Case Report

C1q nephropathy in a young female sensitive to low-dose steroid: Clinicopathological correlation and outcome a rare clinical scenario

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Abstract

C1q nephropathy is a very uncommon form of glomerular disease and the presentation usually coincide with nephrotic syndrome. The histological patterns of C1q nephropathy broadly divided into minimal change disease, focal segmental glomerulosclerosis, and immune-mediated proliferative glomerulosclerosis. Here, we are presenting an interesting case of C1q nephropathy in young female who achieved complete remission on low-dose corticosteroid therapy. Corticosteroids, according to the body weight, are the mainstay of treatment. Some patients who do not tolerate, a low dose of steroid may be used. It is found to be resistant in most of the cases and other immunosuppressant is reserved for such cases.

Keywords: C1q nephropathy, complement system, focal segmental glomerulosclerosis, minimal change disease, systemic lupus erythematosus

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INTRODUCTION

C1q nephropathy was first described by Jennette and Hipp in 1985.[1] This disorder is characterized by immune complex mediated glomerulonephritis and complement deposits mostly C1q.[2,3] Exclusion criteria includes clinical and immunological features of systemic lupus erythematosus (SLE) and type 1 membranoproliferative glomerulonephritis.

C1q is the first component of classical pathway.[4] Complement pathway activation by antigen antibody complex in glomeruli is the reason for the pathogenesis of C1q nephropathy 4, but there is also involvement of alternate pathway and lectin pathway.[5] C1q nephropathy usually present as steroid resistant proteinuria[1,6] in older children and young adults with slight male preponderance at 68%.[7]

Here, we report a case of C1q nephropathy in an 18-year-old female, presented with subnephrotic proteinuria, responded well to low-dose steroid treatment.

CASE REPORT

An 18 year old female presented in OPD with the complaint of progressive increasing swelling all over body for 2 months. There is no significant history of fever, rashes, arthralgia, and hematuria. There is no pertinent family history of diabetes mellitus, hypertension (HTN), rheumatoid arthritis, and obvious occupational history.

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On examination, patient was 160 cm tall, weight 48 kg, and body mass index 18.7 kg/m^2. Vitals were within the normal limits and no obvious physical findings and source of infection.

Laboratory investigation suggestive of hemoglobin 12.0 g/dl, total leukocyte count (TLC) 5300 ($P_{50,}$ L_{42} M_6 E_2), liver function test, and coagulation profile were normal, blood urea was 18 and serum creatinine 0.4, 24 h, urinary protein was 2700 mg/day, serum total protein was 4.0 gm/dl, and albumin was 1.6 g/dl at presentation.

Viral markers, including HIV, hepatitis B surface antigen, and anti-hepatitis C virus, were negative, antinuclear antibody negative, double strandedDNA negative, and rheumatoid factor (RAF) negative. Ultrasound abdomen for the kidney was normal.

On the D5 of admission, ultrasound-guided percutaneous renal biopsy was performed [Figure 1]. Light microscopy reveals 17 glomeruli, all of which were morphologically unremarkable, no definitive lesion of segmental sclerosis, no collapsing pattern of glomerular injury, no mesangial, endocapillary or extracapillary proliferation seen, and no any necrotising lesion found. No tubular atrophy or interstitial fibrosis seen and no acute tubular injury or interstitial inflammation noted. Vascular compartment showed no arteriolar hyalinosis. No vasculitis or thrombotic microangiopathy identified.

Direct imunofluorescence highlights protein absorption droplets in tubules (albumin ×400). 3+ mesangial positivity is seen with immunoglobulin (IgG) and C1q consistent with C1q nephropathy (×400) [Figure 2a-c].

Electron microscopy showed mild effacement of foot process [Figure 3].

We started treatment on prednisolone 50 mg/day after getting renal biopsy report and patient was discharged with advise of close follow-up and daily urine dipstix for protein estimation and charting. Just after 4 days, patient presented to us with fever, shortness of breath, and anasarca. Patient readmitted and investigated. There was moderate pleural effusion on X-ray chest and hypoalbuminemia. Decongestive therapy started with diuretics, IV albumin, and managed accordingly to her general condition. We also suspected the reason of presentation was due to underlying disease and patient did not tolerate on prednisolone therapy as well that we had started. In view of chest infection and intolerance to full dose of prednisolone therapy, dose of prednisolone tapered to 20 mg/day. Patient recovered well on conservative management.

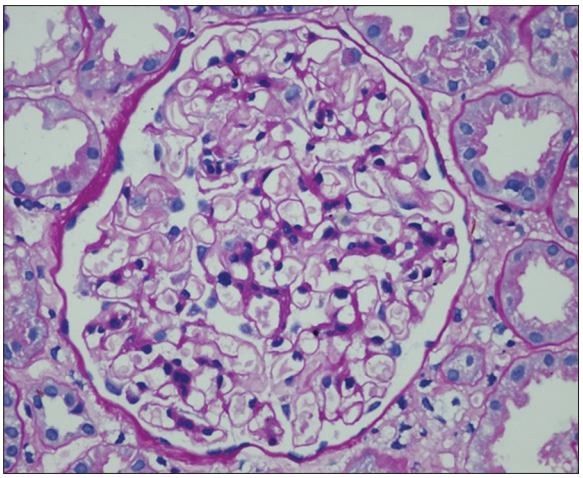

Figure 1: (LM × 400) - Periodic acid–Schiff

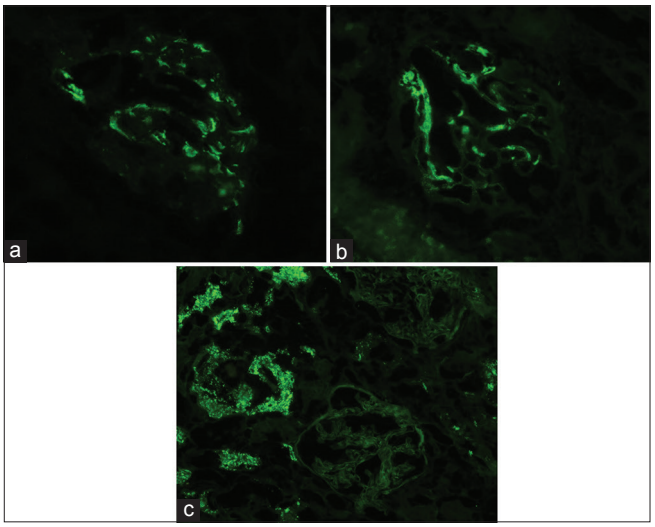

Figure 2: (a) (imunofluorescence × 400) - with C1q, (b) (imunofluorescence × 400) - with immunoglobulin, (c) (imunofluorescence × 400) - with albumin

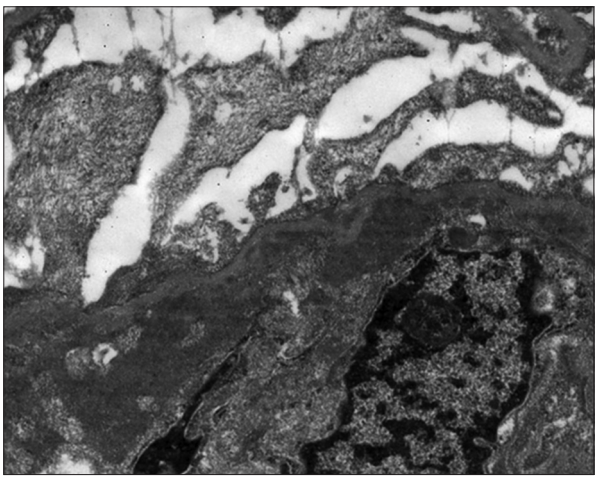

Figure 3: Electron microscopy

There is no evidence effectiveness of low-dose steroid therapy, but the dose of prednisolone was reduced to 20 mg/day and maintained according to clinical response.

Patient showed improvement with the start of treatment and was discharge on D7 on low-dose steroid of 20 mg/day. Patient kept on treatment with same dose of steroid and there was significant improvement in the degree of proteinuria on successive follow-up. After 6 months, we further tapered the dose of steroid to 15 mg and further to 10 mg.

At the time of reporting, patient is under follow-up for >1 year (1 year 3 months) with no any single episode of relapse in between the treatment she started with. Initial 6 months on prednisolone dose 20 mg/day then 10 mg/day till date. At this stage, we are in dilemma whether to decrease the dose of steroid further and when to stop the therapy or should she should be continued on low dose of steroid therapy, as we do not have a definite treatment guideline and due to the paucity of adequate literature related to C1q nephropathy patients who are sensitive to the treatment and specifically low-dose steroid therapy.

DISCUSSION

C1q nephropathy is an uncommon glomerular disease characterized by dominant or codominant mesangial staining with C1q, usually with IgGs, in the absence of clinical or laboratory evidence of SLE. The prevalence of C1q nephropathy is 0.21%–2.5%,[1,2] in biopsies from children and young adults and from 2.1% to 9.2%[7,8] in pediatric biopsies. The disease mostly presented in older children and young adults with an average age of presentation is 19.6 years.[9] The most common presentation of proteinuria or nephrotic syndrome, resistant to steroid. Sometimes, unusual presentation of hematuria, HTN, or renal insufficiency may also present. C1q nephropathy may be primary or secondary. Primary C1q nephropathy divide into, minimal change disease (MCD)/focal segmental glomerulosclerosis (FSGS), and immune complex glomerulonephritis, whereas secondary C1q nephropathy may be seen in patients with viral infections, diabetes,[10] and rarely with rheumatoid arthritis.

The management of C1q nephropathy involves treatment of underlying microscopic lesions. Glucocorticosteroid is the cornerstone treatment,[11] but previous studies indicate poor response to the therapy. Pediatric C1q nephropathy with MCD features respond well to steroid but may have higher incidences of frequent relapses, cases with FSGS-like features treated with steroid has poor response not unlike primary FSGS. No clinic-pathological relationship regarding responsiveness to treatment with different stains or pattern Pulsed methylprednisolone therapy and other immunosuppressant such as cyclophosphamide, azathioprine, cyclosporine, and mycophenolate either separately or with steroid are reserved for steroid resistant cases.

Category of the patient who responded well on steroid therapy to be classified (correlation with age, gender, presentation, histopathological findings, etc.). Treatment guideline is also necessary related to proper dose and duration of therapy in such class of patients. Patients who fortunately respond on low dose steroid should be identified since beginning of therapy in view of immediate and long-term side effects of steroid.

CONCLUSION

C1 q nephropathy is a distinct clinical entity of glomerulonephritis. Some authors suggest it as a combination of diseases rather than single entity including spectrum of MCD and FSGS. Corticosteroid is the first-line treatment. Although many of the patients are resistant to therapy, but our patient responded well, even to the low-dose prednisolone therapy which favors that a complete course of steroid (either full dose or low dose, according to tolerance of the patient) should be tried before switching to other immunosuppressive therapy or pulsed methylprednisolone.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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