Osteoporosis: assessing the risk of fragility fracture

NICE CG146, 2012

This guideline offers best practice advice on the assessment of fragility fracture risk in adults.

Methods of risk assessment

- Estimate absolute risk when assessing risk of fracture e.g. predicted risk of major osteoporotic or hip fracture over 10 years, expressed as a percentage.
- Use either FRAX® (without a BMD value if a DXA scan has not previously been undertaken) or QFracture®, within their allowed age ranges. Above the upper age limits defined by the tools, consider people to be at high risk.
- FRAX® can be used for people aged between 40 and 90 years, either with or without BMD values, as specified.
- QFracture® can be used for people aged between 30 and 84 years. BMD values cannot be included in the risk algorithm.
- Interpret the estimated absolute risk of fracture in people aged >80 years with caution, because predicted 10-year fracture risk may underestimate their short-term fracture risk.
- Take into account that risk assessment tools may underestimate fracture risk in certain circumstances, for example if a person:
  - has a history of multiple fractures,
  - has had previous vertebral fracture(s),
  - has a high alcohol intake,
  - is taking high-dose systemic glucocorticoids*,
  - has other causes of secondary osteoporosis.

Table 1

Causes of secondary osteoporosis

<table>
<thead>
<tr>
<th>Endocrine</th>
<th>Hypogonadism including untreated premature menopause, treatment with aromatase inhibitors or androgen deprivation therapy hyperthyroidism, hyperparathyroidism, hyperprolactinaemia, Cushing’s disease, diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal</td>
<td>Coeliac disease, inflammatory bowel disease, chronic liver disease, chronic pancreatitis, other causes of malabsorption</td>
</tr>
<tr>
<td>Rheumatological</td>
<td>Rheumatoid arthritis, other inflammatory arthropathies</td>
</tr>
<tr>
<td>Haematological</td>
<td>Multiple myeloma, haemoglobinopathies, systemic mastocytosis</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Cystic fibrosis, COPD, metabolic (homocystinuria)</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Homocystinuria</td>
</tr>
<tr>
<td>Other</td>
<td>Chronic renal disease, immobility</td>
</tr>
</tbody>
</table>

Targeting risk assessment

- Consider assessment of fracture risk in:
  - all women aged ≥65 years, and
  - all men aged ≥75 years.
- Consider assessment of fracture risk in women <65 years and men aged <75 years in the presence of risk factors such as:
  - previous fragility fracture,
  - current use or frequent recent use of oral or systemic glucocorticoids,
  - history of falls,
  - family history of hip fracture,
  - other causes of secondary osteoporosis (see Table 1),
  - low BMI (<18.5 kg/m²),
  - smoking,
  - alcohol intake above recommended limits.
- Do NOT routinely assess fracture risk in people aged <50 years unless they have major risk factors e.g. current or frequent recent use of oral or systemic glucocorticoids, untreated premature menopause or previous fragility fracture, because they are unlikely to be at high risk.
- Measure BMD to assess fracture risk in people aged <40 years who have a major risk factor, such as history of multiple fragility fracture, major osteoporotic fracture, or current or recent use of high-dose systemic glucocorticoids.∗
- Also see NICE pathway: Hip fracture

Methods of risk assessment

- Take into account that fracture risk can be affected by factors that may not be included in the risk tool e.g. living in a care home, or taking drugs that may impair bone metabolism e.g. anti-convulsants, selective serotonin reuptake inhibitors, thiazolidinediones, proton pump inhibitors and anti-retrovirals.
- Following risk assessment with FRAX® (without a BMD value) or QFracture®, consider measuring BMD with DXA in people whose fracture risk is in the region of an intervention threshold** for a proposed treatment, and recalculate absolute risk using FRAX® with the BMD value.
- Do NOT routinely measure BMD without prior assessment using FRAX® (without a BMD value) or QFracture®.
- Also see NICE medtech innovation briefing: B Index for investigating suspected osteoporosis.
- Consider measuring BMD with DXA before starting treatments that may have a rapid adverse effect on bone density e.g. sex hormone deprivation treatment for breast or prostate cancer.
- Consider recalculating fracture risk in the future:
  - if there has been a change in the person’s risk factors
- Do NOT routinely assess fracture risk in the future:
  - if the original calculated risk was in the region of the intervention threshold** for a proposed treatment and only after a minimum of 2 years.

Assessment tools

FRAX®
Accessible at: https://www.sheffield.ac.uk/FRAX/tool.jsp

QFracture®
Accessible at: http://www.qfracture.org/

Note: QFracture does not include BMD in its algorithm.

- These algorithms give the 10-year probability of fracture for:
  - hip fracture
  - major osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture)

* >7.5mg prednisolone or equivalent per day for ≥3 months

**An intervention threshold is the level of risk at which an intervention is recommended.
Bisphosphonates for treating osteoporosis
NICE TA464; 2017

Preventing fragility fractures§

- Oral bisphosphonates (alendronic acid, ibandronic acid and risedronate sodium) are recommended as options for treating osteoporosis in adults only if the:
  - person is eligible for risk assessment, AND
  - 10-year probability of osteoporotic fragility fracture is at least 1%.
- Intravenous bisphosphonates (ibandronic acid and zoledronic acid) are recommended as options for treating osteoporosis in adults only if the:
  - person is eligible for risk assessment, AND
  - 10-year probability of osteoporotic fragility fracture is at least 10%, OR
  - 10-year probability of osteoporotic fragility fracture is at least 1% and the person has difficulty taking oral bisphosphonates or these drugs are contraindicated or not tolerated.
- Estimate the 10-year probability of fragility fracture using the FRAX® or QFracture® risk tools.
- Choice of treatment should be made on an individual basis after discussion between the responsible clinician and the patient and/or carers, about the advantages and disadvantages of treatments available.

§ Editorial note: the absolute risk level at which oral bisphosphonates are recommended as treatment options in this guidance is based on cost-effectiveness and are NOT clinical intervention thresholds. See www.nice.org.uk/guidance/ta464.

Recommendations — wording used such as ‘offer’ and ‘consider’ denote the strength of the recommendation.

Drug recommendations — the guideline assumes that prescribers will use a drug’s Summary of Product Characteristics (SPC) to inform treatment decisions.

Table 2: Available bisphosphonate preparations

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulation</th>
<th>Dose</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alendronic acid</td>
<td>10mg tablets</td>
<td>10mg once a day</td>
<td>Postmenopausal osteoporosis&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>70mg tablets/effervescent</td>
<td>70mg once a week</td>
<td>Prevention and treatment of corticosteroid-induced osteoporosis in postmenopausal women not receiving HRT&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Oral solution 70mg/100ml</td>
<td>70mg once a week</td>
<td>Osteoporosis in men&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ibandronic acid</td>
<td>150mg tablets</td>
<td>150mg once a month</td>
<td>Postmenopausal osteoporosis&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>IV injection 3mg/3ml</td>
<td>Once every 3 months</td>
<td>Postmenopausal osteoporosis&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Risedronate sodium</td>
<td>5mg tablets</td>
<td>5mg once a day</td>
<td>Postmenopausal osteoporosis&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>35mg tablets</td>
<td>35mg once a week</td>
<td>Prevention of osteoporosis (including corticosteroid-induced osteoporosis) in postmenopausal women</td>
</tr>
<tr>
<td>Zoledronic acid</td>
<td>IV infusion (over at least 15 minutes) 5mg/100ml</td>
<td>5mg once a year</td>
<td>Postmenopausal osteoporosis&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

a check individual SPCs as indications differ for different preparations.
b to reduce risk of vertebral and hip fractures.
c to reduce risk of vertebral fractures.
d a reduction in risk of vertebral fractures has been demonstrated, efficacy on femoral neck fractures has not been established.