Introduction

- Fracture fractures are fractures that result from mechanical forces that would not ordinarily result in a fracture, known as low-level (or low-energy) trauma.
- Pregnancy and lactation-induced osteoporosis is rare, but can cause fragility fractures with disabling consequences at a young age and with a baby to look after.

Case description

- A 35-year old female who was previously well, until her first pregnancy in 2014 in Israel.
- Her antenatal course was uncomplicated. She breastfed postpartum and three months into this she experienced acute back pain on reaching for a baby.
- She had no other constitutional symptoms and was not on any medications or supplements.
- Examination was unremarkable apart from significant vertebral tenderness and her BMI was 23.
- MRI spine demonstrated multiple vertebral wedge fragility fractures at T3, T6, T8, T9, T10 and T11 with a total of over 4cm height loss. (Figure 1)
- Bone densitometry at the time of fracturing in Israel demonstrated lumbar and vertebral osteoporosis with lumbar spine T-score -4.3 and total mean hip T-score -3.3.
- She moved to the UK 2 years later and was referred to our Endocrine Bone Clinic having received a single dose of denosumab under the rheumatologists.

Clinical course

- Repeat bone densitometry in June 2018 was consistent with naturally improving bone mineral density (BMD) with lumbar T-score -3.2 (Z-score -3.2) and total mean hip T-score -2.5 (Z-score -2.4) (although strictly one should not compare DEXAs from different machines). (Figure 2)
- In keeping with this improved bone mineral density, she had a raised Bone-ALP (23.7iu/L, NR 6.5-14.9) but normal uNTx (18nmolBCE/mmolCr, NR 5-65), and serum P1NP (28.9ug/mL, NR 15-59).
- Osteoporosis risk factors were identified as previous low BMI, ex-smoker, previous vitamin D deficiency, previous SSRI exposure, family history of osteoporosis and breastfeeding 18 months postpartum.
- Additional secondary causes of osteoporosis were excluded (normal myeloma screen, thyroid, renal, and liver functions, negative coeliac and pituitary screens).

Case outcome

- Given her young age and improving BMD, we have currently advised improved calcium intake (1000-1200mg/day), adequate vitamin D supplementation, regular exercise and nutritional support, as any anti-resorptive therapy at this point may stunt her continued natural recovery and improvements in BMD. This has significantly reduced pain and increased activity, with no further fractures.
- Combined OCP was started primarily as contraception due to patient wishes, but also ensures good systemic oestrogen levels to aid bone modelling and limit the risk of future fragility fractures.
- Teriparatide, a recombinant form of parathyroid hormone, is an option to consider if bone density improvement plateau.
- Her management may be challenging, as she plans for further pregnancy. This provides further reason to avoid any anti-resorptive medication or teriparatide for now. In addition we have advised against future lactation post-partum.

Discussion

- Calcium homeostasis is significantly altered during pregnancy and subsequent lactation (Figure 3). Current data suggest small BMD increases at cortical but decreases at predominantly trabecular sites like the spine.
- In pregnancy 2-3% of maternal calcium is transferred to the foetus mostly in the second and third trimester. Subsequently during lactation 300-400mg calcium per day is transferred into breast milk, which is provided predominantly from maternal bone stores. (Figure 3)
- In addition, hyperprolactinaemia as a result of lactation results in oestrogen suppression and further bone loss. Combined with calcium losses as above, lactation can induce up to 10% BMD loss. (3,4)

Summary

- In this case, it is likely her pre-pregnancy BMD was suboptimal, given the additional significant risk factors including previous low BMI and family history. This led to a reduced baseline BMD as she entered pregnancy and lactation which resulted in further losses and ultimately multiple vertebral fractures.
- Osteoporotic fracture is an important differential to consider in women presenting with acute back pain during or after pregnancy. Often there is a natural recovery while pharmacological agent-use is complicated at this time especially if considering further pregnancies/lactation.
- Furthermore, this case highlights the need to consider cautioning patients with reduced BMD regarding future lactation as they enter pregnancy, while ensuring adequate calcium and vitamin D intake.

References