Osteoporosis

Current guidelines and their application to patients with developmental disabilities

Meg Gemmill
Family Medicine, PGY2
Women's College Hospital
University of Toronto
Objectives

- Review the definition and epidemiology of osteoporosis
- Highlight key points from the 2010 Osteoporosis Canada guidelines
- Review the diagnosis and screening for osteoporosis in patients with developmental disabilities
Osteoporosis: definition

- Bone demineralization
  - decreased bone strength
  - increased risk of fractures
- Bone density > 2.5 SD below the average for young, healthy adults of the same sex (T-score)
Osteoporosis: epidemiology

- **Canada**
  - As many as 2 million Canadians
  - 1 in 4 women > 50 y.o.
  - 1 in 8 men > 50 y.o.

- **Canadian Population with Developmental Disabilities**
  - Prevalence varies
  - 21% of community-dwelling adults, 40-60 y.o.
Bone Mineral Density

- Measured by DEXA scan
- Spine, femoral neck and total hip
- High specificity but low sensitivity

**T-score**
- Compares results to the average for young, healthy adults of the same sex

**Z-score**
- Compares results to age-, race- and sex-matched population
Osteoporosis Canada
2010 Guidelines

- Updated from 2002
- *For women and men > 50 y.o.*
- Shift from treating low bone mineral density to preventing fragility fractures

- Indications for BMD
- Clinical tools
- Recommended diagnostic algorithm

Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
**Table 1: Indications for measuring bone mineral density**

<table>
<thead>
<tr>
<th>Older adults (age ≥ 50 yr)</th>
<th>Younger adults (age &lt; 50 yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥ 65 yr (both women and men)</td>
<td>Fragility fracture</td>
</tr>
<tr>
<td>Clinical risk factors for fracture (menopausal women, men age 50–64 yr)</td>
<td>Prolonged use of glucocorticoids*</td>
</tr>
<tr>
<td>Fragility fracture after age 40 yr</td>
<td>Use of other high-risk medications†</td>
</tr>
<tr>
<td>Prolonged use of glucocorticoids*</td>
<td>Hypogonadism or premature menopause (age &lt; 45 yr)</td>
</tr>
<tr>
<td>Use of other high-risk medications†</td>
<td>Malabsorption syndrome</td>
</tr>
<tr>
<td>Parental hip fracture</td>
<td>Primary hyperparathyroidism</td>
</tr>
<tr>
<td>Vertebral fracture or osteopenia identified on radiography</td>
<td>Other disorders strongly associated with rapid bone loss and/or fracture</td>
</tr>
<tr>
<td>Current smoking</td>
<td></td>
</tr>
<tr>
<td>High alcohol intake</td>
<td></td>
</tr>
<tr>
<td>Low body weight (&lt; 60 kg) or major weight loss (&gt; 10% of body weight at age 25 yr)</td>
<td></td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td></td>
</tr>
<tr>
<td>Other disorders strongly associated with osteoporosis</td>
<td></td>
</tr>
</tbody>
</table>

*At least three months cumulative therapy in the previous year at a prednisone-equivalent dose ≥ 7.5 mg daily.
†For example, aromatase inhibitors or androgen deprivation therapy.

Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
Clinical Tools

- WHO Fracture Risk Assessment Tool (FRAX)
- Canadian Association of Radiologists and Osteoporosis Canada (CAROC) Assessment Tool

Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
Figure 1: Assessment of basal 10-year risk of fracture with the 2010 tool of the Canadian Association of Radiologists and Osteoporosis Canada. The T-score for the femoral neck should be derived from the National Health and Nutrition Education Survey III reference database for white women. Fragility fracture after age 40 or recent prolonged use of systemic glucocorticoids increases the basal risk by one category (i.e., from low to moderate or moderate to high). This model reflects the theoretical risk for a hypothetical patient who is treatment-naive; it cannot be used to determine risk reduction associated with therapy. Individuals with a fragility fracture of a vertebra or hip and those with more than one fragility fracture are at high risk of an additional fracture.
Encourage basic bone health for all individuals over age 50, including regular active weight-bearing exercise, calcium (diet and supplements) 1200 mg daily, vitamin D 800–2000 IU (20–50 μg) daily and fall-prevention strategies.

- Fragility fractures
- Use of high-risk medications
- Hypogonadism
- Malabsorption syndromes
- Chronic inflammatory conditions
- Primary hyperparathyroidism
- Other disorders strongly associated with rapid bone loss or fractures

Age < 50 yr

- Fragility fracture after age 40
- Prolonged use of glucocorticoids or other high-risk medications
- Parental hip fracture
- Vertebral fracture or osteopenia identified on radiography
- High alcohol intake or current smoking
- Low body weight (< 60 kg) or major weight loss (> 10% of body weight at age 25)
- Other disorders strongly associated with osteoporosis

Age 50–64 yr

- All men and women

Age ≥ 65 yr

Initial BMD testing

Assessment of fracture risk

Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
Treatment

- Exercise and falls prevention
- Calcium - elemental (1200 mg daily from diet and supplement)
- Vitamin D (1000 IU daily)
- Bisphosphonates

Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
In the DD Population

- Osteoporosis and osteoporotic fractures are more prevalent and occur earlier than the general population
- Osteoporosis is commonly unrecognized and therefore untreated
- Screening threshold should be lower
- If results are not used to make treatment decisions, they can still be used as a baseline
PCDD Guidelines: Risk Factors

- Severity of DD
- Low body weight
- Impaired mobility and impaired weight bearing
- Impaired nutritional intake
- Propensity to fall
- Hypogonadism
- Hyperprolactinemia
- Hypothyroidism
- Amenorrhea
- Specific genetic syndromes
- Long-term use of specific drugs
PCDD Guidelines

- Monitor weight and height regularly and assess risk status using BMI.
- Periodically assess risk for developing osteoporosis in all age groups of male and female patients with DD. Those at high risk warrant regular screening starting in early adulthood.
- Recommend early and adequate intake or supplementation of calcium and vitamin D unless contraindicated (e.g. in Williams syndrome).
Management of Osteoporosis in the DD Population

- Exclude or treat underlying causes
- BMD
- Pharmacotherapy: calcium supplement, vitamin D supplement, bisphosphonate
- Remove risk factors for fractures
- Treat pain
- Restore mobility
Adverse Effects of Bisphosphonates

- Osteonecrosis of the jaw
- Atypical fractures of the femur
- Esophageal cancer
- Atrial fibrillation

- If 10-year fracture risk is high, benefits of bisphosphonate use outweigh risk of therapy.

Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada, CMAJ 2010.
Falls Prevention

- Optimize vision
- Improve lighting, eliminate glare
- Review medications
  - sedatives, drugs altering gait or causing hypotension
- OT referral for in-home equipment
  - rails, walking aids
- PT referral for gait and balance training
Conclusions

- Shift in screening from treating low BMD to reducing risk of fractures
  - BMD indications
  - FRAX, CAROC assessment tools
- Guidelines need interpretation for DD population
- Assess other risk factors if BMD unhelpful
  - medications, frequent falls, underlying conditions
  - Serial BMD to monitor for rapid bone loss
- Balance the benefits and risks of bisphosphonates before starting therapy


Questions?