

Incidence of osteoporosis in steroid therapy in patients with lymphoma

A prospective single-center cohort study

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Introduction

Lymphoma, a prevalent cancer in Thailand, is often treated with chemotherapy regimens combined with high-dose corticosteroids, which increase the risk of osteoporosis. Corticosteroids reduce bone formation and increase bone resorption, leading to lower bone mineral density (BMD) and affect key bone formation markers, such as osteocalcin (OC) and procollagen type I N-terminal propeptide (PINP), which reflects bone formation activity.

This study aims to examine incidence of osteoporosis in lymphoma patients and changes in bone biomarkers to improve screening and prevention strategies.

Material and Methods

- A prospective cohort study
- 64 patients diagnosed with lymphoma between July 2023 and February 2024, including those over 20 undergoing at least 3 months of steroid treatment, excluding those with pre-existing osteoporosis or bone issues conditions
- 47 patients were analyzed
- BMD was conducted at baseline and 1 year post-treatment
- Bone biomarkers, OC and PINP, were measured at baseline, 6 month, and 1 year after treatment
- Primary outcome:** incidence of osteoporosis in lymphoma patients at 1 year after start treatment
- Secondary outcome:** impact of corticosteroids on BMD and bone biomarkers

Results

- Median age was 58, with a male predominance (66%), and 40% of participants had baseline osteopenia
- Most patients (72%) received the CHOP regimen, followed by CVP (8.1%) and BEACODD (6.3%) with median cumulative prednisolone dose of 3,798 mg
- 20% have a decline in bone health, with 8.5% developing osteoporosis. All are postmenopausal women with baseline osteopenia
- 17% of patients with normal BMD progressed to osteopenia
- Significant BMD and T-score reductions were observed at the femur, hip, and spine
- Bone turnover biomarkers increased significantly but did not correlate with BMD reductions

BMD (g/cm ²)	All Δ 12 month	P	Normal Δ 12 month	P	Osteopenia Δ 12 month	P
Femur	-0.05 (-0.07 to -0.02)	< 0.001	-0.06 (-0.1 to -0.02)	0.002	-0.03 (-0.05 to 0)	0.036
Total hip	-0.04 (-0.05 to -0.02)	< 0.001	-0.04 (-0.06 to -0.02)	0.001	-0.04 (-0.06 to -0.02)	0.001
Spine n=42	-0.06 (-0.09 to -0.02)	0.001	-0.06 (-0.1 to -0.01)	0.01	-0.05 (-0.1 to 0)	0.031

Table 3 Mean difference (95% Confidence interval) BMD from baseline to 12 months after treatment

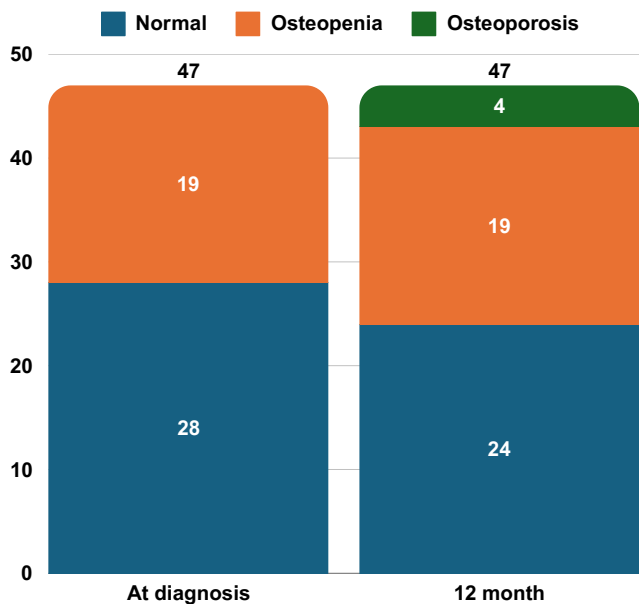


Figure 1 Incidence of osteoporosis and osteopenia

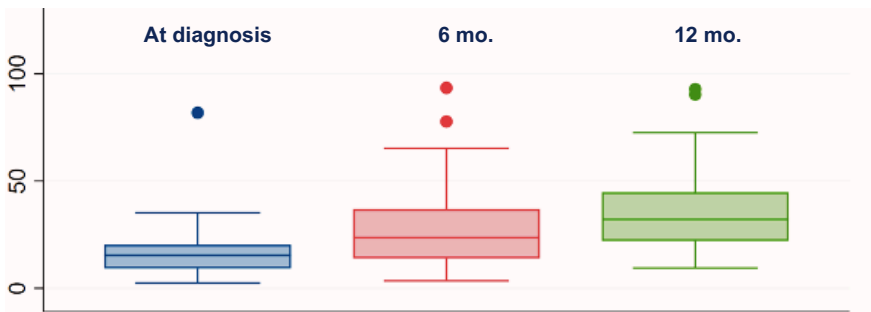


Figure 2 Osteocalcin level at diagnosis, 6 month and 12 month

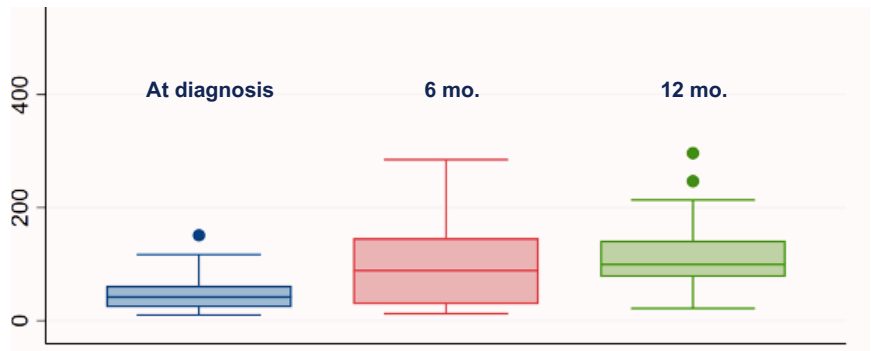


Figure 3 P1NP level at diagnosis, 6 month and 12 month

Conclusion

- Significant impact of corticosteroid-containing regimens on bone health in lymphoma patients
- Postmenopausal women and those with baseline osteopenia are at the highest risk
- Although biomarkers help monitor bone metabolism, their predictive value for osteoporosis is still limited
- These findings emphasize the importance of early BMD assessment, ongoing monitoring, and interventions to minimize skeletal complications

Contact information

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