

ORIGINAL PAPER

The impact of the COVID-19 pandemic on the incidence and clinical course of acute post-streptococcal glomerulonephritis in children – single-centre experience

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ABSTRACT

Introduction: During the SARS-CoV-2 pandemic, a decrease in acute post-streptococcal glomerulonephritis (APSGN) cases was observed; however, as the pandemic subsided, reports of an increased number of diagnosed APSGN cases in the paediatric population emerged. The aim of our study was to compare the number of cases and the patient profile diagnosed with acute post-streptococcal glomerulonephritis in our centre before and after the COVID-19 pandemic.

Material and methods: A retrospective study included 47 patients (21 females, 26 males) diagnosed with APSGN, hospitalised in our centre between 2013–2023. The parameters were compared between the group of patients diagnosed before and after the pandemic. Age at day of diagnosis, history of previous possible streptococcal infection, antistreptolysin O (ASO), C3, epidermal growth factor receptor levels at admission, the presence of the features of nephritic syndrome, the need for pharmacological treatment, and renal replacement therapy were analysed. Additionally, anthropometric measurements the C4 complement component were determined.

Results: From 2013 to 2022, the average number of diagnosed APSGN cases per year was 3.67, increasing to 7 cases per year since 2022. A statistically significant difference in ASO level values at admission was observed between patients diagnosed with post-streptococcal glomerulonephritis before the pandemic (767 IU/ml) compared to those diagnosed after the pandemic (1362 IU/ml). No other statistically significant differences were found in the patient profile analysis.

Conclusions: During the COVID-19 pandemic, no cases of APSGN were observed in our centre, probably due to the implemented personal protective measures and population isolation. After the COVID-19 pandemic, there was an increase in APSGN cases among children. The patient profile with diagnosis before and after the pandemic in terms of most parameters does not differ. The only significant difference was observed in ASO levels, which were higher in patients diagnosed after the pandemic compared to those diagnosed before the pandemic. Further research is needed.

KEY WORDS:

acute post-streptococcal glomerulonephritis (APSGN), Group A Streptococcus, post-pandemic COVID-19 infections.

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INTRODUCTION

Acute post-streptococcal glomerulonephritis (APSGN) is a kidney glomerular disease that develops due to the presence of immunologic complexes formed after infection with nephritogenic strains of β -haemolytic Group A *Streptococcus* (GAS), and less commonly, Group C or G *Streptococci* [1–3]. The incidence of APSGN has significantly decreased over the years, particularly in developed countries [4]. However, in recent years, during the post-COVID-19 pandemic period, an increasing number of cases of APSGN were reported. The clinical manifestation of APSGN is usually mild with a favourable prognosis, but acute glomerulonephritis (AGN) caused by streptococcal infection remains one of the main causes of acute kidney injury (AKI) [4–6]. Long-term observation has shown that even a single episode of APSGN in childhood is a strong risk factor for chronic kidney disease (CKD) and end-stage renal disease in adulthood [4]. There is no doubt, therefore, that APSGN is one of the serious disease entities posing a significant challenge for medical staff and requiring an interdisciplinary approach to ensure adequate quality of care for the patient. Acute post-streptococcal glomerulonephritis most commonly precedes streptococcal pharyngitis or skin infection (pyoderma). Classic development of the disease occurs within 1–2 weeks after throat infection or up to 6 weeks after skin infection [7]. While APSGN is considered one of the most common forms of AGN, it is important to remember that kidney glomerular damage can be triggered by infection with many other microorganisms [2].

The COVID-19 pandemic period has been associated with a long-term avoidance of microorganisms because of social isolation, and widespread use of personal protective measures such as face masks and antibacterial agents. In the last 2 years in our centre we observed a noticeably higher incidence of glomerular diseases including APSGN. This extraordinary situation prompted us to ask the question: how has the incidence and clinical course of APSGN in children changed during the COVID-19 pandemic compared to previous years?

EPIDEMIOLOGY

Acute post-streptococcal glomerulonephritis most commonly affects children aged 3–12 years [8] and is twice as common in boys as in girls [3, 5, 9]. In adults, the disease is less frequent (adults represent 10% of all APSGN cases), occurring most often after the age of 60 years [2]. In an almost half of children with APSGN symptoms, a reduced amount of urine is noted at presentation [4, 10, 11]. Over the past 3 decades there has been a gradual decrease in APSGN cases compared to previous years. This decline in incidence is associated with improved sanitary conditions, development of medical care, and rapid recognition and effective treatment (increased availability of antibi-

otics) of streptococcal infections in developed countries [1, 4, 10], unlike in the Middle East and Africa. The global scale of APSGN accounts for 472,000 cases annually, with 77% originating from low socioeconomic status countries [8]. In developing countries, the incidence of new APSGN cases ranges 8.5–28.5 per 100,000 annually, with approximately 97% of cases occurring in low-income countries [7]. This is mainly due to limited access to medical care and treatment. Acute post-streptococcal glomerulonephritis can also occur in the form of epidemic outbreaks. Reports of epidemics preceded by streptococcal pharyngitis and skin infections come from various parts of the world, mainly rural populations, such as the Indian Lake Reservation in Minnesota, Venezuela, Kuwait, and New Zealand [1, 9, 12, 13]. During the COVID-19 pandemic (2020–2021), the incidence of Group A streptococcal infections significantly decreased, probably as a result of the implemented personal protective measures and widespread isolation [14]. However, since 2022, we have been observing a steady increase in GAS infections, often with severe, invasive, or atypical courses. It is suspected that this is a consequence of reduced exposure to *Streptococcus pyogenes* during the COVID-19 pandemic, decreased development of immunity to this pathogen, and consequently increased susceptibility to severe infection [15]. Additionally, the increase in infections caused by other pathogens (especially viruses) observed since 2022 favours secondary bacterial infections. There is also a hypothesis proposing the possible evolution of more pathogenic types of GAS and the potential emergence of new GAS variants [16]. As a result of these epidemiological changes, there is also an increase in the number of APSGN cases. Unfortunately, estimating the true occurrence of post-streptococcal glomerulonephritis is difficult because most cases are subclinical and transient.

SYMPTOMS RELATED TO KIDNEYS

The course of APSGN can vary from asymptomatic or minimally symptomatic to rapidly progressive glomerulonephritis leading to AKI requiring renal replacement therapy [2]. Symptoms and signs can be divided into stages. Characteristic symptoms of the fully symptomatic APSGN include overt haematuria (up to 70% of cases), proteinuria (most commonly non-nephrotic), leukocyturia, oedema, arterial hypertension, and impaired kidney function (to varying degrees) [1, 5, 7, 9]. Urine in this case may appear red or brown resembling “meat washings” [9]. In 1–3% of cases, postinfectious GN evolves to rapidly progressive glomerulonephritis (RPGN), which often requires renal replacement therapy [17]. To establish the diagnosis, helpful tests include determination of antistreptolysin O titre (ASO titre), which shows increasing antibody titres, and complement component levels – due to activation of the alternative pathway of complement, there is consumption of C3 component with normal C4

component levels (classical pathway) [2, 3]. Additionally, rapid strep A tests from the throat can also be utilised.

AIM

The aim of our study was to compare the number of cases, patient profiles, and course of the disease in children diagnosed with acute post-streptococcal glomerulonephritis in our centre before and after the COVID-19 pandemic, as well as to identify potential differences between patient groups.

MATERIAL AND METHODS

The retrospective analysis included the data on 47 patients treated in the Paediatric Nephrology Department with Dialysis Division, Independent Public Clinical Hospital in Zabrze due to diagnosed APSGN between 2013–2023 (Figure 1). The first confirmed case of COVID-19 in Poland dates to 4 March 2020. To systematise the pre- and post-pandemic period, the beginning of 2022 was taken as the cutoff point. Age at diagnosis, duration of hospitalisation, history of previous throat infection, complement C3 concentration, epidermal growth factor receptor (eGFR) at admission, AKI course, the need for antibiotics, immunosuppressive treatment, and the need for renal replacement therapy were analysed. Anthropometric measurements, blood pressure, haematuria, and proteinuria were also considered.

The inclusion criteria for the study were: patients aged 1–18 years and a diagnosis of APSGN based on the fulfilment, in a child with nephritic syndrome, of 2 out of 3 conditions, which included a positive history of streptococcal infection, elevated ASO levels, and decreased C3 levels. Exclusion criteria considered the presence of previously diagnosed CKD or other significant chronic illness that could aggravate the clinical course of APSGN and made the diagnosis ambiguous.

STATISTICAL ANALYSIS

For qualitative data analysis, due to the small sample size, the χ^2 test with Yates' correction was used. For variables with normal distribution (body mass index, systolic arterial pressure, diastolic arterial pressure), we used Student's *t*-test. We used the non-parametrical Mann-Whitney *U* test for variables not meeting the normal distribution criteria. Statistical significance was set at $p < 0.05$.

RESULTS

Characteristics of the study group with anthropometric data are presented in Table 1. A comparison of qualitative and quantitative parameters in patient groups diagnosed before and after the COVID-19 pandemic are shown, respectively, in Tables 2 and 3.

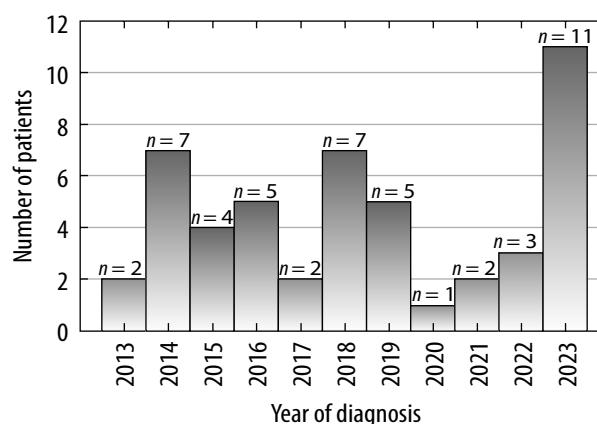


FIGURE 1. Number of patients diagnosed with acute post-streptococcal glomerulonephritis per years 2013–2023

Forty-seven patients were observed, among whom 21 (45%) were girls and 26 (55%) were boys. From 2013 to 2020, 33 cases of APSGN were diagnosed, accounting for 70% of the children in the study, while in 2022–2023, APSGN was diagnosed in 14 children, accounting for 30% of all cases over a 10-year observation period. From 4 March 2020 until November 2022, no cases of APSGN were treated. In the 9-year period before 2022, an average of 3.67 cases were diagnosed annually, whereas from 2022 onwards, this number increased to 7 cases per year. In search of reasons for such a large change, an analysis of differences between the pre-pandemic diagnosis group and the post-pandemic diagnosis group was conducted. In the analysis, compared to 86% of the total, only 7 patients (14%) did not report a previous throat infection in their clinical history. Elevated levels of ASO above the reference norm at admission were present in all subjects, with a median value of 790 IU/ml (Q1, Q3 = 543; 1350), while decreased C3 complement component was observed in 82% of patients, with a median value of 0.32 g/l (Q1, Q3 = 0.2; 0.78). Among the studied parameters ASO and C3, which are also components of the inclusion criteria for the study, only the ASO levels at admission showed a statistically significant difference between the group of patients with confirmed APSGN before the pandemic and those after the pandemic. The antistreptolysin O levels at admission for patients with APSGN before the pandemic averaged 767 IU/ml, whereas post-pandemic levels averaged 1362 IU/ml. Antistreptolysin O levels at discharge and the length of hospital stay were also examined; however, no statistically significant differences were found in these cases.

During the course of APSGN, AKI occurred in 9 patients (18%), of whom 7 (78%) were before and 2 (22%) were after the pandemic. Only one patient from the post-pandemic group required dialysis therapy. Antibiotic therapy was applied in 45 patients (96%). Glucocorticoid therapy was administered to 3 patients (6%), with 2 patients receiving it after the pandemic and one patient before the pandemic. Proteinuria was observed in 61% of patients in the pre-pandemic group and 79% in

TABLE 1. Characteristics of the group – selected anthropometric parameters upon admission to the ward

Parameters	Children with acute poststreptococcal glomerulonephritis			
	Whole group, <i>n</i> = 47	Before the pandemic, <i>n</i> = 33	After the pandemic, <i>n</i> = 14	Student's <i>t</i> -test/ Mann-Whitney <i>U</i> test
Age (years)	6.8 ± 2.6 (3–17.5)	6.24 ± 1.98 (3–11)	7.68 ± 3.4 (4.5–17.5)	<i>U</i> = 182.00, <i>z</i> = −1.13, <i>p</i> > 0.05
Height [cm]	119.91 ± 14.85 (87–173)	117.44 ± 12.64 (87–142)	125.75 ± 18.29 (107.5–173.0)	<i>U</i> = 178.50, <i>z</i> = −1.21, <i>p</i> > 0.05
SDS for height	1.08 ± 2.18 (−2.67 to 7.24)	0.99 ± 2.30 (−2.67 to 7.24)	1.29 ± 1.93 (−1.85 to 5.89)	<i>U</i> = 186.50, <i>z</i> = −1.02, <i>p</i> > 0.05
Height (%)	45.89 ± 30.93 (2–97)	47.18 ± 31.05 (2–96)	42.86 ± 31.60 (3–97)	<i>U</i> = 217.50, <i>z</i> = 0.30, <i>p</i> > 0.05
BW [kg]	24.31 ± 9.21 (10.5–63.2)	22.72 ± 7 (10.5–42.2)	28.4 ± 12.56 (15.3–63.2)	<i>U</i> = 171.00, <i>z</i> = −1.38, <i>p</i> > 0.05
SDS for BW	1.07 ± 2.18 (−2.76 to 7.24)	0.98 ± 2.30 (−2.76 to 7.24)	1.29 ± 1.93 (−1.85 to 5.89)	<i>U</i> = 185.00, <i>z</i> = −1.06, <i>p</i> > 0.05
BW (%)	47.62 ± 31.22 (2–100)	46.52 ± 31.72 (2–100)	50.21 ± 31.03 (3–97)	<i>U</i> = 216.00, <i>z</i> = −0.34, <i>p</i> > 0.05
BMI [kg/m ²]	16.36 ± 2.47 (11.72–22.81)	16.11 ± 2.55 (11.72–22.81)	16.95 ± 2.26 (13.24–21.12)	<i>t</i> (45) = −0.52, <i>p</i> > 0.05
BMI (%)	51.62 ± 29.22 (3–100)	50.03 ± 30.55 (3–100)	55.36 ± 26.50 (3–93)	<i>U</i> = 204.50, <i>z</i> = −0.61, <i>p</i> > 0.05
SYS [mm Hg]	114.77 ± 12.51 (90–143)*	113.56 ± 11.87 (90–143)**	118.88 ± 14.54 (94–142)***	<i>t</i> (33) = −1.06, <i>p</i> > 0.05
SYS (%)	70.43 ± 30.88 (10–95)*	69.26 ± 30.05 (10–95)**	74.38 ± 35.40 (10–95)***	<i>U</i> = 80.50, <i>z</i> = −1.09, <i>p</i> > 0.05
DIA [mm Hg]	70.94 ± 11.94 (45–94)*	69.19 ± 11.38 (45–94)**	76.88 ± 13.39 (53–90)***	<i>t</i> (33) = −1.61, <i>p</i> > 0.05
DIA (%)	70.43 ± 27.56 (10–95)*	69.44 ± 27.22 (10–95)**	73.75 ± 30.33 (10–95)***	<i>U</i> = 89.00, <i>z</i> = −0.75, <i>p</i> > 0.05

* *n* = 35 (data missing)

** *n* = 27 (data missing)

*** *n* = 8 (data missing)

BMI – body mass index, BW – body weight, DIA – diastolic arterial pressure, SDS – standard deviation score, SYS – systolic arterial pressure,

Data are presented as the mean ± standard deviation (minimum–maximum).

The conducted analysis revealed no statistically significant differences between the two groups of patients.

the post-pandemic group. Erythrocyturia was observed in 96% of patients included in the study, while macroscopic haematuria occurred in 64% of the pre-pandemic group and 86% of the post-pandemic group. The epidermal growth factor receptor at admission averaged 88.78 ± 35.75 (5.6–167) ml/min/1.73 m² according to the Schwartz formula [18]. During the analysis of eGFR at admission and discharge in patients from both groups, no significant statistical differences were observed. Reduced haemoglobin concentration at admission was observed in 23 (49%) patients, while the mean concentration was 11.1 ± 1.32 (7.6–14.1). Comparing the values of haemoglobin concentration at discharge and admission in patients from the pre-pandemic and pandemic periods, the analysis did not show a significant difference.

The conducted analysis did not show a significant difference in eGFR values between patients diagnosed before the pandemic compared to those diagnosed after the pandemic. Other data such as age at diagnosis upon admis-

sion also did not differ between the groups. The only parameter with a significant difference between the groups was ASO value at admission.

DISCUSSION

The precise mechanism of APSGN is currently unknown. However, it is assumed to be related to a type III hypersensitivity reaction, which results in the accumulation of antigen-antibody complexes in the renal glomeruli [6, 7, 9]. In response to a GAS aetiology infection, the organism reacts by forming immune complexes consisting of antibodies combined with streptococcal antigens [6, 9]. The presence of immune complexes activates the alternative complement pathway, leading to local damage of the renal glomeruli, through leukocyte infiltration and mesangial cell proliferation, which then impairs the perfusion of capillaries and consequently the glomerular filtration rate [3, 7]. Immunoglobulin binding proteins can be

TABLE 2. Comparison of qualitative parameters in patient groups diagnosed before and after the COVID-19 pandemic

Parameters	Before the pandemic, <i>n</i> = 33 (%)	After the pandemic, <i>n</i> = 14 (%)	χ^2 test with Yates' correction
Throat inflammation history	27 (82)	13 (93)	$\chi^2 = 0.27$ $p = 0.60$
Elevated ASO level	31 (94)	14 (100)	–
Decreased C3 level	26 (79)	12 (86)	$\chi^2 = 0.02$ $p = 0.88$
Decreased C4 level	2 (6)	3 (21)	$\chi^2 = 1.09$ $p = 0.30$
Occurrence of AKI	7 (21)	2 (14)	$\chi^2 = 0.02$ $p = 0.88$
Dialysed patients	0	1 (7)	–
Steroid therapy	1 (3)	2 (14)	$\chi^2 = 0.63$ $p = 0.43$
Haematuria	31 (94)	14 (100)	–
Macroscopic haematuria	21 (64)	12 (86)	$\chi^2 = 1.36$ $p = 0.24$
Proteinuria	20 (61)	11 (79)	$\chi^2 = 0.73$ $p = 0.39$

AKI – acute kidney injury, ASO – antistreptolysin O

TABLE 3. Comparison of quantitative parameters in patient groups diagnosed before and after the COVID-19 pandemic

Parameters	Before the pandemic, <i>n</i> = 33 (%)	After the pandemic, <i>n</i> = 14 (%)	Mann-Whitney <i>U</i> test
	M (SD)		
Age at diagnosis (year)	6.24 (1.99)	7.68 (3.54)	<i>U</i> = 182.00, <i>z</i> = −1.13, <i>p</i> > 0.05
eGFR value at admission [ml/min/1.73 m ²]	93.23 (36.50)	78.29 (34.23)	<i>U</i> = 175.00, <i>z</i> = 1.29, <i>p</i> > 0.05
ASO at admission [IU/ml]	767 (490.53)	1362 (963.19)	<i>U</i> = 145.00, <i>z</i> = −1.99, <i>p</i> < 0.05
ASO at discharge [IU/ml]	723 (474.39)*	1002 (833.20)**	<i>U</i> = 84.00, <i>z</i> = −0.09, <i>p</i> > 0.05
C3 at admission [g/l]	0.35 (0.39)	0.28 (0.43)	<i>U</i> = 194.00, <i>z</i> = 0.83, <i>p</i> > 0.05
C3 at discharge [g/l]	0.64 (0.39)***	0.62 (0.23)****	<i>U</i> = 65.00, <i>z</i> = 0.80, <i>p</i> > 0.05
Haemoglobin at admission [g/dl]	11.30 (1.27)	10.95 (1.52)	<i>U</i> = 210.50, <i>z</i> = 0.47, <i>p</i> > 0.05
Haemoglobin at discharge [g/dl]	11.17 (1.15)	10.85 (1.04)	<i>U</i> = 175.00, <i>z</i> = 1.29, <i>p</i> > 0.05
Duration of hospitalisation (days)	9 (5.19)	9 (5.62)	<i>U</i> = 227.00, <i>z</i> = 0.08, <i>p</i> > 0.05

* *n* = 17 (data missing)

** *n* = 13 (data missing)

*** *n* = 18 (data missing)

**** *n* = 9 (data missing)

ASO – antistreptolysin O, eGFR – epidermal growth factor receptor

observed on the surface of streptococci, which partially inhibit the classical complement pathway. The result of these processes is decreased levels of complement component C3 in almost all cases, whereas decreased levels of C1 and C4 components occur only in 15–30% of patients [1, 4, 8]. Among the patients included in the study, a decreased C3 complement component was observed in 82% of patients.

Additionally, if there is no evidence of previous streptococcal infection, attention should be paid to the possibility of other postinfectious glomerulonephritis occurring during bacterial infections (*Streptococcus pneumoniae*, *Staphylococcus aureus*, *Mycoplasma species*, *Meningococcus species*, *Leptospira species*) as well as viral infections (varicella zoster virus, cytomegalovirus, Epstein-Barr virus [2]. In our examined patients, we excluded above-mentioned infections.

In most cases, APSGN is a self-limiting disease whose treatment is symptomatic [3, 9]. The aim of treatment is to preserve kidney function or eventually reverse their damage [9]. Antibiotic therapy of GAS aetiology infection is a way to prevent the development of APSGN [6, 9]. Antibiotic therapy was administered to 96% of the patients included in the study. In some cases, dialysis therapy and immunosuppressive treatment may be necessary [1, 8, 19]. In our study, glucocorticoid therapy was administered to 3 patients, and dialysis therapy to one patient in the post-pandemic group.

The prognosis for APSGN in children is favourable [3, 7, 8]. Complete recovery, both clinical and morphological, is observed in 92% of children within 6–8 weeks [2, 7]. In the remaining patients, permanent abnormalities in urine tests (proteinuria, haematuria), arterial hypertension, and the development of chronic kidney failure are noted [2, 8]. Oedema usually subsides within 5–10 days, while blood pressure returns to normal after 2–3 weeks. The long-term prognosis of APSGN may be influenced by the coexistence of risk factors for chronic renal failure, which include diabetes and metabolic syndrome [9]. Long-term studies have shown that the occurrence of an episode of APSGN in childhood is a risk factor for the development of CKD in the future, even in the event of complete remission of APSGN [4]. This is a potential direction for future research if there are any differences in patients before and after the COVID-19 pandemic.

OCCURRENCE OF ACUTE POST-STREPTOCOCCAL GLOMERULONEPHRITIS IN THE ERA OF THE COVID-19 PANDEMIC

In the literature we find consistent reports of a significantly reduced incidence of streptococcal infections in the early period of the COVID-19 pandemic (2020–2021), probably related to the implementation of social distancing, widespread use of disinfectants, and wearing masks in public places [20]. In our centre, APSGN was also diagnosed in only one patient in the period 2020–

2021. However, recent reports have indicated a significant increase in streptococcal infections, especially in the second half of 2022 [21]. A study conducted in the Netherlands across 7 hospitals shows a sharp post-pandemic increase in the frequency of streptococcal infections in 2022, particularly in its second quarter. There was a 3-fold and 14-fold increase in diagnosis frequency compared to the same quarters in 2019 and 2018, respectively. This trend was most pronounced in children under 5 years old [21]. Australian researchers also observed a similar sharp increase in the diagnosis of invasive streptococcal disease from mid-2022 onwards [22]. This phenomenon was also highlighted by the World Health Organisation, which cited examples from European countries such as France, Ireland, Sweden, and the United Kingdom, where an increase in the number of infections was also observed in the second half of 2022 [23]. It is worth noting that, according to global reports, streptococcal infections in 2022–2023 were characterised by a higher risk of severe course and death compared to previous years [20]. Observations from our centre may confirm the information about a higher number of APSGN diagnoses annually – in 2023 alone, we diagnosed APSGN in 13 patients (which represents the highest number of APSGN diagnoses per year in a 10-year observation), and the average number of diagnosed cases significantly increased compared to the period before (an average of less than 4 cases per year) and after the pandemic (an average of 7 diagnoses per year). However, the patient profile with diagnosed APSGN in our centre did not significantly differ depending on the time of diagnosis (before/after the pandemic).

The exact reasons behind the rise in APSGN cases among children following the pandemic remain unclear. One theory suggests that COVID-19 preventive measures reduced children's exposure to *Streptococcus pyogenes*, hindering the development of protective immunity and thereby increasing their vulnerability to severe infections. Another possible factor is the surge in other viral infections post-pandemic, which, alongside the heightened activity of *Streptococcus pyogenes*, may lead to more secondary bacterial infections. Additionally, the emergence of more virulent GAS clones could also be contributing to this trend.

Based on the results of our study, it is essential to expand future research on the impact of the COVID-19 pandemic on the increased incidence of streptococcal infections and the resulting cases of APSGN. A potential direction for future research is to investigate the correlation between changes in hygiene practices, including the use of personal protective measures, and their lasting impact on the epidemiology of streptococcal infections. Another important research direction is the analysis of the pathogen itself and the evolution of more pathogenic bacterial strains. It is equally important to conduct studies on the long-term health effects of prior APSGN, especially concerning kidney health also into adulthood. These potential research areas highlight the importance of con-

ducting epidemiological analyses to better understand the dynamics of streptococcal infections in nephrology amidst changing sanitary-epidemiological conditions and increased awareness of personal protection measures.

LIMITATIONS OF THE STUDY

The main limitations of our study include its retrospective analysis and potential biases in data collection, the absence of certain parameters in the patients' medical records, and the lack of long-term follow-up, which results in missing information on changes in biochemical tests and potential long-term effects. Additionally, due to the single-centre nature of the study and the lack of comparative data from other Polish centres, the ability to generalise the results is limited.

CONCLUSIONS

The number of cases of APSGN on an annual scale in the post-pandemic years significantly increased. The patient profile with diagnosis before and after the pandemic in terms of most parameters does not differ. A significant difference was confirmed in ASO levels at admission, which were higher in patients diagnosed after the pandemic compared to those diagnosed before the pandemic. Further research is needed to identify the reasons for the increase in incidence of APSGN.

DISCLOSURES

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