CLINICAL SPECTRUM AND OUTCOME OF ACUTE POST STREPTOCOCCAL GLOMERULONEPHRITIS IN CHILDREN

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ABSTRACT

Background: *Acute post streptococcal glomerulonephritis (APSGN) is characterized by abrupt onset of hematuria, edema, hypertension, oliguria and impaired renal function following streptococcal group A beta hemolytic streptococcai throat or skin infection* ***(Bagga and Srivastava, 2011*** *and* ***Roy et al., 2014)****. In pediatric age group APSGN, accounts for approximately 80% of cases of acute nephritic syndrome (ANS)* ***(Smith et al., 2003****;* ***Bagga and Srivastava 2011,*** *and* ***Roy et al., 2014)****.*

Aim of Study: *Is to study the clinical presentation, complications and outcome of APSGN in children attending Assiut University Children Hospital (AUCH) as well as to follow-up of abnormal laboratory finding of serum complement system3 (C3) level after 6-8 weeks.*

Patients and Methods: *This prospective descriptive study was done for children attending AUCH, with clinical manifestation of acute PSGN. This study covered outpatient clinic and nephrology unit during one year period from 1st of May 2017 to 30th April 2018. In addition to meticulous history taking and thorough clinical examination, all cases in this study were subjected to the following laboratory investigations:*

Urine analysis, urine spot protein creatinine ratio, ASOT, and serum complement C3 levels at admission and after 6-8 weeks.

Results: *This study included 70 patients (40 were males and 30 were females). Patients included in the study were divided into three sub-groups according to their ages. We found that 90% of cases were found to have history of preceding pharyngitis / tonsillitis. The most common presenting complaint in this study was hematuria (82.9%). Complement C3 level at admission was decreased (<90 mg/dl) in 67 patients while the level of C3 returned to normal level (90-180 mg/dl) after 6-8wks.*

Conclusion: *APSGN is a disease of a childhood. It represents a health problem in less wealthy nation. ASOT is perfect for detecting APSGN. Serum complement (C3) level is the corner stone for diagnosis of APSGN. Follow-up of serum complement (C3) level after 6-8 weeks has a good prognostic value. Short-term outcome of APSGN is excellent at expert hand.*

Key Words: *APSGN, ASOT, complement C3.*

Abbreviations: *Acute post streptococcal glomerulonephritis (APSGN), anti-streptolysin O titre (ASOT), rapid progressive glomerulonephritis (RPGN).*

INTRODUCTION

Acute post streptococcal glomerulonephritis (APSGN) is an immunologic response of the kidney to infection characterized by abrupt onset of hematuria, edema, hypertension, oliguria and impaired renal function following streptococcal group A beta hemolytic streptococcal throat or skin infection **(Bagga and Srivastava, 2011** and **Roy et al., 2014)**. There is a declining incidence of APSGN worldwide, particularly in industrialized nations. But in the underdeveloped world, global burden of APSGN continues to be significant **(Roy et al., 2014)**. The most constant serological finding in Patients with APSGN is the reduction in serum complement levels that occurs in more than 90% of the cases **(Itube and Mezzano, 2009)**. Serum complement 3 (C3) level is usually reduced in the acute phase and returns to normal 6-8 wks after onset **(Rodriguez-Hurbo and Batsford, 2007)**. On the other hand, a rising antibody titer to streptococcal antigen confirms a recent streptococcal infection **(Bagga and Srivastava, 2011** and **Roy et al., 2014)**. Rising ASOT are the usual clinical indications of a preceding streptococcal infection since positive cultures are obtained in only 20–25% of the cases, except during epidemics **(Pan CG, 2011)**. It starts rising within 2 weeks, peaks at 4 weeks and falls at 12 weeks **(Bagga and Srivastava, 2011** and **Roy et al., 2014)**. Treatment of patients with APSGN is directed towards reduction of hypertension, but prompt addresses of complications are essential to avoid immediate mortality **(Roy et al., 2014)**.

Short and long term prognosis of APSGN is excellent, with1% mortality during acute stage and 1% ending up with chronic kidney disease **(Bagga and Srivastava, 2011** and **Roy et al., 2014)**.

Aims of the Work

To study the clinical presentation, complications and outcome of APSGN in children attending Assiut University Children Hospital (AUCH) as well as to follow-up the abnormal laboratory finding of serum complement system3 (C3) level after 6-8 weeks.

PATIENTS AND METHODS

This prospective descriptive study was done during one year period from 1st of May 2017 to

30th April 2018, on patients attending outpatient clinic of pediatric & nephrology unit of AUCH. 70 patients were included during this period (40 were males and 30 were females), with clinical manifestation of acute PSGN.

Inclusion criteria:

1. Children in the age groups of 2-15 years presenting with clinical manifestation of APSGN will be included in the study.
2. APSGN was diagnosed by the presence of:
   I. Features of acute nephritic syndrome. e.g. hematuria, edema, hypertension, oliguria and impaired renal function **(Bagga and Srivastava, 2011** and **Roy et al., 2014)**.
   II. Lower serum complement C3 levels < 90 mg/dl.
   III. ASOT>200 units/ml was considered as evidence of recent streptococcal infection **(Bison and Stevens 2009** and **Goldman and Schafer 2011)**.

Exclusion criteria:

Children with past history suggestive of chronic renal and/or cardiac disease.

Children with congenital renal anomalies.

Children with clinical manifestation of nephrotic syndrome.

Children with clinical manifestation of acute nephritic syndrome due to other causes.

Hematuria was defined as presence of ≥5 red blood cells per high power field on a centrifuged urinary specimen **(Sarkissian et al., 1997)**. Hypertension was defined as systolic and/or diastolic blood pressure values exceeding the 95th centile for age, sex and height **(Arunagirinathan et al., 2015)**.

Hypertension is defined as systolic and/or diastolic blood pressure> the 95th percentile for gender, age and height percentile on at least three consecutive occasions.

Hypertensive urgency is defined as a diastolic blood pressure of 110 mm Hg or greater without the acute signs of end-organ damage. The presence of acute and rapidly involving end-organ damage with an elevated diastolic blood pressure, usually greater than 120 mm Hg, establishes a diagnosis of hypertensive emergency **(Erin et al., 2012)**.

Nephritic proteinuria typically ranges from 500 mg/d to 3gm/d not > 3.5gm/d which represent nephrotic range proteinuria **(Michealet al., 2001)**.

Acute kidney injury was defined as an abrupt reduction in renal function leading to increase in serum creatinine > 0.3 mg/dl, or a percentage increase in serum creatinine of more than or equal to 1.5 fold from the baseline **(Mehta et al., 2007)**.

Full recovery at discharge was defined as absence of edema, hypertension, and normal renal function **(Sarkissian et al., 1997)**.

Ethical consideration:

1. The study was approved and monitored by the medical ethics committee, Assiut Faculty of Medicine.
2. The investigators explained the steps and value of the research to all eligible participants those who agreed to be included in the study signed fully informed consent.
3. The participant has the right to withdraw from the study at any time.
4. The data & result of the study are confidential and the patient has the right to keep it.
5. The auther declaired that there is no conflict of interest regarding the study or publication.

Financial disclosure/funding:

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Statistical analysis:

All data analyzed using SPSS software Chicago, IL, USA, version 21.

RESULTS

Our results were demonstrated in the following tables.

Table (1): Personal and demographic data of the studied patients

Data	Frequency(No)	Percent (%)
(1) Sex:		
Male	40	57.1%
Female	30	42.9%
(2) Age (in years):		
Range	(2-15) y	
Mean±SD	(7.7± 3.2)	
Group1 (2-5) y_{rs}	17	24.3%
Group2 (6-10)y_{rs}	40	57.1%
Group 3 ≥10 y_{rs}	13	18.6%

This study includes 70 patients with APSGN their ages ranged from 2-15 years old with mean (7.7 ± 3.2), 40 were males and 30 were females.

Patients included in the study were divided into three sub-groups according to their ages: First group (2-5) years old included 17 child (24.3%), group 2 (6-10 years old and included 40 child (57.1%) and group 3(>10 years old) included 13 child (18.6%).

Table (2): Type of infection preceding APSGN according to gender of patients

			Gender	
			Male	Female
Etiology of infection	Upper respiratory tract infection N=63 (90%)	Count	36	27
		% of Total	51.4%	38.6%
	Skin infection N=7 (10.0%)	Count	4	3
		% of Total	5.7%	4.3%
P-value			0.495	0.559

Recorded data shows that, 90% of cases were found to have history of preceding pharyngitis/ tonsillitis, which 36 (51.4%) were male and 27 (38.6%) were female while 4 (5.7%) cases were male and 3 (4.3%) were female of total patients with history of preceding skin infection 10%. P-value showed

insignificant statistical difference between the studied.

Clinical presentation:

Table (3): Clinical data of the studied group of APSGN according to sex

Clinical data	Male	Female	P-value
1. Hematuria N=58 (82.9%)	33 (47.1%)	25 (35.7%)	0.928
2. Oliguria N=23 (32.9%)	13 (18.6%)	10 (14.3%)	0.942
3. Edema (N=54) 1- Facial (N=25) 2- Generalized (N=29)	 16 (22.9%) 14 (20.0%)	 9 (12.9%) 15 (21.4%)	0.788
4. Hypertension N=40 (57.1%)	24 (34.3%)	16 (22.9)	0.583

Recorded data shows that, the most presenting complaint in this study was hematuria (82.9%), oedema (78.1%) and oliguria (32.9%). History suggestive of HTN was found in only (57.1%) of cases of all that we found that there's male predominance. P-value statistically insignificant.

Table (4): Correlation between blood pressure stage &clinical presentation on admission of studied cases

Clinical presentation / Blood pressure stage		Anxiety	Headache	Bleeding per nose	Convulsion	Disturbed conscious level	Complete recovery
Normal (<90th percentile). N=29 (41.4%)		0	0	0	0	0	29
		0.0%	0.0%	0.0%	0.0%	0.0%	41.4%
Pre-hypertension (90th-95th percentile). N=4 (5.7%)		2	1	0	0	0	1
		2.9%	1.4%	0.0%	0.0%	0.0%	1.4%
Stage I (95th-99th percentile plus 5 mmHg). N=20 (28.6%)		6	8	2	3	0	1
		8.6%	11.4%	2.9%	4.3%	0.0%	1.4%
	P-value	**0.006**	**0.008**	0.564	0.559	0.269	**0.000**
Stage II (>99th percentile plus 5 mmHg). N=17 (24.3%)		1	5	3	5	3	0
		1.4%	7.1%	4.3%	7.1%	4.3%	0.0%
	P-value	0.331	.271	0.054	**0.007**	**0.001**	**0.000**

Previous data shows that, the main complaint was headache (20%), 12.9% had history of anxiety while, convulsion and bleeding per nose occurred in 11.4% and 7.1% respectively but disturbed conscious level in only 4.3% of cases.41.4% of cases had normal blood pressure on admission, whereas 28.57% were stage I hypertension and stage II hypertension 24.4%. Prehypertension noticed only in 5.7% of cases.

P-value is statistically significant in stage I hypertension (anxiety & headache& complete recovery) and stage II hypertension (convulsion, disturbed conscious level & complete recovery). P-value 0.01 level is highly significant.

Table (5): Laboratory investigations data of the studied group

		Frequency (No= 70)	**Percent** (%)
I-Urine analysis.			
Microscopic RBCS.		13	18.6%
Microscopic RBCS and granular cast.		4	5.7%
Microscopic RBCS and albumin.		22	31.4%
All (smoky urine, RBCS, granular cast and albumin).		31	44.3%
II- 24^{hr} protein excretion in urine.	Normal (up to 150mg/dl).	68	97.1%
	Increased (> 150 mg/dl)	2	2.9%
III- ASOT.	Negative (< 200 IU).	1	1.4%
	Positive (≥ 200 IU).	69	98.6%

Data recorded in 70 patients shows that, urine analysis had smoky urine, RBCS, granular casts and albumin in 44.3%, where, microscopic RBCS and albumin found in 31.4% and 5.7% of patients had microscopic RBCS and granular casts. About 97.1% has normal 24 hours urinary protein excretion, while 2.9% of them have increased proteinuria. Data of ASOT showed that, 98.6% had positive ASOT, while 1.4% had negative ASOT< 200 IU.

Table (6): C3 level at admission according to sex and age group

Complement C3 at admission				Gender		P-value
				Male	Female	
Normal (90-180mg/dl)	age in groups N= 3 (4.2857%)	(2-5) years N=2 (66.7%)		0	2	
			% of Total	0.0%	66.7%	
		more than 10 years N=1 (33.3%)		1	0	
			% of Total	33.3%	0.0%	
Decreased (<90 mg/dl)	age in groups N= 67 (95.714%)	(2-5) years N=15 (22.4%)		11	4	0.066
			% of Total	16.4%	6.0%	
		(5-10) years N=40 (59.7%)		19	21	**0.042**
			% of Total	28.4%	31.3%	
		more than 10 years N=12 (17.9%)	Count	9	3	0.509
			% of Total	13.4%	4.5%	
P-value				0.160	0.013	

Our data showed that, Complement 3 level at admission was normal in 3 (4.2857%) cases where 2 cases in age (2-5) year while only one case more than 10 year. C3 was decreased in 95.714% of cases most of them 59.7% in age group (5-10) then (2-5) year was 22.4% and 17.9% in cases older than 10 years.

P-value of C3 according to gender is insignificant but correlation of decreased serum C3 level at admission and different age group showed that, P-value statistically significant at level 0.05 in age group (5-10) years.

Table (7): C3 level after (6-8) weeks according to sex and age group

Complement C3 after (6-8) weeks from admission				Gender		P-value
				male	Female	
Back to normal (90-180 mg/dl) N=67 (95.7%)	age in groups N=35	(2-5) years N=9 (25.7%)		6	3	
			% of Total	17.1%	8.6%	
		(5-10) years N=19 (54.3%)		12	7	
			% of Total	34.3%	20.0%	
		more than 10 years N=7 (20.0%)		5	2	
			% of Total	14.3%	5.7%	
Still decreased (<9o mg/dl) N=3 (4.3%)	age in groups N=35	(2-5) years N=8 (22.9%)		5	3	.898
			% of Total	14.3%	8.6%	
		(5-10) years N=21 (60.0%)		7	14	.497
			% of Total	20.0%	40.0%	
		more than 10 years N=6 (17.1%)		5	1	
			% of Total	14.3%	2.9%	.679

Follow up of our patients after 6-8 weeks showed that, 95.7% of them had normal C3 level, while 4.3% still had decreased serum C3. P-value of C3 after 6-8 weeks with no significant (P value .05 level is significant).

Table (8): Complications and outcome of APSGN according to age group

Patients age groups	Complications and outcome of APSGN			
	Hypertensive encephalopathy	Rapidly progressive GN	Congestive heart failure	Complete recovery
(2-5) years	1	0	0	16
N=17(24.3%)	1.4%	0.0%	0.0%	22.9%
(6-10) years	1	4	4	31
N=40(57.1%)	1.4%	5.7%	5.7%	44.3%
>10 years	1	1	0	11
N=13 (18.6%)	1.4%	1.4%	0.0%	15.7%

Our study recorded that the majority of our patients had complete recovery (82.9%) while, 7.1% had RPGN, 4.2% had hypertensive encephalopathy and 5.7% had congestive heart failure. The majority of complication occurred at age 6-10 years (57.1%), while 24.3% in age 2-5 years. P-value statistically insignificant 0.05 level.

Table (9): Outcome according to the sex of the patients

			Complication of APSGN			
			Hypertensive encephalopathy	Rapidly progressive glomerulonephritis	Congestive heart failure	Complete recovery
Gender	Male N=40 (57.19%)		2	4	0	34
		% of Total	2.9%	5.7%	0.0%	48.6%
	Female N=30 (42.9%)		1	1	4	24
		% of Total	1.4%	1.4%	5.7%	34.3%

Our recorded data showed that, male suffered from complications more than female as 57.19 % to 42.9% respectively.

DISCUSSION

Data of this study showed that, males were affected more than females (57.1% vs 42.9%). We noticed that, the ages of affected patients in this study ranged from 2-15 years old with Mean ± SD (7.7± 3.2). These data are in agreement with the results of **Kline and Sturgill, 1989** and **Matsukura, et al., 2003**, who found that, APSGN disease occurred in children between the ages of 2 and 12 years old and young adults, and it was more common in males than in females **(Kline et al., 1989** and **Matsukura et al., 2003)**.

Results of the present study showed that, 90% of cases had history of preceding pharyngitis/ tonsillitis and 10% of cases had history of preceding skin infection caused by group A beta hemolytic streptococci. P-value of etiology of infection & gender showed insignificant statistical difference between the studied.

These data agreed with that of **Couser, 1999** and **Nordstrand, et al., 1999** who reported that, APSGN disease post group A beta hemolytic streptococci infection and followed upper airway e.g. pharyngitis or tonsillitis by 14-21 days and 3-6 weeks after skin infection especially in warmer climates **(Couser, 1999** and **Nordstrand et al., 1999)**.

In the present study, hematuria was the most common clinical finding that occurred in 58 cases (82.9% of patients), while edema was found in 54 cases (77.1% of patients). This is non-comparable with **Itube and Mezzano, 2009** who noticed that glomerular hematuria was an almost universal finding in cases with APSGN disease and gross hematuria was present in one-third of the patients, but edema was the chief complaint and more frequently in children (90%) than in adult patients (75%) **(Itube and Mezzano, 2009)**.

Rodriguez- Hurbo and Batsford, 2007 reported that oliguria was referred on admission by patients or their families in less than half of cases. This is comparable with the results of our study where, generalized edema occurred in 29 cases (41.4 % of patients) and facial edema occurred typically in 25 cases (35.7% of patients) **(Rodriguez-Hurboand Batsford, 2007)**.

In the present study, 29 patients (41.4%) had normal blood pressure, while 41 patients (58.6%) complained of different stages of HTN with history of anxiety in 9 cases (12.9%), headache in 14 cases (20%),

bleeding per nose in 5 cases (7.1%), convulsions in 8 cases (11.4%), and disturbed conscious level in 3 cases (4.2%). We noticed that, of the 41 patients with HTN, 4 cases (5.7%) had pre-hypertension (90th-95th percentile), 20 cases (28.6%) had stage I HTN (95^{th}-99^{th} percentile plus 5 mmHg) and 17 cases (24.2%) of them had stage II HTN (>99th percentile plus 5mmHg). P-value of our study is statistically significant in stage I hypertension (anxiety & headache & complete recovery) (0.006& 0.008& 0.000 respectively) and stage II hypertension (convulsion, disturbed conscious level & complete recovery) (0.007 & 0.001 & 0.000 respectively) that is highly significant 0.01. The results of our study are somewhat comparable with that of **Itube and Mezzano, 2009** who noticed that HTN was the third cardinal sign in patients with APSGN (60-80% of cases) and was severe enough to require specific anti-hypertensive treatment in about half of the cases **(Itube and Mezzano, 2009)**. On the other hand, **Iturbe and Musser in 2008** reported that, HTN is usually mild in patients with APSGN and has a biphasic character and sometimes complications of high blood pressure such as headache, vomiting, dizziness or seizures that bring attention to the presence of APSGN. They added that, patients may develop encephalopathy owing to hypertension or hypervolemia which is manifested by headache and convulsion **(Iturbe and Musser, 2008)**.

Regarding laboratory investigation, the present study was supported by the easiest and basic tests to confirm the diagnosis of APSGN. Macroscopic and microscopic examination of urine showed that,13 cases (18.6% of patients) had microscopic RBCs, 4 cases (5.7% of patients) had microscopic RBCs and granular casts, 22 cases (31.4% of patients) had microscopic RBCs and albumin, while 31 cases (44.3% of patients) had smoky urine, RBCs and granular casts and albumin. **Pan C G, 2011**, stated that a good urinalysis is the first order of business in assessing a child with suspected APSGN. He added that, the presence of red blood cell casts, while not invariably seen, is diagnostic of GN if present.

Proteinuria is also nearly invariant in AGN, although any cause of gross hematuria can lead to some urinary protein. If the urine is not grossly bloody, however, the combined presence of hematuria and proteinuria

virtually always means GN **(Pan CG, 2011** and **Thomas and Welch, 2012)**.

Quantitation of urinary protein excretion in 78 cases of PSAGN between 1979 and 1988 revealed nephrotic range proteinuria (defined as >40 mg/m2/h) in 27 cases (34.6% of patients) **(Roy and Stapleton, 1990)**. **Eison, 2011** reported that protein excretion in urine (<5 mg/m2/h) in 20 cases (25.6% of patients) **(Eison, 2011)**. In our study, the 24hr protein excretion in urine was normal (<150 mg/24 hours urine) in 68 cases (97.1% of patients) and proteinuria (>150 mg/24 hours urine) occurred in 2 cases only (2.9% of patients), but it was mild and did not reach the nephrotic range.

The serological markers most commonly used to identify streptococcal infection as the trigger of PSGN are ASOT and depression of serum C3 level. Increased levels of antibody to anti-streptococcal antigens (ASO), anti-hyaluronidase (A-H) and anti-DNase are documented less often than low levels of complement C3. ASO titers are higher in pharyngitis-associated PSGN than pyoderma-associated PSGN **(Burke and Titus, 1966** and **Ramnath et al., 2017)**.

In an early study, the sensitivity of an elevated ASO titer was extremely high (97%), but the specificity was only 80%, presumably because up to 20% of unaffected controls demonstrated evidence of streptococcal exposure with a significantly elevated titer **(Ramnath et al., 2017)**. Early descriptions of the time course for increasing ASO and A-H titers showed that, in a group of patients with typical PSGN, ASOT was increased above normal in 72% **(Markowitz et al 1965** and **Ramnath et al., 2017)**.

This is comparable with the results of the present study where, ASOT was positive in 69 cases (98.6% of patients). On the other hand, **Eison, 2011**, tested for ASOT, AH, and anti- DNase in 60 patients with APSGN and he found that ASO was negative while anti-DNase and/or AH were positive **(Eison, 2011)**.

In **2007, Rodriguez- Hurbo and Batsford** reported that, ASOT is commonly elevated after a pharyngeal infection but rarely increases after streptococcal skin infections because of the presence of thick lipid barrier of skin **(Rodriguez- Hurbo and Batsford, 2007)**. **Ayoub, et al 1962** and **Eison, 2011** stated that performance of more than one

streptococcal antibody test increased the number of individuals with "positive" titers from 80-95% **(Ayoub et al., 1962** and **Eison, 2011)**.

By far, the most important and frequently forgotten test to obtain initially is an assessment of the serum complement system. The most constant serological finding in patients with APSGN is the reduction in serum complement levels that occurs in more than 90% of the cases **(Itube and Mezzano, 2009)** The serum C3 level is usually reduced in the acute phase and returns to normal 6-8 wks after onset **(Rodriguez-Hurboand Batsford, 2007** and **Iturbe and Musser, 2008)**. This is agreed with the results of the present study where, serum C3 levels decreased in 67 cases (95.7% of patients) and normalized after 6-8 weeks in all of them P-value of C3 according to gender was insignificant but correlation of decreased serum C3 level at admission of different age group showed that, P-value statistically significant at level 0.045 in age group (5-10) years. P-value of C3 after 6-8 weeks in correlation with age group was insignificant.

Derrick, et al. 1970 and **Ramnath and Stephen, 2017** stated that, the acute reduction of serum complement C3 concentration in APSGN with the typical return to normal levels within 6 weeks of onset is of foremost diagnostic importance when renal biopsy is not performed. They added that, the importance of a timely measurement of C3 can′t be over stressed **(Derric et al., 1970** and **Ramnath et al., 2017)**.

Complication of APSGN occurred with the highest frequency of 7.14% of all studied patients who had RPGN, with good outcome in the majority of cases. In contrast, in previous old studies of PSAGN patients between 1962 and 1970, two cases died from RPGN during the acute phase of illness **(Eison, 2011)**. In the present study, no deaths were recorded.

Hypertensive encephalopathy is a serious complication found in 0.5-10% of hospitalized patients **(Seegal 1941** and **Tasic, 2016)**. **Roy, et al., 2014**, reported that patients may develop encephalopathy owing to hypertension or hypervolemia which is manifested by headache and convulsion **(Roy et al., 2014)**. Encephalopathy may also result directly from the toxic effect of streptococcus on central nervous system **(Rakeshet al., 2001** and **Roy et al., 2014)**.

In the present study, hypertensive encephalopathy was a third complication that occurred in 3 cases (4.3% of patients). Our results are comparable with that of **Seegal, et al. 1941** and **Tasic, 2016** who reported that, hypertensive encephalopathy was a serious complication found in 0.5-10 % of hospitalized patients **(Seegal 1941** and **Tasic, 2016)**. In our study P-value statistically insignificant in relation with age group or sex of patients (0.05).

Since children and young individuals have healthy cardiovascular systems, previous studies reported that, cardiac failure is rarely seen and only 5% of patients with APSGN may develop heart failure as a complication of hypertension **(Bagga A and Srivastava, 2011)**. On the other hand, evidence of congestive heart failure was found in half of children with APSGN in one early series **(Burke and Titus, 1966** and **Eison, 2011)**. This is in contrary to the results of our study where, only 4 cases (5.7% of patients) had congestive heart failure.

CONCLUSION

- Males are more affected than females.
- Prompt address on clinical presentation, diagnosis and complications are the mainstay of treatment.
- Haematuria is the main cause for seeking medical advice.
- ASOT is perfect for detecting APSGN.
- Serum complement system (C3) is the corner stone for diagnosis of APSGN.
- Follow-up of serum complement system (C3) level after 6-8 weeks has a good prognostic value.
- RPGN, hypertensive encephalopathy and congestive heart failure are a serious complications of APSGN if poverty and negligence prevent early prompt treatment.
- Short-term outcome of APSGN is excellent at expert hand.

RECOMMENDATIONS:

To improve the process of diagnosis, outcome of APSGN and therefore, to prevent its complications in children attending to AUCH the following recommendation are suggested:

1. Good housing and avoidance of overcrowdness.

2. Health education and sanitary programs about APSGN and its complication and prophylaxis in rural areas.
3. Proper history taking from the parents and relatives of patients and good examination with proper documentation in patient's files.
4. Write daily progressive notes on patient's weight, urine output, hematuria, blood pressure and heart sounds for early discovering of complications.
5. Proper antibiotic coverage of upper respiratory tract infection (tonsillitis /pharyngitis) and skin infection.
6. Advising outpatient follow-up especially for serum complement system after 6-8 weeks.

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الحالة السريرية وتوابع الالتهاب الكلوى الكبيبي الحاد في الأطفال

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مقدمة: في الحقيقة يعد الالتهاب الكلوى الكبيبي الحاد مرض طفولة حيث يمثل حوالي 90٪ من أمراض الكلى عند الأطفال. وهو عبارة عن استجابة مناعية للكلى لمواجهة العدوى، تتميز بالظهور المفاجئ لاحمرار لون البول، وجود زلال بولى، تورم بالجسم كذلك ارتفاع ضغط الدم. يحدث المرض بشكل رئيسي في الأطفال الذين تتراوح أعمارهم بين 2 و 12 عامًا، وغالبًا ما يكون الذكور أكثر إصابة من الإناث.تعد أكثر العوامل المعدية شيوعًا في الأطفال التي تسبب أوسع مجموعة من الأمراض السريرية لدى البشر هي المجموعة العقدية الانحلالية بيتا (بكتيريا الاستربتوكوكس) والتى تتبع التهابات مجرى الهواء العلوي مثل التهاب البلعوم أو التهاب اللوزتين خلال 14 إلى 21 يوما في البلدان ذات المناخات المعتدلة والباردة خلال فصل الشتاء و 3-6 اسابيع بعد الإصابة بتقيح الجلد خاصة في المناخات الدافئة.

هدف البحث: هذا العمل هو دراسة وصفية للحالة السريرية وتوابع ومضاعفات الالتهاب الكلوى الكبيبي الحاد فى الأطفال والتي أجريت في مستشفى الأطفال الجامعى بأسيوط خلال الفترة من 1 مايو إلى 30 أبريل 2018. وكذلك متابعة

المرضى الذين يعانون من انخفاض مستوى الدلالات التكميلية (C3) بالدم من بداية المرض وبعد 6-8 أسابيع. كما تشمل هذه الدراسة 70 حالة (40 حالة من الذكور و30حالة من الإناث).

نتائج الدراسة: أظهرت بيانات هذه الدراسة أن الذكور تأثروا أكثر من الإناث (57.1 ٪ مقابل 42.9 ٪). لاحظنا أن أعمار المرضى المصابين في هذه الدراسة تراوحت بين 2-15 سنة بمتوسط عمر يتراوح بين 7,7±3,2.

أظهرت نتائج هذه الدراسة أن 90 ٪ من الحالات كان لها تاريخ سابق من التهاب البلعوم/ التهاب اللوزتين و 10٪ من الحالات لديها تاريخ من العدوى الجلدية السابقة الناجمة عن المجموعة العقدية الانحلالية بيتا. كان البول المدمم هو الاكتشاف السريري الأكثر شيوعا الذي حدث في 58 حالة (82.9٪ من المرضى)، في حين تم العثور على وذمة في 54 حالة (77.1٪) من المرضى.في هذه الدراسة هناك 9 حالات (12.9٪) يعانون من القلق، و14 حالة (20٪) يعانون من الصداع، ووجد نزيف في الأنف في 5 حالات (7.1٪)، ومعدل حدوث تشنجات في 8 حالات (11.4٪)، واضطراب مستوى الواعي في 3 حالات (4.2٪).كما لاحظنا أنه من بين 41 مريضًا مصابون بارتفاع ضغط الدم، كان هناك 4 حالات (5.7٪) مصابة بارتفاع ضغط الدم (90 إلى 95 في المئة)، 20 حالة (28.6٪) كانت مصحوبة بالمرحلة الاولى لارتفاع ضغط الدم (95 إلى 99 فى المئة بزيادة 5 مللى زئبقى) و 17 حالة (24.2٪) منهم تعانى من المرحلة الثانية لارتفاع ضغط الدم بنسبة مئوية (< 99 +5 مللى زئبقى).

فيما يتعلق بالنتائج المعملية، تم دعم هذه الدراسة من قبل أسهل الاختبارات لتأكيد تشخيص الالتهاب الكلوى الكبيبي الحاد عن طريق مقاييس الفحص المجهري للبول.

قد كان اختبار الاجسام المضادة لبكتيريا الاستربتوكوكس إيجابيا في 69 حالة (98.6٪ من المرضى) بينما فيما يتعلق بأكثر الاختبارات المصلية أهمية وثباتا وجدنا أن مستويات الدلالات التكميلية C3 في المصل انخفضت في 67 حالة (95.7٪ من المرضى) وتم رجوعها للمستويات الطبيعية بعد 6-8 أسابيع في جميع المرضى. حدثت مضاعفات الالتهاب الكلوى الكبيبي الحاد بأعلى تردد 7.14٪ من جميع المرضى الذين خضعوا للدراسة والذين لديهم التهاب الكلى المترقي السريع مع نتائج جيدة في غالبية الحالات. كان غيبوبة اعتلال الدماغ بارتفاع ضغط الدم هو ثاني أكثر المضاعفات شيوعًا التي حدثت في 3 حالات (4.3٪ من المرضى)، أيضًا وجدنا أن اربعة فقط (5.8٪ من المرضى) مصابون بفشل القلب الاحتقانى.

كان التشخيص ونتائج الالتهاب الكلوى الكبيبي الحاد ممتازًا وحدث الشفاء التام في 58 حالة (82.9٪من المرضى) ولم تحدث وفيات.

الاستنتاج: ومن خلال نتائج وبيانات دراستنا الحالية يمكننا أن نستنتج أن:

1. الذكور أكثر تأثراً من الإناث بالتهاب الكلي الكبيبي الحاد.

2. يعد الاهتمام الفورى للعرض السريري الناتج عن المرض والتشخيص والمضاعفات من أهم قواعد العلاج الالتهاب الكلوى الكبيبي الحاد.

3. يعتبرالتغير المفاجئ للون البول هو السبب الرئيسي لطلب المشورة الطبية.

4. عمل اختبار الاجسام المضادة لبكتيريا الاستربتوكوكس واحدا من اهم وسائل اكتشاف الالتهاب الكلوى الكبيبي الحاد.

5. يعتبر قياس مستوى الدلالات التكميلية بالدم (C3) هو حجر الزاوية لتشخيص الالتهاب الكلوى الكبيبي الحاد في الاطفال.

6. متابعة مستوى الدلالات التكميلية بالدم (C3) بعد 6-8 أسابيع جعل القضاء التام على المرض أسهل.

7. النتائج قصيرة المدى لالتهاب الكلوى الكبيبي الحاد ممتازة في متناول اليد ويحدث الشفاء التام بنسب هائلة عالميا.

التوصيات: ومما سبق ينصح بالآتي:

- تجنب الأماكن المزدحمة والتثقيف الصحي ونشر الوعى بأعراض ومخاطر مرض الألتهاب الكلوى الكبيبي الحاد في الاطفال مع سرعة علاج التهابات البلعوم واللوزتين وتقيحات الجلد بالمضادات الحيوية.

- الدقة في معرفة التاريخ المرضي للمريض من الاهل والفحص الجيد للمريض مع تسجيل العلامات الحيوية كالضغط ومعدل ضربات القلب ومتابعة تغيير لون البول المدمم.

- ضرورة الاهتمام بعمل التحاليل الاساسية بدء من تحليل البول وضرورة قياس مستوى الدلالات التكميلية بالدم (C3).

- التاكيد علي ضرورة اعادة قياس مستوى الدلالات التكميلية بالدم(C3) بعد 6-8 اسابيع.