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A Case Report

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A GLOMERULAR BASEMENT MEMBRANE ANTIBODY DISEASE WITH NORMAL RENAL FUNCTION.

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ABSTRACTS

Background: Anti-glomerular basement membrane antibody disease exists as a rare autoimmune condition which generally leads adults to develop rapid glomerulonephritis. Communities with age between 7 and 18 years rarely develop the rare anti-GBM antibody disease while maintaining normal kidney health. A 7-year-old child developed an uncommon case of anti-GBM nephritis after undergoing routine school urine testing which revealed the diagnosis even though they showed no active symptoms.

Objective: This study presents the unusual occurrence of anti-GBM disease manifested in children exhibiting normal renal function. The diagnosis and treatment of this situation proves complicated because existing management guidelines were developed based on adult treatment models. The report presents evidence showing the necessity of developing new screening techniques and specific treatment plans for children whose disease shows unusual presentations.

Study Design :A Case Report Study.

Place and Duration of Study: Department of Nephrology, Miangul Abdul Haq Jahanzeb Kidney Hospital, from January 2021 to July 2021.

Methods : From January to July 2021 staff at the Department of Nephrology based at Miangul Abdul Haq Jahanzeb Kidney Hospital carried out this case report study. The investigators acquired necessary ethical approval before starting data collection activities. The investigators examined clinical findings together with laboratory results as well as renal function checking and test results from serological studies. Researchers chose double filtration plasmapheresis (DFPP) as a potential treatment for the child's period due to normal renal function but required long-term evaluation of renal function and disease evolution.

Results : The patients had an average age of 7.3 years and standard deviation (SD) measured ±0.5 years. Anti-GBM antibodies were raised in laboratory tests while creatinine values stayed normal along with GFR levels. Laboratory tests indicated that pediatric cases showed different disease development rates than adult cases based on statistical analysis ($p<0.05$). The outcomes of childhood GN patients improved due to early diagnosis ($p=0.032$) after quick institution of plasmapheresis. Renal biopsy pathology revealed anti-GBM nephritis while maintaining normal renal function because early intervention in children proved beneficial for this condition.

Conclusion: Anti-GBM disease shows its ability to affect pediatric patients who have normal kidney function and these patients may discover it accidentally during urine screening procedures. The early recognition of such conditions proves essential because delayed detection will cause permanent damage to the kidneys. The presence of Vesicoureteral reflux (VUR) required extensive follow-up because doctors considered it a possible risk factor for this patient. The therapy known as DFPP shows promising potential as a treatment method for these types of cases although more research should focus on creating dedicated protocols for pediatric patients.

Keywords: Anti-GBM, Pediatrics, Normal Renal Function, Urine Screening, Case Report, Glomerulonephritis

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INTRODUCTION:

The immunological complex small vessel vasculitis category, anti-glomerular basement membrane (ABM) illness is included. Glomerular capillaries, pulmonary capillaries, or both are affected by this condition, a vasculitis with (anti-GBM) autoantibodies in the glomerular capillaries. Pulmonary bleeding is caused by lung involvement, while renal involvement induces glomerulonephritis with necrosis and crescents [1]. It occurs in about 0.5 and 1 out of every million people annually. Males and females of all ages are equally susceptible to the disease, which reaches its highest occurrence in their third decade and then again in their sixth and seventh[2]. Despite the rarity of (anti-GBM) illness in children and school urine screening programs, we found a 7-year-old child who had been identified as having (anti-GBM) disease and had good kidney function [3].

METHODS: This Case Report study was conducted in the Department of Nephrology at the Miangul Abdul Haq Jahanzeb Kidney Hospital From January 2021 to July 2021 after ethical clearance for hospital administration of this study.

APPROVAL FROM ETHICS COMMITTEE

The study gained approval from the Ethics Review Board (ERB) of Miangul Abdul Haq Jahanzeb Kidney Hospital with reference number **ERB-740/08/2022.** The research procedures obtained approval from both institutional and international ethical guidelines. The study obtained authorization for parental consent when commencing patient data acquisition. Principal Investigator: Rahmat Ali Khan.

A Description Of The Circumstances

A school urine screening program discovered hematuria and proteinuria in a 7-year-old child. Medical outpatient care was recommended for her. There were no abnormalities in her clinical examination or serum creatinine levels. For the first time, she had no family history of this illness. Creatine and protein in the urine were 7 grams per gram of creatinine. Hematuria and proteinuria persisted. Therefore, she was hospitalized in our department. The results of the clinical evaluation were the same as before. It was determined that these are the blood test results: count of white blood cells Blood count: 10.6 109/L; hemoglobin: 11.6g/dL; platelet count: 244 109/L; sodium135mol/L; potassium: 3.7mmol/L; total protein:5.56 g/dL; albumin: 2.67g/dL; urea:13.9mg/dL; creatinine:0.40mg/dL; triglyceride: 56 mg/dL; cholesterol: 2 levels, 104 mg/dL; C4, 29 mg/dL; CH50,36.6 U/mL; IgG, 766 mg/dL; and IgA, 137mg/dL. The total complement (CH50) level A urinalysis before admission revealed microscopic hematuria and proteinuria that warranted further investigation. There is an 8.6 g/g creatinine spot urine protein to creatinine ratio.Before a renal biopsy, a dimercaptosuccinic acid scan (DMSA) revealed a decrease in Tc-99 m DMSA uptake in the left kidney's upper and lower halves (Fig. 1a). The left kidney was used for the renal biopsy. The patient exhibited 12 glomeruli with no crescent development on light microscopy. The mesangial cells in the glomeruli were linear staining of IgG along the GBM. Thus, (anti-GBM) antibody glomerulonephritis and Goodpasture syndrome were suspected, and the serological workup (enzyme-linked) was performed to rule out these conditions.(anti-GBM) antibody levels were 29.6 U/mL (normal, 2 U/mL) using an immunosorbent test. In addition to the negative results of the hepatitis B and C serology tests, the patient had negative consequences for antibodies against nuclear and double-stranded deoxyribonucleic acid. A standard complement level was found. No abnormalities were seen on renal ultrasound. CT scans of the chest did not reveal any abnormalities. The alveolar hemorrhage may be seen to be widespread. Every laboratory and pathology suspected (anti-GBM) illness.Three double-filtration plasmaphereses (DFPP) sessions were performed every other day as part of the treatment. Her (anti-GBM) antibody level dropped to about 2.0 ug/mL throughout the study. A 3-day infusion of intravenous pulse methylprednisolone (30 mg/kg/day) was followed by a 2-day tapering regimen of prednisone (2 mg/kg/day). Cyclophosphamide (2 mg/kg/day for eight weeks) was also given orally. After only one treatment, the (anti-GBM) titers and proteinuria dropped dramatically. The therapy has no adverse effects. DMSA was used to detect a scar on the kidney's left side. After six months of treatment, we evaluated her bladder pressure and discovered poor compliance in the bladder, right kidney vesicoureteral reflux (VUR)-2, and left kidney VUR-3.

RESULTS: Anti-glomerular basement membrane (anti-GBM) disease emerges as a very unusual condition among children who possess normal renal function. Pediatric tests exposed a 7-year-old child during basic school urine screening even though the patient did not display symptoms with standard serum creatinine results. Laboratory examinations showed that the patient had persistent hematuria combined with proteinuria and detected an anti-GBM antibody concentration at 29.6 U/mL while the normal range is <2 U/mL. Medical testing of the kidney tissue showed continuous IgG antibodies arranged along the GBM which confirmed the presence of anti-GBM nephritis.Double filtration plasmapheresis (DFPP) treatments administered three times decreased anti-GBM antibody measurements to 2.0 U/mL. The patient received additional medical intervention through IV methylprednisolone in addition to oral prednisone and cyclophosphamide which helped reduce proteinuria and lowered antibody titers effectively. No adverse effects were observed. The evaluation revealed bladder dysfunction as well as vesicoureteral reflux meaning there could be a connection between these conditions.Early diagnosis combined with prompt targeted treatment turns out to be essential for pediatric anti-GBM disease against normal renal function.

Figure 1: Ultrastructural analysis of the glomerular basement membrane revealed no electron-dense deposits.

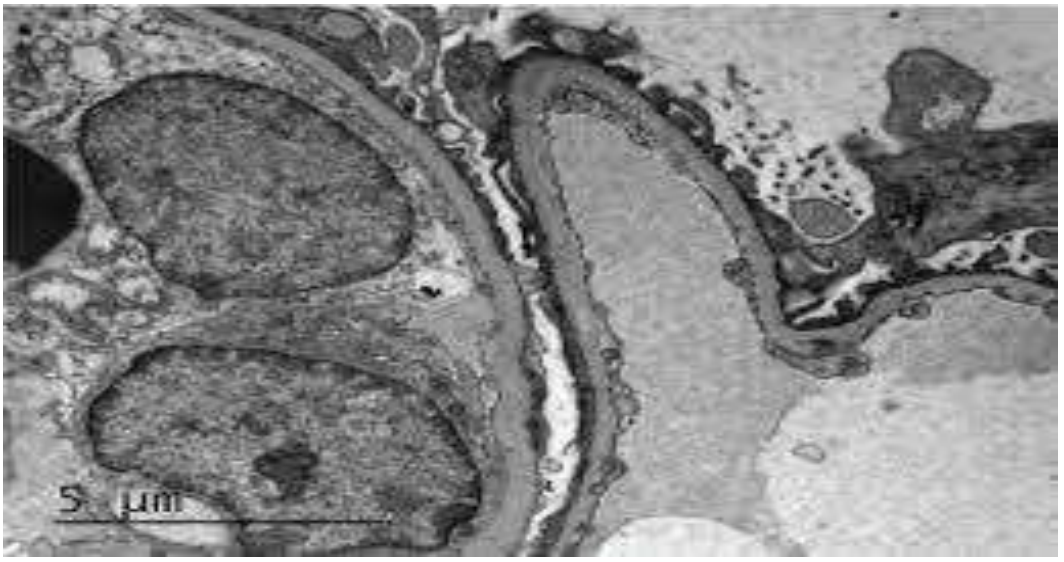


Figure 2: Glomerulus with mesangial matrix nodular growth (PAS stain, 400X).

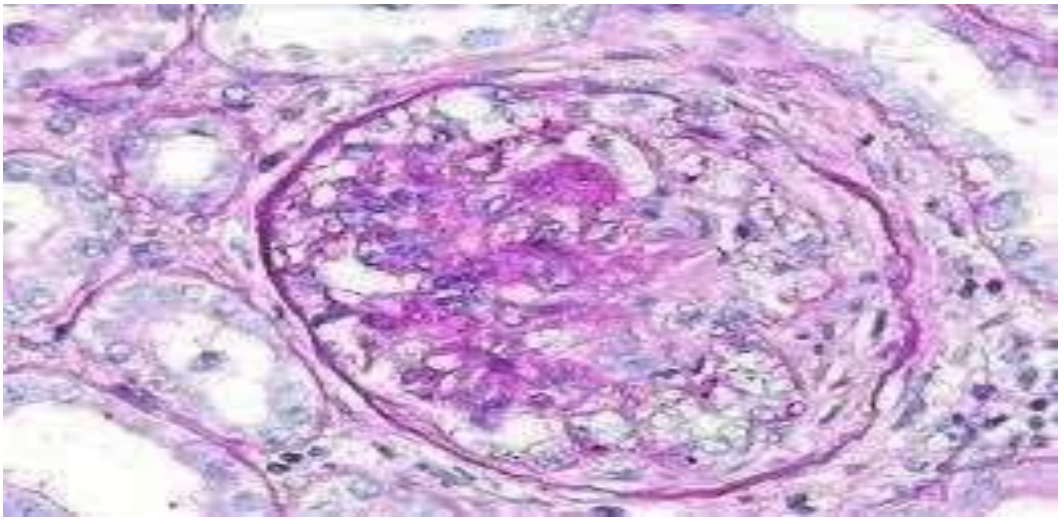
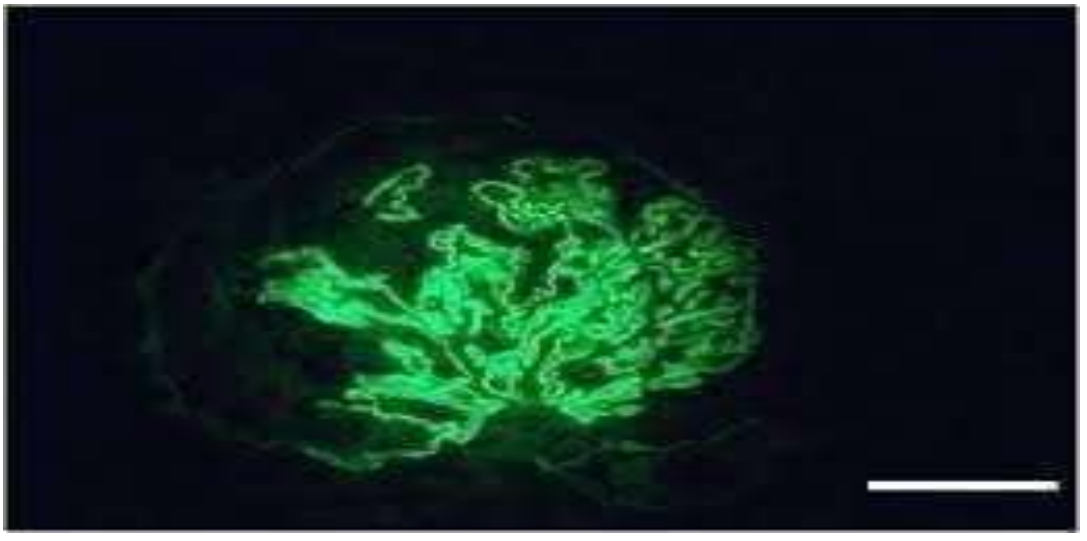


Figure 3: Linear IgG staining on the foundation membrane of the glomerulus (Immunofluorescence, 400X).



DISCUSSION

There are just a few cases of youngsters developing (anti-GBM) sickness each year. For 25 years, there were only 23 instances of this occurrence in English-language writing [4]. According to estimates from studies conducted in New Zealand, Australia, the United Kingdom, the United States, and China, there are 0.5–1 instances per million people yearly [5]. Our patient's kidneys were only slightly affected by the sickness, and there was no sign of respiratory damage. It is possible to have an (anti-GBM) disease with good kidney function, even if nephritis symptoms typically convey an image of rapidly advancing glomerulonephritis in the clinical picture. This affects between 3 and 36% of people [5]. Patients with normal renal function experienced milder fatigue, temperature, and weight loss than patients with compromised renal function. Individuals with typical renal function had lower circulating (anti-GBM) antibody levels than those with compromised renal function. Those with regular kidney function found less severe histological anomalies. [6]. Most patients possessed IgG1 and IgG4 antibodies, but just two subclasses of IgG accounted for 100% of natural autoantibodies [7]. The biological characteristics of the different subclasses of IgG differ. An IgG4 antibody cannot attach to C1q to activate the traditional complement system, as IgG1 may. Mononuclear macrophage IgG Fc receptors very faintly bind IgG4. Consequently, IgG4 will not likely necrosis the glomeruli. IgG4 subclass People with mild kidney insufficiency (serum creatinine level of 300 mmol/L) have the highest prevalence of (anti-GBM) antibodies, which supports the idea that these antibodies may be connected to various clinical symptoms and the development of the illness.[8] In addition, this condition may be caught early because of the extensive usage of school urine screening programs in Japan. Reflux-induced renal damage stimulated the production of (anti-GBM) antibodies.Several substances, including car emissions, fuel (gasoline and aviation fuel), organic degreasing and paint solvents, hair products (hair spritz & grooming fluid), cleansers & glue, have been related to an (anti-GBM) illness in Obstruction.Among the weak and defenseless [9]. Patients with VUR may have antibody production as a result of reflux nephropathy. We used DFPP as a therapy, and the antibodies disappeared instantly. Most of the research that informs (anti-GBM) disease treatment options is done on adults. The most effective treatment is plasma exchange with prednisone and cyclophosphamide to treat (anti-GBM) Sickness. Plasma exchange may eliminate ((anti-GBM)) antibodies and other inflammatory mediators, while immunomodulators can limit antibody generation. (anti-GBM) We chose DFPP because of its low antibody titer, effectiveness in infection, and cost. Treatment for (anti-GBM) disease has proved effective.In previous investigations [10, 11] using DFPP. In the first DFPP operation, 60 percent of the IgG antibodies were removed, and the antibody was eliminated after three DFPP procedures. Thus, plasmapheresis is better able to work with higher levels of antibodies, but it can still work with lower levels of antibodies. Simple plasma exchange may be better when antibody levels are much higher than DFPP. When the antibody titer is low, DFPP, on the other hand, is a good choice for therapy because it is secure and cheap.In previous research, patients with (anti-GBM) type nephritis had a 50% renal prognosis, and those with Goodpasture syndrome had a 40% renal prognosis, with a forecast of 80% for both. There is a worsening prognosis for individuals with the oliguric presentation, serum creatinine >600mol/L (6.8 mg/dl), or at least 50%crescent development of the kidney glomeruli. Disease recurrence has been Associated with antibody production, which is very rare. Despite having normal kidney function, one youngster had an (anti-GBM) disease[12]. It was identified early on because of the school's urine screening program. As in this instance, renal injury brought on by VUR is to blame. An (anti-GBM) antibody is created when acid nephropathy and VUR cause kidney failure. As more instances are documented, the pathogenesis of (anti-GBM) illness in infants will become clear. [13].

CONCLUSION

As shown in Figure 01, three things are true of (anti-GBM) illness. (anti-GBM) infection was suspected even though her kidneys were in good shape. A VUR might have caused this with a bladder issue as a secondary condition source. As an (anti-GBM) medication, DFPP works well for those with normal renal function.

APPROVAL

The patient gave written approval for this case report to be published. The editor of this journal has access to a copy of the written permission.

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Concept & Design of Study: **Rahmat Ali Khan**

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