The Development of a Tool for Preventing and Managing Bone Disease in HIV-infected Adults

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Objective:

- As the HIV-infected population ages, numerous comorbidities are emerging including bone disease.
- HIV clinicians are faced with managing a variety of conditions that require additional knowledge and skills.
- The objective is to describe the development of an updated version and content of a practical tool to assist clinicians in preventing and managing bone disease in HIV-infected adults.

Methods:

- Development of the tool involved a group of local pharmacists with expertise in HIV and osteoporosis.
- The content was based on published literature, HIV conference abstracts, osteoporosis guidelines and expert consultation with an HIV endocrinologist and dietitian.
- The tool was then reviewed for content, readability and applicability by several other Canadian HIV Pharmacists.
- The final tool was published in the form of a 10-page fold-out pocket card, posted electronically and available nationally free of charge.[¥]

Results:

The tool has four main sections:

1 Risk Factors for Fractures/Bone Loss

Patient Characteristics

- Age ≥ 50 y.o.
- History of fragility fracture
- Vertebral Fracture (radiographic or occult)
- Parental Hip Fracture history
- Low body weight (< 60 kg)
- Major weight loss of 10% after age of 25 years old
- Sedentary lifestyle
- Caucasian, East Asians
- Premature menopause (< 45 y.o.)
- Post-menopausal women

Diseases/Disorders

- Chronic kidney disease (CKD)
- Chronic viral hepatitis
- Endocrinopathy – hypogonadism,
- HIV factors – lower extremity neuropathy (↑ risk falls), lipoatrophy, low nadir CD4, longer duration of HIV infection

Includes patient characteristics, diseases, nutrition, substances and medications, including certain antiretrovirals.

2 Patient Assessment

LEGEND:
BMD – bone mineral density
DXA – dual-energy x-ray absorptiometry

Initial Screening Assessment (prior to BMD Scan)

- Screen post-menopausal women and men ≥ 50 y.o. for risk factors
- In HIV+ patients ≥ 50 y.o., consider measuring height every 1-2 years (ideally with a stadiometer)
  – ≥ 2 cm loss in height could indicate a vertebral fracture
  – significant height loss should be investigated radiographically
- Assess history and risks for falls in the past year

Includes recommendations on initial screening, indications for bone mineral density testing, fracture risk assessment and diagnostic work-up.

3 Treatment

Who to Treat?

HIGH RISK

- CAROC System: High risk (> 20%)
- FRAX® Algorithm: Major fracture risk > 20% or hip fracture risk ≥ 3%

MODERATE RISK

- CAROC System: Moderate risk (10-20%)
- Initiating therapy is a clinical decision that depends on the presence of additional significant risk factors and careful evaluation for such risk factors is recommended. Consider delaying bisphosphonates and modify ARVs to a bone-sparing regimen *(See Patient Assessment- Secondary Causes)*. Repeat BMD after one year to reassess need for therapy
- Plain X-rays of thoracic and lumbar spine can be useful to evaluate for subclinical vertebral fracture; if present, treatment is strongly encouraged

Reviews who to treat based on risk assessment and treatment options, including drugs to treat osteoporosis.

4 Prevention

General Preventative Measures

- Evaluate/treat modifiable risk factors
- Smoking cessation
- Alcohol – limit use
- Limit sodium intake to < 2300 mg daily
- Limit caffeine intake to < 400 mg daily (e.g. coffee 95-200 mg/cup; tea 50 mg/cup; cola 30-55 mg/can)
- Weight bearing exercise – 30 minutes 3 days/week and resistance training
- Fall assessment and prevention; balance and gait exercises
- Calcium and vitamin D

Discusses non-pharmacologic and pharmacologic measures (e.g. vitamin D and calcium supplementation).

Conclusions:

- A clinical tool for the prevention and treatment of bone disease in HIV was developed by a group of expert pharmacists to provide practical guidance to clinicians and to standardize an approach to patient care.
- Follow-up study is needed to evaluate the clinical utility of the tool and impact on prevention and detection of osteoporosis and disease management in HIV-infected patients.

¥ For electronic version of the card, see CATIE website at: http://www.catie.ca/en/resources/tool-preventing-and-managing-bone-disease-hiv-infected-adults

References:

1. Papaioannou A et al. 2010 clinical practice guidelines for the diagnosis and management of osteroporosis in Canada: summary. Can Med Assoc J. 2010;182(17):1864-73. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2988535/ and http://www.osteoporosis.ca/multimedia/pdf/Executive_Summary_October_2010.pdf
2. Hanley DA et al. Vitamin D in adult health and disease: a review and guidelines statement form Osteoporosis Canada (summary). Can Med Assoc J. 2010;182(12):1315-1319. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2934850/
3. McComsey GA et al. Bone disease in HIV infection: a practical review and recommendations for HIV care providers. Clin Infect Dis. 2010;51(8):937-946. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3105903/
4. Brown TT et al. Recommendations for evaluation and management of bone disease in HIV. Clin Infect Dis. 2015;60(8):1242-51. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4400413/
5. Negredo E et al. Pharmacologic approaches to the prevention and management of low bone mineral density in HIV-infected patients. Curr Opin HIV AIDS. 2016;11:351-357.
6. Osteoporosis in Primary Care. Can Pharm J. 2011;144(suppl 1):S2-24. http://journals.sagepub.com/toc/cphc/144/1_suppl
7. Cosman F et al. Clinician's guide to prevention and treatment of osteoporosis. Osteoporosis Int 2014;25(10):2359-81. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4176573/
8. Battalora L et al. Frax-tool fracture-risk comparison: have a little backbone! [abstract 678]. Conference on Retroviruses and Opportunistic Infections. Seattle Washington, Feb 13-16, 2017. http://www.croiconference.org/sessions/frax-tool-fracture-risk-comparison-have-little-backbone
9. Yin MT et al. Management of osteoporosis in the HIV-infected patient. IAS-USA CME Activity. Jan 14, 2016. http://www.iasusa.org/content/management-osteoporosis-hiv-infected-patient
10. Brown JP et al. Bisphosphonates for treatment of osteoporosis: expected benefits, potential harms, and drug holidays. Can Fam Physician. 2014;60(4):324-333. https://www.ncbi.nlm.nih.gov/pubmed/24733321
11. Adler RA et al. Managing osteoporosis patients after long-term bisphosphonate treatment: Report of a task force of ASBMR. J Bone Miner Res. 2016;31(1):16-35. https://www.ncbi.nlm.nih.gov/pubmed/26350171
12. FRAX WHO Fracture Risk Assessment Tool. University of Sheffield, UK. www.sheffield.ac.uk/FRAX/tool.jsp (select Canada for country)
13. CAROC – Canadian Association of Radiologists and Osteoporosis of Canada. www.osteoporosis.ca/multimedia/pdf/CAROC.pdf
14. Osteoporosis Canada, 2017. www.osteoporosis.ca/
15. Health Canada. Vitamin D and Calcium: Updated Dietary References Intakes, November 30, 2010. www.hc-sc.gc.ca/fn-an/nutrition/vitamin/vita-d-eng.php
16. Compendium of Pharmaceuticals & Specialties, on-line version (e-CPS). CPhA monograph, Calcium Salts: Oral, February 2014.

This project was sponsored by an unrestricted educational grant from ViiV Healthcare.

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