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Comparison between the ISKDC Classification and a New Semi-quantitative Classification for Predicting the Outcomes of Henoch-Schonlein Purpura Nephritis

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Abstract

There is a new semi quantitative classification released recently for predicting the outcomes of pediatric HSP nephritis. In this study we try to find out if the new semi quantitative classification is sensitive than the already existing ISKDC classification.

Primary kidney biopsies from 31 HSP nephritis patients were reevaluated using both the ISKDC classification and the new semi quantitative classification. Both the classification was compared in terms of patient outcomes. There are 4 outcome groups .outcome A, n=16 (52%) - no signs of renal disease .outcome B, n= 10 (32%) - minor urinary abnormalities .outcome C, n=4(13%) - patients with active renal disease and outcome D, n=1 (3%) - renal insufficiency, end stage renal disease or succumbed due to HSP nephritis. Outcomes A and B were considered to be favorable and outcomes C and D were considered to be unfavorable.

Patients with unfavorable outcomes (C and D) taken together due to limited patient numbers had significantly higher biopsy scores than those with favorable outcomes (A and B) . But there was no significant difference in the areas under the curve between total biopsy scores by semi quantitative classification and the ISKDC findings.

Our results suggest that the recent semi quantitative classification is not more sensitive than the ISKDC classification in predicting the outcomes of HSP nephritis patients.

Keywords: HSP nephritis, renal biopsy, outcomes, ISKDC, semi-quantitative classification

INTRODUCTION

Henoch–Schonlein purpura (HSP) is a small-vessel vasculitis of childhood. The prognosis of HSP in children is generally favorable. Renal involvement is the principal cause of morbidity and may result in chronic renal disease. Henoch–Schonlein nephritis (HSN) can occur in 30–50% of patients [1,2]. Kidney biopsy is the gold standard for evaluating renal disease [3]. Renal biopsy findings are important to guide treatment decisions. The International Study of Kidney Disease in Children (ISKDC) classification is widely used for grading renal biopsies in HSN [4]. This classification is mainly based on glomerular changes. The number of reports that emphasize the importance of tubulointerstitial and vascular findings in predicting the outcome of HSN is increasing [3,5,6]. A new semi quantitative classification (SOQ) including tubulointerstitial grading was suggested recently by Ronkainen et al. [7] and modified by Koskela et al. [3].

METHODS:

Study method: Hospital based retrospective study

Sample size: 31

A total of 31 patients with biopsy proven HSP nephritis treated in our department over the last 5 years were identified from the patient register . The

medical reports and laboratory data of the patients at the onset of the disease and at the latest visit were collected. The outcome of each patient was assessed at the last control visit. A modified version of the grading system reported by Goldstein et al. [8] and Ronkainen et al. [9] was used to determine the outcome. This clinical outcome was graded as:

A- no signs of renal disease in laboratory tests and normal blood pressure;

B- Minor urinary abnormalities (microscopic hematuria and/or non-nephrotic proteinuria) or antiproteinuric/antihypertensive medication in use, normal blood pressure, and GFR;

C- active renal disease (nephrotic proteinuria or hypertension or immunosuppressive medication in use);

D- Reduced renal function (GFR <60 ml/min/1.73 m2).

Of the 31 samples taken 16 patients had outcome A, 10 patients had outcome B, 4 had outcome C and 1 had outcome D. All of the kidney biopsies were reevaluated by pathologists and were classified using both classifications: ISKDC [4] and modified SOQ. Histologic criteria of the SOQ were compared with the histologic criteria of the ISKDC in children. Total SOQ score was used to compare with the ISKDC classification. Table 1 and 2 shows the modified semi quantitative classification for HSP nephritis and the grading system of the International study of Kidney Disease in children classification for renal biopsies in cases of HSP nephritis respectively.

RESULTS:

Table 3 shows the clinical characteristics of the patient at the time of biopsy. Parameters with normal distribution were expressed as mean ± SD and the parameters with abnormal distribution were expressed as median .

Table 4 shows the comparison of the lab parameters of patients during follow up and at the time of biopsy.

Table 5 shows the grades of ISKDC according to the renal outcome groups. In this classification 5 patients were grouped in grade 1, out of which 4 patients had outcome A and 1 patient had outcome B. 8 patients were grouped in grade 2 ,of which 6 patients had outcome A and 2 had outcome B. In grade 3, 15 patients were grouped, of which 5 patients had outcome A, 6 patients had outcome B and 4 had outcome C+D combined. Under grade ≥4, 3 patients were placed, out of which 1 had outcome A, 1 had outcome B and 1 had outcome C+D.

Table 6 shows the semi quantitative classification scores according to the renal outcome groups. Total biopsy scores for outcome A, B, C+D are 2, 3 and 5 respectively. Activity Index for outcome A, B and C+D are 1,2.5 and 3 respectively. Chronicity Index for Outcome A, B and C+D are 0, 0.5 and 1 respectively.

Table 7 compares the semi quantitative classification scores according to the ISKDC classification.

The true positive rate and false positive rate of the two biopsy classifications were compared using ROC curve analyses. Areas under the curve values of ISKDC classification, total biopsy score, activity and chronicity scores were calculated and presented in Table 8. The AUC values of ISKDC classification, total biopsy score, and chronicity score were significant ($p<0.05$).

DISCUSSION:

The AUC difference between ISKDC classification and biopsy scores was not statistically significant thus showing that the new semi quantitative classification is not so sensitive than the ISKDC classification in predicting the outcomes of the patients with HSP nephritis. However semi-quantitative classification takes into account the activity and the chronicity indices which is lacking in ISKDC classification.

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TABLES:

Table 1. Modified semiquantitative classification for Henoch–Schönlein nephritis.

Modified SOQ		Description	Score
Glomerular changes	Lobulation	Active	0–1[a]
	Mesangial proliferation	Active	0–1[a]
	Cellular crescents	Active	0–3[b]
	Fibrous crescents	Chronic	0–3[b]
	Adhesions	Chronic	0–3[b]
	Fibrinous thrombosis	Active	0–3[b]
	Global sclerosis	Chronic	0–3[b]
	Segmental sclerosis	Chronic	0–2[c]
Tubular changes	Thickening of the basement membrane	Chronic	0–1[a]
	Complete atrophy	Chronic	0–1[a]
	Tubular dilatation	Active	0–1[a]
Interstitial changes	Fibrosis	Chronic	0–1[a]
	Inflammation or periglomerular inflammation	Chronic	0–1[a]
Capillary changes	Arteriosclerosis or arterial inflammation	Chronic	0–1[a]
	Focal or diffuse mesangial proliferation		0 for focal 1 for diffuse

SOQ: semiquantitative classification.
[a]0 = absent, 1 = present.
[b]0 = 0% of glomerulus affected; 1 = 0–5% of glomerulus affected; 2 = 5–10% of glomerulus affected; 3 = >10% of glomerulus affected.
[c]0 = 0% of glomerulus affected; 1 = 0–5% of glomerulus affected; 2 = >5% of glomerulus affected.

Table 2 The grading system of the International Study of Kidney Disease in Children classification for renal biopsies in cases of Henoch–Schönlein nephritis

ISKDC grade	Description
Grade I	Minimal changes
Grade II	Mesangial proliferation
Grade III	Crescents < 50% of the glomeruli; A: Focal, B: Diffuse
Grade IV	Crescents 50–75% of the glomeruli; A: Focal, B: Diffuse
Grade V	Crescents > 75% of the glomeruli
Grade VI	Membranoproliferative glomerulonephritis

ISKDC, The International Study of Kidney Disease in Children

TABLE 3 :CLINICAL CHARACTERISTICS OF THE PATIENT AT THE TIME OF BIOPSY

	TOTAL	A	B	C+D	P VALUE
GENDER (M:f)	13:18	7;9	4:6	2:3	0.669
AGE(YEARS)	9.6±2.23	8.56±2.03	10 ±2	12.2±1.3	0.132
FOLLOW UP YEARS	5	4	5.5	8	0.002
SERUM CREATININE	0.5	0.45	0.5	0.6	0.765
G.F.R.(ml/kg/1.73sqm	106.5±15.4	110.8±13	105.2±14.1	95.2±21.5	0.829
SERUM ALBUMIN	3±0.6	3.1±0.4	3.3±0.6	2.16± 0.4	0.721
SBP	115.4±10.5	114.1±9.2	110.2±7.5	130±5.8	0.098
DBP	65.4±7.5	65.6±7.6	62.2±6.1	131±7.3	0.254
TIME OF NEPHRITIS TO BIOPSY	56	56	65	30	0.36
TIME OF BIOPSY TO TREATMENT	7	7	11	6	0.49
24 HOUR URINE PROTEIN	2.7	2.85	2	4.4	0.018
HEMATURIA	31(100%)	16(100%)	10(100%)	5(100%)	
TREATMENT WITH STEROIDS OR IMMUNOSUPPRESSANTS	22(72%)	11(70%)	6(61%)	5(100%)	0.001

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	AT BIOPSY	LAST VISIT	P VALUE
SERUM ALBUMIN	3 ±0.6	4.2 ± 0.3	<0.001
SERUM CREATININE	0.5(0.2 TO 0.9)	0.5(0.2 TO 1.4)	0.551
SBP	115.4± 10.5	115±17.2	0.160
DBP	65.4± 7.5	116±12.2	0.653
GFR	106.5 ± 15.4	122± 20.6	<0.001

TABLE 4 : COMPARISON OF THE LAB PARAMETERS OF PATIENTS DURING FOLLOWUP

	A	B	C+D	TOTAL
GRADE 1	4	1		5
GRADE 2	6	2		8
GRADE 3	5	6	4	15
GRADE ≥4	1	1	1	3

TABLE 5 GRADES OF ISKDC ACCORDING TO RENAL OUTCOME GROUPS

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	A	B	C+D	TOTAL	P
TOTAL BIOPSY SCORE	2	3	5	2	0.022
ACTIVITY INDEX	1	2.5	3	1	0.094
CHRONICITY INDEX	0	0.5	1	0	0.002

TABLE 6 SOQ CLASSIFICATION SCORES ACCORDING TO RENAL OUTCOME GROUPS

ISKDC	SOQ SCORES			
	0 – 2	3-6	≥7	P VALUE
GRADE 1 (5)	5(100%)	0	0	
GRADE 2 (8)	6(75%)	2(25%)		<0.001
GRADE 3(15)	6(40%)	9(60%)		
GRADE≥4(3)	0	1(33.3%)	2(66.7%)	

TABLE 7 SOQ SCORES ACCORDING TO ISKDC CLASSIFICATION

	AUC	95% C.I	P VALUE
ISKDC	0.639	0.525-0.753	0.016
A.I	0.613	0.494-0.731	0.060
C.I	0.603	0.502-0.704	0.045
TOTAL BIOPSY	0.624	0.501-0.746	0.046

TABLE 8

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