

Clinical Study of Post Streptococcal Acute Glomerulonephritis in Children with Special reference to Presentation

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Abstract

Acute glomerulonephritis, essentially a disease of child hood that accounts for 90% of renal disorders in children. Acute glomerulonephritis (AGN) is a disease characterized by the sudden appearance of edema, hematuria, proteinuria, and hypertension. There is wide variability in manifestations and course of the disease where they do not predict the outcome. Hence this study was undertaken to analyze the various types of clinical presentations of both typical and atypical post streptococcal glomerulonephritis. This study included 50 cases of acute glomerulonephritis admitted to the pediatric wards. Detailed history and clinical examination was performed. Routine blood analysis, serum urea and creatinine and urine analysis were done. It was observed that edema, oliguria and hematuria were present in all patients. In 80% of the cases which had hypertension were associated with oedema. Pallor was seen in 20% of cases $Z = 0.35 < 1.96$. CCF, hepatomegaly and ascites were seen in 5% of cases. ASO titre and ESR were non specific.

Key words: Glomerulonephritis, Edema, Proteinuria, Hematuria
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Introduction:

Acute glomerulonephritis (AGN) is a disease characterized by the sudden appearance of edema, hematuria, proteinuria, and hypertension [1, 2]. It is essentially a disease of child hood that accounts for approximately 90% of renal disorders in children. The group A beta-haemolytic streptococcus (GAS) is a common infective agent in children that causes the widest range of clinical disease in humans of any bacterium [3]. Glomerulonephritis is a disease of the low socioeconomic class [4]. Post-streptococcal acute glomerulonephritis (PSAGN) is still prevalent in the developing countries [5]. Burden of APSGN in underdeveloped countries is 9.3 cases per 100,000 populations [6].

Infection can be that of respiratory tract in the form of pharyngitis, otitis media or skin infections like pyoderma, impetigo or infected scabies [7]. Streptococcal pyoderma is a frequent complication of scabies in tropics and usually is manifested by small vesicles that break early and leave a thick crust; post impetigo nephritis has an incubation period of 3 to 6 weeks [8]. Streptococcal pharyngitis may cause only sore throat or may be associated with fever, cervical adenopathy and purulent exudates, less than 3% of pharyngitis without any of these symptoms is streptococcal. The latent period of PSAGN and acute respiratory tract infection is about 1 to 3 weeks. Pharyngitis related PSAGN tends to peak in winter and spring months, and pyoderma related PSAGN is more prevalent in summer and autumn although this is by no means absolute. [7].

The incidence of cardiac involvement is very variable. Congestive cardiac failure is a common manifestation of acute glomerulonephritis and occurs in 15% to 50% of children with PSAGN [9]. In the early phase of illness the clinical picture closely resembles that of CCF with cardiomegaly, systolic apical murmur, gallop rhythm, tachycardia, dyspnoea, liver enlargements and pulmonary edema. These symptoms may appear suddenly usually in presence of hypertension and may be the presenting symptom of PSAGN. Children with PSAGN may develop hypertensive encephalopathy at comparatively lower levels of blood pressure. Drowsiness and convulsion may be the presenting features and may resemble encephalitis. Measurement of blood pressure and urine examination is diagnostic [7].

The manifestations and course of the disease is varied and do not predict the outcome. Therefore, this study intended to analyse the various clinical presentations and with both typical and atypical of post streptococcal glomerulonephritis.

Materials and Methods

The present study was conducted in the pediatric department of Jubilee Mission Medical College Hospital, Thris-sur. This study includes a clinical and detailed systematic evaluation of 50 cases of acute glomerulonephritis admitted to the pediatric wards.

Inclusion Criteria

All children of 3-12 years age group presenting with acute onset of edema, oliguria and hematuria with or without hypertension and proteinuria, along with or without any evidence of antecedent streptococcal infection were selected.

Exclusion Criteria

Children having history suggestive of renal and cardiac disease in the past were excluded from the study.

Having selected the cases, a detailed history was taken with particular reference to the type of antecedent infection and initial symptomatology. A detailed clinical examination was done to note the signs of cardiac failure with particular emphasis was given to recording of blood pressure, heart rate, heart sounds gallop rhythm and murmurs. Congestive cardiac failure was said to be present if the child who had tachycardia, tachypnoea, hepatomegaly and raised Jugular venous pressure. Hypertension was said to be present when Blood pressure exceeds 95th centile for the age [10]. Complete urine examination was done with special reference to the colour of urine quantity of urine passed in 24 hours, semiquantitative estimation of albumin using sulphosalicylic acid, microscopy for abnormal urinary sediments and estimation of urine protein. Blood urea, serum creatinine were also estimated. Chest X-ray was taken in all patients to look for pulmonary congestion.

Results

Of the 4067 pediatric cases admitted 50 (1.23%) were AGN. Taking the hypothesis that AGN has hospital occurrence of 1% of all pediatric admissions, 1.23% is accepted by normal test with $Z = 1.56, < 1.96$. Cases were in the age group of 3-13 years, of which 15 (30%) cases were in the age group of 3-6 years, 21 (42%) were in 6-9 years and 14 (28%) were in 9-13 years. Using Z test, $Z = 0.39, < 1.96$, it was shown that 95% of these cases have an average age between 6.73 to 8.01 years. 28 (56%) were male children and 22 (44%) were female children. There was no gender susceptibility for AGN ($\chi^2 = 1.43, P = 0.23, > 0.05$). 17 (34%) children admitted in winter (Oct-Jan), 11 (22%) in summer (Feb-May) and 22 (44%) in rainy season (June-Sept). The seasonal incidence has an effect with 50% of cases admitted in rainy season followed by winter 30% and only 20% in summer ($\chi^2 = 1.45, P = 0.48, > 0.05$). Among the infections that preceded the AGN, 21 (40%) children had skin infection, 17 (35%) had sore throat and 12 (25%) had no infection ($\chi^2 = 0.03, P = 0.98$). The presenting symptoms are shown in Table-1, Edema, oliguria and hematuria are seen in all patients ($\chi^2 = 0.22, P = 0.89$). Vomiting and abdominal pain were seen in 25% of the cases ($\chi^2 = 0.08, P = 0.77$). Cough was seen in 12% ($Z = 0.47 < 1.96$) and altered sensorium in 2% of cases ($Z = 0.97 < 1.96$). Table-2 shows the presented Signs. In 80% of the cases which had hypertension were also associated with edema ($Z = 0.70 < 1.96$). Pallor is seen in 22% of cases $Z = 0.35 < 1.96$. CCF, hepatomegaly and cardiomegaly are seen in 6% of cases $Z = 0.32, Z = 0.32, Z = 0.97 < 1.96$. Out of 29 cases of severe hypertensive children two cases were associated with congestive cardiac failure. One normotensive child had congestive cardiac failure. The co-variation between blood urea and serum creatinine is 5.32 which was significant with $r = 0.58$. Macroscopic hematuria was present in 92% of the cases and microscopic hematuria is present in 100% of the cases. The urine albumin level 1+, 2+, and 3+ is present in the ratio 6:3:1. $\chi^2 = 0.49, p = 0.7788$. 76% of the children who had ASO titre of > 200 IU was found to precede the infection. Chest x-ray showed only 3 cases had cardiomegaly with features of pulmonary edema. Cases were admitted for an average of 9 days duration. No death occurred due to AGN in the present study period.

Table 1: Presenting Symptoms

SI.No	Symptoms	No. of cases	Percentage
1	Edema	50	100
2	Oliguria	46	92
3	Hematuria (Macro)	46	92
4	Vomiting	13	26
5	Abdominal Pain	12	24
6	Cough	6	12
7	Fever	3	6
8	Head ache	3	6
9	Breathlessness	3	6
10	Convulsion	2	4
11	Altered sen-sorium	1	2

Table 2: Presented Signs

SI No	Signs	No. of Cases	Percentage
1	Edema	42	94
2	Hyper tension	40	80
3	Pallor	11	22
4	CCF	3	6
5	Hepatomegaly	3	6
6	Ascites	1	2
7	Cardiomegaly	3	6

Discussion

Acute glomerulonephritis is one of the common renal dis-eases in children. The course and sequale of an individual patient is unpredictable. In the present study, there were 50 cases of acute glomerulonephritis admitted over a pe-riod of one year. The signs and symptoms have been ana-lyzed and an attempt has been made to correlate them with the severity of the disease and clinical and investiga-tional abnormalities. The occurrence of acute glomeru-lonephritis in the present study is 1.23 % of the total pedi-atric admissions. In the present study the average age is about 7.5 years. Derakhshan and Hekmat [11] report an average age of 8.5 years while Etuk [4] et al reports 7.2 years.

In the present study males were 56% while females were 44% which was similar to majority of series that reported male predominance in disease occurrence [4]. The differ-ence in ratio is difficult to explain as susceptiblity to streptococcal infection is apparently not gender related. In the present study the maximum admissions were made

during the months of June – September (Rainy Season) comprising 44% of the cases, signifying the effect of climate in disease occurrence. Becquet [12] et al reported similar observation.

History of preceding infection was present in 76% of the cases. The incidence of skin infection (42%) was more than the incidence of Respiratory infection (34%). Common sign as well as symptom in the presented was edema. Derakhshan and Hekmat [11] noted skin infection in 78%, hypertension 75% and sore throat 4% of cases. Hypertension of variable degrees was present in 82% of patients in the present study. In the present study out of three cases of CCF two cases were associated with severe hypertension and one case had no hypertension, which shows that hypertension is the only factor in the production of CCF. The cardiac insufficiency could also be due to contributory factors like hypervolemia secondary to salt and water retention and generalized vasospasm producing hypoxia of myocardial cells [7]. Both proteinuria and hematuria were the most consistent urinary findings found in all the cases in the present study. In the present study there was no difference in clinical presentation and progress of the disease in those with gross hematuria and those with microscopic haematuria. In the present study blood urea was significantly high in 10 cases (20%). Serum creatinine values were elevated in 13 cases (26%). Blood urea nitrogen level is proportionately elevated in relation to the serum creatinine level. Hyponatremia in acute phase of AGN is due to haemodilution. In the present study three patients who showed features of pulmonary edema and cardiomegaly. Pulmonary changes did not bear any relation to proteinuria or blood urea. Clearance of X-ray findings coincided with diuresis and disappearance of edema. In patients with moderate-to-severe AGN, a measurable reduction in volume of glomerular filtrate (GF) is present, and the capacity to excrete salt and water is usually diminished, leading to expansion of the extracellular fluid (ECF) volume. The expanded ECF volume is responsible for edema and, in part, for hypertension [2]. ASO titre was raised in 64% of the cases in the present study. Derakhshan and Hekmat [11] reported elevated ASO in 84% cases. A slight increase in ASO response was noted in patients with skin infections than with sore throat.

Out of 50 cases studied, there was no death in the present study. Average duration of hospital stay was 7 days. Patients with complications needed more time to recover, but all the patients recovered completely with out any sequelae.

Conclusion

In conclusion edema, proteinuria and hematuria were the consistent features. Hypertension and congestive cardiac failure was important in assessing the prognosis. Serum urea and creatinine levels indicated the renal damage and monitoring of which helps in assessing prognosis. ASO titre and ESR were non specific.

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