Case Report

DOI: 10.7860/JCDR/2026/82359.22208

Internal Medicine Section

Nephrotic Syndrome Secondary to Rheumatoid Arthritis in a Known Case of Dilated Cardiomyopathy: A Diagnostic Insight

SIDDHARTH SHAH[1], SUNIL KUMAR[2], DEVANSHI MARU[3], YASH ANAND CHORDIA[4]

ABSTRACT

Rheumatoid Arthritis (RA) is a chronic systemic autoimmune disease that primarily affects joints but can lead to extra-articular complications, including renal and cardiac involvement, which can significantly impact patient prognosis. This case report describes a 44-year-old woman with a 15-year history of poorly controlled RA, characterised by multiple rheumatic nodules and inconsistent treatment adherence. She was diagnosed with Dilated Cardiomyopathy (DCMP) one year prior, with an ejection fraction of 20%, and presented with progressive bilateral pedal oedema and dyspnoea. Clinical examination revealed hepatomegaly and multiple joint nodules. Laboratory investigations showed hypoalbuminaemia, severe dyslipidaemia, and nephrotic-range proteinuria. Renal biopsy, including light microscopy, immunofluorescence, and electron microscopy, confirmed stage I membranous nephropathy secondary to RA, with negative PLA2R staining indicating a secondary aetiology rather than primary membranous nephropathy. The co-existence of DCMP and membranous nephropathy posed diagnostic and management challenges, as symptoms overlapped between cardiac and renal dysfunction. This rare combination highlights the need for comprehensive evaluation in patients with long-standing autoimmune diseases to identify uncommon renal manifestations early. Reporting this case underscores the importance of multidisciplinary care in complex comorbidities and the potential benefits of screening RA patients for renal involvement, particularly those with poor disease control, to improve outcomes and prevent progression.

Keywords: Arthritis rheumatoid, Cardiomyopathies, Membranous glomerulonephritis, Nephrotic syndrome, Proteinuria

CASE REPORT

A 44-year-old female labourer presented to our hospital with bilateral leg swelling for 20 days and breathlessness for one week. The swelling was progressive and pitting, with reduced urine output, while dyspnoea was exertional, worsening when lying flat. She denied fever, chest pain, cough, haematuria, or oliguria. Her past medical history included RA diagnosed 15 years ago based on joint pain, morning stiffness, and positive rheumatoid factor, but she was non-compliant, using only intermittent paracetamol due to financial constraints. She was diagnosed with DCMP one year ago, with echocardiography showing a 20% ejection fraction and global hypokinesia; she irregularly took carvedilol 3.125 mg twice daily and furosemide 20 mg as needed [1].

She underwent a total abdominal hysterectomy 10 years ago for menorrhagia, with no history of diabetes, hypertension, tuberculosis, or drug allergies. She followed a vegetarian diet with adequate appetite and had no tobacco, alcohol, or substance use. Family and obstetric history (G3P3L2D1, last childbirth 26 years ago) were unremarkable.

On examination, she was haemodynamically stable {pulse 72/min, Blood Pressure (BP) 100/70 mmHg, Respiratory Rate (RR) 18/min, SpO2 98% on room air}, pale but oriented. General examination showed grade 2 pitting pedal oedema bilaterally, extending to the knees (graded as 1+ barely detectable, 2+ slight indentation, 3+ deeper, 4+ persistent) [2]. Abdominal examination revealed hepatomegaly (16 cm liver span, soft, non-tender) without ascites. Cardiovascular and respiratory exams were normal. Joint examination noted soft, mobile, non-tender nodules over the left olecranon, bilateral Metacarpophalangeal (MCP), Proximal Interphalangeal (PIP), Distal Interphalangeal (DIP), hallux, and Metatarsophalangeal (MTP) joints, with soft-tissue swelling consistent with chronic RA; no active synovitis or deformity was present. The provisional diagnosis was decompensated DCMP with possible congestive heart failure; differentials included nephrotic syndrome secondary to RA or hepatic cirrhosis or malnutrition-related hypoalbuminaemia.

Laboratory findings showed mild anaemia (haemoglobin 10.1 g/dL), normal white blood cell count (7300/µL) and platelets (2.25 lac/µL), elevated erythrocyte sedimentation rate (28 mm/hr), hypoalbuminaemia (serum albumin 2.8 g/dL), significant proteinuria (urine protein 205.2 mg/dL), and Urine Protein-to-Creatinine Ratio (UPCR) of 10.36 (nephrotic-range >3.5 g/day). Serum creatinine was 0.9 mg/dL, total cholesterol 297 mg/dL, triglycerides 439 mg/dL, thyroid-stimulating hormone 5.2 µIU/mL (borderline elevated), and rheumatoid factor >150 IU/mL} [Table/Fig-1]. Additional tests were negative for antinuclear antibody, complement, and hepatitis B, C, and HIV; urine showed 4+ albumin. Spot UPCR was used as a surrogate. Imaging confirmed an ejection fraction of 30%, global hypokinesia, and grade 3 diastolic dysfunction, with grade II fatty liver on ultrasound.

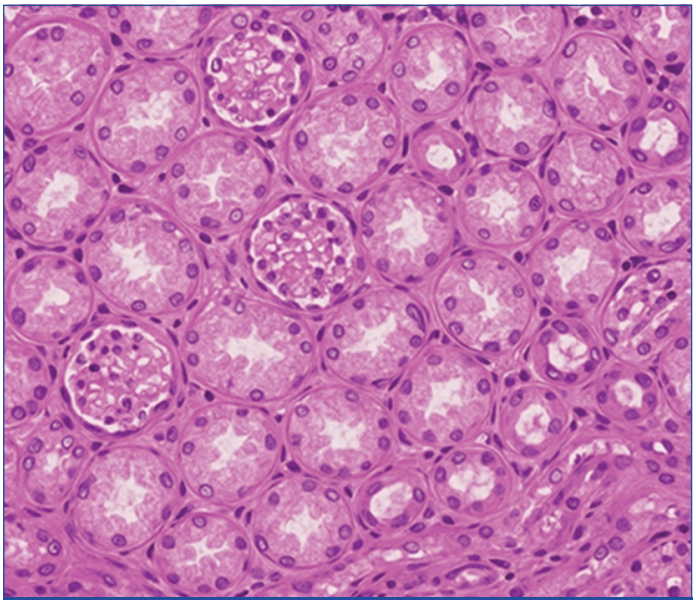
Renal biopsy showed 18 glomeruli on light microscopy, one with global sclerosis; glomeruli had normal cellularity and open capillary loops [Table/Fig-2]. Immunofluorescence revealed +3 IgG and kappa, +2 lambda, +1 C3, and negative IgA, IgM, and C1q [Table/Fig-3]. Electron microscopy confirmed stage I Membranous Nephropathy (MN) with subepithelial deposits and foot process effacement [Table/Fig-4]. Negative PLA2R supported a secondary etiology. The final diagnosis was nephrotic syndrome due to secondary MN from RA, with comorbid DCMP.

Management involved a multidisciplinary approach. For nephrotic syndrome, she received ramipril 2.5 mg daily, furosemide 40 mg twice daily, atorvastatin 40 mg daily, and albumin infusions (100 mL daily for three days), with a low-salt, high-protein diet. For RA, prednisolone 40 mg daily (tapered over four weeks) and methotrexate 15 mg weekly with folic acid 5 mg weekly were

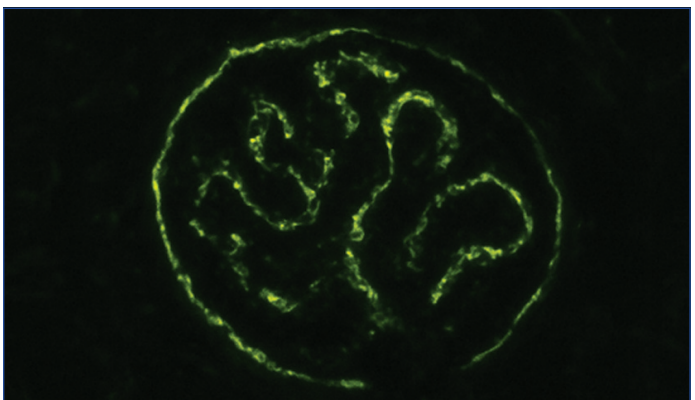
started. For DCMP, carvedilol was increased to 6.25 mg twice daily, and spironolactone 25 mg daily was added. At one-month follow-up, oedema and dyspnoea reduced, serum albumin rose to 3.2 g/dL, UPCR dropped to 4.2, and ejection fraction stabilised at 30%; the patient remains under monitoring.

Test	Result	Normal Range*	Interpretation
Haemoglobin (g/dL)	10.1	12-16 (female)	Mild anaemia
WBC count (/µL)	7300	4000-11000	Normal
Platelet count (lac/µL)	2.25	1.5-4.5	Normal
ESR (mm/hr)	28	<20 (female)	Mildly elevated
Serum albumin (g/dL)	2.8	3.5-5.0	Hypoalbuminaemia
Urine protein	205.2 mg/dL	<150 mg/day	Significant proteinuria
Urine creatinine (mg/dL)	19.8	10-30	Normal
UPCR	10.36	<0.2	Nephrotic-range proteinuria
Serum creatinine (mg/dL)	0.9	0.6-1.1 (female)	Normal renal function
Total cholesterol (mg/dL)	297	<200	Elevated
Triglycerides (mg/dL)	439	<150	Elevated
TSH (µIU/mL)	5.2	0.4-4.5	Borderline elevated
RA factor (IU/mL)	>150	<14	Strongly positive (RA)

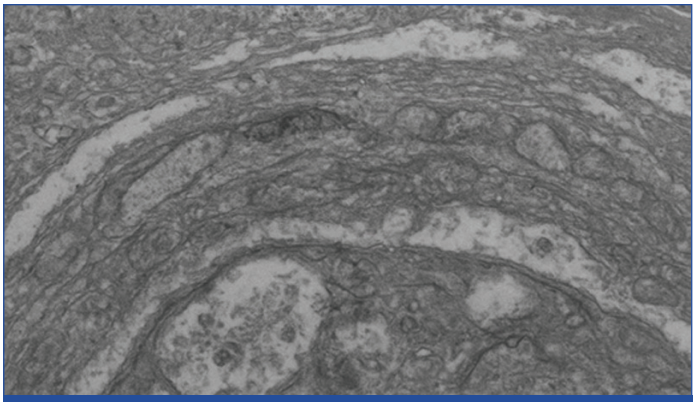
[Table/Fig-1]: Laboratory investigations.
*Normal ranges are based on DGH Hospital Laboratory reference values.



[Table/Fig-2]: Renal biopsy light microscopy image (haematoxylin and eosin stain, 400x magnification) showing glomeruli with open capillary loops and mild basement membrane thickening, consistent with stage I membranous nephropathy.



[Table/Fig-3]: Immunofluorescence image (400x magnification) showing +3 IgG granular staining along glomerular basement membranes, consistent with membranous nephropathy.



[Table/Fig-4]: Electron microscopy image (5000x magnification) showing sub-epithelial electron-dense deposits and foot process effacement, confirming stage I membranous nephropathy.

DISCUSSION

The RA is a chronic autoimmune disease primarily affecting joints but capable of extra-articular manifestations, including renal involvement in up to 20% of cases, often due to immune complex deposition, amyloidosis, or medication toxicity [3]. In this patient, long-standing poorly controlled RA likely led to secondary MN, as evidenced by negative PLA2R, absence of drug exposure, and histological findings of subepithelial deposits on electron microscopy. MN, a leading cause of adult nephrotic syndrome, involves podocyte injury from immune complexes, resulting in proteinuria >3.5 g/day, hypoalbuminaemia, and dyslipidaemia [4]. The comorbid DCMP complicated presentation, as oedema and dyspnoea could stem from reduced cardiac output or hypoalbuminaemia; hepatic steatosis may have exacerbated oncotic imbalance [5,6].

This case's novelty lies in the rare association of MN with RA, typically more linked to amyloidosis [7]. In Helin H et al., a biopsy series of 110 RA patients, MN was seen in only 6% versus amyloidosis in 47% [8]. Mok CC et al., reported three cases of MN in RA, attributing it to immune dysregulation, supported by high rheumatoid factor and nodules, as in our patient [9]. Moroni G et al., review noted autoimmune diseases like RA as causes in 10-20% of secondary MN cases, with worse prognosis if untreated [10]. Recent genetic analyses have shown causal links between RA and increased MN risk [11]. A case report highlighted Neural Epidermal Growth Factor-Like 1 (NELL-1) positive MN in RA, expanding diagnostic considerations [12]. Another study noted therapy-induced MN in RA, though our patient had no such exposure [13]. Causality is strengthened by the 15-year RA history preceding renal symptoms, negative PLA2R, and exclusion of other aetiologies (negative serologies).

Treatment avoided nephrotoxic agents like NSAIDs, used ramipril for proteinuria, and initiated immunosuppression cautiously given cardiac risks. Clinical implications suggest screening RA patients with poor control via urinalysis and UPCR to detect early renal involvement.

CONCLUSION(S)

This case highlights the importance of recognising rare extra-articular manifestations like secondary MN in chronic RA, especially with overlapping cardiac comorbidities. Early renal biopsy and multidisciplinary management can improve outcomes.

Acknowledgement

The authors thank the patient for her cooperation and the SBKS MI & RC team for their support in patient care and data collection.

REFERENCES

[1] Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, Drazner MH, et al. 2013 ACCF/AHA guideline for the management of heart failure. Circulation. 2013;128(16):e240-e327. Doi: 10.1161/CIR.0b013e31829e8776.

[2] Brodovicz KG, McNaughton K, Uemura N, Meininger G, Girman CJ, Yale SH. Reliability and feasibility of methods to quantitatively assess peripheral edema. Clin Med Res. 2009;7(1-2):21-31. Doi: 10.3121/cmr.2009.841.
[3] Woytala PJ, Gumprecht J, Wiecek A. Renal involvement in rheumatoid arthritis. Rheumatol Int. 2013;33(6):1501-10. Doi: 10.1007/s00296-012-2568-1.
[4] Beck LH, Salant DJ. Membranous nephropathy: recent travels and new roads ahead. Kidney Int. 2010;77(9):765-70. Doi: 10.1038/ki.2010.34.
[5] Felker GM, Thompson RE, Hare JM, Hruban RH, Clemetson DE, Howard DL, et al. Underlying causes and long-term survival in patients with initially unexplained cardiomyopathy. N Engl J Med. 2000;342(15):1077-84. Doi: 10.1056/NEJM200004133421503.
[6] Nicola PJ, Maradit-Kremers H, Roger VL, Jacobsen SJ, Crowson CS, Ballman KV, et al. The risk of congestive heart failure in rheumatoid arthritis. Arthritis Rheum. 2005;52(2):412-20. Doi: 10.1002/art.20855.
[7] Ponticelli C, Glassock RJ. Glomerular diseases: Membranous nephropathy- a modern view. Clin J Am Soc Nephrol. 2014;9(3):609-16. Doi: 10.2215/CJN.04160413.
[8] Helin H, Mustonen J, Pasternack A. Renal biopsy findings and clinicopathologic correlations in rheumatoid arthritis. Arthritis Rheum. 1995;38(2):242-47. Doi: 10.1002/art.1780380213.
[9] Mok CC, Ying KY, Ng WL. Membranous nephropathy in patients with rheumatoid arthritis: report of three cases. Lupus. 2000;9(5):395-98. Doi: 10.1191/096120300678828523.
[10] Moroni G, Ponticelli C. Secondary membranous nephropathy. A narrative review. Front Med (Lausanne). 2020;7:611317. Doi: 10.3389/fmed.2020.611317.
[11] Yu Y, Wang Y, Li J, et al. Causal effects of rheumatoid arthritis or ankylosing spondylitis on membranous nephropathy: a Mendelian randomization study. Front Immunol. 2023;14:1213898. Doi: 10.3389/fimmu.2023.1213898.
[12] Saito M, Saito A, Komatsu M, et al. Neural epidermal growth factor-like 1-positive membranous nephropathy with rheumatoid arthritis. Kidney Int Rep. 2023;8(4):921-24. Doi: 10.1016/j.ekir.2023.01.002.
[13] Yoshizawa S, Sugino H, Kaneko Y, et al. Membranous nephropathy caused by rheumatoid arthritis. CEN Case Rep. 2019;8(4):233-38. Doi: 10.1007/s13730-019-00399-9.

PARTICULARS OF CONTRIBUTORS:
1. Assistant Professor, Department of General Medicine, SBKS Medical Institute and Research Centre, Sumandeep Vidhyapeeth (Deemed to be University), Vadodara, Gujarat, India.
2. Professor and Head, Department of General Medicine, SBKS Medical Institute and Research Centre, Sumandeep Vidhyapeeth (Deemed to be University), Vadodara, Gujarat, India.
3. Resident, Department of General Medicine, SBKS Medical Institute and Research Centre, Sumandeep Vidhyapeeth (Deemed to be University), Vadodara, Gujarat, India.
4. Resident, Department of General Medicine, SBKS Medical Institute and Research Centre, Sumandeep Vidhyapeeth (Deemed to be University), Vadodara, Gujarat, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Yash Anand Chordia,
Shreenath Bungalows Opposite Yash Complex, Gotri, Vadodara-390021,
Gujarat, India.
E-mail: ychordia99@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Aug 26, 2025
- Manual Googling: Sep 18, 2025
- iThenticate Software: Oct 08, 2025 (3%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Jul 27, 2025**
Date of Peer Review: **Sep 04, 2025**
Date of Acceptance: **Oct 10, 2025**
Date of Publishing: **Jan 01, 2026**