The cost of delay: a case report highlighting the need for early intervention in bone health

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ABSTRACT

Osteoporosis is a common condition in older adults, which can lead to a cascade of serious fragility fractures if left untreated. This report describes the case of an 86-year-old woman with a history of osteoporosis, previously treated with denosumab, which was discontinued due to jaw osteonecrosis. She was admitted to the orthopedics ward with a right-sided hip fracture (HF) and subsequently discharged to a rehabilitation facility after surgical repair, without resuming anti-osteoporotic therapy. Two months later, she was re-admitted to the orthogeriatrics ward with a contralateral HF. Postoperatively, she developed delirium, which further compromised her cognitive and functional recovery. Once again, anti-osteoporotic treatment was not initiated during hospitalization but was instead postponed until the outpatient care phase. This case highlights the risks of anti-osteoporotic treatment discontinuation, a common gap in secondary fracture prevention among older adults. Timely initiation of anti-osteoporotic therapy is essential to prevent future fractures, and the risk-benefit balance of treatment should be carefully considered not only when prescribing, but also when deciding to withhold therapy.

KEYWORDS

Hip fracture, older adults, osteoporosis, anti-osteoporotic treatment.

Introduction

Osteoporosis is a highly prevalent condition among older adults, characterized by reduced bone mass and microarchitectural deterioration, resulting in a heightened risk of fractures [1]. Fragility fractures (FFs), usually caused by low-energy trauma such as a fall from standing height, are among the most serious consequences of osteoporosis. Among FFs, hip fractures (HFs) are a particular concern due to their profound impact on health, functional independence, and quality of life [2,3]. In Italy, the annual cumulative incidence of HFs is alarmingly high, approaching 100,000 cases per year [4].

The risk is even greater in individuals with a history of vertebral fractures, with more than 55% of patients hospitalized for HF showing radiological or clinical evidence of prior vertebral fractures [5,6]. Furthermore, patients who have already sustained a HF are up to five times more likely to experience a subsequent fracture within two years, with a high proportion occurring on the contralateral side [7,8]. This highlights the progressive nature of osteoporotic disease, where one FF substantially raises the risk of subsequent fractures, a phenomenon known as the "fracture cascade" [9-11]. Timely initiation of appropriate anti-osteoporotic therapy is essential to reduce the risk of refracture [12]. However, 70% to 80% of high-risk individuals remain untreated for osteoporosis in Italy [1]. The present case exemplifies the clinical impact of and risks associated with omission of anti-osteoporotic therapy.

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Case report

An 86-year-old woman presented to the Emergency Department (ED) of the IRCCS San Gerardo dei Tintori Foundation (Monza, Italy) after a fall at home, witnessed by her husband. Initial work-up included urgent blood tests, electrocardiogram (sinus rhythm), and pelvic X-rays, which revealed a displaced pertrochanteric fracture of the right hip and a non-displaced fracture of the right ischiopubic ramus. She was admitted to the orthopedics ward and evaluated by a geriatrician within 24 hours, in accordance with the hospital's orthogeriatric care pathway.

The preoperative geriatric assessment revealed severe frailty (Clinical Frailty Scale score 7) [13], with full dependence in basic activities of daily living, except for eating and mobility. Her husband reported multiple prior falls, progressive mobility decline, and the use of a single-point cane for indoor ambulation. He also reported memory difficulties, despite previously preserved cognitive function (Mini-Mental State Examination (MMSE) 29/30)

[14], and a history of depressed mood treated with citalopram. The patient's medical history included osteoporosis, initially treated with denosumab following a vertebral fracture, but discontinued the previous year due to osteonecrosis of the jaw (ONJ). Additional comorbidities included myelodysplasia in the context of polycythemia vera, managed with hydroxyurea.

Surgical fixation of the right hip with a gamma nail was performed within 72 hours of admission. Postoperatively, the patient developed progressive anemia, managed with intravenous iron and folic acid supplementation, without requiring transfusion. The MMSE completed during hospitalization showed a worsening of cognitive function compared with the previous year, as shown by a total score of 25/30. Nutritional assessment revealed caloric-protein malnutrition and sarcopenia, as indicated by a Mini Nutritional Assessment–Short Form score of 3/14 [15], handgrip strength of 9 kg, calf circumference of 29 cm, and serum albumin level of 3 g/dL. Early mobilization and physiotherapy were initiated within 24 hours of surgery, and the patient achieved assisted bed-to-chair transfers, although she was unable to stand independently. On postoperative day 7, she was discharged to a rehabilitation facility with prescriptions for vitamin D, protein supplements, and a referral for a post-discharge metabolic bone evaluation, with the aim of considering resumption of anti-resorptive therapy or initiation of anabolic treatment.

Two months later, the patient returned to the ED after another fall, caused by tripping. X-rays revealed contralateral pertrochanteric HF. Surgical fixation with a gamma nail was performed within 24 hours, and physiotherapy resumed on postoperative day 2. During this hospitalization, the patient required transfusion of two units of packed red blood cells, and experienced prolonged postoperative delirium, which significantly impacted her cognitive status and functional rehabilitation. Although she regained assisted standing, she did not recover ambulation. On postoperative day 7, she was discharged once again to a rehabilitation facility. Discharge therapy included vitamin D, protein supplements, and trazodone. At the time of the second admission, the patient had not yet attended the post-discharge appointment to assess her suitability for initiation of osteoporosis treatment. Once again, anti-osteoporotic therapy was not initiated during hospitalization, this aspect having been deferred to the outpatient care phase.

Discussion

This case highlights a common gap in secondary prevention of osteoporotic fractures in older adults, illustrating the consequences of discontinuing denosumab without initiating an alternative treatment. While treatment is generally recommended after FF, clinical uncertainty may arise in older adults who are perceived to have limited life expectancy or where there is concern about the potential futility of pharmacological intervention. Chattaris *et al*. demonstrated in their study that anti-osteoporotic medications can be equally effective in preventing subsequent fractures in both frail and non-frail individuals hospitalized for HFs [16]. Clinicians should, therefore, consider the potential benefits of anti-osteoporotic treatments in older adults. However, this practice remains significantly underutilized in Italy, where anti-resorptive and anabolic treatments still account for a very small proportion of total drug consumption [17].

In the present case, osteoporosis treatment was initially withheld due to concerns about ONJ. However, in the absence of documented contraindications or patient refusal, the continued lack of therapy is likely linked to missed opportunities for specialist reassessment, which ultimately contribute to therapeutic inertia. While clinical concerns may arise when reintroducing anti-osteoporotic therapy in such cases, several studies have shown that abrupt discontinuation of denosumab can trigger rapid reactivation of osteoclasts, and therefore accelerated bone loss [18-20]. A recent systematic review recommends resuming anti-osteoporotic treatment with an oral bisphosphonate or intravenous zoledronate when oral therapy is not tolerated [21]. AAOMS (the American Association of Oral and Maxillofacial Surgeons) [22] and SICMF-SIPMO (the Italian Society of Maxillofacial Surgery and the Italian Society of Pathology and Oral Medicine) [23] support the gradual reintroduction of antiresorptive drugs, emphasizing the need for case-by-case evaluation. The decision should be individualized based on the patient's fracture risk, as well as the characteristics and severity of the prior ONJ episode (e.g., stage, localization, recurrence) [24,25]. Nevertheless, evidence to support or contraindicate treatment in complex cases remains limited.

In addition to timely prescription of treatment, continuity of care should be a key priority, ideally delivered through a fracture liaison service model [26]. Gaps in anti-osteoporotic therapy often stem from poor coordination between hospital and outpatient care settings. Implementing automated digital reminder alerts and scheduling outpatient appointments before discharge could strengthen continuity of care and improve adherence. Further research is needed to develop evidence-based strategies for early, targeted bone health interventions in older adults, including those with a history of adverse events.

Conclusions

This case highlights the urgent need for ongoing, careful management of anti-osteoporotic therapy in older adults to prevent fractures and maintain bone health. Targeted educational programs are crucial to enhance clinicians' awareness and improve patient adherence. Moreover, structured collaboration between hospital and community services can ensure continuity of care and reduce the risk of refractures. A coordinated strategy combining education, integrated care pathways, and supportive health policies is vital for effective osteoporosis management.

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