10.7861/clinmed.22-4-s20

Teriparatide therapy for medication-related osteonecrosis of the jaw: case report and literature review

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Introduction

Medication-related osteonecrosis of the jaw (MRONJ) is a recognised complication of antiresorptive therapy.[1] Emerging evidence suggests impaired epithelialisation post-dental surgery, local pro-inflammatory response and inhibition of angiogenesis in its pathogenesis.[2] Risk factors include old age, prolonged medication exposure, intravenous bisphosphonates (BP), smoking, glucocorticoid therapy, anaemia, obesity, diabetes and cancer.[3]

Case presentation

We present the case of an 81-year-old woman with severe osteoporosis and ischaemic heart disease, who had been on alendronate 70 mg weekly for 3 years from when she had a tooth extraction. Three months later, she presented to maxillofacial surgery with non-healing extraction sites, facial pain and erythema, and a malodorous discharging sub-mantle sinus. She received a diagnosis of stage 3 MRONJ confirmed by orthodentography and computed tomography. She had *Proteus mirabilis* on tissue culture. She had no history of osteosarcoma or local radiotherapy.

For 14 months, she underwent conventional therapy with limited debridement of the exposed bone, long-term antibiotics and chlorhexidine wash of the exposed areas, but her condition deteriorated. On referral to rheumatology, her vitamin D deficiency was corrected, total procollagen type 1 N-terminal propeptide (P1NP) and C-terminal cross-linking telopeptide (CTX) were within normal limits. She was commenced on subcutaneous teriparatide 20 µg daily for 2 years.

Within 2 months, there was full soft tissue coverage of the intramural lesion, the fistula was lined with healthy oral mucosa and she did not require further debridement. Within 5 months, her P1NP doubled and CTX remained the same. She then underwent surgical closure of the orocutaneous fistula. This healed successfully, leading to improved appetite and gradual weight gain. She was then provided with upper and lower dentures.

Discussion

The incidence of MRONJ in the UK is 620 per year. At the time of treatment, we reviewed 11 case reports, two case series and one retrospective study using teriparatide to treat MRONJ that was resistant to conventional treatment in a total of 44 patients, where all but one patient found a favourable outcome.[4,5]

The biological rationale for the benefit of teriparatide (is a recombinant parathyroid hormone (rPTH)) could be that rPTH increases the proliferation of T-cells, thereby increasing Wnt-10b protein production and enhancing osteoblast differentiation.[6] Teriparatide enhances osteoblast RANKL production to drive osteogenesis and augments osteoclast recruitment.[7] These cells are pivotal to bone healing and a prerequisite for the anabolic effect of teriparatide on osteoblasts.

Teriparatide induces and 'anabolic window' where there is early response of the bone formation markers with delayed catch-up of resorption marker in MRONJ patient within the first 9 months of treatment, leading to a positive bone balance and indicating a role for these in monitoring treatment response.[8]

Over the past 2 years, a systematic review and an randomised controlled trial has finally established the beneficial effect of teriparatide in the treatment of MRONJ, which provides welcome relief to the rare patients afflicted with this condition.[9,10] ■

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