Looking at a difficult case of osteoporosis

The number of people suffering from osteoporosis is set to double by 2030, write Mary Clifford and Evelyn Kearns

There are a number of principles that should guide the treatment of osteoporosis. In the elderly, a holistic approach to falls prevention should be taken. All patients should be advised not to smoke cigarettes or drink excessive alcohol. Adequate calcium and vitamin D in diets is essential for all patients. These approaches treat or prevent secondary hyperparathyroidism and reduce the risk of proximal femur fracture. Intake of at least 1g Ca, 800iu vitamin D and 1g/kg body weight of protein is recommended.

Evidence suggests that both calcium and vitamin D should be supplemented to the diet of frail nursing home residents to reduce the risk of hip fractures and also those on bisphosphonates and selective oestrogen receptor modulators (SERMs). These supplements should not be administered at the same time as other agents as they may interfere with absorption.

Immobilised patients lose bone rapidly and so regular exercise within the limits of their illness should form an integral component of their management. Also, weight-bearing and muscle-strengthening exercises, posture and balance exercises carry much benefit. Physiotherapy after a fracture is extremely important and should always be considered.

Ever-increasing incidence

Within the clinical setting, osteoporosis is an important condition to consider as there are many possible presentations and its incidence is ever-increasing, namely due to people living longer, exercising less and having poorer diets. There are now five times as many fractures each year due to osteoporosis as there were in the 1960s, and the number of people suffering from osteoporosis is set to double by 2030. The following clinical scenario aims to highlight practical and relevant points in the management of this bone disorder characterised by a reduction in bone mineral density, enough to cause an increased risk of fracture.

Here we look at a case study on how a difficult case of osteoporosis is dealt with in general practice.

Case study

Joan is 65 years old. She smokes and has a BMI of < 18. She recently fractured her wrist after a low-velocity injury and presented to her GP for her annual check-up.

Salient points here within history, examination and investigations include: assessing for risk factors; ruling out a secondary cause for osteoporosis; and the DXA scan issue.

Risk factors

When looking for risk factors always consider:

- Genetics: Female, age > 65, Caucasian, Asian, family history
- Nutrition: Alcohol > three units/day, caffeine, vitamin D deficiency
- Body weight: BMI < 19
- Hormone status: Nulliparous, late menarche, early menopause
- Medications: Anticonvulsants, long-term lithium therapy, corticosteroids
- Lifestyle: Inactive, smoking
- Comorbidities: Rheumatoid arthritis, renal failure, congestive cardiac failure.
- Secondary causes: May become apparent from the assessment and include: recent or chronic immobility; breast cancer; Graves disease; ulcerative colitis or one of numerous dermatological conditions (lichen planus, bullous pemphigoid, dermatomyositis and polymyositis).

The history and examination should guide the investigations, which may include some of the following:
haematological, biochemical and serological profiles: FBC, U+E, LFT, TFT, RF, ANA, dsDNA, ESR, CRP, serum Ca, vitamin D, LDH, serum ACE.

In the above scenario, Joan presents with many risk factors. NICE guidelines suggest that prior to treatment, a confirmatory DXA scan should be performed in order to get a baseline T Score and to monitor response to subsequent treatment. If Joan were 75 years or older, however, there would be no requirement for prior DXA.

**One month after initial visit**

Joan represents to your surgery one month later to discuss the results of her DXA scan. She received a T score of < -2.5. She wants to know does she need to start medication.

Patient education and guidance is required here. It is important to spend adequate time explaining the significance of this result, as it will aid the patient’s understanding of her condition, her adherence to practical guidelines and medication compliance.

Explain that T Scores compare a person’s bone density against a reference range and reflect the relative increase in risk of fracture. Advise her that she has osteoporosis, meaning that her bone mineral density is more than 2.5 standard deviations below the young adult mean.

**Treatment options**

The pharmacological treatment options for osteoporosis are vast and ever-expanding. NICE guidelines cover the secondary prevention of osteoporotic fragility fractures in postmenopausal women who have sustained a clinically-apparent osteoporotic fracture. They cover the treatment of postmenopausal women who have normal calcium levels and/or vitamin D levels. Unless clinicians are confident that women who receive osteoporosis treatment have an adequate calcium intake and are vitamin D replete, calcium and/or vitamin D supplementation should be provided.

Bisphosphonates: alendronate, etidronate and risedronate are recommended as treatment options for the secondary prevention of osteoporotic fragility fractures:

- In women aged 75 years and older – in this age group there is no requirement for prior DXA
- In women aged between 65 and 74 years – bisphosphonates are appropriate treatment if the presence of osteoporosis is confirmed by DXA
- In postmenopausal women younger than 65 years, bisphosphonates are appropriate treatment if they have a very low bone mineral density (BMD) or if they have confirmed osteoporosis plus one, or more, additional age-independent risk factors including: low BMI (< 19 kg/m2); family history of maternal hip fracture before the age of 75 years; untreated premature menopause; certain medical disorders independently associated with bone-loss such as chronic inflammatory bowel disease, rheumatoid arthritis, hyperthyroidism or coeliac disease; conditions associated with prolonged immobility.

If you are considering a bisphosphonate for Joan, it is essential you explain that the effectiveness of bisphosphonates is impaired by food, calcium, iron, coffee, tea and orange juice. Therefore, compliance with dosing regime is essential (fasting, ie. before breakfast, remaining upright for 30 minutes post-ingestion, washing down with 200ml water only).

Side-effects to warn her about include: GI disorders; oesophageal ulceration; dyspepsia; dysphagia; musculoskeletal pain; and headache. She should know what to do if any of these occur.

**Two months after initial visit**

Joan returns to your surgery two months later. She stopped taking her bisphosphonate after four weeks due to dyspepsia and recurrent headache. She read on the internet that HRT is useful in osteoporosis and looks for your advice.

Advise Joan that although HRT is an effective treatment, in helping to maintain bone density and reduce fracture rates for duration of therapy, it is no longer recommended for postmenopausal women over 50 unless other treatments are contraindicated or not tolerated. A risk-benefit ratio indicates that HRT should not be used as first-line due to the increased risk of coronary heart disease, stroke and breast cancer (according to the Women’s Health Initiative study from 2002).

Alternatively, consider a SERM, raloxifene. This is recommended as an alternative treatment option in women: for whom bisphosphonates are contraindicated; or for women who are physically unable to comply with the special recommendations for use of bisphosphonates; or those who have had an unsatisfactory response to bisphosphonates (another low-trauma fracture despite adhering fully to therapy for one year and BMD decrease below pre-treatment baseline); or who are intolerant of bisphosphonates.

Raloxifene reduces the risk of vertebral fractures but its suitability in the over 65 age group is questionable, as non-vertebral sites are not protected. In this instance, advise Joan of potential side-effects including hot flushes, leg cramps, flu-like syndrome, peripheral oedema and risk of venous thromboembolism.

Another agent to consider is strontium ranelate, protelos.
Anti-osteoporotic agents

Advise Joan that only anti-osteoporotic agents increase bone formation and reduce bone resorption, resulting in a rebalance of bone turnover in favour of bone formation. These agents significantly reduce the risk of vertebral fractures in postmenopausal osteoporotic women with or without previous fractures, and also significantly reduce the risk of hip fractures.

It also has specific efficacy in the over 80s. Taken as a 2g sachet daily. Food and milk reduce its absorption. Side-effects include nausea, diarrhoea, increased risk of DVT and rarely DRESS – a severe skin reaction, occurring within the first three months of treatment.

10 months after initial visit

Joan returns 10 months later. She has sustained another fracture and a repeat DXA scan reveals a worsening of bone mineral density with a T Score of < -3. How might you proceed?

In view of continued fractures while on therapy it would not be unreasonable to consider a secondary care referral.

Here, her suitability for a parathyroid hormone analogue would be considered, i.e. teriparatide. These agents can only be prescribed on a high-tech prescription by a hospital consultant for the treatment of established osteoporosis or others at high risk of fracture. They stimulate new bone formation, having a greater effect on bone architecture and strength. They are given daily by subcutaneous injections for 18 months.

Bisphophonates should be stopped prior to their use and it is standard practice to place a person on anti-resorptive treatment after completing a course of PTH treatment.

Adverse side-effects include headache, dizziness and transient episodes of oesophageal hypotension. The change in serum calcium with teriparatide is small and routine monitoring is not required. Other reasons to consider referral to secondary care include: diagnostic difficulty; intolerance of oral bone-sparing agents; metabolic bone diseases – osteomalacia; Paget’s disease; confirmed osteoporosis or low trauma fracture in men.

Questions of diagnosis and treatment

As well as advising patients on practical issues as mentioned above, i.e. falls prevention, diet and lifestyle advice, it is important to remember that GPs are a resource for patients who may have questions about different aspects of diagnosis and treatment. Many women will avoid a DXA scan unnecessarily due to lack of knowledge and fear of the unknown. To avoid this, encourage patients to express their concerns and fears, provide plenty of literature and stay informed yourself.

DXA scan

Patients need to know that a DXA scan is a non-invasive and painless method of measuring bone density. DXA is used both for the diagnosis of osteoporosis and for assessment of treatment efficacy. It measures bone density in the lumbar spine and at the femoral neck, where osteoporotic fractures are most likely to occur. It lasts for approximately eight minutes. The radiation emitted is one-fifth that of a standard chest x-ray.

The GP fills out a referral letter, either a proforma or a handwritten referral, and once this is received by Clinical Age Assessment they post out a form to the patient. If the patient does not complete this form and post it back, they will not be booked for a DXA scan. Prior to commencement of the scan, the patient receives an education assessment in relation to diet, lifestyle, exercise and fall prevention plus information on medications that may be started.

The current waiting list for a DXA scan is two weeks, and is free if the patient goes public. A DXA scan costs €120. It is to be repeated every two years but no automatic recalls are initiated. A patient will only have a repeat DXA performed if it is organised by their GP.

Exclusion criteria for DXA include: severe kyphosis preventing the patient lying flat, weight > 120kg, severe shortness of breath on lying flat and confusion and agitation. Contraindications include pregnancy and recent barium studies.

Osteoporosis in men

Another area to consider is osteoporosis in males. This is often overlooked but research shows that up to one-in-five men will develop the condition; 40-60% of men with osteoporosis have an identifiable cause or risk factor. The major risk factors include alcohol abuse, corticosteroid use and hypogonadism. Other risk factors include a variety of medical conditions such as renal or liver disease and cancer, particularly myeloma.

All male patients suspected of having osteoporosis should ideally be referred for investigation to a specialist centre, particularly in the case of younger men. Lifestyle measures and treatment of any underlying cause are essential. Treatment for hypogonadism for instance increases bone density by up to 15%.

Treatment options for men with osteoporosis are antiresorptives, anabolics and testosterone therapy – if there are low levels of testosterone, they can be given to help maintain bone density.

Treatable and preventable

In conclusion, although osteoporosis is becoming increasingly more common, it is both treatable and preventable. As GPs, our focus should be on lifestyle interventions, drug therapies and falls risk assessment in high risk patients.

The aim of these simple measures will be to improve quality of life for our patients, reduce fracture rates, and reduce their subsequent impact on our already stretched financial resources.

Mary Clifford and Evelyn Kearns are both second-year GP trainees with the Midwest GP Training Scheme

References on request