

A Case Report Study at the Miangul Abdul Haq Jahanzeb Kidney Hospital in Swat Found Glomerular Basement Membrane Antibody Disease with Normal Renal Function.

Rahmat Ali Khan¹, Syed Munib², Mohammad Shahzad³, Mufti Baleegh⁴, Liaqat Ali⁵, Mohammad Shahid⁶

¹. Assistant Professor Nephrology, Miangul Abdul Haq Jahanzeb Kidney Hospital in Swat.

². Associate Professor Nephrology (IKD), Peshawar

^{3,4,5}. Associate Professor Urologist (IKD), Peshawar

⁴. Consultant Nephrologist Peshawar.

⁶. Consultant nephrologist dhq hospital Batkhala

Received: 21 April 2023

Accepted: 20 July 2023,

Published: 16 August 2023

Corresponding Authors: Syed Munib

Emails: munibsyed@gmail.com, Mshahid@gmail.com

Abstracts

Background: Anti-glomerular basement membrane (GBM) antibody disease is a rare autoimmune condition causing rapidly progressive glomerulonephritis, typically affecting adults. We present an unusual case of anti-GBM nephritis in a 7-year-old child, initially identified through a routine school urine screening. This young patient displayed no overt signs of renal impairment but testing revealed the atypical presence of GBM antibodies..

Objective: The purpose of this case report is to draw attention to the uncommon occurrence of anti-GBM disease in pediatric populations presenting with normal renal function. Diagnosis and management in such cases poses challenges given our understanding of anti-GBM nephritis derives mainly from adult patients. This anomaly prompts consideration of alternate screening and treatment approaches for younger patients who may manifest the disease atypically compared to older populations.

Study design: A Case Report Study.

Place and duration of study: department of nephrology at the Miangul Abdul Haq Jahanzeb Kidney Hospital From January 2021 to July 2021

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.

Results: (anti-GBM) illness in infants with intact renal function is uncommon. For this reason, professionals must carefully pick an appropriate therapy for youngsters since the prognosis is grim.

Conclusion: Figures 1 to 3 show that 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.

Keywords: Anti-GBM, Pediatrics, Normal renal function, School urine screening programmed, case report

Authors Contribution

RAK. Concept & Design of Study, SM, Drafting,

MS. Data Analysis, MB. Revisiting Critically,

LAMS, Final Approval of version

[Creative Commons License This work is licensed under a Creative Commons Attribution-Noncommercial 4.0 International License](#)

INTRODUCTION:

In 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 programmes, 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.

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 grammes per gramme 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; haemoglobin: 11.6g/dL; platelet count: 244 10⁹/L; sodium: 135mol/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, 137 mg/dL. The total complement (CH50) level A urinalysis before admission revealed microscopic hematuria and proteinuria that warranted further investigation. There was 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 proliferating. Figure 1bd shows immunofluorescence demonstrating 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 normal complement level was found. No abnormalities were seen on renal ultrasound. CT scans of the chest did not reveal any abnormalities. The alveolar haemorrhage 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-GBM) illness in infants with intact renal function is uncommon. For this reason, professionals must carefully pick an appropriate therapy for youngsters since the prognosis is grim.

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

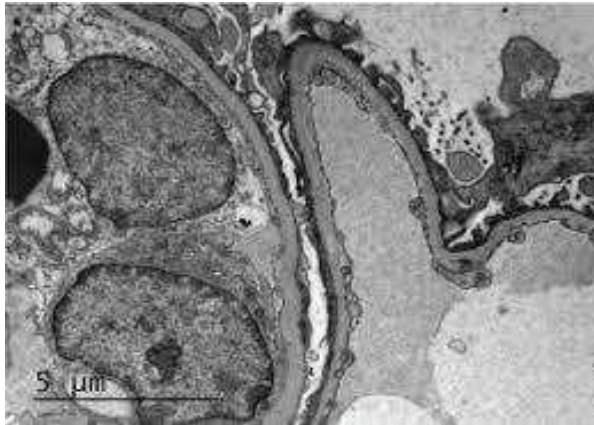


Figure 2: Glomerulus with mesangial matrix nodular growth (PAS stain, 400X).

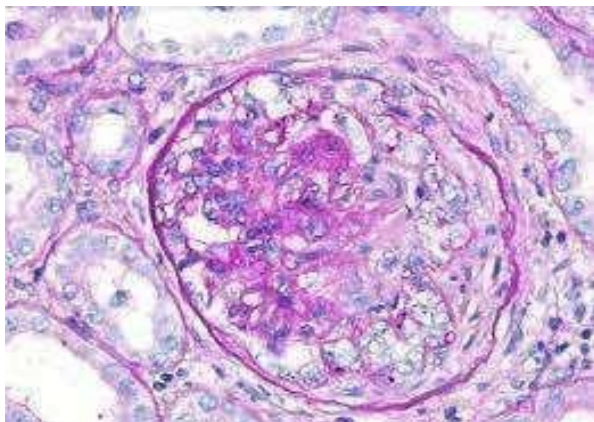
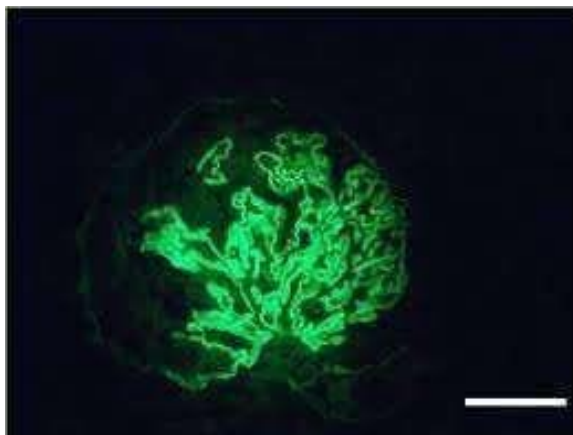


Figure 3: Linear IgG staining on the foundation membrane of the glomerulus (Immunofluorescence, 400X).



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 [2]. 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 [3, 4]. 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 serious 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. To activate the traditional complement system, an IgG4 antibody cannot attach to C1q, 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 programmes 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 adults. In some cases of (anti-GBM) illness after lithotripsy and ureteric stent placement, this condition has been associated with releasing antibodies from physically injured kidneys.

Obstruction. Among the weak and defenceless [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 per cent 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 a better option when antibody levels are very high 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 $>600\text{mol/L}$ (6.8mg/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 programme. 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 casereport to be published. The editor of this journal has access to a copy of the written permission.

ACKNOWLEDGEMENT

The Authors Are Thankful To All The Doctors And Staff Members of the Department of Nephrology And Urology for Their Support During The study.

REFERENCES

1. Hellmark T, Segelmark M. Diagnosis and classification of Goodpasture's disease (anti-GBM). *J Autoimmun.* 2014;48–49:108–12.
2. Bayat A, Kamperis K, Herlin T. Characteristics and outcome of Goodpasture's disease in children. *Clin Rheumatol.* 2012;31:1745–51.
3. Silvariño R, Noboa O, Cervera R. Anti-glomerular basement membrane antibodies. *Isr Med Assoc J.* 2014;16:727–32.
4. Salama AD, Levy JB, Lightstone L, Pusey CD. Goodpasture's disease. *Lancet.* 2001;358:917–20. Cui Z, Zhao MH, Singh AK, Wang HY. Antiglomerular basement membrane disease with normal renal function. *Kidney Int.* 2007;72:1403–8

5. Ang C, Savage J, Dawborn J, Miach P, Heale W, Clarke B, et al. Anti-glomerular basement membrane (GBM)-an antibody-mediated disease with normal renal function. *Nephrol Dial Transplant*. 1998;13:935–9.

Disclaimer: Nil

Conflict of Interest: There is no conflict of interest.

Funding Disclosure: Nil

7. Cui Z, Wang HY, Zhao MH. Natural autoantibodies against the glomerular basement membrane exist in normal human sera. *Kidney Int*. 2006;69:894–9.

8. Williamson SR, Phillips CL, Andreoli SP, Nailescu C. A 25-year experience with pediatric anti-glomerular basement membrane disease. *Pediatr Nephrol*. 2011;26:85–91.

9. Kluth DC, Rees AJ. Anti-glomerular basement membrane disease. *J Am Soc Nephrol*. 1999;10:2446–53.

10. Kumazaki S, Umeda Y, Sato K, Mishima H, Ishihara T, Uzawa T. [Double filtration plasmapheresis in case of Goodpasture's

11. Syndrome]. *Nihon Kyobu Shikkan Gakkai Zasshi*. 1990;28:628–633. [Article in Japanese]

12. Hajime N, Michiko A, Atsunori K, Tatsuo K, Yuko, Naoki O, et al. A case report of the

13. the efficiency of double filtration plasmapheresis in treating Goodpasture's syndrome. *Ther Apher Dial*. 2009;13:373–7.