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CASE REPORT
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Presumptive Post-Chemotherapy Polyarthritis in a Maltese Bitch: Clinical Characteristics and Outcome

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ABSTRACT

***Background*:** Post-chemotherapy polyarthritis is a recognized chemotherapy-related complication in human oncology but has not been clearly documented in dogs. Non-septic arthritis has been mentioned only once as an adverse effect of chemotherapy in dogs without detailed clinical features. In human medicine, post-chemotherapy polyarthritis has been reported across multiple chemotherapy protocols including doxorubicin. This report describes the 1st presumptive case of doxorubicin-associated non-septic inflammatory polyarthritis in a dog, suggesting a possible parallel to post-chemotherapy polyarthritis reported in human cancer patients.

***Case*:** An 11-year-old spayed bitch Maltese presented with lethargy, hyporexia, and lameness 4 months after initiating an adjuvant chemotherapy with doxorubicin administered following unilateral nephrectomy for renal hemangiosarcoma. Physical examination revealed pyrexia, weight loss and swelling with warmth of the right hock joint. Hematologic evaluation identified moderate normocytic normochromic non-regenerative anemia, neutrophilia and monocytosis with marked elevation in C-reactive protein concentration. Diagnostic imaging including radiography, ultrasonography and computed tomography revealed no evidence of tumor recurrence or other sources of inflammation. Infectious disease testing, including polymerase chain reaction panels, yielded negative results. Arthrocentesis of multiple joints showed increased nucleated cell counts with neutrophilic inflammation and absence of infectious organisms. Synovial fluid culture, antinuclear antibody titers and rheumatoid factor tests were all negative. Non-infectious inflammatory polyarthritis was diagnosed and presumed to be secondary to chemotherapy based on clinical progression and exclusion of alternative causes. Treatment with prednisolone and mycophenolate mofetil resulted in complete remission and normalization of inflammatory markers. The patient remained clinically stable for 5 months after diagnosis, and died due to systemic metastasis of hemangiosarcoma confirmed on postmortem examination.

***Discussion*:** This case describes the temporal association between chemotherapy and the onset of polyarthritis in a bitch, proposes a diagnostic approach for dogs based on diagnostic criteria reported in human patients, and suggests an immune-mediated mechanism consistent with this condition. Although the mechanism of post-chemotherapy polyarthritis has not been fully understood, immune dysregulation after chemotherapy has been consistently suggested as a potential cause. In human medicine, joint manifestations typically arise 2 to 8 months after the initiation of chemotherapy, which aligns with the onset observed in this bitch. Diagnostic considerations for this condition in human studies include a confirmed diagnosis of cancer, documented exposure to chemotherapy, development of joint disease without previous joint disorder and no other identifiable cause of arthritis. The clinical features in this patient fulfilled these criteria, strengthening the suspicion that chemotherapy contributed to joint disease development. Therapeutic strategies reported in human patients generally rely on immunomodulatory treatment. In this case, prednisolone and mycophenolate mofetil were selected, resulting in complete resolution and sustained clinical stability. This favorable response supports the immune-mediated process and suggests that immunosuppressive therapy may be effective for managing post-chemotherapy polyarthritis in dogs. This case provides a detailed description of clinical presentation and progression of presumptive post-chemotherapy polyarthritis in a dog. Recognition of this potential chemotherapy-associated complication is essential, and rigorous patient monitoring after initiation of chemotherapy is warranted.

Keywords: chemotherapy, dog, immunosuppressant, lameness, post-chemotherapy polyarthritis.

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INTRODUCTION

Post-chemotherapy polyarthritis (PCPA) is an increasingly recognized chemotherapy-related complication in human medicine [1,7]. Although its pathogenesis remains poorly understood, PCPA has been proposed to represent an autoimmune or rheumatoid-like process triggered by chemotherapy-induced immune dysregulation [3,5]. This condition has been observed across various chemotherapy regimens, suggesting that it is not confined to a single chemotherapeutic agent [1,3].

Several clinical characteristics of PCPA have been described, including stiffness, arthralgia, and arthritis involving both large and small joints [3,6]. PCPA is typically diagnosed in cancer patients who develop joint symptoms during or after chemotherapy, provided they have no prior history of joint disease and no other identifiable cause of arthritis is found [1]. Management strategies for PCPA generally include immunomodulatory therapy based on its presumed immune-mediated pathogenesis, and most patients show clinical improvement with this approach [1]. Nonsteroidal anti-inflammatory drugs (NSAIDs) are also commonly used for palliative control of pain and inflammation [2,3]. When the response to these treatments is inadequate, corticosteroids are frequently added as adjunctive therapy [2,3].

In veterinary medicine, chemotherapy-related non-septic arthritis has been reported only once in a study describing it as one of several adverse effects observed in dogs receiving chemotherapy without detailed clinical description [4]. This report describes a bitch with presumptive PCPA, providing detailed insights into the clinical characteristics and successful management.

CASE

An 11-year-old spayed bitch Maltese presented with lethargy, hyporexia, and lameness. The medical history included a diagnosis of renal hemangiosarcoma (HSA), which had been treated by unilateral nephrectomy 5 months before presentation. Following nephrectomy, adjuvant chemotherapy with doxorubicin[1] [Doxosin® - 1 mg/kg intravenously every 21 days for 5 treatments] was initiated 4 months before presentation. Clinical signs were observed 1 month after completion of the chemotherapy protocol.

Physical examination revealed pyrexia (39.4°C), weight loss, and swelling with warmth of the right hock joint. During gait assessment, the patient showed a short-strided gait in the hindlimbs. Complete blood cell count revealed normocytic normochromic non-regenerative moderate anemia (packed cell volume 28%; reference interval [RI]: 37%-55%; reticulocyte 64.5 × 10^9/L; RI: 10-110 × 10^9/L). Neutrophilia (neutrophil 15.52 × 10^9/L; RI: 2.95-11.64 × 10^9/L) and monocytosis (monocyte 1.45 × 10^9/L; RI: 0.16-1.12 × 10^9/L) were also identified. Serum biochemistry and blood gas analysis results were all within the reference range, except for an elevated C-reactive protein (CRP) level (8.5 mg/dL; RI: 0.1-1.0 mg/dL). Radiography, ultrasonography and computed tomography of the thorax and abdomen revealed no evidence of tumor recurrence or other inflammatory abnormalities. Radiography of bilateral forelimbs and hindlimbs showed no erosive changes (Figure 2). To rule out infection, a whole blood polymerase chain reaction (PCR; Anemia PCR Panel-Canine) was performed and all results were negative. Arthrocentesis was performed on the right carpal and stifle joints. Synovial fluid obtained from the right carpal and stifle joints revealed increased nucleated cell counts (8 and 99 cells/40× field, respectively; RI: < 2 cells/40× field), characterized by a predominance of non-degenerate neutrophils (70% and 91%, respectively; RI: < 12%), with no infectious agents identified (Figure 1 A & B). The results of synovial fluid culture, antinuclear antibody (ANA) titers, and rheumatoid factor (RF) were all negative. Based on these findings, the patient was diagnosed with non-infectious inflammatory polyarthritis, which was presumed to be secondary to chemotherapy given the temporal association of symptom onset and the low probability of other causes.

As a therapeutic trial, immunosuppressive therapy with prednisolone[2] [PDS; Solondo® - 1 mg/kg orally every 12 h] was initiated. One week after PDS administration, the clinical signs of hyporexia and lethargy resolved, while lameness, neutrophilia, monocytosis and elevations in CRP remained (neutrophils 34.42 × 10^9/L; RI: 2.95-11.64 × 10^9/L; monocytes 1.24 × 10^9/L; RI: 0.16-1.12 × 10^9/L; CRP 3.7 mg/dL; RI: 0.1-1.0 mg/dL), showing partial improvement. Subsequently, mycophenolate mofetil[3] [MMF; CellCept® - 10 mg/kg orally every 12 h] was added to the ongoing PDS therapy. After 10 days of MMF administration, clinical signs resolved completely and the CRP level decreased to normal reference range (0.6 mg/dL; RI: 0.1-1.0 mg/dL).

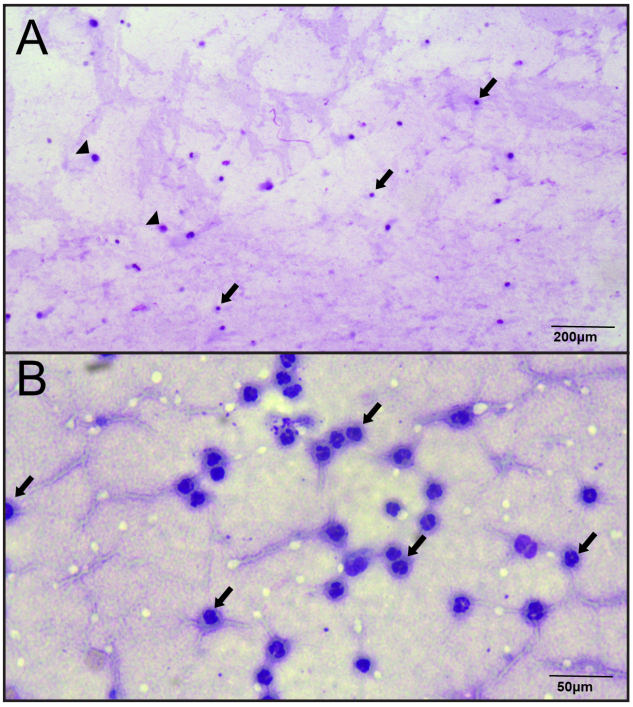

Figure 1. Cytologic images of synovial fluid obtained from an 11-year-old spayed bitch Maltese presumed to have post-chemotherapy polyarthritis (PCPA). Neutrophils (arrows) and monocytes (arrowhead) are identified on the synovial fluid smear. Non-degenerate neutrophilic pleocytosis without infectious agents is observed in (A) right carpal joint, and (B) right stifle joint. [Diff-Quik staining: A- ×100, scale bar= 200 µm; B- ×400, scale bar= 50 µm].

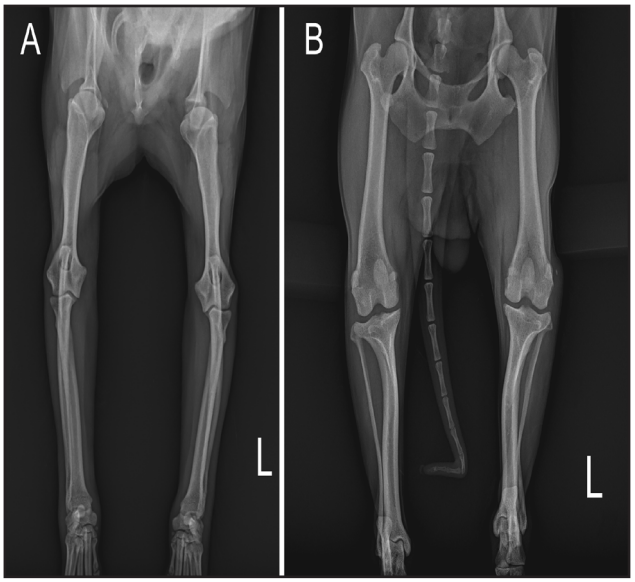

Figure 2. Radiographic findings of the forelimbs and hindlimbs. A- Forelimbs radiograph demonstrating preserved joint margins with no evidence of subchondral bone erosion or periarticular osteolysis. B- Hindlimbs radiograph showing similar non-erosive changes, supporting a diagnosis of non-erosive inflammatory polyarthritis.

After achieving complete remission (CR), the dose of PDS was gradually decreased by approximately 25% every 4 weeks. Seven months after initiating PDS tapering, when the PDS dose had been reduced to 0.3 mg/kg orally every other day while maintaining MMF at the same dose, the bitch developed weight-bearing lameness in the left hindlimb and marked elevation of the CRP level (7.0 mg/dL; RI: 0.1-1.0 mg/dL). Given these findings, relapse of polyarthritis was suspected, and the dosage of PDS was increased to 0.5 mg/kg orally once daily, which resulted in sustained clinical remission without further relapse. However, 1 year after presentation, the patient died as a result of systemic metastasis of HSA. *Post mortem* examination revealed HSA involvement in multiple organs, including the left retroperitoneal region, liver, and lungs.

DISCUSSION

The pathogenesis of PCPA remains unclear; however, immune-mediated processes have been consistently suggested as a major contributor in human studies [3,6]. One proposed explanation is that chemotherapeutic agents disrupt immune homeostasis and may trigger autoimmune responses [2,3]. A recent study has suggested that DNA-damaging chemotherapeutic agents can activate DNA damage response (DDR) pathways, leading to chronic inflammation and immune system activation, which resemble the immunopathogenesis observed in autoimmune diseases [10]. Based on previously published human reports, approximately 63% of chemotherapeutic agents administered to patients with PCPA are presumed to have DNA-damaging properties, including doxorubicin [1,6]. The development of polyarthritis following doxorubicin chemotherapy in this case supports the possible involvement of an immune-mediated mechanism induced by activation of the DDR pathway. Given these findings, autoantibodies such as RF and ANA have been assessed in most reported human cases, with predominantly negative results [1,3]. A similar seronegative pattern was observed in the present case. These results suggest that PCPA may be an immune-related adverse effect distinct from those observed in rheumatoid arthritis or other autoantibody-positive autoimmune diseases.

In human studies, joint-related manifestations of PCPA have been reported to occur within 2 to 8 months after the initiation of chemotherapy, with some

cases occurring several years after treatment [1]. Accordingly, PCPA is regarded as a potential late-onset adverse effect of chemotherapy [8]. In this case, joint symptoms developed 4 months after the initiation of chemotherapy, which is consistent with the time course observed in human patients. Recognizing that PCPA may occur as a late adverse effect of chemotherapy, clinicians should consider PCPA when joint symptoms develop months or even years after chemotherapy, and careful monitoring of clinical signs during this period is warranted.

PCPA has been diagnosed based on clinical features, which generally include the following: (1) a diagnosis of cancer and exposure to chemotherapy; (2) development of joint symptoms during or after chemotherapy, and (3) exclusion of patients with a history of joint disease prior to chemotherapy [1]. In this case, the patient was definitively diagnosed with renal HSA and underwent unilateral nephrectomy followed by adjuvant chemotherapy with doxorubicin. Subsequently, the bitch developed joint symptoms that had not been observed before chemotherapy. Given that the clinical features were consistent with the diagnostic criteria for PCPA, the patient was suspected to have PCPA.

In human medicine, immunomodulatory therapy is generally chosen based on its presumed immune-mediated pathogenesis, and most patients show clinical improvement with this approach [1]. For disease management, disease-modifying antirheumatic drugs (DMARDs) - a class of immunomodulatory agents widely used to treat rheumatic diseases in human medicine, including methotrexate, hydroxychloroquine, and sulfasalazine - have been administered in patients with PCPA [9]. Additionally, NSAIDs are often administered concurrently as palliative therapy to control joint inflammation, with effective symptom control reported in most human cases [3,6]. When clinical improvement is insufficient with these 1st-line agents, PDS is most commonly selected as an adjunctive agent and has demonstrated favorable outcomes in symptom control through its immunomodulatory effects comparable to those of DMARDs [3,6]. Given these therapeutic properties and the limited availability of DMARDs in veterinary medicine, PDS was selected as the initial agent in the present case. The patient achieved partial remission with PDS monotherapy, after which MMF was introduced to enhance the immunosuppressive effect, leading to CR. These findings may further support the involvement of the immune-mediated mechanisms in PCPA, and immunosuppressive therapy may be considered an effective option for the management of PCPA.

This report provides a detailed description of a dog with presumptive PCPA. The diagnosis of PCPA can be made through the temporal association between chemotherapy and the onset of joint symptoms, and by the exclusion of other causes. Immunosuppressive therapy may be a reasonable option for the clinical management of PCPA. Clinicians should consider PCPA as a potential late adverse effect of chemotherapy when unexplained joint symptoms occur following chemotherapy.

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***Artificial intelligence statement*.** The authors declare that no artificial intelligence (AI) tools were used to generate, analyze, or interpret the data or to produce the scientific content of this manuscript. The authors are solely responsible for all aspects of the work.

REFERENCES

1 **Almoallim H., Abdulaziz S., Fallatah E., Alhazmi H., Meraiani N., Bazuhair T., Mansour M., Tayeb A. & Fathaldin O. 2017.** Clinical characteristics and outcomes of cancer patients with post-chemotherapy arthritis: a retrospective case series report. *Open Access Rheumatology: Research and Reviews*. 9: 111-116. DOI: 10.2147/OARRR.S134816.

2 **Amiri A. & Rafiei A. 2010.** Analysis of patients with post-chemotherapy arthralgia and arthritis in breast cancer. *Indian Journal of Medical Sciences*. 64(5): 197. DOI:10.4103/0019-5359.98926.

3 **Amiri A.H. & Jaferian S. 2012.** Post-chemotherapy arthralgia and arthritis in lung cancer. *South Asian Journal of Cancer*. 1(02): 72-75. DOI: 10.4103/2278-330X.10371.

4 Chavalle T., Chamel G., Denoeux P., Lajoinie M., Sayag D., Berny P. & Ponce F. 2022. Are severe adverse events commonly observed in dogs during cancer chemotherapy? A retrospective study on 155 dogs. *Veterinary and Comparative Oncology*. 20(2): 393-403. DOI: 10.1111/vco.12782.

5 Creamer P., Lim K., George E. & Dieppe P. 1994. Acute inflammatory polyarthritis in association with tamoxifen. *Rheumatology*. 33(6): 583-585. DOI:10.1093/rheumatology/33.6.583.

6 Kim M.J., Ye Y.M., Park H.S. & Suh C.H. 2006. Chemotherapy-related arthropathy. *The Journal of Rheumatology.* 33(7): 1364-1368. DOI: 10.3899/jrheum.050962.

7 Loprinzi C., Duffy J. & Ingle J. 1993. Postchemotherapy rheumatism. *Journal of clinical oncology*. 11(4): 768-770. DOI: 10.1200/JCO.1993.11.4.768.

8 Marchese V.G., Morris G.S., Gilchrist L., Ness K.K., Wampler M., VanHoose L. & Galantino M.L. 2011. Screening for chemotherapy adverse late effects. *Topics in Geriatric Rehabilitation.* 27(3): 234-243. DOI: 10.1097/TGR.0b013e318219912a.

9 Peasah S.K., Swart E.C., Huang Y., Kane-Gill S.L., Seybert A.L., Patel U., Manolis C. & Good C.B. 2024. Disease-modifying medications in patients with rheumatoid arthritis in the USA: trends from 2016 to 2021. *Drugs-Real World Outcomes*. 11(2): 241-249. DOI: 10.1007/s40801-024-00416-3.

10 Pezone A., Olivieri F., Napoli M.V., Procopio A., Avvedimento E.V. & Gabrielli A. 2023. Inflammation and DNA damage: cause, effect or both. *Nature Reviews Rheumatology*. 19(4): 200-211. DOI: 10.1038/s41584-022-00905-1.