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An Intresting Case of Multiple Myeloma Associated Light Chain (AL) Amyloidosis with Renal Involvement Presented as Nephrotic Syndrome

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Abstract: ***Introduction: Multiple myeloma is characterized by the neoplastic proliferation of plasma cells producing a monoclonal immunoglobulin. The plasma cells proliferate in the bone marrow and can result in extensive skeletal destruction with osteolytic lesions, osteopenia, and/or pathologic fractures. In rare cases, patients with multiple myeloma may develop (AL) immunoglobulin light chain amyloidosis as a secondary complication due to abnormal production of immunoglobulin light chains by myeloma cells. Case Report: - We report a rare case of 58-year-old male who presented with anasarca from the previous 2 years and shortness of breath from the last 6 months; at the time of presentation pedal edema and ascites was there, patient has Nephrotic range proteinuria and mild anemia, so we suspected nephrotic syndrome, kidney biopsy was done in suspicious of multiple myeloma, laterkidneybiopsy was suggestive of (AL) immunoglobulin light chain Amyloidosis. Later, a bone marrow biopsy was performed, which was suggested of Multiple myeloma. Further, Patient was given supportive treatment upon admission, followed by Palliative Chemotherapy. Conclusion: Multiple myeloma associated immunoglobulin light chain (AL) Amyloidosis is rare, it can significantly increase patient mortality. Therefore, if AL amyloidosis is suspected in patients with multiple myeloma, assessment of organ involvementand early initiation of intensive care including proper chemotherapy are required.***

Keywords: Nephrotic Syndrome, (AL) Immunoglobulin Light Chain Amyloidosis, Multiple Myeloma

1. Introduction

Monoclonal gammopathies are a heterogeneous group of disorders characterized by the presence of monoclonal proteins in blood and/or urine. This abnormal protein can be a complete immunoglobulin or only a heavy or light chain produced by a B cell or plasma cell clone, which is usually located in the bone marrow. Systemic light chain (AL) amyloidosis and multiple myeloma (MM) are classified within the category of "Plasma cell neoplasms (PCN) and other diseases with paraproteins.

First, we discuss multiple myeloma, which is a hematologic malignancy characterized by the clonal proliferation of monoclonal protein-producing plasma cells and can cause immunoglobulin light chain (AL) amyloidosis. It can result in extensive skeletal destruction, with osteolytic lesions, osteopenia, and pathological fractures. The kidney is the most affected organ. And there has many different kidney pathologies with different clinical presentations in multiple myeloma. It commonly manifests as myeloma cast nephropathy (Myeloma Kidney) in 40–60%, AL amyloidosis in 15–35%, monoclonal immunoglobulin deposition disease in 20–25%, and acute tubular necrosis in 7–9% of cases.

Clinical presentations of MULTIPLE MYLOMA like, Bone pain with lytic lesions discovered using routine skeletal films or other imaging modalities. Increased total serum protein concentration and/or the presence of a monoclonal protein in urine or serum. Systemic signs or symptoms suggestive of malignancy, such as unexplained anaemia. Hypercalcemia is either symptomatic or discovered incidentally. Acute kidney failure with a bland urinalysis or Nephrotic syndrome, Nephrotic syndrome due to concurrent immunoglobulin light chain (AL) amyloidosis is a rare and challenging disease, characterized by the group of protein misfolding disorders by the extracellular deposition of insoluble polymeric protein fibrils in tissues and organs. There are many types of amyloidosis, one of them, which refers to amyloid composed of immunoglobulin light chain, formerly termed as primary systemic amyloidosis, caused by clonal expansion of bone marrow plasma cells that secrete a monoclonal immunoglobulin light chain deposited as amyloid fibrils in tissue. Whether clonal plasma cells produce a light chain that misfolds and leads to AL amyloidosis or a light chain that folds properly, allowing the cell to inexorably expand over time and develop into multiple myeloma. It can occur in multiple myeloma or other B lymphoproliferative diseases, including non-Hodgkin lymphoma. Amyloid deposits may be found in any tissue of the body; thus, screening is required for cardiac, renal, hepatic, and autonomic involvement, and factor X deficiency. Among these, the kidney is the most frequently involved organ and is affected in 70-80% of patients. Patients with renal involvement generally have proteinuria, often in the nephrotic range, leading to hypoalbuminemia that may be severe, and can present with pedal oedema or anasarca. Identification of an underlying clonal plasma cell or B. lymphoproliferative process and clonal IC are key to the diagnosis of AL amyloidosis. Serum protein electrophoresis and urine protein electrophoresis, although of value in multiple myeloma, are not useful screening tests

if AL amyloidosis is suspected because the clonal IC or whole immunoglobulin is often not present in sufficient amounts to produce a monoclonal "M-spike' in the serum or LC (Bence Jones) protein in the urine. However, more than 90% of patients with AL amyloidosis have serum or urine monoclonal IC or whole immunoglobulin detectable by immunofixation electrophoresis of the serum or urine.

2. Case Summary

We report a case of 58-year-old male non-diabetic, non-hypertensive, chronic smoker presented with complaints of generalized body swelling from the last2 years (swelling usually started from the face), shortness of breath on exertion in the last 6-month (NYHA-3), patient was hemodynamically stable. (BP-138/86 mph, PR-80/min, Spo2-99% ORA, RR-18/min),on physical examination there was pallor present, bilateral pedaloedema was present (grade 3) and Ascites was there (shifting dullness was present) and no any other physical examination revealed any other signs. Systemic examination of the respiratory system revealed equal bilateral air entry and mild basal crepitation, systemic examination of the other systems did not reveal any other significant findings.

There was proteinuria present in urine routine and microscopy (Albumin- +++, RBC- 5-7), we further go with 24-hoururine protein and that was highly suggestive of nephrotic rangeproteinuria

Table 1

Investigation	**Results**
CBC	HB-7.8, WBC-7.2, PLATLETS-240, MCV-90, MCHC-30
RFT	S. CREAT-2, S. UREA-51, S. URIC ACID-6.8, NA-132, K-5.2, CL-113 S. ALBUMIN-1.7
S. PHOSPHURUS- S. CALCIUM-	5 6.8
24-hour urine protein	5280
LDH-	446
Beta 2 microglobulin-	13985
Serum Immunofixation Electrophoresis (IFE)-	IgA band- Present Lambda band- Present
Protein electrophoresis-	Total protein-4.4, Albumin- 1.3 g, M band- absent
Kappa LambdaFLC (free light chain) assay	kappa-119, Lambda- 2663
USG (w/a)	Tchicked GB wall (4mm), splenomegaly Was there with right renal cyst (12.2 cm)
Upper GI endoscopy-	Bile reflux gastritis Colonoscopy- prolapsed hemorrhoids, rectal Erosions.
Colonoscopy-	Prolapsed hemorrhoids and rectal erosion.
Renal biopsy-	Demonstrated a mesangial matrix positive for Congo red staining and deposition of amyloid fibrils on electron microscopy.
Rectal biopsy-	Non-specific colitis.
Bone marrow biopsy-	Suggestive of Multiple myeloma.
PET CT-	Diffuse and patchy bone marrow FDG uptake with ill- defined lytic sclerotic lesions involving the visualized axial andappendicular skeleton. No any other hypermetabolic lesions were found elsewhere in the body. Mild-to-moderate ascites were observed.
24-hour urine protein	5280

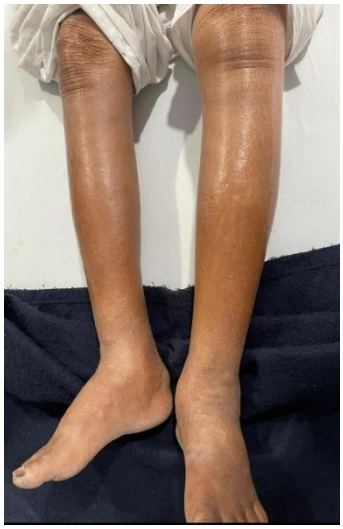

Figure 1:- B/L Pedal edema

Figure 2: Facial Swelling

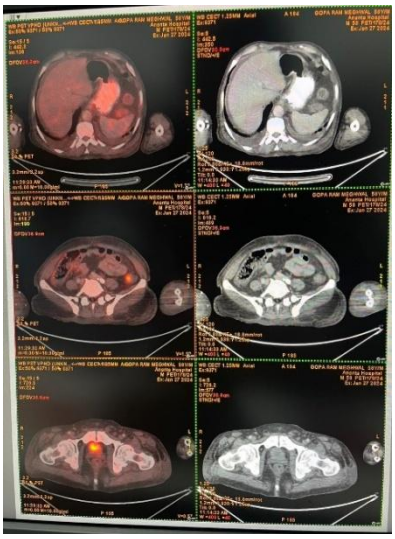

Figure 3: Slides of PET-CT

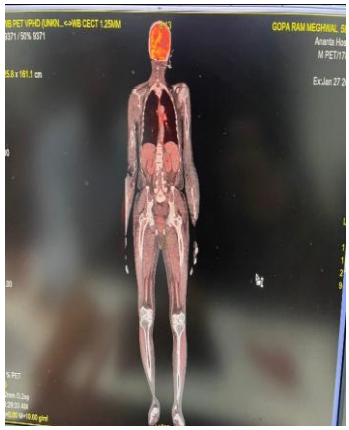

Figure 4: PET'CI

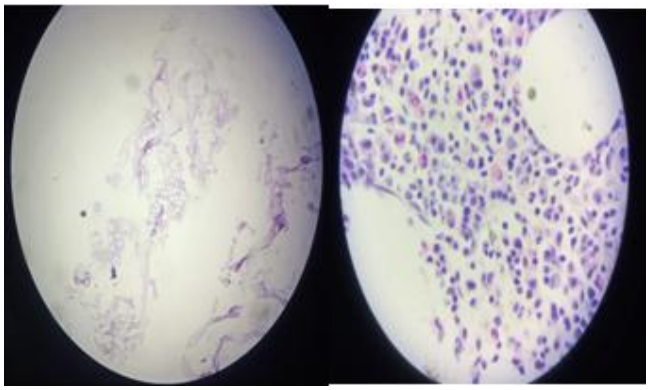

Figure 4: Slides of Bone Marrow Biopsy

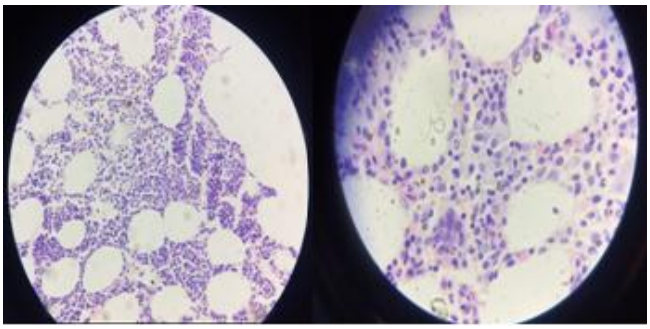

Figure 5: Slides of Bone MarrowBiopsy

3. Conclusion

Final diagnosis was nephrotic syndrome secondary to multiple myeloma associated (AL) immunoglobulin light chain amyloidosis with renal involvement and no other organ involvement was there.

4. Discussion

AL amyloidosis occurs in 10% to 15% of Multiple Myeloma cases. Amyloid nephropathy generally presents with asymptomatic proteinuria, nephrotic syndrome, and acute or chronic renal failure. In Multiple myeloma patients, the LC lambda is detected more frequently than the LC-kappa at a 3:1 ratio, In our case, the initial presentation suggested secondary nephrotic syndrome caused by the glomerular deposition of amyloid fibrils derived from immunoglobulin G/LC-lambda. AL Amyloidosis was secondary to multiple myeloma that was confirmed by the myeloma panel, which showed high LDH, high BETA 2 microglobulin, high

lambda: kappa ratio- 3;1, and presence of the igA band and lambda band, which was highly suggestive of multiple myeloma; later bone marrow biopsy was proven for multiple myeloma; further, we ruled out for other organ involvement, like for cardiac amyloidosis, the most common presentation is restrictive cardiomyopathy for which 2D echo was performed, but the result was negative; for GI Amyloidosis, upper GI endoscopy, colonoscopy with rectal biopsy was performed, and the results were negative. Therefore, we conclude that only the kidneys were involved.

Therefore, in rare presentation like this case, early assessment of organ involvement is required, later Patient started chemotherapy and other supportive drug, currently patient is under continuous monitoring, he is doing better and serum. creatinine value improved

Refrences

[1] Chapter 112 amyloidosis, page 878, Harrison principle of internal medicine.
[2] Röllig C, Knop S, Bornhäuser M. Multiple myeloma. Lancet 2015; 385:2197–208.
[3] 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 (Basel). 2023 Jul 6;13(7):1518. doi: 10.3390/life13071518. PMID: 37511893; PMCID: PMC10382070.
[4] In Hee Lee, MD, PhDa,∗, Chang-Yeon Kim, MDa, Sungmin Kang, MD PhDb, Dong Jik Ahn et. Al. Multiple myeloma-associated light chain amyloidosis involving heart, kidneys, and peripheral nerves, 1 aug. 2021, https://www.semanticscholar.org/paper/Multiple-myeloma-associated-light-chain-amyloidosis