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Images in nephrology: Nodular glomerulopathy.

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Abstract

Introduction: Immunotactoid glomerulopathies, fibrillar glomerulopathies due to fibronectin deposition, diabetic nephropathy, and disease due to monoclonal immunoglobulin deposits are among the differential diagnoses of nodular glomerulopathy's injury pattern.

Clinical case: This is a 36-year-old man with chronic nephrotic syndrome and hypertension who presents deterioration of kidney function, requiring renal replacement therapy in the last 4 months. He has no history of diabetes, and immunological tests were negative. A percutaneous renal biopsy was performed.

Results: Predominantly nodular lesion pattern, with a chronicity index of 9 (nine) with severe chronic changes, global sclerosis in 60% of the glomeruli (3), tubular atrophy in 65 - 70% (3), Interstitial fibrosis in 75-80 % (3), intimal sclerosis in 40% of the thickness. Congo's red stain was negative. IgG immunofluorescence: positive in basement membranes and nodular areas ++/+++. IgA: negative, IgM: negative. Internal control present, C3 positive in basement membranes, and the nodular regions ++/+++, C1q: traces, KAPPA: Positive ++/+++ fine granular in mesangium, LAMBDA: Negative.

Conclusion: Within the differential diagnosis is diabetic glomerulosclerosis, disease due to monoclonal Ig deposits, Amyloidosis, chronic TMA, GN MP type I and III, EDD (GN MO II), Fibrillary glomerulopathy, Glomerulopathy due to immunotactoids, Idiopathic nodular glomerulosclerosis. Electron microscopy is required for definitive diagnosis.

Keywords:

Nodular glomerulopathy, Diabetic glomerulosclerosis, Monoclonal immunoglobulin-mediated GN and C3 glomerulopathy, Amyloidosis, Fibrillary glomerulopathy, Immunotactoid Glomerulopathy, Idiopathic nodular glomerulosclerosis.

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Nodular glomerulopathy is characteristic of patients with diabetic nephropathy; outside this clinical context, they are relatively rare entities, and an adequate differential diagnosis should be considered [1]. We present some pathological images related to nodular glomerulopathy.

Clinical case

Case Summary

The patient is a 36-year-old man with chronic nephrotic syndrome and hypertension who has deteriorated renal function, requiring renal replacement therapy in the last 4 months. He has no history of diabetes, and all immunological tests were negative: for systemic lupus erythematosus, serology for hepatitis B, C negative, HIV negative, and negative ANCA antibodies, among others. A percutaneous renal biopsy was performed.

Pathology images

Pathology images showed a predominantly nodular lesion pattern with a chronicity index of 9 (nine) with severe chronic changes, global sclerosis in 60% of glomeruli (3), tubular atrophy in 65-70% (3), interstitial fibrosis in 75-80% (3), and intimal sclerosis in 40% of the thickness. Congo red staining was negative. IgG immunofluorescence: positive in basement membranes and nodular areas ++/+++. IgA: negative, IgM: negative. Internal control present, C3 positive in basement membranes and the nodular regions ++/+++, C1q: traces, KAPPA: Positive ++/+++ fine granular in mesangium, LAMBDA: Negative.

Figure 1. Staining of Masson's trichrome.

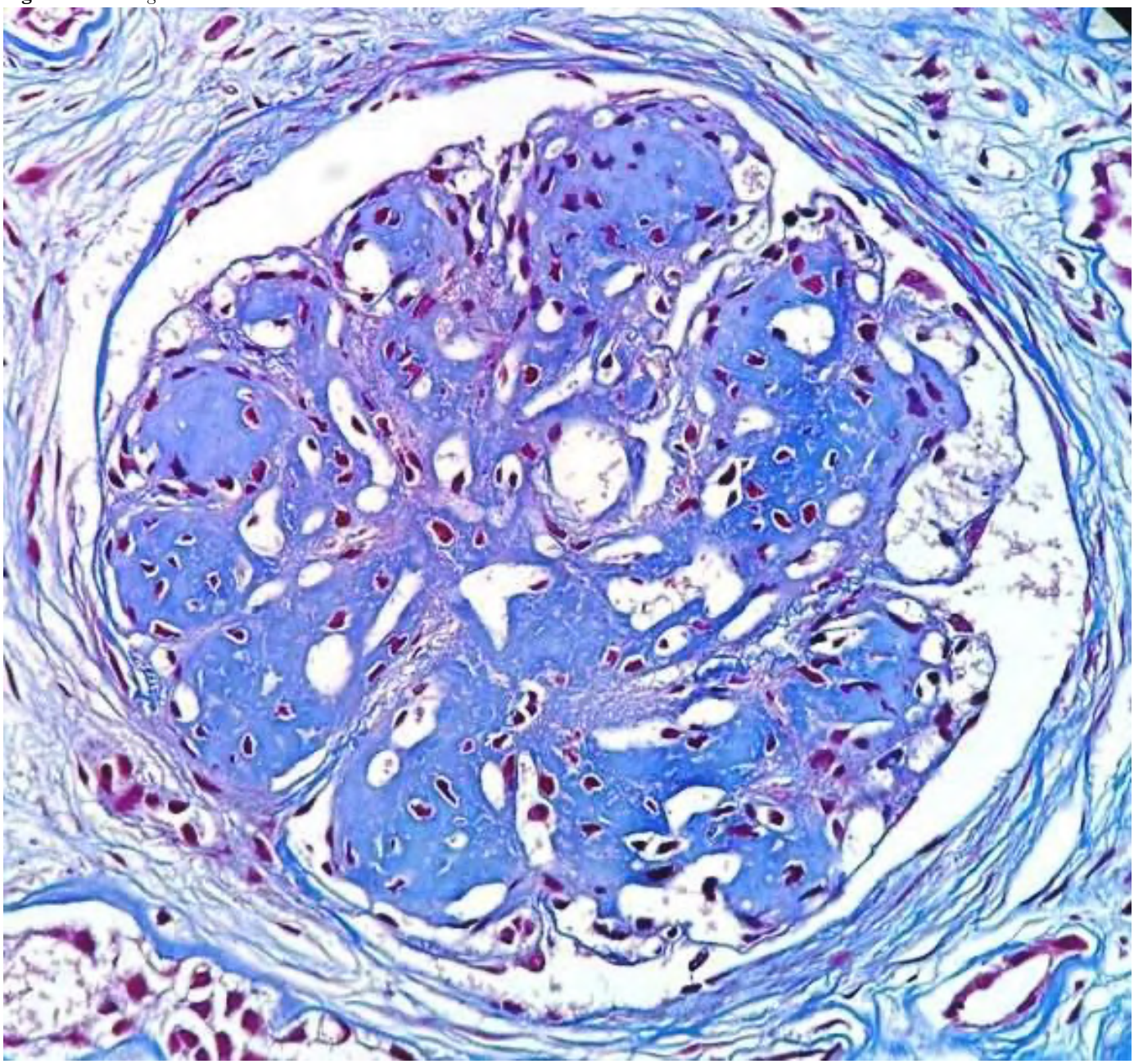


Figure 2. Hematoxylin and Eosin stain.

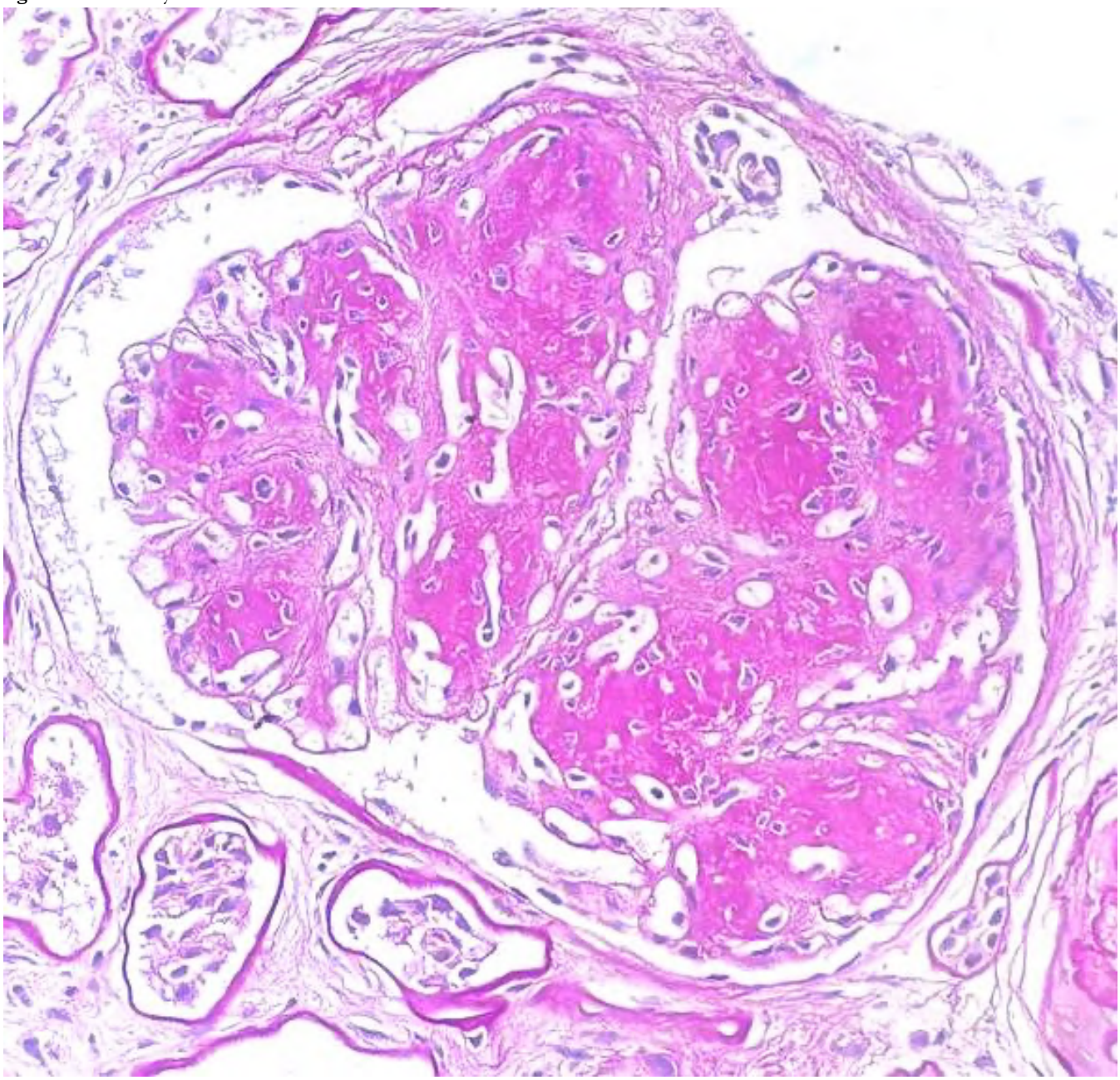


Figure 3. Silver stain.

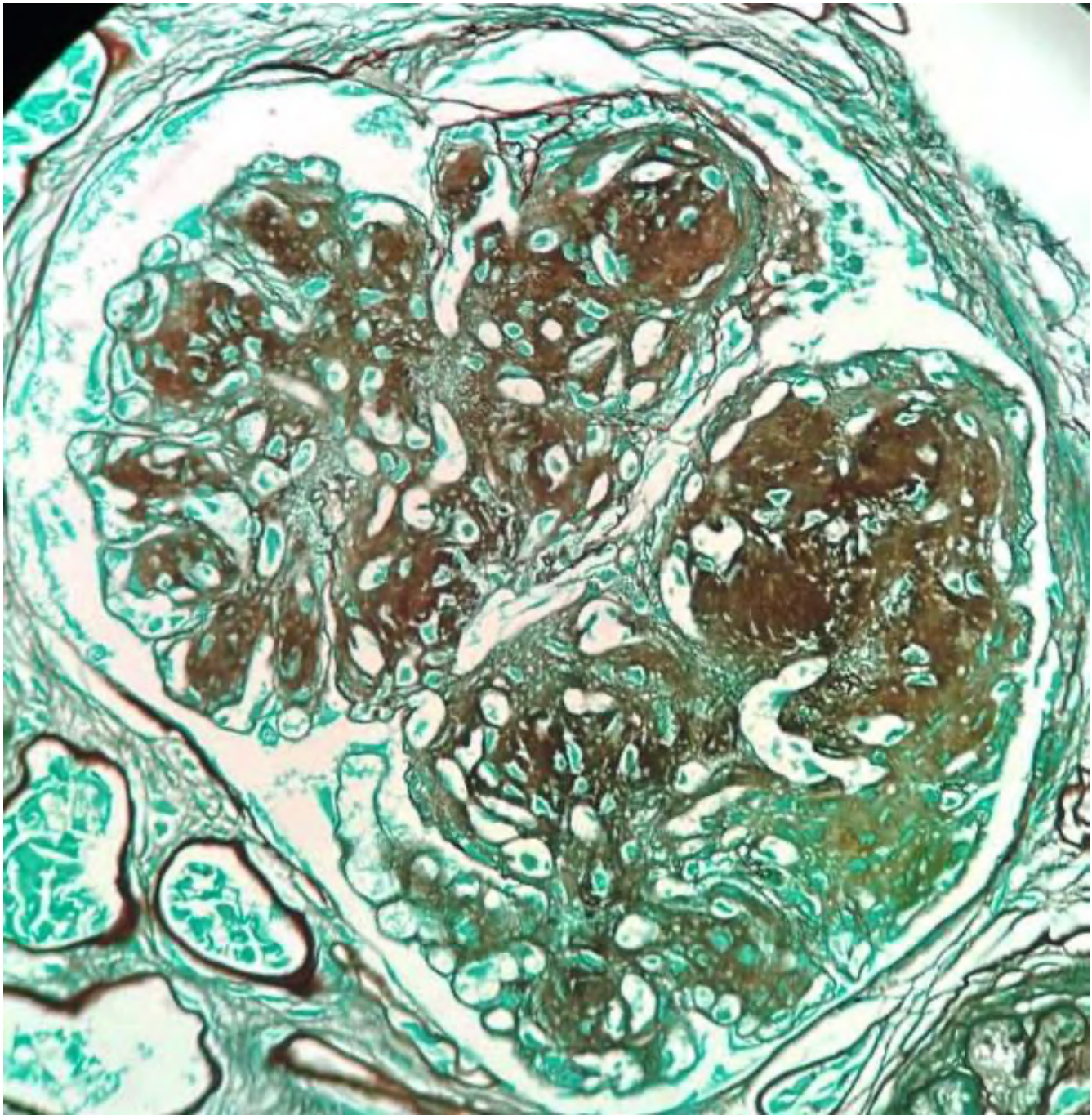


Figure 4. PAS (Peripheral Cell) staining Acid Schiff)

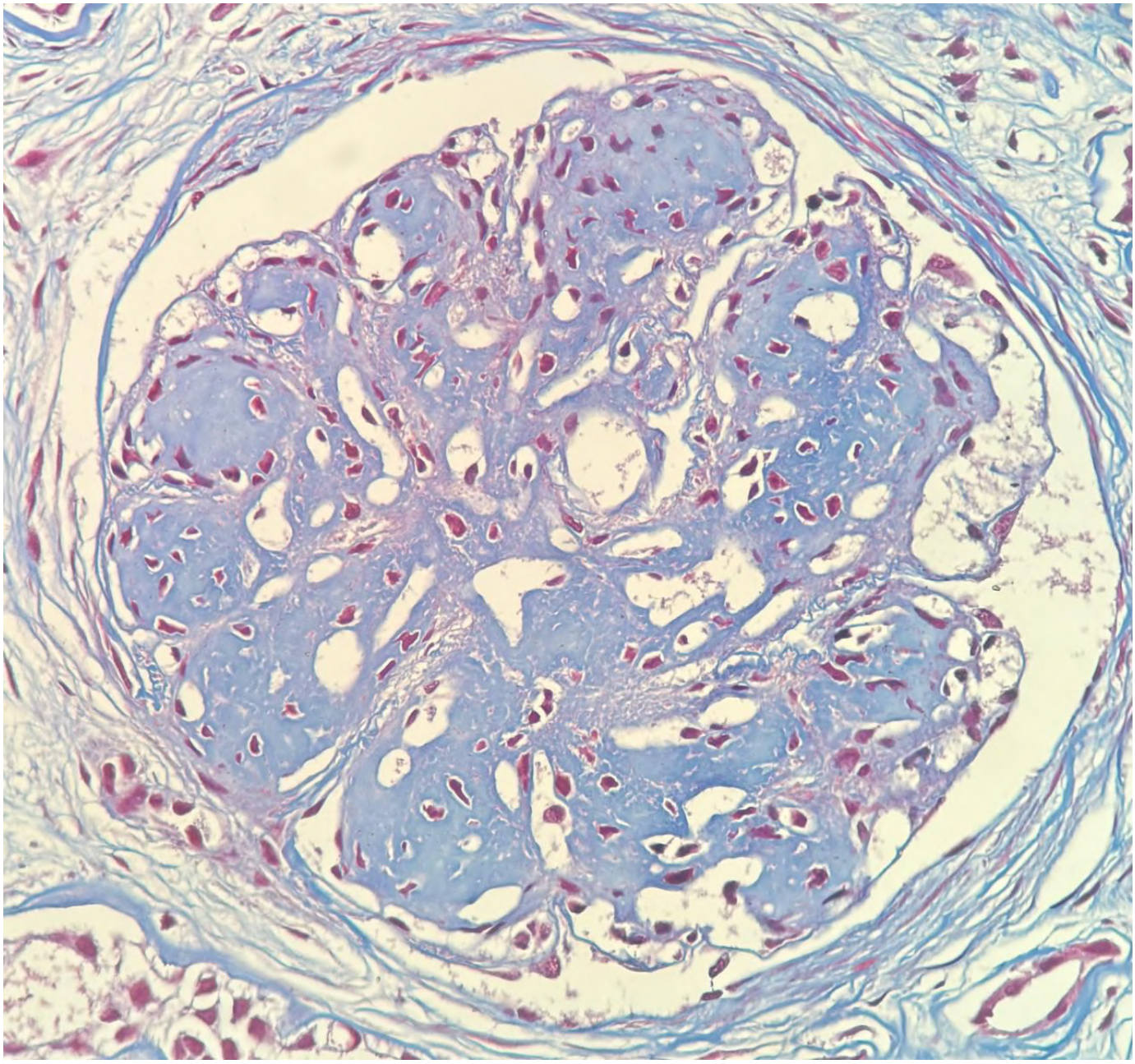
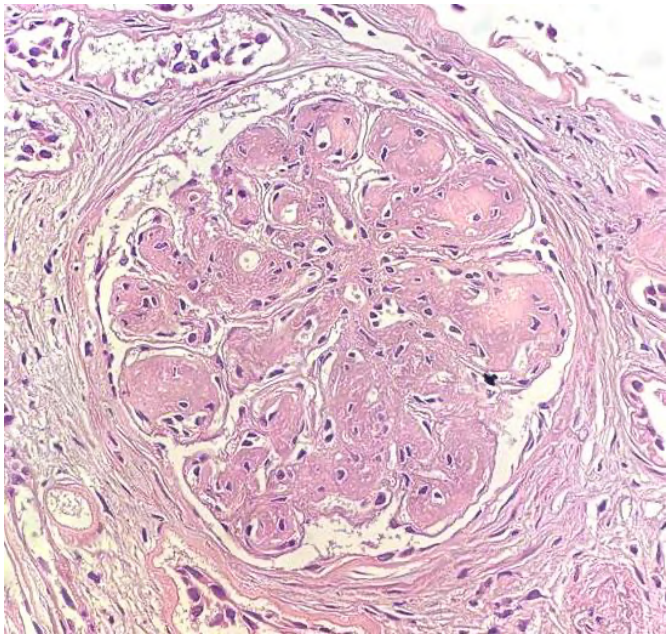


Figure 5. Eosin Hematoxicillin stain.



Discussion

The clinical case presents a predominantly nodular glomerular lesion pattern, which suggests a group of specific glomerular diseases. Relevant histological findings, such as the nodular pattern, suggest mesangial proliferation or deposition processes. The Chronicity Index indicates that long-standing glomerular disease, global and tubular sclerosis, and interstitial fibrosis are signs of advanced chronic renal damage. The immunofluorescence results (Images not shown), with positivity for IgG and C3 in basement membranes and nodular areas, are compatible with an immunological process. The positivity for kappa in mesangium suggests a possible monoclonal origin. The expanded differential diagnosis should consider the following entities:

- Monoclonal immunoglobulin deposition disease: Kappa positivity in the mesangium suggests this possibility, although confirmation with serum and bone marrow immunofixation studies is required.
- Amyloidosis: Although Congo red staining was negative, it does not entirely rule out this entity since other types of amyloid may not stain with this dye.
- Membranoproliferative glomerulonephritis type I and III: C3 positivity suggests these entities, but this disease's nodular pattern is less typical.
- Immune complex deposition disease: IgG and C3 positivity are compatible, but the deposition pattern is not specific.
- Fibrillar glomerulopathy: Although it is not the most typical pattern, it could be considered in cases with fibrillar deposits in the electron microscope.
- Immunotactoid glomerulopathy: IgG positivity might suggest this entity, but the deposition pattern differs.
- Idiopathic nodular glomerulosclerosis: This is considered when other causes have been ruled out.

These results have clinical implications, as the next level is the study of renal biopsy with electron microscopy, which can help confirm the diagnosis [2]. Other complementary studies should consider serum and bone marrow immunofixation studies to rule out light chain disease. In addition, it is essential to evaluate serum protein electrophoresis, even if the patient is already on a renal function replacement therapy program; this will have implications for the long-term prognosis and the possibility of recurrence in a renal transplant.

Conclusions

The diagnosis of nodular glomerulopathy in this patient was challenging because renal lesions in patients on hemodialysis programs are generally not subject to renal biopsy. Clinical suspicion of idiopathic nodular glomerulopathy was established by the history of chronic nephrotic syndrome in the absence of type 2 diabetes mellitus or other immunologic disease.

Abbreviations

ANCA: Antineutrophil cytoplasmic antibodies.
IgC : Immunoglobulin.
C3: Complement 3.

Additional information

No supplementary materials have been declared.

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Authors' contributions

Verónica Piedad Remache Otañez: Conceptualization, methodology, investigation, Writing – Original draft, Project administration, Supervision, validation, visualization, Writing – review and editing.

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Availability of data or materials

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Statements

Ethics committee approval and consent to participate

Not applicable to clinical cases.

Consent for publication

The author has permission from the patient to publish in written form.

Conflicts of interest

The author declares that she has no conflicts of interest.

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