Recurrent acute poststreptococcal glomerulonephritis following respiratory infections in a 6-year-old boy: a case report

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ABSTRACT

Background: Acute poststreptococcal glomerulonephritis (APSGN) pediatric disorder, usually with hematuria, hypertension, and edema following group A beta-hemolytic streptococcus. Recurrence is very rare, and only a few cases have been reported worldwide. This case highlights an unusual recurrence of APSGN in a child, underscoring the importance of long-term follow-up despite apparent recovery.

Case Presentation: A 6-year-old boy complained of macroscopic hematuria and high ASO (antistreptolysin O) titers (650 IU/ml) after a respiratory infection. He had hypocomplementemia (C3: 0.30 g/l) and mild acute kidney injury (creatinine: 64 µmol/l). Two months later, renal function returned to normal without treatment. Six months later, recurrent hematuria (ASO (antistreptolysin O): 770 IU/ml, C3: 0.6 g/l) developed after another respiratory infection. Even with recurrence, renal function was stable, and symptoms disappeared spontaneously. Kidney biopsy was delayed due to a mild clinical course.

Conclusion: This case demonstrates that recurrent APSGN, although rare, can occur after new streptococcal infections and may present with milder features. Conservative management was effective, but the report underscores the need for continued follow-up and clinical vigilance in pediatric patients even after apparent full recovery.

Keywords: Poststreptococcal glomerulonephritis, recurrent glomerulonephritis, recurrence, nephrology, case report.

Type of Article: CASE REPORT **Specialty:** Pediatrics

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Introduction

Acute poststreptococcal glomerulonephritis (APSGN) is caused by infections with group A beta-hemolytic streptococci (GABHS) [1-3]. Group A streptococcus, a common childhood pathogen, causes a wide range of diseases, including APSGN [4]. The mechanism includes antibodies reacting to streptococcal antigens, and the formation of immune complexes that deposit in the glomeruli [5]. This results in complement activation, which is commonly seen with a characteristic decrease in serum C3 levels [5,3].

The classic clinical presentation of acute APSGN is hematuria, edema, and hypertension [1,2]. APSGN typically has a good prognosis and is frequently self-limiting [1,6,7].

Recurrence of APSGN in pediatric populations is particularly rare, making such cases notable for their clinical and educational importance [8]. While the early episodes of APSGN are well-researched and generally understood, recurrences are rare and can pose difficulties for both diagnosis and treatment [8].

We present here a very rare recurrent APSGN case in a 6-year-old boy. We are presenting this case to emphasize its rarity and emphasize the crucial need for long-term follow-up despite the patient appearing to have completely recovered.

Case Presentation

A 6-year-old boy was hospitalized in July 2023 with macroscopic hematuria and acute kidney injury. According to medical records, the boy had a respiratory infection 3 weeks before admission. He had oliguria the day before his presentation to the clinic. Blood pressure was 110/60 mmHg, and there was no edema at the time of physical examination. The lung examination was clear. Skin appeared normal, and there were no other significant signs.

Laboratory tests revealed a mild acute kidney injury, with an increase in creatinine levels at 64 µmol/l (normal 35-53 µmol/l) and urea at 8.3 mmol/l (normal 2.9-6.4 mmol/l). The measurements of potassium and sodium are normal.

Table 1. Timeline and clinical summary of APSGN episodes.

FEATURE	FIRST EPISODE (JULY 2023)	SECOND EPISODE (JANUARY 2024)
Infection triggered APSGN	Upper respiratory infection (June 2023)	Upper respiratory infection (December 2023)
Antibiotic use	None	None
Symptoms	Macroscopic hematuria, Oliguria	Macroscopic hematuria, Dysuria
ASO titer	650 IU/ml	770 IU/ml
C3 level	0.30 g/l	0.60 g/l
Serum creatinine	64 µmol/l (elevated)	Normal
Management	Supportive care	Supportive care
Outcome & follow-up	Hematuria resolved in 11 days. C3 and creatinine normalized at 2-month follow-up.	Symptoms resolved spontaneously. C3 and renal function normalized on subsequent follow-up.

Evidence of a preceding streptococcal infection was confirmed by the levels of ASO (antistreptolysin O), which increased to 650 IU/ml (normal <200). The complement component C3 was low at 0.30 g/l (normal 0,83–1,93 g/l). C4, antinuclear antibodies, and immunoglobulin A levels were normal. The analysis of urine samples revealed 20 fresh red blood cells, numerous dysmorphic red blood cells, and 40 white blood cells. Renal ultrasonography was normal. Urine culture was sterile.

The patient was managed supportively with close monitoring of his fluid and blood pressures. His gross hematuria resolved spontaneously in 11 days. He was sent home with outpatient follow-up plans. At a 2-month follow-up appointment, his serum creatinine and C3 levels were normal again, confirming the remission of an initial APSGN attack.

In December 2023, the patient developed a recurring upper respiratory tract infection. Once again, he was not subjected to any antibiotic treatment. After 3 weeks in January 2024, he came to the clinic with dysuria and reappearance of dark brown, macroscopic hematuria (Table 1).

Repeat laboratory testing was done, showing an again elevated ASO (antistreptolysin O) titer of 770 IU/ml and a low C3 level of 0.6 g/l. However, on this occasion, his renal function remained intact with normal serum creatinine and urea levels. The urine protein-to-creatinine ratio was slightly elevated at 0.45 mg/mg. Urinalysis also indicated hematuria with 20 dysmorphic erythrocytes and 20 leukocytes per high power field.

A kidney biopsy was not performed due to the mild recurring symptoms. His management remained conservative. Although no new complications developed, continued observation was required. Clinical and laboratory findings, including normalization of complement level, confirmed the diagnosis [3]. The patient's health improved with supportive care alone, suggesting that the management was effective in the recurrent episode. Potential complications were considered, but none developed [1]. For example, hypertension and chronic kidney disease did not occur.

Discussion

This report outlines a unique case of recurrent APSGN in a child, with several valuable clinical insights. While APSGN is a common childhood disease, its recurrence is very unusual, with less than 10 well-documented cases in the literature [8]. The case illustrates an essential teaching point: a history of APSGN is not protective, and the physician should consider the diagnosis in a patient with recurrent hematuria following a new streptococcal infection, even after a previous, fully resolved attack.

The pathogenesis of recurrence of APSGN remains uncertain, but most likely is due to re-exposure to a nephritogenic strain of GABHS, as evidenced by the rising ASO (antistreptolysin O) titers before both episodes in our patient [7,8]. Another, though less likely, mechanism could be a latent immune response or re-activation of the original immune complexes with a new immunological stimulus [8]. The very low C3 levels in both episodes are also classic and are confirmatory of the recurrence of the immune-complex mediated process [5].

One very significant teaching point from this case is the reinforcement of a conservative management approach to mild, recurrent APSGN. Despite the recurrence, the renal function in our patient remained normal, and his symptoms resolved spontaneously without any antibiotic or steroid treatment. This is as per recent guidelines against renal biopsy in children with a classical clinical course and preserved renal function [9]. The case demonstrates here that in uncomplicated recurrences, biopsy may be safely deferred, thus preventing an invasive procedure.

Comparison with other isolated case reports of recurrent APSGN reveals that the presentation in our patient fits into a pattern of milder clinical course in recurrence [8]. The first attack has a more nephritic presentation with hypertension and renal dysfunction, while recurrences may at times present with hematuria and hypocomplementemia alone without a significant decrease in renal function. This would mean that renal injury in recurrence may be less severe, but the fundamental inflammatory process remains identical.

Finally, this case highlights the utmost importance of long-term follow-up and patient education. Parents and the primary care physician must be counseled about the minimal but certain risk of recurrence. They must be educated to seek early medical attention for the future onset of hematuria or symptoms of streptococcal infection to allow early diagnosis and monitoring, even if the outcome had otherwise been excellent in the past.

In conclusion, while recurrence of APSGN is rare, it is a clinically relevant event. This case reiterates that it can follow a new infection, present in a milder form, and can be managed successfully with supportive therapy and close monitoring, emphasizing the need for ongoing follow-up of such patients.

Conclusion

This case report presents a rare case of recurrent APSGN (APSGN) in a pediatric patient who developed a respiratory infection. The patient had a good prognosis, and renal function remained unaffected despite the recurrence.

This case emphasizes a valuable clinical lesson: with apparent complete recovery from APSGN, follow-up and monitoring over the long term are required, as recurrence, though rare, can occur. APSGN should be considered in the differential diagnosis of a child with recurrent hematuria and exposure to a new streptococcus, even in the absence of previous severe symptoms.

What is new

This case emphasizes that acute APSGN, though usually an isolated occurrence, can in rare instances recur in children following a new infection. It illustrates that recurrent attacks may be mild and self-limited, treated effectively with observation alone and not by invasive means. This underlines the necessity for continued clinical awareness and patient education despite initial improvement.

Acknowledgment

None.

List of abbreviations

APSGN	acute poststreptococcal glomerulonephritis
ASO	antistreptolysin O
GABHS	group A beta-hemolytic streptococci

Conflict of interests

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Consent for publication

Due permission was obtained from the parents of the patient to publish the case.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Summary of the case

CATEGORY	SUMMARY
1. Patient	Male, 6 years old
2. Final diagnosis	Recurrent acute poststreptococcal glomerulonephritis (APSGN)
3. Symptoms	Macroscopic hematuria, oliguria (first episode); macroscopic hematuria, dysuria (second episode)
4. Medications	None (supportive care only)
5. Clinical procedure	Conservative management and monitoring; renal biopsy was not performed.
6. Specialty	Nephrology