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RESEARCH ARTICLE

Evaluating Multidisciplinary Management in Rare Musculoskeletal Vasculitis: A Two-Year Prospective Study at Tertiary Hospital

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Abstract: **Background:** Rare vasculitic disorders affecting bone and joint structures pose substantial diagnostic challenges because their musculoskeletal manifestations often resemble primary orthopedic or rheumatologic diseases. Delayed identification may lead to ischemia-related bone damage, joint dysfunction, and long-term disability. Early multidisciplinary intervention is essential for improving patient outcomes. ***Aims and Objectives:*** To assess the clinical features, diagnostic modalities, therapeutic approaches, and functional outcomes in patients with rare vasculitic disorders presenting with bone and/or joint involvement. ***Materials and Methods:*** A prospective observational study was conducted at tertiary hospital, Belagavi, Karnataka, in the Departments of Rheumatology and Orthopedics over a 2-year period. A total of 30 clinically confirmed cases of rare vasculitis with musculoskeletal involvement were enrolled. Comprehensive clinical assessment, laboratory biomarkers, and advanced imaging including CT/MRI angiography were utilized for evaluation. Treatment planning involved multidisciplinary coordination with rheumatologists, orthopedic surgeons, radiologists, immunologists, and physiotherapists. Follow-up was performed to assess improvement in symptoms, functional mobility, and relapse pattern. ***Results:*** Among the 30 patients, inflammatory arthritis (76.7%), myalgia (63.3%), and osteitis with localized tenderness (46.7%) were predominant. Angiographic evaluation demonstrated ischemic bone changes in 30% of cases. Immunosuppressants and biologic therapy yielded significant symptom control in 83.3% of patients. Surgical intervention was required in 20% of subjects due to osteonecrosis or persistent structural complications. Functional outcomes improved in most patients following coordinated multidisciplinary care, and reduced relapse rates were noted in those with sustained follow-up. ***Discussion:*** Musculoskeletal manifestations may be the earliest indication of systemic vasculitis. In this study, multidisciplinary management at an early stage contributed to better functional preservation and fewer complications. Improved diagnostic pathways, awareness among clinicians, and regular monitoring remain essential to reduce disability burden. Future multicenter studies with larger samples are recommended to strengthen existing evidence.

Keywords: Rare vasculitis, bone involvement, joint manifestations, ischemic osteopathy, multidisciplinary management, immunosuppressive therapy, tertiary hospital.

INTRODUCTION

Vasculitic disorders represent a heterogeneous group of immune-mediated diseases characterized by inflammation and necrosis of blood vessel walls, leading to tissue ischemia and multi-organ dysfunction (1). Although systemic involvement such as renal, pulmonary, and neurological complications is frequently emphasized, musculoskeletal manifestations remain among the most common initial presentations (2). Bone and joint symptoms including inflammatory arthritis, myalgia, osteitis, and ischemic skeletal damage may be the earliest or dominant feature, particularly in rare vasculitic conditions. These manifestations often resemble primary orthopedic or rheumatologic disorders, contributing to considerable diagnostic delays (3).

The classification of vasculitides based on vessel size provides an understanding of their pathogenesis and clinical patterns. Small and medium-vessel vasculitic disorders, such as eosinophilic granulomatosis with polyangiitis, granulomatosis with polyangiitis, polyarteritis nodosa, and Behçet's disease, frequently involve musculoskeletal tissues (1,4). Inflammation-induced vascular occlusion can result in avascular necrosis, pathological fractures, and long-term functional disability if untreated. Early recognition of musculoskeletal signs is therefore critical for preventing irreversible tissue damage (5).

Advances in imaging techniques including magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET-CT), and CT/MR angiography have greatly improved the detection of

skeletal and vascular changes. Modern immunologic assays and biomarker profiles further enhance diagnostic accuracy (6). In addition, immunomodulatory therapies such as corticosteroids, cytotoxic agents, and biologics targeting specific inflammatory pathways have shown substantial success in preventing progression and improving patient outcomes (7).

Despite these developments, rare vasculitic disorders with predominant bone and joint involvement remain under-reported in the Indian clinical setting. Limited awareness, variability in clinical presentation, and the absence of standardized evaluation protocols contribute to gaps in timely diagnosis (8). Given the complex nature of these conditions, multidisciplinary coordination between rheumatology, orthopedics, radiology, immunology, and rehabilitation specialists is essential (8).

This study was undertaken to analyze the clinical characteristics, diagnostic pathways, and treatment outcomes in patients with rare vasculitic disorders presenting with musculoskeletal involvement at a tertiary care teaching hospital, aiming to strengthen early detection strategies and promote integrated management approaches.

Aim:

To evaluate the clinical characteristics, diagnostic approaches, and treatment outcomes of patients with rare vasculitic disorders presenting with bone and joint involvement.

Objective:

To assess the musculoskeletal manifestations and effectiveness of multidisciplinary management in improving functional outcomes among patients with rare vasculitis over a two-year study period.

MATERIAL AND METHODS

This prospective observational study was conducted in the Departments of Rheumatology and Orthopaedics at tertiary hospital, Belagavi, Karnataka, over a period of two years. A total of 30 patients diagnosed with rare vasculitic disorders and presenting with bone and/or joint involvement were included.

Inclusion Criteria:

- Clinically and/or biopsy-proven vasculitic disorder
- Presence of musculoskeletal symptoms such as arthritis, myalgia, bone pain, or osteitis
- Age ≥ 18 years
- Willingness to provide informed consent and comply with follow-up

Exclusion Criteria:

- Vasculitis secondary to infection or malignant diseases
- Pre-existing primary rheumatologic or orthopedic disorders that could confound interpretation
- Incomplete diagnostic workup or loss to follow-up

Data Collection:

All enrolled patients underwent detailed history taking and comprehensive clinical examination. Laboratory investigations included complete blood counts, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), renal and liver function tests, antinuclear antibody (ANA), anti-neutrophil cytoplasmic antibody (ANCA), and other relevant immunologic markers. Imaging evaluation incorporated conventional radiography, magnetic resonance imaging (MRI), and computed tomography/magnetic resonance angiography where indicated, to assess joint inflammation and ischemic bone involvement.

Treatment decisions were made through a multidisciplinary approach involving rheumatologists, orthopedic surgeons, radiologists, immunologists, and physiotherapy specialists. Therapeutic modalities included glucocorticoids, disease-modifying antirheumatic drugs (DMARDs), biologics, and surgical intervention in cases of advanced bone damage. Follow-up assessments were performed periodically to evaluate symptom improvement, functional mobility, radiological progression, and relapse.

Statistical Analysis: Data were compiled in a structured proforma and analyzed using descriptive statistics including mean, percentage, and frequency distribution. Ethical approval for the study was obtained from the Institutional Ethics Committee of tertiary hospital prior to commencement.

RESULTS AND OBSERVATIONS:

The high proportion of patients with elevated ESR/CRP (86.7%) confirms the inflammatory nature of these disorders. Ischemic bone involvement noted in 30% reflects impaired vascular supply and highlights the risk of avascular necrosis and bone destruction. Autoantibody positivity (ANCA 26.7%, ANA 20%) contributed to diagnostic confirmation in a subset of patients, indicating the value of immunologic profiling alongside imaging.

Corticosteroids remained the primary therapy across all cases (100%), while DMARDs (73.3%) and biologics (26.7%) were used based on disease severity and response. The requirement of surgical intervention in 20% of patients suggests advanced or refractory skeletal complications in a significant subset. Notably, clinical improvement was achieved in 83.3% of patients, demonstrating the effectiveness of early multidisciplinary management. A relapse rate of 16.7% highlights the need for ongoing monitoring and long-term maintenance therapy to prevent disease recurrence.

Table 5: Treatment Modalities and Outcomes

Management/Outcome	(n)	Percentage (%)
Corticosteroid therapy	30	100
DMARDs	22	73.3
Biologic agents	8	26.7
Surgical intervention	6	20
Clinical improvement	25	83.3
Relapse	5	16.7

DISCUSSION

Rare vasculitic disorders with bone and joint involvement represent a clinical challenge due to their wide-ranging symptoms and substantial overlap with primary rheumatologic and orthopedic conditions (9). In the present study conducted over two years at tertiary hospital, musculoskeletal manifestations were identified as the predominant presenting feature in the majority of patients with rare vasculitis. This highlights the need for heightened clinical suspicion among physicians encountering unexplained inflammatory joint and bone pain.

The peak age group observed (41–60 years) aligns with global epidemiological trends showing that many vasculitides commonly manifest in middle adulthood. The slight male predominance seen in this study is consistent with previous findings in medium-vessel vasculitis such as polyarteritis nodosa. Polyarteritis nodosa emerged as the most prevalent disorder in this cohort, reflecting its known association with musculoskeletal ischemic complications due to arterial involvement. Eosinophilic granulomatosis with polyangiitis and Behçet's disease also featured prominently, reinforcing the significance of small- and medium-vessel vasculitides in skeletal pathology (10).

Musculoskeletal presentations including inflammatory arthritis (76.7%) and myalgia (63.3%) were highly prevalent, concordant with earlier literature describing joint pain as one of the earliest signs of vasculitis. Osteitis with localized bone tenderness (46.7%) and pathological fractures indicate progression to deeper skeletal structures when diagnosis is delayed. Notably, ischemic bone involvement detected in 30% of cases underscores the serious impact of vascular inflammation on bone perfusion. The femur and humerus being commonly affected in this study is consistent with the preferential involvement of long bones in vasculitis-induced osteonecrosis.

Laboratory inflammatory markers (ESR and CRP) were elevated in most cases, supporting their utility as early indicators of systemic inflammation. While autoantibodies such as ANCA and ANA contributed to diagnostic specificity in a subset of patients, their heterogeneous expression reiterates that laboratory

confirmation requires careful clinical correlation. This aligns with standard diagnostic algorithms emphasizing multimodal assessment involving serology, imaging, and clinical judgment (11).

The multidisciplinary management strategy employed in this study demonstrated encouraging outcomes. Corticosteroid therapy for all patients and DMARDs or biologics based on disease severity resulted in symptomatic improvement in 83.3% of the cohort. This outcome is consistent with emerging evidence supporting the early use of immunosuppressants and targeted biologics in preventing irreversible tissue damage. Despite this, surgical interventions were required in 20% of patients due to osteonecrosis or structural deformities, suggesting that a proportion of patients still progress to severe complications before diagnosis or treatment initiation.

Relapse occurred in 16.7% of cases, predominantly in those with delayed care, irregular follow-up, or poor treatment adherence, highlighting the chronic relapsing nature of vasculitic diseases. Long-term monitoring and patient education on adherence to immunomodulatory therapy remain essential components of management. The overall improvement in functional outcomes across the study reinforces the benefits of a coordinated multidisciplinary approach, incorporating rheumatology, orthopedics, radiology, and rehabilitative therapy.

The findings of this study contribute valuable clinical insight into the Indian healthcare context where underdiagnosis and resource limitations may further delay recognition of rare vasculitic conditions. However, the study has limitations, including a relatively small sample size and the lack of standardized disease activity scoring. Furthermore, the short follow-up period restricts assessment of long-term outcomes, particularly regarding relapse control, disability indices, and quality-of-life metrics.
Future research should include multicenter studies with larger cohorts to validate these findings and develop clearer diagnostic and therapeutic protocols. Moreover, the role of advanced imaging techniques and newer targeted biologics warrants further investigation in resource-limited settings.

Early identification of musculoskeletal signs of vasculitis and prompt initiation of multidisciplinary treatment can significantly reduce skeletal complications and improve patient function. Increasing awareness and developing standardized evaluation

pathways are crucial steps toward reducing diagnostic delays and optimizing care for patients with rare vasculitic disorders affecting bone and joint structures (1,12).

CONCLUSION

Rare vasculitic disorders with musculoskeletal involvement often present with nonspecific bone and joint symptoms that may delay diagnosis and increase the risk of complications such as ischemic bone damage and deformity. This study demonstrates that early recognition, comprehensive diagnostic assessment, and a coordinated multidisciplinary treatment approach led to significant clinical and functional improvement in most patients. Immunosuppressive therapies remain the cornerstone of management, while surgical intervention is required in advanced cases. Improved clinician awareness, timely referral, and long-term follow-up are essential to reduce relapse rates and disability. Larger studies are recommended to strengthen evidence-based protocols for optimal patient outcomes.

REFERENCES

1. Bacchiega ABS, Ochtrop MLG, de Souza AWS. Systemic vasculitis. Autoimmunity: From Bench to Bedside. 2013 Jul 18;5:1–?.
2. Kim J-W, Suh C-H. Systemic manifestations and complications in patients with rheumatoid arthritis. J Clin Med. 2020 Jun 26;9(6):2008. doi:10.3390/jcm9062008.
3. Engler ID, Jawa A. Inflammatory arthritis. In: The Resident's Guide to Shoulder and Elbow Surgery. 2023 Apr 17;27–40.
4. Hoang MP, Park J. Vasculitis. In: Hospital-Based Dermatopathology. 2020 Jan 1;245–296. doi:10.1007/978-3-030-35820-4_7.
5. Matthews AH, Davis DD, Fish MJ, Stitson D. Avascular necrosis. StatPearls. 2023 Aug 28.
6. Müller NL. Advances in imaging. Eur Respir J. 2001;18(5):867–871.
7. Strzelec M, Detka J, Mieszczak P, Sobocińska MK, Majka M. Immunomodulation: a general review of the current state-of-the-art and new therapeutic strategies for targeting the immune system. Front Immunol. 2023;14:1127704.
8. Ralli M, Campo F, Angeletti D, Minni A, Artico M, Greco A, et al. Pathophysiology and therapy of systemic vasculitides. EXCLI J. 2020;19:817–854.
9. Dantas JG, Biegelmeyer E, Zarur EB, Pinheiro FAG. Rare primary vasculitis: update on multiple complex diseases and the new kids on the block. Adv Rheumatol. 2024;64(1):79.
10. Watanabe R, Hashimoto M. Eosinophilic granulomatosis with polyangiitis: latest findings and updated treatment recommendations. J Clin Med. 2023;12(18):5996.
11. Bosch X, Font J, Mirapeix E, Revert L, Urbano-Marquez A, Ingelmo M. Anti-neutrophil cytoplasmic autoantibodies: antigenic specificities and clinical associations. Adv Exp Med Biol. 1993;336:281–286.
12. Nielsen BD, Seitz L, Schmidt WA. Update in imaging for large vessel vasculitis. Best Pract Res Clin Rheumatol. 2025;39(3):102060.