Case report

Amyloidosis Presenting with Nephrotic Syndrome and Cardiac Disease: A Case Report

Muhari T, Akunga O, Maina MD, Namasaka M

Mater Misericordiae Hospital, Nairobi, Kenya

Address for Correspondence: Dr. Titus Muhari. Email: titusmuhari@gmail.com

Abstract

Amyloidosis is a heterogeneous disease that results from the deposition of toxic insoluble beta-sheet fibrils protein aggregates in different tissues. It can either be acquired or inherited. The estimated incidence stands at 1 case per 100,000 person-years in Western countries. Other data indicates that it is rare, only affecting 5-12 million people globally per year. The mean age of diagnosis is 63 years, though it's most common in ages above 65 years. A diagnostic and differentiating feature of amyloidosis is the apple-green birefringence of amyloid on Congo red staining. Cyclophosphamide, bortezomib, dexamethasone, and melphalan combinations have proved treatment choices for AL amyloidosis. Mortality and morbidity depend on the organ involved, with cardiovascular involvement having high mortality and morbidity. This is a case report of an elderly, African female diagnosed with multiple myeloma and associated amyloidosis, presenting with worsening nephrotic syndrome and cardiac involvement in a private tertiary Kenyan hospital.

Key words: Amyloidosis, Nephrotic syndrome, Cardiac involvement, Multiple myeloma, AL-amyloidosis

Introduction

Amyloidosis represents a complex array of disorders characterized by the aberrant deposition of insoluble protein fibrils in various tissues, leading to organ dysfunction and significant morbidity and mortality[1]. The condition manifests in both acquired and inherited forms, with a notable incidence observed globally. While estimates suggest a prevalence of 1 case per 100,000 person-years in Western countries, the true burden of the disease may be underestimated, with rare occurrences affecting millions of individuals worldwide each year[2,3]. This heterogeneous disease entity presents a diagnostic challenge due to its diverse clinical manifestations and underlying aetiologies. Clinicians encounter amyloidosis across a spectrum of patient demographics, with age of diagnosis typically skewed towards older populations, notably those above 65 years[1]. Despite advancements in diagnostic techniques, including the hallmark apple-green birefringence of amyloid on Congo red staining, timely identification remains critical for optimizing patient outcomes. In this context, the case report presented herein sheds light on a rare yet clinically significant presentation of amyloidosis in an elderly African female. Coexisting with multiple myeloma with cardiac and renal involvement, the patient's clinical course underscores the intricate interplay between systemic amyloid deposition and plasma cell dyscrasias, necessitating a multidisciplinary approach to management. Through a detailed examination of the patient's clinical history, diagnostic workup, and therapeutic interventions, this report aims to elucidate the challenges and complexities inherent in diagnosing and managing amyloidosis coexisting with multiple myeloma.

Case report

The patient, a 63-year-old African female with hypertension treated with ramipril, was diagnosed with nephrotic syndrome six months ago, complicated by pleural and pericardial effusion. A renal biopsy three months earlier confirmed amyloidosis. Presenting with anasarca, fatigue, and dyspnea, symptoms worsened progressively over a week. Examination revealed mild pallor, pitting anasarca, and a distended abdomen with shifting dullness. Diagnostic workup showed normocytic normochromic anaemia (HB 10.6g/dl), severe proteinuria, haematuria, hypoproteinemia (37g/l), hypoalbuminemia (17.8d/l), and hypercalcemia (2.8mmol/l). Bone marrow aspirate revealed atypical plasma cells (25-30%) with a lambda/

kappa ratio of 18.6. Renal biopsy confirmed AL amyloidosis with positive Congo red staining. Cardiac involvement was evident on 2D echo and MRI, consistent with cardiac amyloidosis. A working diagnosis of AL amyloidosis with multiple myeloma stage two was made based on CRAB criteria and plasma cells in BMA. Treatment with cyclophosphamide, bortezomib, and dexamethasone was initiated, with minimal improvement in anasarca noted. Follow-up care is ongoing.

Figure 1: MRI T2 weighted image of bilateral pleural effusion with a pericardial effusion

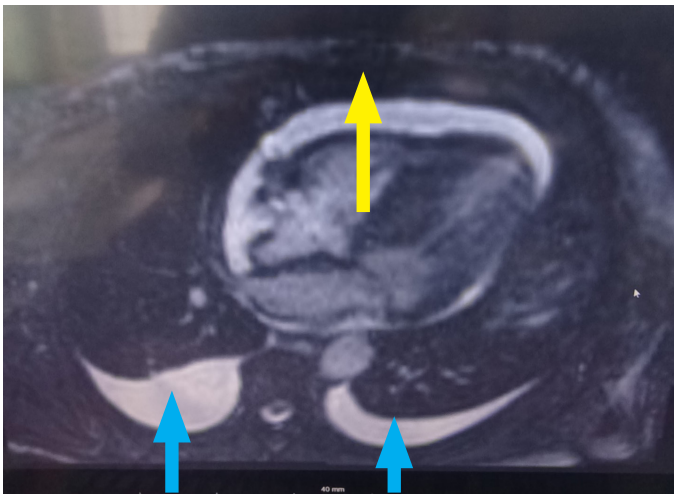
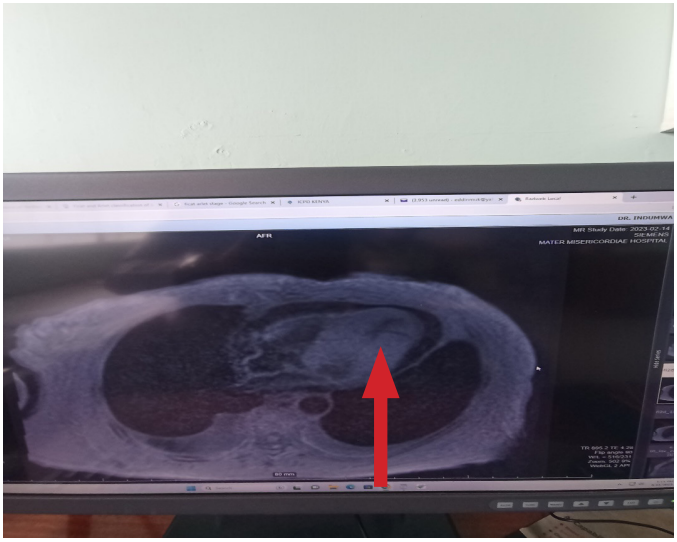


Figure 2: MRI T1 weighted –showing wall thickening



Discussion

Amyloidosis is a disorder characterized by aberrant protein deposition in tissues, presenting diagnostic and therapeutic challenges due to its diverse clinical manifestations and underlying aetiologies[4]. The coexistence of amyloidosis with multiple myeloma further complicates management, necessitating a multidisciplinary approach[5]. Late diagnosis contributes to poor outcomes, highlighting the importance of early detection using accurate biomarkers and specialized imaging techniques[6]. In this case, the patient's presentation with nephrotic syndrome and cardiac involvement underscores the systemic nature of amyloidosis and its impact on various organs[7]. The rarity of this presentation in an elderly African female accentuates the need for heightened clinical suspicion and comprehensive evaluation, especially in populations with limited access to healthcare resources[8]. Despite advancements in diagnostic modalities and treatment options, challenges persist in addressing advanced disease presentations and managing comorbid conditions[9]. Targeted therapies promise to improve outcomes, but further research is needed to optimize their efficacy and safety profiles. The complexity of amyloidosis and multiple myeloma underscores the importance of a collaborative approach involving haematologists, oncologists, cardiologists, nephrologists, and other specialists. Ongoing efforts to enhance diagnostic accuracy and develop novel therapeutic interventions offer hope for better patient outcomes in the future.

Conclusions

The clinical case of AL amyloidosis with myeloma features presenting with kidney and cardiac involvement presented here is not as common and this could be attributed to a low index of suspicion on the part of the clinician or lack of necessary diagnostic modalities. Prognosis remains worse, especially with cardiac involvement. It calls for the clinician to have a high index of suspicion especially in patients with nephrotic syndrome not explained by the common causes to think of AL amyloidosis as a possible cause. In patients with multiple myeloma, the clinician should have a high index of suspicion and evaluating for AL amyloidosis as both could coexist or one precedes the other. The availability of the necessary diagnostic equipment plays a big role in identifying a diagnosis and prompt treatment with an overall improvement in morbidity and mortality.

Declaration of patient consent: The patient has given her consent for her images and other clinical information to be reported in this case report. The patient understands that her name and initials will not be published and due efforts will be made to

conceal her identity. The case report is written with permission from the Director of Medical Services, Ministry of Health, Kenya.

References

1. Baker KR, Rice L. The amyloidoses: clinical features, diagnosis and treatment. *Methodist DeBakey Cardiovascular J.* 2012; **8**(3):3. https://doi.org/10.14797/mdcj-8-3-3
2. Kamal WSAA, Taib T, Noor N, Jong T. Myeloma-associated primary systemic amyloidosis. *Indian J Dermatol*. 2016b; **61**(1):124. https://doi.org/10.4103/0019-5154.174166
3. Lekpa FK, Ndongo S, Pouye A, Tiendrebeogo JW, Ndao AC, Ka MM, Diop TM. Amyloidosis in sub-Saharan Africa. *Médecine et Santé Tropicales*. 2012b; **22**(3): 275–278. https://doi.org/10.1684/mst.2012.0085
4. Palladini G, Merlini G. What is new in the diagnosis and management of light-chain amyloidosis? *Blood*. 2016; **128**(2): 159–168. https://doi.org/10.1182/blood-2016-01-629790
5. Rajkumar SV, Gertz MA, Kyle RA. Primary systemic amyloidosis with delayed progression to multiple myeloma. *Cancer*. 1998; **82**(8): 1501–1505.
6. Ríos-Tamayo R, Krsnik I, Gómez-Bueno M, Garcia-Pavia P, Segovia-Cubero J, *et al.* AL amyloidosis and multiple myeloma: A complex scenario in which cardiac involvement remains the key prognostic factor. *Life*. 2023; **13**(7): 1518. https://doi.org/10.3390/life13071518
7. Senecal JB, Abou-Akl R, Allevato P, Mazzetti I, Hamm C, Parikh R, Woldie I. Amyloidosis: A case series and review of the literature. *J Med Case Reports*. 2023; **17**(1):184. https://doi.org/10.1186/s13256-023-03886-1
8. Siragusa S, Morice W, Gertz MA, Kyle RA, Greipp PR., *et al*. Asymptomatic immunoglobulin light chain amyloidosis (AL) at the time of diagnostic bone marrow biopsy in newly diagnosed patients with multiple myeloma and smoldering myeloma. A series of 144 cases and a review of the literature. *Annals Hematol*. 2011; **90**(1):101–106. https://doi.org/10.1007/s00277-010-1028-8
9. Suzuki K. Diagnosis and treatment of multiple myeloma and AL amyloidosis with a focus on improvement of the renal lesion. *Clin Exper Nephrology*. 2012; **16**(5): 659–671. https://doi.org/10.1007/s10157-012-0684-5