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Primary Bone Lymphoma: A Case Report

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ABSTRACT

A 26-year-old woman presented with three months progressive right hip pain and difficult ambulation, which was subsequently diagnosed as germinal center–type diffuse large B-cell lymphoma in the right femoral head, neck and upper-midshaft region without any nodal or visceral lesions. Primary bone lymphoma (PBL) is an uncommon extranodal lymphoma representing approximately 1% of all lymphomas and 3–7% of malignant primary bone tumors. While it typically affects older adults, occurrences in younger patients are rare and may lead to delayed recognition. PBL may radiologically resemble benign bone disease, emphasizing the importance of clinical suspicion. Diagnosis requires multimodal evaluation, with chemoimmunotherapy remaining the primary treatment.

Keywords: Primary bone lymphoma; Case report

INTRODUCTION

Primary bone lymphoma (PBL) is a distinct, infrequent subtype of extranodal lymphoma arising in the skeletal system. There is no consensus over the best definition of PLB. According to World Health Organization, classification of bone and soft-tissue tumors, PLB is defined as a single skeletal neoplasm composed of malignant lymphoid cells without regional lymph-node invasion, or bone lesions without invasion on visceral tissue or lymph node.[1] In contemporary reviews, primary bone lymphoma is described as a neoplasm of malignant lymphoid cells arising within bone, where systemic disease—such as nodal, visceral, or marrow involvement—remains absent at presentation and does not emerge within the first six months following diagnosis.[2,3]

Accounting for only 1% of all lymphomas and 3–7% of extranodal presentations—most commonly DLBCL (>80%)—PBL remains exceptionally uncommon.[2] Constituting merely 3–7% of malignant primary bone tumors, its rarity contributes both to frequent delays in diagnosis and to the absence of universally accepted, evidence-based management guidelines.[4]

PBL most commonly presents in adults in their 5th–6th decade, with a slight male predominance.[2,4] Cases of PBL in individuals younger than 30 years are even more infrequent, representing fewer than 5% of reported presentations in contemporary series, thereby underscoring the clinical significance of this report. PBL can initially mimic benign or low-grade bone disease on imaging, necessitating multimodal diagnostic assessment. Its management highlights key considerations regarding systemic therapy response and the selective role of orthopedic intervention in structurally compromised long bones.

CASE REPORT

A 26-year-old female with no previously known comorbidities, initially consulted for a 3 month history of worsening right hip pain associated with difficulty in ambulating, wheel-chair bound. Initial Xray of the right hip joint (22 April 2025) showed Ill-defined lytic areas/ moth eaten appearance along the proximal shaft and the neck of the right femur with cortical thinning (Figure 1). There was a periosteal reaction noted along the proximal femur. MRI (27 April 2025) revealed a large well defined, intramedullary, complex lytic-sclerotic, mildly expansile marrow replacing lesion involving right femoral head, neck and upper-midshaft region, 13x3.7x3.7cm (CC,AP,TR) in maximum dimension, with narrow zone of transition. Lesion showed T2/STIR mixed signals with internal cystic areas, T1 weighted signals isointense to adjacent skeletal muscles, with heterogeneous contrast enhancement in post-gadolinium scan with internal multiple variable sized non-enhancing cystic necrosis. There were associated cortical interruptions at places resulting to extraosseous extension, evident by periosteal and adjacent musculature enhancing edema. No obvious chondroid matrix was seen. Differentials included fibrous dysplasia and adamantinoma. A PET CT scan (13 May 2025) showed an FDG avid sclerotic bone lesion in the right femur (head, neck, intertrochanteric regions), with SUV max of 12.08 – Figure 2.

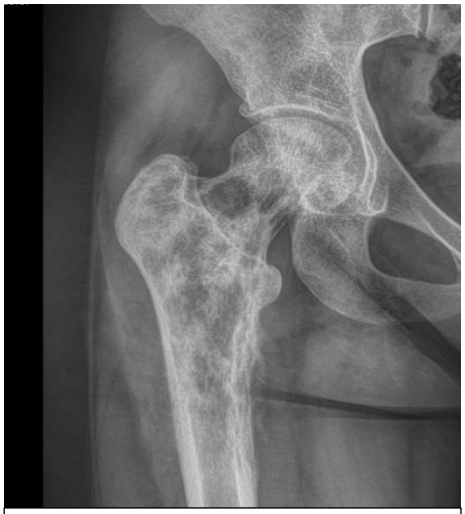

Figure 1: Right Hip Joint X-Ray

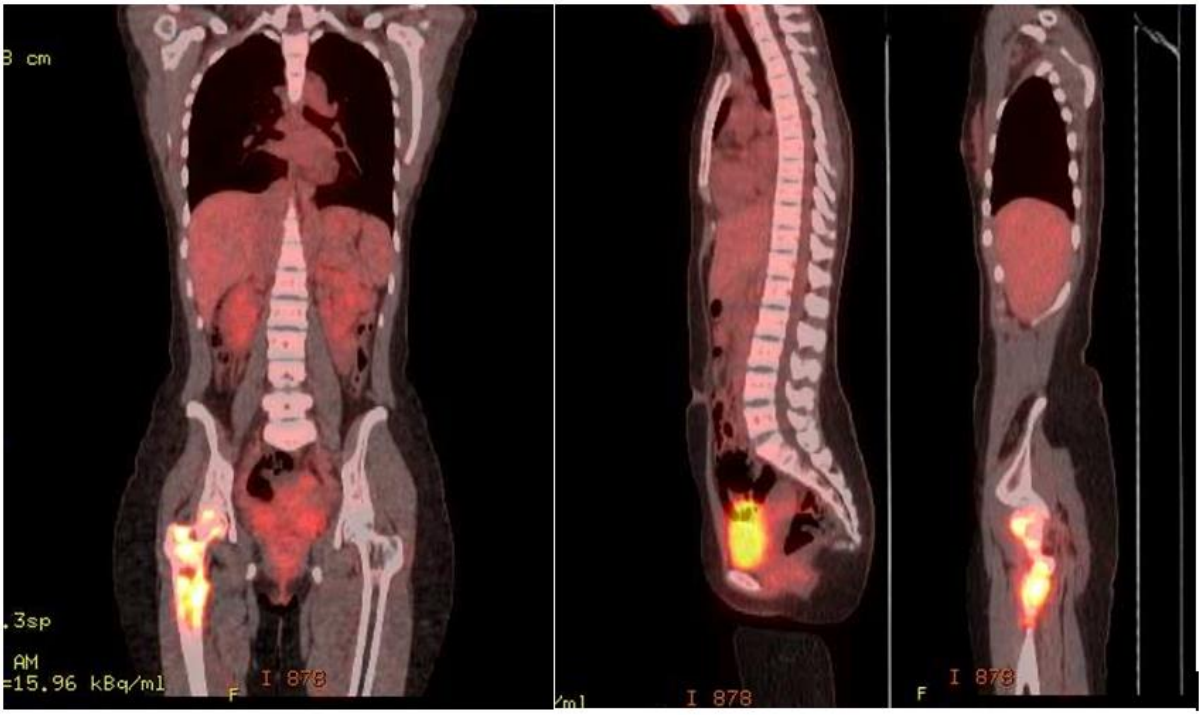

Figure 2: PET CT scan results showing an FDG avid sclerotic bone lesion in the right femur (head, neck, intertrochanteric regions)

Bone biopsy (31 May 2025) and subsequent immunohistochemistry showed membranous positivity with CD45 in tumor cells suggestive of lymphoid origin. PAS, CD99 and PanCK were negative in the tumor cells. IHC showed positive staining of tumor cells with CD20, CD10 and Bcl6. CD3 showed very occasional background T cells; Ki67 was 15% at hot spots. Bcl2, MUM1 and CD3 were negative in tumor cells, consistent with germinal center type diffuse large B cell lymphoma.

After 4 cycles of RCHOP regimen, PET CT scan (29 August 2025) showed significant metabolic regression of the lymphoma lesion in the right femur (Deauville score 4; partial metabolic response); 2 cycles RCHOP & 2 cycles Rituximab were further given. PETCT scan (16 December 2025) showed lesions in right femoral head, neck, proximal shaft, right ilium, manubrium, T11. She underwent proximal femoral resection, right hip, and right cemented femoral endoprosthesis (15 January 2026) at the Philippine General Hospital), gaining better ambulation and pain relief. The T11, T12, sternum (1st set) and L3-5, right ilium (2nd set) lesions underwent Cyberknife SBRT in March 2026 at Asian Cancer Institute-Asian Hospital and Medical Center, followed-up with additional rituximab.

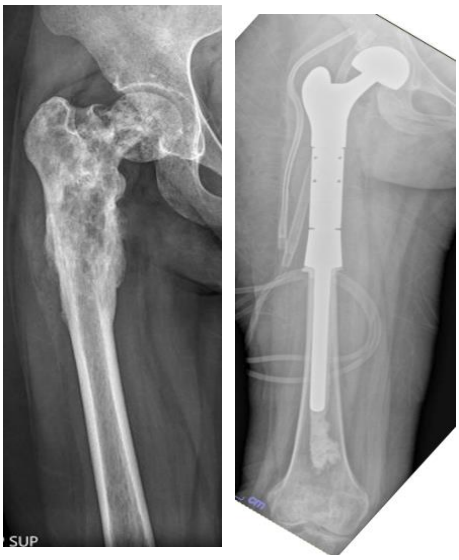

Figure 3: X-ray just before, after surgery

DISCUSSION

Primary bone lymphoma (PBL) is a distinct, infrequent subtype of extranodal lymphoma arising in the skeletal system, described as a neoplasm of malignant lymphoid cells arising within bone, where systemic disease remains absent at presentation and does not emerge within the first six months following diagnosis.[2,3]
PBL remains 1% of all lymphomas and 3–7% of extranodal presentations—most commonly DLBCL (>80%), and about 3–7% of malignant primary bone tumors.[2,4]

PBL most commonly presents in adults in their 5th–6th decade, with a slight male predominance.[2,4] In contrast, PBL in individuals younger than 30 is exceedingly rare, with pediatric and young adult cases appearing only in small series and isolated reports. These cases collectively highlight the atypical age distribution and the diagnostic uncertainty that often surrounds PBL in younger patients. These reports include PBL involving long bones such as the radius and tibia in adolescents[5], as well as rare presentations in young adults involving the femur.[6] Isolated reports have also documented PBL affecting less common sites such as the patella in young adults, highlighting the variable clinical and anatomic spectrum of this disease in patients under 30 years.[7,8]

Long bones—including the femur, humerus, tibia, and pelvis—are the most commonly involved sites, with proximal femoral disease such as in our patient recognized but less frequently encountered.[2] The clinical picture is usually dominated by slowly progressive, non-mechanical bone pain and functional limitation. Because these symptoms are frequently attributed to benign musculoskeletal conditions such as trauma or degenerative disease, many patients experience delays before appropriate evaluation is undertaken. Soft-tissue swelling or pathologic fracture may be present later in the disease course. Systemic “B symptoms” are uncommon in comparison with nodal DLBCL, which can further contribute to delayed consultation and diagnosis.[9]

On imaging, PBL often appears as an ill-defined lesion with either lytic or mixed lytic–sclerotic features and may be associated with cortical thinning, erosion, or a periosteal response. These radiologic characteristics can closely resemble those of primary bone sarcomas, metastatic deposits, or benign conditions such as fibrous dysplasia and adamantinoma. Because of this overlap, imaging findings alone are rarely diagnostic.[1,10] In this our case reported, plain radiography and MRI of the proximal femur demonstrated a large marrow-replacing lytic–sclerotic lesion with cortical thinning and extraosseous extension, prompting PET-CT and biopsy to exclude differential considerations.

Histopathologic confirmation remains the definitive diagnostic step. Histo-pathologically, the vast majority of PBLs are **diffuse large B-cell lymphoma (DLBCL), not otherwise specified**, accounting for more than 80% of reported cases.[11] In this patient, biopsy with immunophenotyping identified **CD45+, CD20+, CD10+, BCL6+, germinal center–type DLBCL,** with a **Ki-67 index of 15%,** aligning with current WHO characterization of PBL.

There are currently no randomized trials specific to PBL, and treatment recommendations are largely extrapolated from diffuse large B-cell lymphoma (DLBCL) management guidelines issued by major oncology societies, including ESMO, NCCN, and ASCO, as dedicated PBL-specific protocols are lacking.[11-13]

According to ESMO guidance and ASCO/NCCN-aligned recommendations, **anthracycline-based chemoimmunotherapy—most commonly R-CHOP—remains the standard first-line approach**.[13] In selected cases, **involved-site radiotherapy (ISRT)** may be added to enhance local disease control, particularly for bulky lesions or incomplete metabolic response on interim imaging. According to available cohort studies and contemporary reviews, primary bone lymphoma demonstrates a 5-year overall survival rate of approximately 60%–80%, which is comparatively more favorable than outcomes reported for most other primary malignant bone tumors.[1,2,14] These survival estimates largely reflect the responsiveness of diffuse large B-cell lymphoma to systemic chemoimmunotherapy, distinguishing PBL from osseous sarcomas and other skeletal malignancies that often require aggressive surgical resection and still carry poorer prognoses. This prognostic advantage underscores the importance of timely recognition and appropriate oncologic management, as early diagnosis enables patients to access curative-intent therapy and avoid the morbidity associated with misclassification as a primary bone sarcoma.

Primary bone lymphoma (PBL) generally has a favorable prognosis compared with many other extranodal lymphomas, especially when confined to bone and treated with modern rituximab-based chemoimmunotherapy, with long-term overall survival commonly in the 70–90% range for limited-stage disease.[15]

Progression from an initial solitary femoral-head primary bone lymphoma to additional vertebral (T11) and right iliac lesions represents transition from unifocal to multifocal osseous disease, which is associated with a substantially worse prognosis than localized (stage IE) presentations.[4] For primary bone DLBCL, 5-year overall survival (OS) is roughly 80–90% in stage IE disease but falls toward 35–40% once disease is

disseminated or multifocal, especially with axial involvement.[16] Multifocal involvement of axial skeleton (especially spine and pelvis) tends to cluster with other high-risk features and is often linked to worse outcomes than purely appendicular disease.[1]

Surgery in primary bone lymphoma involving the femoral head/shaft with additional T11 and iliac lesions is supportive as systemic chemoimmunotherapy—rather than surgical excision—remains the effective disease-directed treatment.[16] Proximal femur is high-risk for fracture and loss of ambulation; intramedullary nailing or endoprosthesis replacement is used for impending or actual pathologic fractures to allow early weight-bearing. For combined femoral head/acetabular involvement, reconstructive procedures (e.g., proximal femoral replacement with acetabular reconstruction or Harrington-type constructs) can restore stability before or after R-CHOP-based therapy.[17,18]

RT is commonly reserved for symptomatic sites (pain, risk of fracture, spinal cord/nerve compression) and residual PET-avid or bulky lesions after chemo, particularly if only partial response is achieved. In limited-stage primary bone DLBCL, a multicenter rituximab-era study showed no OS or RFS advantage to routine consolidative RT overall, but suggested possible benefit for patients with only partial response after chemoimmunotherapy, a principle often extrapolated when considering focal RT in multifocal cases.[19]

For multifocal PBL, most protocols favor full-course R-CHOP (or equivalent) as systemic therapy, with RT targeted to selected problematic bones rather than all involved sites.[20] Isolated, asymptomatic iliac or vertebral lesions without major structural compromise are usually managed non-operatively with chemo ± RT and monitored radiologically.[2] Systemic chemoimmunotherapy (± radiotherapy) is the primary antitumor treatment, with RT reserved for residual/progressive or highly symptomatic sites.[21]

Even with multifocal spine–pelvis–femur involvement, long-term remission is still achievable in a subset when effective salvage therapy, depending on fitness and availability, is delivered; small series document durable complete remissions despite widespread bone disease.[17]

After R-CHOP relapse, common salvage regimens (usually with rituximab) are R-ICE (rituximab, ifosfamide, carboplatin, etoposide), R-DHAP (rituximab, dexamethasone, high-dose cytarabine, cisplatin), R-GDP (rituximab, gemcitabine, dexamethasone, cisplatin/carboplatin), or R-ESHAP/DICE variants (etoposide, methylprednisolone, cytarabine, cisplatin ± rituximab).[22]

This case adds to the limited literature on primary bone lymphoma in young adults, highlighting its uncommon age distribution and potential to mimic benign bone disease. The diagnostic process—integrating imaging, histopathology, and PET-CT—illustrates the need for a multimodal approach, while treatment considerations emphasize the role of systemic chemoimmunotherapy and selective orthopedic intervention. In the absence of PBL-specific randomized trials and standardized protocols, reports such as this help broaden clinical awareness, support earlier recognition, and inform management strategies for future patients.

DECLARATIONS

Ethical Approval and Consent to participate

A copy of the written consent is available for review by the Editor-in-Chief of this journal.

With the patient's consent, ethical approval was given.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Availability of supporting data

The patient's medical record is available at the hospital for review.

Competing interests

There is no competing interest on behalf of the authors in reporting this case.

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Authors' information and contributions

Authors are doctors of the University of the Philippines-Philippine General Hospital and Asian Hospital and Medical Center, and members of the multidisciplinary team who took care of the patient and contributed to the case report writing and review.

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REFERENCES

1. Liu CX, Xu TQ, Xu L, Feng XG, Meng J, Zhai Z. Primary lymphoma of bone: A population-based study of 2,558 patients. Ther Adv Hematol. 2020;11:2040620720958538.
2. Theofilos Kanavos, Effrosyni Birbas, Alexandra Papoudou-Bai, Eleftheria Hatzimichael, Aikaterini Kitsouli, Georgia Karpathiou, et al. Primary bone lymphoma: A review of the literature with emphasis on histopathology and histogenesis. Diseases. 2023;11(1):42.
3. Tejinder Singh, C T Satheesh, K C Lakshmaiah, T M Suresh, Govind K Babu, D Lokanatha, et al. Primary bone lymphoma: A report of two cases and review of the literature. J Cancer Res Ther. 2010;6(3):296-8.
4. Poorva Bindal, Aakash Desai, Lukas Delasos, Sudhanshu Mulay, James Vredenburgh. Primary bone lymphoma: A case series and review of literature. Case Rep Hematol. 2020:2020:4254803.
5. Yanmei Huan, Yiwei Qi, Weisheng Zhang, Jianguo Chu. Primary bone lymphoma of radius and tibia: A case report and review of literature. Medicine (Baltimore). 2017;96(15):e6603.
6. Amy Kiamos, Kimberly Boldig, Vinay Gagadam, Rahul Gujarathi. Rare case of primary bone lymphoma of the femur. BMJ Case Rep. 2023;16(7):e254291.
7. Al Absi E Al Mulla, A Alrabeh R, Alkhunaizi Z. Primary bone lymphoma of the patella: Rare presentation of primary non-germinal center B-cell-like diffuse large B-cell lymphoma—Case report and review of the literature. EC Orthopaedics. 2021;12(2):62–66.

8. Sarra Ben Rejeb, Majdi Ben Romdhane, Majdi Sghaier, Mehdi Charfi. Primary large B-cell lymphoma of the patella: Case report. Radiology Case Reports. Int J Surg Case Rep. 2025;131:111344.
9. Khder Yousf, Ahmad Osman, Mkdad Dalla, Loujain Zaher, Tala Zaher, Rabab Salloum, et al. Isolated primary diffuse large B-cell lymphoma in thumb: Rare case with review. Medicine (Baltimore). 2025;104(34):e43959.
10. Jia Wang, Shouren Fan, Jie Liu, Bao Song. A rare case report of primary bone lymphoma and a brief review of the literature. Onco Targets Ther. 2016;9:4923–4928.
11. Dai Maruyama, Takashi Watanabe, Yasuo Beppu, Yukio Kobayashi, Sung-Won Kim, Kazuki Tanimoto, et al. Primary bone lymphoma: A new and detailed characterization of 28 patients in a single-institution study. Jpn J Clin Oncol . 2007;37(3):216-23.
12. Susanibar-Adaniya, S., & Barta, S. K. 2021 update on diffuse large B-cell lymphoma: A review of current data and potential applications on risk stratification and management. Am J Hematol. 2021;96(5):617-629.
13. Kahl, B. S., & Bartlett, N. L. Management of diffuse large B-cell lymphoma: Current approaches and novel therapies. Journal of Clinical Oncology. 2023;41(Suppl.):S1–S10.
14. Eyre, TA, Wilson, MR, Hall GW, Preston G, Collins, GP. Primary bone lymphoma: Clinical features, management and outcomes—An ESMO Open review. ESMO Open. 2022;7(5), 100384.
15. Liang X, Lu W, Li T, Luo B, Wu Y, Lin C, Liu Y, Wang L. Epidemiology and survival of patients with primary lymphoma of bone: a large retrospective cohort study. Ann Hematol. 2025;104(6):3345-3358.
16. U Vitolo, J F Seymour, M Martelli, G Illerhaus, T Illidge, E Zucca, et al. Extranodal diffuse large B-cell lymphoma and primary mediastinal B-cell lymphoma: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. Ann Oncol. 2016;27(suppl 5):v91-v102.
17. Abul MS, Bektaş E, Sevim ÖF, Gümüştaş, SA. Primary bone lymphoma: A retrospective analysis of 15 patients treated in a single tertiary center. Archives of Basic and Clinical Research 2025;7(3):147–152.
18. Sbaraglia, M. (2019). Primary lymphoma of bone: Orthopedic management considerations. In Primary lymphoma of bone(pp. 345–348). Springer.
19. Rezazadeh A, Szabo A, Khurana A, Inwards DJ, Lunning MA, Bartlett NL. Outcomes of limited stage primary bone diffuse large B-cell lymphoma in the rituximab era: a multicenter, retrospective study. Haematologica. 2024;109(5):1439-1444.
20. Song W, Miao D, Zhu Z, Wu Q, Wang Y, Lv C. Role of radiation therapy differs between stages in primary bone large B-cell lymphoma in rituximab era: A population-based analysis. Frontiers in Oncology. 2020;10:1157.
21. Pooja Bhakta, Zachary E Hunzeker, Juan D Garcia, Ayman Youssef, Bradley J Grant, Rasha Alfattal, et al. Pathological fracture due to primary bone lymphoma in a patient with a history of prostate cancer: A case report and review of literature. Front Oncol. 2023;13:1100559.
22. Boonlerd P, Tantiworawit A, Norasetthada L, Chai-Adisaksopha C, Punnachet T, Hantrakun N, et al. Efficacy of ESHAP versus ICE plus dexamethasone (DICE) as salvage chemotherapy for relapsed or refractory diffuse large B-cell lymphoma. Ann Med. 2023;55(2):2261109.