. Assess an individual's risk for fracture.
  5. Assess the response to osteoporosis therapy.
  6. Perform vertebral fracture assessment (VFA).

Osteoporosis

- A skeletal disorder characterized by low bone density and elevated fracture risk
- An estimated 1.5 million (10%) Canadians 40 years or older have been diagnosed with it
- Women were 4 times more likely to develop then men
- One in five (21%)reported having a fracture after age of 40 at common sites for osteoporotic fracture ie. wrist, humerus or shoulder, spine, pelvis or hip
- BMD tests indicate whether someone has osteoporosis and future likelihood of developing the disease.

Composition of Bone

- Osteoclasts—remove bone, causing bone resorption
- Osteoblasts—build or replace bone tissue
- Peak bone mass is reached at approximately 20 -30 years of age. (70 % determined by genetics)
- After 35 years of age, more bone is removed than replaced.
- A period of decreasing bone mass starts at approximately age 50 for women and age 65 for men
- Decrease in bone mass in women becomes more pronounced at menopause with loss of bone preserving estrogen.

Clinical Indications

- Women with estrogen deficiency
- Individuals with vertebral abnormalities
- Individuals receiving glucocorticoid therapy
- Individuals with hyperparathyroidism
- Individuals undergoing osteoporosis drug therapy

Risk Factors for Osteoporotic Fractures

- Sex (female greater risk than male)
- Increased age
- Estrogen deficiency
- Body habitus (<25th percentile)
- Family history
- Previous fracture as adult
- Rheumatoid arthritis
- Ethnicity
- Alcohol/tobacco use

Additional Risk Factors for Osteoporotic Fractures

- Hormonal conditions and diseases (
- Neuromuscular disorders
- Long-term steroid use
- Poor visual acuity
- Long-term disability
- Low dietary calcium intake
- Vitamin D deficiency

Contraindications

- Too low body mass
- Anatomic malformations—severe scoliosis or kyphosis
- Metallic prosthesis of the affected anatomic site
- Pregnancy
- Recent radiographic contrast or nuclear medicine study (within a week)

Individual T-Score Classifications

Classification	T-Score
Normal	No lower than –1.0
Osteopenia	Lower than –1.0 but higher than –2.5
Osteoporosis	–2.5 or lower
Severe osteoporosis	–2.5 or lower(combined with one or more fractures present)

T score- Number of standard deviations as individual's BMD is from average BMD for gender matched, young normal peak bone masses.

Osteoporotic Management Drugs

Type	Drugs or Agents
Antiresorptive	Estrogen replacement –Raloxifene (Evista) –Calcitonin (Miacalcin) –Bisphosphonate –Alendronat (Fosamax) –Risedronate (Actonel)
Anabolic agents	Parathyroid hormone –Teriparatide (Forteo)

Bone Health Recommendations

- Obtain recommended amounts of calcium and vitamin D
- Engage weightbearing & resistance exercise
- Avoid smoking or excessive alcohol
- Seek medical counsel regarding bone health
- Have a BMD test and take medication when appropriate