

Membranous nephropathy with inferior vena cava and renal vein thrombosis

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Abstract

A biopsy proven membranous nephropathy female came to the hospital with fever and bilateral lumbar pain. There were no urinary or respiratory symptoms. The workup revealed a creatinine of 1.4 mg/dL, low serum albumin and 3+ proteins in the urine. Her erythrocyte sedimentation rate (ESR) was raised and her serology showing a C3 and C4 of complements of 2.24 and 0.41 respectively. Notably, antinuclear antibody (ANA) was strongly positive, anti-dsDNA was negative. Ultrasonography showed slight echogenic kidneys with a hematoma seen in her left kidney. Then a CT scan of chest, abdomen and pelvis was planned that revealed enlarged and swollen kidneys having indistinct cortico-medullary junction and a partial thrombus in the inferior vena cava (IVC) and the renal veins. Antiphospholipid antibodies serology and D-dimer levels were unremarkable. She was given streptokinase infusion that resulted in recovery of her renal functions and later on kept on lifelong warfarin.

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Case Report

A young-24-year old female, known case of membranous glomerulonephritis, having been biopsied at our hospital 1 month prior and on symptomatic management (her renal biopsy showing diffuse thickening of glomerular basement membrane with focal spikes on silver stain and IMF had diffuse granular positivity for IgG shown by [Figure 1](#)), presented this time at our outpatients' department with fever since 1 month in duration along with bilateral lumbar pain since the last 10 days.

Her fever was low grade, associated with chills, having no specific time of occurrence, and was temporarily relieved by antipyretics. No history of cough, hemoptysis, urinary complains, macroscopic hematuria or of nausea and vomiting was noted. Apart from being anemic, the rest of her physical examination was unremarkable.

Initial lab work showed a hemoglobin of 7.2 g/dL, urea 26 mg/dl, creatinine 1.4 mg/dL and serum albumin 1.2 g/dL. Additionally, urine detail report had 3+ proteins while a 24-hour urine collection showed proteins of 4503 mL/24 h.

Her erythrocyte sedimentation rate (ESR) was of 67 mm/h, viral markers were negative and her serology showed C3; 2.24 g/L (normal 0.79 to 1.52) and C4 0.41 g/L

Core tip

Thrombus in the IVC is a rare incidence in membranous nephropathy.

(0.16 to 0.38), antinuclear antibody (ANA) was strongly positive while anti-dsDNA was negative.

Ultrasonography of kidney ureter and bladder was done, which showed slight echogenic kidneys with hematoma seen in left kidney along with internal echoes at the base of the bladder.

CT scan of chest, abdomen and pelvis was done that showed both the kidneys enlarged and swollen with indistinct cortico-medullary junction and a partial thrombus was seen in the inferior vena cava (IVC) and the renal veins along with mild ascites and few sub-centimeters para-aortic nodes ([Figure 2](#)). Additionally, echocardiography was unremarkable with an EF 70%.

Her D-dimer levels were also sent to rule out pulmonary involvement and was 0.3 µg/mL (normal is less than 0.5 µg/mL). Antiphospholipid antibodies serology was also negative. She was diagnosed with renal vein and IVC thrombosis and was started on streptokinase infusion, which improved her renal functions and they soon returned to baseline. She was kept on lifelong warfarin



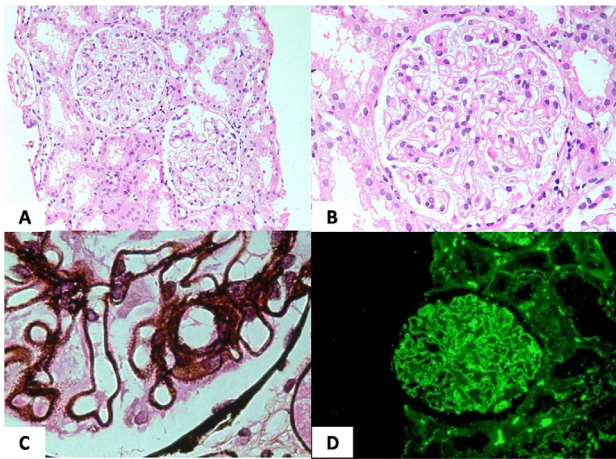


Figure 1. (A) Low-power view showing two glomeruli with only subtle changes on light microscopy (H&E, $\times 100$). (B) High-power view showing one glomerulus with thickening and tautness of glomerular basement membrane (GBM). No cellular proliferation or other pathology is appreciated (H&E, $\times 400$). (C) High-power view showing spikes projecting from outside of the GBM (JMS, $\times 1000$). (D) Immunofluorescence (IF) showing diffuse, granular, membranous positivity of IgG along capillary walls (IF for IgG, $\times 400$).



Figure 2. Partial thrombus in the inferior vena cava and bilaterally renal vein.

therapy with an international normalized ratio (INR) between 2-3 and was later discharged home.

Discussion

Membranous nephropathy is the most common type of nephrotic syndrome, with the amount of proteinuria being directly related to the risk of developing renal failure in them (1).

Since no specific treatment options exist for it. These patients are managed symptomatically with angiotensin-converting-enzyme inhibitor (ACE inhibitor), angiotensin II receptor blockers (ARBs) and diuretics (1).

Complications associated with nephrotic syndrome also include deep venous thrombosis (DVT), pulmonary embolism (PE) and renal vein thrombosis (RVT). DVT is clinically seen in 6% of the patients with nephrotic syndrome, while thrombi is visualized in 25% through the use of Doppler ultrasound. Thrombus in the IVC is a rare entity and its incidence in the membranous nephropathy is currently unknown (2).

Renal vein thrombosis is mostly seen in patients with nephrotic syndrome, particular amongst the membranous nephropathy, but it could also have various causes. The loss of antithrombin III along with the excess amount of fibrinogen predisposes to clot formation, with thrombi seen in both arteries as well as in veins. In patients with SLE, RVT is associated with lupus nephritis class V that is, named membranous lupus nephritis too. Other causes include antiphospholipid related nephropathy, antithrombin III deficiency protein C and S deficiency and Behcet's syndrome (3).

These patients could present with flank pain, hematuria and even renal failure. RVT could either be unilateral, bilateral and could even extend into the IVC. A chronic presentation is more often seen in nephrotic patients (4). Diagnosis is made by the use of various imaging modalities with venography being the gold standard. The risk of RVT in membranous nephropathy is said to be around 37% (5). In a study conducted on the Chinese population. It was suggested that RVT caused due to nephrotic syndrome, was due to hyperviscosity, hypercoagulability along with the use of steroids in it and its associated intravascular volume loss (6).

Cagnoli et al described a case of membranous lupus nephritis who developed acute renal failure because of thrombosis of both renal veins along with a calcified thrombi in the IVC, this was treated with thrombolytics, which resulted in recovery of her renal functions (7).

Treatment options in the past included heparin and warfarin but these are associated with pulmonary embolism and enlargement of the caval thrombosis (5-7). Current evidences suggest successful treatment with streptokinase and urokinase. Other options include a balloon embolectomy catheter (5-7).

Authors' contribution

All authors contributed equally to the work.

Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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