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Rituximab Therapy for Fibrillary Glomerulonephritis in an Older Adult With Advanced Chronic Kidney Disease

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Abstract

Fibrillary glomerulonephritis (FGN) is a rare immune-mediated glomerular disease characterized by progressive kidney dysfunction, proteinuria, and a high risk of progression to end-stage kidney disease (ESKD). No standardized treatment exists, although rituximab has emerged as a promising therapeutic option in selected patients. We report the case of a 75-year-old woman who presented with progressive kidney dysfunction and worsening proteinuria. Kidney biopsy demonstrated FGN with substantial chronic histologic injury. She was treated with two doses of rituximab 1 g administered intravenously two weeks apart, in conjunction with renin-angiotensin-aldosterone system (RAAS) blockade. Despite a baseline estimated glomerular filtration rate (eGFR) below 30 mL/min/1.73 m^2 and significant chronicity on biopsy, she experienced improvement and subsequent stabilization of kidney function, with a reduction in proteinuria. This case adds to the growing evidence supporting rituximab as a therapeutic option for selected patients with FGN, even in the presence of advanced chronic kidney disease.

Categories: Internal Medicine, Nephrology
Keywords: add fibrillary glomerulonephritis, advanced chronic kidney disease, fibrillary glomerulonephritis, rituximab (rtx), rituximab therapy

Introduction

Fibrillary glomerulonephritis (FGN) is an uncommon glomerular disease characterized by the deposition of randomly arranged, nonbranching, Congo red-negative fibrils, typically composed of polyclonal immunoglobulins, within the glomerular basement membrane and mesangium [1]. Clinically, FGN commonly presents with proteinuria, microscopic hematuria, hypertension, and progressive chronic kidney disease [1,2]. It was initially considered an idiopathic disease, but recent studies have highlighted associations in some cases with autoimmune disease, malignant neoplasm, or hepatitis C virus infection [3]. The prognosis is generally poor, with approximately half of patients progressing to end-stage kidney disease (ESKD). The median time from kidney biopsy to ESKD is approximately 24 months, and nearly 50% of patients develop ESKD within two years [1-3]. Diagnostic accuracy has improved substantially with the discovery of DNAJB9, a highly sensitive and specific biomarker for FGN, which has enhanced diagnostic confidence and facilitated distinction from other fibrillary glomerular diseases [4]. However, when DNAJB9 immunohistochemistry is unavailable, as in the present case, the diagnosis continues to rely on the characteristic ultrastructural findings identified on electron microscopy.

FGN lacks an evidence-based standard of care. Supportive management with renin-angiotensin-aldosterone system (RAAS) blockade remains foundational, while immunosuppressive therapies have demonstrated variable efficacy [1,2]. The role of immunosuppression remains controversial, with no consensus regarding the optimal therapeutic regimen [1]. By depleting CD20+ B lymphocytes, rituximab is thought to reduce the production of pathogenic immunoglobulins that form the fibrillar deposits. Among available therapies, B-cell depletion with rituximab has emerged as the most promising strategy, particularly when initiated early and in patients with less chronic histologic injury [1,2,5]. However, data regarding rituximab use in patients with advanced chronic kidney disease remain limited [2,5]. Advanced chronic kidney disease typically reflects extensive, irreversible glomerulosclerosis and tubulointerstitial fibrosis. Once glomeruli become globally sclerosed and the interstitium is fibrotic, the resulting structural damage is permanent, and no immunosuppressive therapy can restore lost nephrons.

We present a case of biopsy-proven FGN with significant chronic histologic injury and reduced baseline estimated glomerular filtration rate (eGFR) that demonstrated improvement and subsequent stabilization following rituximab therapy.

Case Presentation

Patient information

A 75-year-old woman with a medical history notable for hypertension, prediabetes, chronic anemia, gastroesophageal reflux disease, and prior deep vein thrombosis presented for evaluation of progressive kidney dysfunction. Age-appropriate malignancy screenings, including mammogram, Pap smear, and colonoscopy, had recently been completed and were unremarkable.

Physical examination

On physical examination, the patient appeared obese. Cardiovascular examination revealed a normal heart rate with a regular rhythm, normal peripheral pulses, and normal heart sounds. Pulmonary examination demonstrated normal respiratory effort without evidence of respiratory distress, and breath sounds were clear bilaterally, with no wheezing or rales appreciated. Musculoskeletal examination was notable for bilateral lower extremity edema involving both the right and left lower legs. Neurologically, the patient was alert and demonstrated no focal neurological deficits.

Clinical course

The patient experienced a progressive decline in renal function, with serum creatinine increasing from 1.1 mg/dL in January 2024 to 2.5 mg/dL by April 2024, without spontaneous recovery (Table *1*). During the same period, the urine protein-to-creatinine ratio increased from 0.5 g/g to 1.1 g/g, and urinalysis demonstrated new-onset 3+ microscopic hematuria compared with a negative urinalysis in 2021. Urine protein/creatinine ratio was 1.1 g/g, consistent with worsening proteinuria. A comprehensive serologic evaluation for secondary causes of proteinuria, including hepatitis B and C, HIV, systemic lupus erythematosus, and ANCA-associated vasculitis, was unrevealing (Table *2*). Her blood pressure regimen was adjusted for better control with enalapril 40 mg daily, nifedipine 90 mg daily, labetalol 200 mg three times daily, and furosemide 20 mg daily. Hyperglycemia was controlled, with hemoglobin A1c <6%. Given the progressive deterioration in kidney function, worsening proteinuria, and persistent microscopic hematuria, a kidney biopsy was performed, confirming FGN. The patient subsequently received two doses of rituximab, 1 g each, in mid-October 2024 and early November 2024. Over the following 11 months, she demonstrated a favorable clinical response, with serum creatinine improving from 2.5 mg/dL to 1.8 mg/dL, proteinuria decreasing from 1.1 g/g to 0.3 g/g, and microscopic hematuria improving from 3+ to trace, consistent with partial remission and stabilization of renal function. Kidney biopsy findings are shown in Table *3*, and images are shown in Figures *1*-*3*.

Time point	Clinical context	Approximate creatinine (mg/dL)	Interpretation
January 2024	Baseline	1.1	Baseline renal function
April 2024	Pre-treatment trend	2.5-2.7	Significant renal decline
July 2024	Ongoing disease activity	2.6-2.7	Persistent elevation
October 2024	Pre-rituximab	2.4-2.5	Slight improvement but persistently elevated
October 2024	Rituximab dose 1	2.4	Treatment initiation
November 2024	Rituximab dose 2	2.2-2.3	Second infusion administered
January 2025	Early post-treatment	2.2-2.4	Early stabilization
April 2025	Post-treatment response	2	Gradual improvement
October 2025	Sustained response	1.8	Nadir renal function improvement
January 2026	Late follow-up	2	Mild fluctuation within a stable chronic kidney disease range
April 2026	Most recent follow-up	2	Stable renal function

TABLE 1: Serum creatinine trend before and after rituximab therapy.

Test	Reference range	Result
Anti-myeloperoxidase (MPO) antibodies	0.0-0.9 units	<0.2 units
Anti-proteinase 3 (PR3) antibodies	0.0-0.9 units	<0.2 units
Atypical p-ANCA	Negative: <1:20 titer	<1:20
Cytoplasmic ANCA (c-ANCA)	Negative: <1:20 titer	<1:20
Complement C3, serum	82-167 mg/dL	144 mg/dL
Complement C4, serum	12-38 mg/dL	30 mg/dL
Serum protein electrophoresis	Normal	Normal
HIV antigen/antibody, fourth generation	Nonreactive	Nonreactive
Hepatitis B surface antigen	Nonreactive	Nonreactive
Hepatitis C antibody	Nonreactive	Nonreactive
24-hour urine protein/creatinine ratio	42-225 mg/24 hr	1,088 mg/g
ANA screen	Negative	Negative

TABLE 2: Serologic and laboratory evaluation.

ANA: Antinuclear antibody; ANCA: Antineutrophil cytoplasmic antibody; MPO: Myeloperoxidase; PR3: Proteinase 3.

Modality	Findings
Light microscopy	Moderate global glomerulosclerosis involving approximately 47% of glomeruli. Interstitial fibrosis and tubular atrophy involving approximately 40% of the sampled cortex. Enlarged glomeruli with a moth-eaten mesangial appearance. Moderate-to-severe arterionephrosclerosis and arteriolonephrosclerosis. No glomerular necrosis or crescents identified. Congo red stain negative. See Figure 1.
Immunofluorescence	Smudgy mesangial and capillary loop staining for IgG, C3, kappa, and lambda light chains. No significant staining of tubular basement membranes or vessel walls. Polyclonal staining pattern. See Figure 2.
Electron microscopy	Randomly arranged, nonbranching fibrils within the mesangium and glomerular basement membranes, measuring 8.66-10.3 nm in diameter (mean, 9.68 nm). Fibril morphology was consistent with fibrillary glomerulonephritis. DNAJB9 staining was not performed. See Figure 3.

TABLE 3: Kidney biopsy findings.

C3: Complement component 3; IgG: Immunoglobulin G.

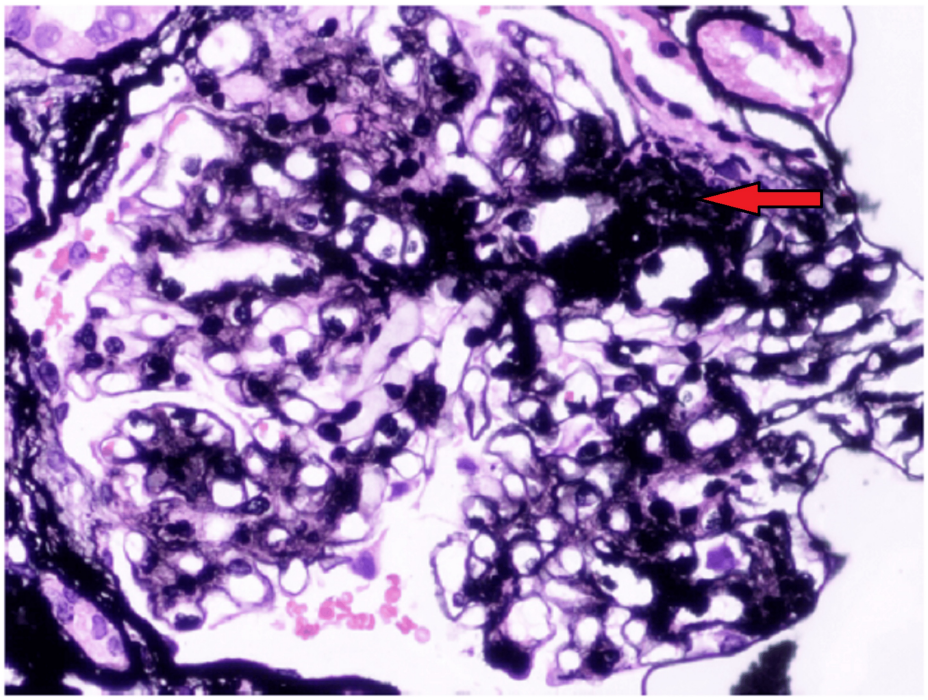


FIGURE 1: Light microscopy.

The mesangium shows a mild to moderate increase in matrix deposition and cellularity, with a moth-eaten appearance on methenamine silver stain (red arrow).

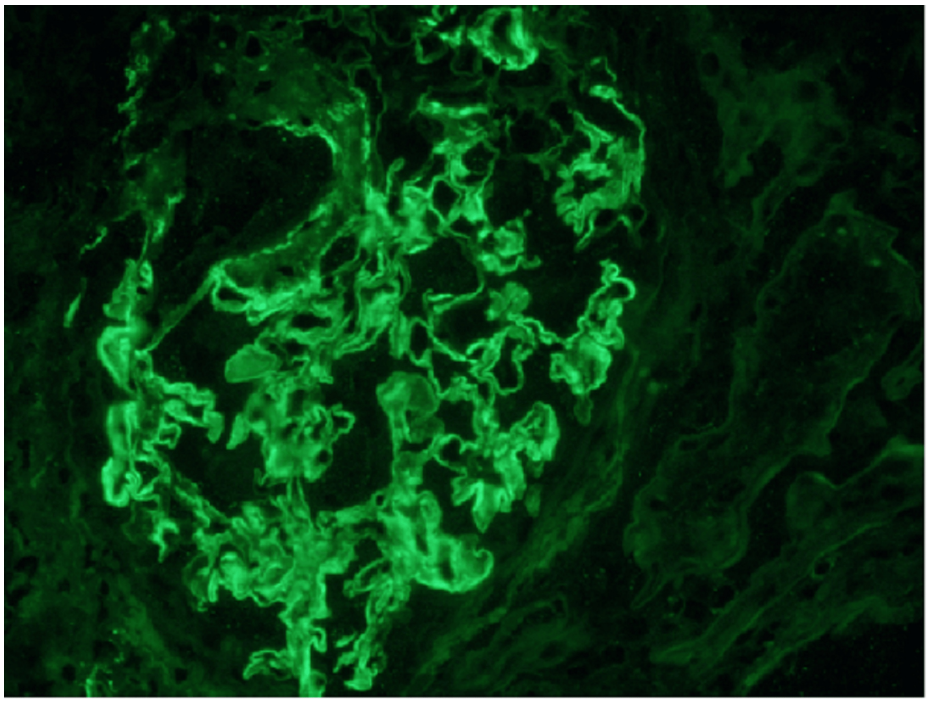


FIGURE 2: Immunofluorescence.

There is smudgy mesangial and capillary loop staining for IgG (1+).

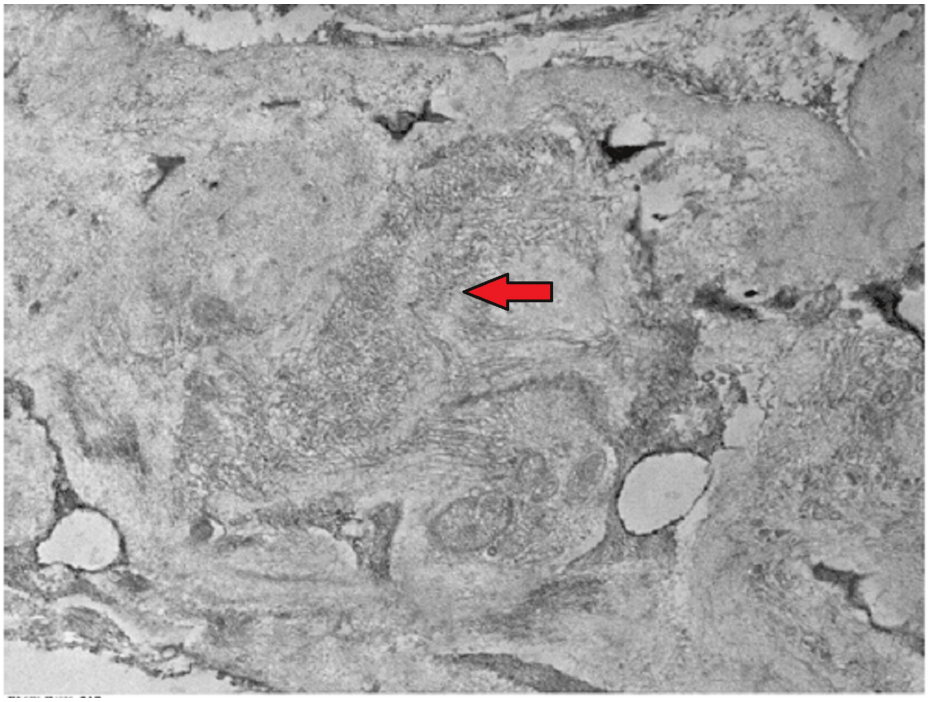


FIGURE 3: Electron microscopy.

Deposits are present in the glomerular basement membrane and mesangium, with randomly arranged, nonbranching fibrils measuring approximately 9.68 nm in diameter (red arrow).

Diagnosis

The findings were consistent with FGN, with significant chronic vascular and tubulointerstitial injury contributing to renal dysfunction. Although DNAJB9 immunohistochemistry was not available in this case, the diagnosis of FGN was supported by characteristic ultrastructural findings on electron microscopy, including randomly arranged, nonbranching fibrils, along with negative Congo red staining. Alternative fibrillary glomerular diseases were considered unlikely based on the ultrastructural features and clinicopathologic correlation. In particular, amyloidosis was excluded by negative Congo red staining, while immunotactoid glomerulopathy was excluded by the absence of organized microtubules with hollow cores and parallel alignment.

Management

Following a multidisciplinary discussion and shared decision-making process, the patient was initiated on treatment with rituximab, administered as two IV doses of 1 g given two weeks apart. RAAS blockade was continued with enalapril 40 mg daily, and antihypertensive therapy was optimized to achieve adequate blood pressure control. The patient was also placed under close surveillance with serial monitoring of renal function and proteinuria. Rituximab was selected based on the presumed immune-mediated pathogenesis of FGN, the absence of identifiable secondary causes, and the lack of contraindications to B-cell-depleting therapy.

Outcome

At 11 months following rituximab therapy, the patient demonstrated a clinically meaningful renal response, with improvement in both kidney function and proteinuria. Serum creatinine decreased from 2.5 mg/dL to 1.8 mg/dL, while the eGFR improved from 19.6 to 28.8 mL/min/1.73 m^2. Proteinuria also declined significantly from 1.1 g/g to 0.3 g/g, and microscopic hematuria improved from 3+ to trace. These improvements were maintained for a total of 18 months after completing the course of rituximab therapy, consistent with a favorable partial renal response.

Discussion

FGN is a rare glomerular disease associated with poor renal outcomes, with nearly half of affected patients progressing to ESKD within several years of diagnosis [1]. This case demonstrates that rituximab may provide clinically meaningful benefit even in the setting of advanced chronic kidney disease and substantial chronic histologic injury. Although FGN is frequently progressive, emerging data suggest that selected patients may experience stabilization or improvement in renal outcomes with B-cell-depleting therapy [1,2].

The largest published series of rituximab-treated FGN patients was reported by Hogan J et al. and included 12 individuals treated with either rituximab 1 g administered twice or 375 mg/m² weekly for four weeks, in conjunction with RAAS blockade [2]. At baseline, the median serum creatinine was 2.1 mg/dL (range, 0.7-2.7 mg/dL), the median eGFR was 39 mL/min/1.73 m² (range, 21-98 mL/min/1.73 m²), and the median proteinuria was 4.5 g/day (range, 0.2-7.5 g/day) [2]. Outcomes were heterogeneous: four patients did not develop progressive kidney disease, three experienced progression without reaching ESKD, and five progressed to ESKD [2]. Importantly, patients who experienced favorable outcomes generally had lower serum creatinine levels, higher baseline eGFR, and earlier initiation of therapy [2].

Compared with this cohort, our patient presented with several traditionally unfavorable prognostic features, including advanced age, significant chronic histologic damage, approximately 47% global glomerulosclerosis and 40% interstitial fibrosis/tubular atrophy, and a baseline eGFR below 30 mL/min/1.73 m². These features have been associated with worse renal outcomes in observational studies of FGN [1]. Despite these factors, she experienced mild improvement and stabilization in renal function, along with improvement in proteinuria, following rituximab therapy, with serum creatinine improving from 2.5 to 1.8 mg/dL, eGFR increasing from 19.6 to 28.8 mL/min/1.73 m², and proteinuria decreasing from 1.1 g/g to 0.3 g/g. This degree of response compares favorably with outcomes reported in the aforementioned series and suggests that rituximab may still confer benefit even when initiated at a later stage of disease in carefully selected patients.

Additional evidence supporting rituximab use comes from a prospective pilot study by Erickson SB et al., which similarly showed that rituximab may stabilize kidney function without consistently inducing complete remission, particularly in patients with more advanced disease [5]. Earlier reports similarly described favorable responses characterized by reduced proteinuria and preserved renal function [6]. Combination immunosuppressive regimens incorporating rituximab with corticosteroids and cyclophosphamide have demonstrated higher response rates in some reports, supporting the hypothesis that more profound or sustained B-cell depletion may be necessary for optimal disease control [5]. Collectively, these studies suggest that B-cell depletion may alter disease progression in at least a subset of patients. However, the increased risk of infection and treatment-related toxicity must be carefully weighed, especially in older adults.

Supportive therapy remains essential in all patients with FGN and includes RAAS blockade, blood pressure optimization, and avoidance of nephrotoxic exposures [1]. Despite advances in treatment, progression to ESKD remains common [1]. Kidney transplantation remains an effective treatment option for ESKD, although recurrence of FGN within the allograft has been reported [7].

This case contributes to the growing body of literature supporting rituximab as a therapeutic option in FGN and suggests that meaningful renal recovery may be possible even in patients with advanced chronic kidney disease and significant chronic histologic injury [2,5,6].

Conclusions

FGN remains a rare glomerular disease with limited evidence-based treatment options and a generally guarded prognosis. This case demonstrates that rituximab may result in meaningful improvement and stabilization of kidney function, along with a reduction in proteinuria, even in patients with advanced chronic kidney disease and substantial chronic histologic injury. Although this favorable outcome adds to the growing body of evidence supporting rituximab use in FGN, larger prospective studies are needed to confirm its efficacy and better define its role in the management of this rare disease. Early recognition, accurate diagnosis, optimized supportive care, and carefully selected immunosuppressive therapy may improve outcomes in selected patients with FGN.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Nasr SH, Valeri AM, Cornell LD, Fidler ME, Sethi S, Leung N, Fervenza FC: Fibrillary glomerulonephritis: a report of 66 cases from a single institution. Clin J Am Soc Nephrol. 2011, 6:775-784. 10.2215/CJN.08300910
2. Hogan J, Restivo M, Canetta PA, Herlitz LC, Radhakrishnan J, Appel GB, Bomback AS: Rituximab treatment for fibrillary glomerulonephritis. Nephrol Dial Transplant. 2014, 29:1925-1931. 10.1093/ndt/gfu249
3. Nasr SH, Fogo AB: New developments in the diagnosis of fibrillary glomerulonephritis . Kidney Int. 2019, 96:581-592.
4. Nasr SH, Vrana JA, Dasari S, et al.: DNAJB9 is a specific immunohistochemical marker for fibrillary glomerulonephritis. Kidney Int Rep. 2018, 3:56-64. 10.1016/j.ekir.2017.07.017
5. Erickson SB, Zand L, Nasr SH, Alexander MP, Leung N, Drosou ME, Fervenza FC: Treatment of fibrillary glomerulonephritis with rituximab: a 12-month pilot study. Nephrol Dial Transplant. 2021, 36:104-110. 10.1093/ndt/gfaa065
6. Collins M, Navaneethan SD, Chung M, Sloand J, Goldman B, Appel G, Rovin BH: Rituximab treatment of fibrillary glomerulonephritis. Am J Kidney Dis. 2008, 52:1158-1162. 10.1053/j.ajkd.2008.07.011
7. El Ters M, Bobart SA, Cornell LD, et al.: Recurrence of DNAJB9-positive fibrillary glomerulonephritis after kidney transplantation: a case series. Am J Kidney Dis. 2020, 76:500-510. 10.1053/j.ajkd.2020.01.018