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CORRELATION OF OXFORD MEST-C SCORES WITH CLINICAL-BIOCHEMICAL VARIABLES IN IGA NEPHROPATHY-A RETROSPECTIVE STUDY

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ABSTRACT

Background

IgA Nephropathy is most common primary glomerulopathy reported worldwide. It presents with varied features. MEST-C is used to score histopathology in IgA nephropathy. M stands for Mesangial hypercellularity, E stands for Endocapillary hypercellularity, S stands for Segmental glomerulosclerosis, T stands for Tubular atrophy/interstitial fibrosis, C stands for crescents. As IgA nephropathy is diagnosed in advanced stage in South India, there is deficient data on direct correlation between MEST-C score in kidney biopsy with clinical stage of disease. This study can help in prognostication of the disease in renal outcome by adding MEST-C score to clinical data available at the time of kidney biopsy. There is paucity of data on correlation of Oxford MEST-C scores with clinical-biochemical variables in IgA Nephropathy. Hence, this study was conducted to gain this information.

Methods

It was a retrospective observational study conducted to assess the correlation of Oxford MEST-C scores in kidney biopsy with clinical-biochemical variables in total of 53 kidney biopsy proven IgA Nephropathy patients among the total of 501 total kidney biopsies done. This study was conducted using medical records of IgA nephropathy diagnosed patients. Data was collected regarding patient's demography, clinical features, biochemical parameters and kidney biopsy histopathological findings. Data analysis regarding correlation between clinical-biochemical parameters and MEST-C score in kidney biopsy findings was assessed.

Results

It was found that all M,E,S,T,C scores were significantly linked to presence of renal failure and so, with poor renal outcome, though higher scores T(1,2), C(C2) were significantly noted with presence of renal failure. M,C scores were significantly linked to presence of hypertension. S score was linked to presence of nephrotic proteinuria. S, T scores were linked to microscopic hematuria. C score was

linked to macroscopic hematuria.Chronicity was linked to presence of renal failure and macroscopic hematuria. IgA staining was found to localize more in mesangial/paramesangial areas, had strong association with M,E,S,C scores and C3 staining. Among light chain staining, it was found that Lambda chain staining was dominant.
In this study, patients were younger, had greater prevalence of hypertension, nephrotic proteinuria, advanced renal failure on presentation unlike to data quoted in western literature as in Swarnaltha Gowrishankar et al study.
Conclusions
MEST-C score correlated with various clinical features of IgA nephropathy significantly, which may help in prognostication of the disease.

Keywords: Kidney, Biopsy, Hypertension, Renal Failure.

INTRODUCTION

IgA Nephropathy is most common primary glomerulopathy reported worldwide.[1,2,3,4] It presents with varied features ranging from microscopic to macroscopic hematuria, mild to nephrotic range of proteinuria, hypertension and acute kidney injury (AKI) to chronic kidney disease(CKD).[1,2] Though histological findings also indicate prognosis, but are not well accepted globally.[5]

The 2009 defined Oxford classification and scoring system for IgA nephropathyidentifies 4 independent histologic variables in predicting renal outcome: M stands for: Mesangial hypercellularity score(M-0 means equal to or less than 50% glomeruli with ≥4 mesangial cells per mesangial area, M-1 means more than 50% glomeruli with ≥4 mesangial cells per mesangial area), E stands for Endocapillary hypercellularity (E-0 means its absence, E-1 means its presence), S stands for: Segmental glomerulosclerosis (S-0 means its absence, S-1 means its presence) and T stands for: Tubular atrophy/interstitial fibrosis(T-0 means its presence in less than 25% of cortex, T-1 means its presence in 25-50% of cortex, T-2 means its presence in more than 50% of cortex). Subsequently, scoring of crescents (C-0 means its absence, C-1 means its presence in less than 25% glomeruli, C-2 means its presence in more than 25% of glomeruli) was also introduced as a factor influencing disease outcome.[1,6-11]

Previous studies have shown that proteinuria, blood pressure data for ≥2 years follow-up was required before risk prediction of disease progression could be seen leading to delayed risk prediction of IgA nephropathy progression.[8] Hence, applying newer MEST-C score in association with clinical data at time of biopsy may help in early risk prediction.[8]

Indian data shows higher prevalence of hypertension, significant nephrotic proteinuria, higher CKD prevalence at presentation compared to earlier published western data.[1]
There is paucity of data on correlation of Oxford MEST-C scores with clinical-biochemical variables in IgA Nephropathy. Hence, this study was conducted to gain this information.

OBJECTIVES

1. To assess demography-(age, gender), clinical features-(Hypertension, Renal failure), Biochemical parameters-(Serum creatinine, 24hour urine protein, Nephrotic proteinuria, microscopic hematuria, macroscopic hematuria), MEST-C histologic scores, Chronicity in IgA nephropathy patients.
2. To assess Correlation between demography-(age, gender), clinical features-(Hypertension, Renal failure), Biochemical parameters-(Serum creatinine, 24hour urine protein, Nephrotic proteinuria, microscopic hematuria, macroscopic hematuria) with MEST-C histologic scores-(M,E,S,T,C), Chronicity in IgA nephropathy patients.
3. To assess Correlation between MEST-C score with immunofluorescence findings (C1q,C3,IgG,IgM,IgA,IgA pattern of staining, Kappa, Lambda staining).

MATERIALS & METHODS

This study was conducted using medical records of IgA nephropathy diagnosed patients at Vydehi Institute of Medical Sciences and Research Centre, which is a tertiary care Hospital in Bangalore.

Data Collection

Data was collected regarding patient's demography, clinical features (Blood pressure, age of onset of disease to kidney biopsy time), biochemical parameters (serum creatinine, 24 hours urine protein) and kidney biopsy histopathological findings. Data analysis regarding correlation between clinical-biochemical parameters and MEST-C score in kidney biopsy findings will be assessed.

Inclusion Criteria

All patients diagnosed as kidney biopsy proven IgA Nephropathy in Vydehi Hospital between January 2012 to August 2020.

Exclusion Criteria

Patients treated with immunosuppressants.

Precise Description of Methodology of the Proposed Research

Study design**:** Retrospective Observational study was conducted to assess the correlation of Oxford MEST-C scores with clinical-biochemical variables in IgA Nephropathy.
Outcomes/Endpoints observed: To assess the correlation of Oxford MEST-C scores with clinical-biochemical variables in IgA Nephropathy

Plan for Statistical Analysis of the Study

The data was collected, entered and analysed with SPSS version 19. Continuous variables were presented as mean±Standard deviation Categorical variables were presented as frequency and percentage. Chi square test or Fischer exact test were performed to see the association between any two categorical variables. Mann whitney test was performed when comparing 1 independant variable with 2 levels (groups). Kruskalwallis test was performed when comparing 1 independant variable with >2 levels (groups) for continuous variables. P value of <0.05 was considered as statistically significant and value ≤ 0.001 was considered highly significant.

RESULTS

Prevalence of Clinical Findings and Histology Findings

Study had in total 53 patients of IgA nephropathy had more than 8 viable glomeruli allowing for MEST-C scoring[2] from a total of 501 biopsies performed during this period leading to 10.6% proportion of IgA nephropathy. Mean age of presentation was 27years with age ranging between 8 to 50years. Males populations was 31(58.5%) with male:female ratio 1.4:1. The prevalence of hypertension, diabetes mellitus, renal failure, nephrotic proteinuria, microscopic hematuria, macroscopic hematuria was 10(18.9%), 2(3.8%), 21(39.6%), 11(20.8%), 41(77.4%) and 4(7.5%) respectively as depicted in **Table 1.**
When MEST-C score was analysed, M score 1 was noted in 32(60.4%), E score 1 was noted in 37(69.8%), S score 1 was noted in 24(45.3%), T score 1 and 2 were noted in 7(13.2%), 23(43.4%) respectively and C score 1, 2 were noted in 2(3.8%), 7(13.2%) respectively.
Chronicity was defined as presence of more than 50% sclerosed glomeruli and more than 50% interstitial fibrosis /tubular atrophy. Chronicity was noted in 8(15.1%).
In the immunofluorescence study, C3 (2+,3+) staining was 7(13.2%),9(17%) respectively, C1q, IgG staining was absent in all 53(100%), IgM(1+,2+)staining was noted in 10(18.5%)/13(24.5%) respectively, IgA staining was noted strongly in all 53(100%), IgA pattern of staining-mesangial /paramesangialand capillary areas were noted in 49(92.5%) and 4(7.5%) respectively, Kappa chain and Lambda chain strong staining were noted in 12(22.6%) and 47(88.7%) respectively with greater

intensity of lambda presence as depicted in **Table** 1.The presence of Lambda staining was of greater intensity by a factor of 3.9.

Correlation among Various Variables

In our study, an attempt was done to look at association of all 5 scores with gender, hypertension, renal failure, microscopic hematuria, macroscopic hematuria, nephrotic proteinuria as in **Table 2.** M score was noted to be strongly associated (p value <0.001), with hypertension, renal failureand moderately associated (p value <0.05) with microscopic hematuria, macroscopic hematuria. E score was noted to be strongly associated (p value <0.001) with renal failure and moderately associated (p value <0.05) with hypertension, microscopic hematuria.S score was noted to be strongly associated (p value <0.001) with renal failure, microscopic hematuria and moderately associated (p value <0.05) withhypertension, nephrotic proteinuria, macroscopic hematuria.T score was noted to be strongly associated (p value <0.001) with renal failure, microscopic hematuria andmoderately associated (p value <0.05) withhypertension.C score was noted to be strongly associated (p value <0.001) withhypertension, renal failure and macroscopichematuria.

Chronicity was noted to be strongly associated (p value <0.001) with renal failure, macroscopic hematuriaandmoderately associated (p value <0.05) withhypertension.

On subanalysis, between renal failure and within T score, it was noted that there was strong association (p value <0.001) between them especially with higher scores T1,T2.

On subanalysis, between serum creatinine and within C score, it was noted that there was strong association (p value <0.001) between them especially with higher score C2.

Within IgA staining pattern, it was found to localize in mesangial/paramesangial areas dominantly compared to capillary wall. It had strong association with M,E,S,C scores and not with T score.It had strong association and accompanying with C3 staining in 16(30%).

Among light chain staining, it was found that Lambda chain staining was dominant. It had strong association with E,S,T scores and not with M,C scores.

Characters	**Units**	**Values**
Clinical Findings		
Age	Years	27.58(mean)
Gender	Male/Female	31(58.5%)/22(41.5%)
Hypertension		10(18.9%)
Diabetes mellitus		2(3.8%)
Renal Failure		21(39.6%)
Laboratory Findings		
Nephrotic Proteinuria		11(20.8%)
Microscopic Hematuria		41(77.4%)
Macroscopic Hematuria		4(7.5%)
Histological Findings		
M score 0		21(39.6%)
1		32(60.4%)
E score 0		16(30.2%)
1		37(69.8%)
S score 0		29(54.7%)
1		24(45.3%)
T score 0		23(43.4%)
1		7(13.2%)
2		23(43.4%)
C score 0		44(83%)
1		2(3.8%)
2		7(13.2%)
Chronicity		8(15.1%)

C3(absent/2+/3+)		37(69.8%), 7(13.2%),9(17%)
C1q		0
IgG		0
IgM(-/1+/2+)		30(56.6%)/10(18.5%)/13(24.5%)
IgA(2+/3+)		15(28.3%) /38(71.7%)
IgA pattern of staining-mesangial /paramesangial		49(92.5%)
Capillary		4(7.5%)
Kappa staining- Mild staining(-/1+) Strong staining(2+/3+)		 41(77.4%) 12(22.6%)
Lambda staining Mild staining(-/1+) Strong staining(2+/3+)		 6(11.3%) 47(88.7%)
Table 1: Characteristics of study group (Total number of patients=53)		

Oxford scores	**Gender**			**Hypertension**			**Renal Failure**		
	Male	**Female**	**P value**	**Present**	**Absent**	**P value**	**Present**	**Absent**	**P value**
M score 0	13(41.9%)	8(36.4%)	0.683	8(80%)	13(30.2%)	0.009	21(100%)	0	0.001
1	18(58.1%)	14(63.6%)		2(20%)	30(69.8%)		0	32(100%)	
E score 0	12(38.7%)	4(18.2%)	0.109	6(60%)	10(23.3%)	0.05	16(76.2%)	0	0.001
1	19(61.3%)	18(81.8%)		4(40%)	33(76.7%)		5(23.8%)	32(100%)	
S score 0	16(51.6%)	13(59.1%)	0.59	2(20%)	27(62.8%)	0.031	0	29(90.6%)	0.001
1	15(48.4%)	9(40.9%)		8(80%)	16(37.2%)		21(100%)	3(9.4%)	
T score 0	13(41.5%)	10(45.5%)	1	1(10%)	22(34.9%)	0.025	0	23(71.9%)	0.001
1	4(12.9%)	3(13.6%)		1(10%)	6(14%)		0	7(21.9%)	
2	14(45.2%)	9(40.9%)		8(10%)	15(34.9%)		21(100%)	2(6.3%)	
C score 0	26(83.9%)	18(81.8%)	1	5	39(90.7%)	0.004	13(61.9%)	31(96.9%)	0.002
1	1(3.2%)	1(4.5%)		2	0		2(9.5%)	0	
2	4(12.9%)	3(13.6%)		3	4(9.3%)		6(28.6%)	1(3.1%)	
M score 0	6(54.5%)	15(35.7%)	0.31	20(48.8%)	1(8.3%)	0.017	4(100%)	17(34.7%)	0.02
1	5(45.5%)	27(64.3%)		21(51.2%)	11(91.7%)		0	32(65.3%)	
E score 0	4(36.4%)	12(28.6%)	0.716	16(39%)	0	0.01	0	16(32.7%)	0.303
1	7(63.6%)	30(71.4%)		25(61%)	12(100%)		4(100%)	33(67.3%)	
S score 0	2(18.2%)	27(64.3%)	0.015	18(43.9%)	11(91.7%)	0.003	0	29(59.2%)	0.036
1	9(81.8%)	15(35.7%)		23(56.1%)	1(8.3%)		4(100%)	20(40.8%)	
T score 0	2(18.2%)	21(50%)	0.095	13(31.7%)	10(83.3%)	0.006	0	23(46.9%)	0.102
1	1(9.1%)	6(14.3%)		6(14.6%)	1(8.3%)		0	7(14.3%)	
2	8(72.7%)	15(35.7%)		22(53.7%)	1(8.3%)		4(100%)	19(38.8%)	
C score 0	9(81.8%)	35(83.3%)	0.577	33(80.5%)	11(91.7%)	1	0	44(89.8%)	0.001
1	1(9.1%)	1(2.4%)		2(4.9%)	0		0	2(4.1%)	
2	1(9.1%)	6(14.3%)		6(14.6%)	1(8.3%)		4(100%)	3(6.1%)	
Table 2: MEST-C score correlation with clinical findings									

Study	Swarnalata et al[1]	Mittal et al[1,1F]	S.Siddappa et al[1D]	Muthu kumar et al	Chandrika et al[1B]	Chacko et al[1C]	Bhagchi et al[1F]	Present study
Characters	**Values**							**Values**
No. of IgAN cases	3345/25277	66	31	98	227	478	103	53/501
IgAN as a % from total biopsies	13.23		7.8		14.26	8.6		10.6
Mean Age(Years)	35.83	29.9	36.6	25.7	30	32	28.8	27.58
Male:female ratio	2.4:1	4.4:1	1.2:1		1.5:1		2.8:1	1.4:1
Hypertension	60%	78.8	48	9.2	3.5	58	39.4	18.9%
Diabetes mellitus	-							3.8%
Renal Failure	78.9%(if serum creatinine≥1mg /dl),36.4%(if serum creatinine≥3 mg/dl)	38	38	13.5	5.7	60	16.5	39.6%
Nephrotic Proteinuria	37.4%	23.1		25.6	36.7	55	63.1	20.8%
Microscopic Hematuria	79.9%	81(total)		5.1(hematuria)	18.9(hematuria)	16(hematuria)	91(hematuria)	77.4%
Macroscopic Hematuria	3.9%							7.5%
M score in% cases 0	59							39.6%
1	59	79.6					77.7	60.4%
E score 0								30.2%
1	38	29.6					9.7	69.8%
S score 0								54.7%
1	60	57.4					43.7	45.3%
T score 0								43.4%
1	20	74.2(T1+T2)					39.6(T1+T2)	13.2%
2	4							43.4%
C score 0								44(83%)
1	20	56.6					10.7	3.8%
2	8							13.2%
Chronicity in % cases	14							15.1%
C3 positivity in % cases	92							30.2
C1q								0
IgG								0
IgM positivity in % cases								43
IgA(2+/3+) in % cases								28.3%, 71.7%
IgA pattern of staining-mesangial /paramesangial								49(92.5%)
Capillary								4(7.5%)
Factor difference between presence of Lambda light chain vs Kappa light chain staining	<2							3.9

Table 3: Comparison of demographics, laboratory and histopathological findings with different Indian studies

udy	Valiga[1,4]	Zeng et al[1,1F]	Wu et al[3] in child	Oxford derivation[4]	North American Validation[4]	SJ Barbour et al[4]	Katafuchi et al[4]	Takahito et al[16]	Present study
Characters									**Values**
No. of IgAN cases	1147	1026	1243	167	87	901	702	871	53/501
IgAN as a % from total biopsies									10.6
Mean Age(Years)	36	34	14	36.1	41.8	38.1	30	31	27.58
Male:female ratio	2.7:1		2.1:1	2.3:1	1.41:1	2.4:1		0.69:1	1.4:1
Hypertension	65	33							18.9%
Diabetes mellitus									3.8%
Renal Failure	37	24					25		39.6%
Nephrotic Proteinuria	21								20.8%
Microscopic Hematuria		27							77.4%
Macroscopic Hematuria									7.5%
M score in% cases 0									39.6%
1	26.9	43	29	78.4	89.7	42.5	49.4		60.4%
E score 0									30.2%

1	11.4	11	35	37.1	31	18.1	44.9		69.8%
S score 0									54.7%
1	75.3	83	37	79	65.5	75	72		45.3%
T score 0									43.4%
1	17.6	27.3(T1 +T2)	23	19.2	17.2	17.9	21.7		13.2%
2	4.3		4.3	4.8	2.3	4.2	5.9		43.4%
C score 0									44(83%)
1	9(total)	48	44	40.7(total)	32.2(total)	17.1(total)	45.4		3.8%
2			4.6				5.3		13.2%
Chronicity in % cases									15.1%
C3 positivity in % cases			84						30.2
C1q									0
IgG			25						0
IgM positivity in % cases			44						43
IgA(2+/3+) in % cases			13%,81%						28.3%, 71.7%
IgA pattern of staining-mesangial /paramesangial			68						49(92.5%)
Capillary			32						4(7.5%)
Factor difference between presence of Lambda light chain vs Kappa light chain staining									3.9 in 47(88.7%) patients

Table 4: Comparison of demographics, laboratory and histopathological findings with different foreign studies

DISCUSSION

We added MEST-C scores with variables like hypertension, renal failure, nephrotic proteinuria, microscopic hematuria and macroscopic hematuria to improve risk prediction of renal function decline. This will help in avoiding usually followed 2 years of follow-up data before making treatment decisions. But, the importance of this association in looking at early risk prediction, prognosis and its importance in guiding the treatment of disease is not clear at present as there are only few studies across globe looking into this.

The prevalence of IgA nephropathy varies from 2% to 50% worldwide.[1,2,12] Its prevalence in US/Canada and Asia is 11.8% and 39.5 respectively.[13] Its prevalence in India is 7% to 16%.[1,2,3,14] Geographic variation could be related to genetic factors or lower rates of kidney biopsies in otherwise asymptomatics with mild urinary abnormalities.[13] As our hospital is a tertiary care hospital, wherein referral come from many centres, hence it reflects a fair representation of disease in India.

In the present study, IgA nephropathy constitute to 53 patients from a total of 501 biopsies performed during this period leading to 10.6% proportion of IgA nephropathy, which is similar to ranges mentioned in other studies across India.

Mean age of presentation was 27 years, slightly younger compared to other studies across the globe varying between 28 to 38 years.[1] Male:female ratio was 1.4:1 as mentioned in earlier literature.[1,4]

Table 1, 3, 4 summarizes the clinical and biochemical data. The prevalence of hypertension varies across globe between 6% to 65%. Indian studies quote hypertension prevalence between 35% to 60%.[1]The prevalence of hypertension in this study noted was 18.9%.

The prevalence of renal failure varies across globe between 2% to 36%.[1] Indian studies quote its prevalence between 5.6% to 60%.[1,14] The prevalence of renal failure in this study was higher noted in 39.6% showing detection of disease in advanced stage.The prevalence of nephrotic range proteinuria varies across the globe.[1] Indian studies quote its prevalence between 23% to 63%.[1] The

prevalence of nephrotic proteinuria in this study was higher noted in 20.8% compared to quoted in western literature.

The prevalence of hematuria in Indian studies varies from 5.1% to 91%.[1] The prevalence of microscopic hematuria (defined as >4red blood cell count /high power field), macroscopic hematuria (defined as 'numerous' or >100 red blood cell count /high power field) in this study noted was 77.4% and 7.5% respectively. IgA nephropathy is being detected at advanced stage in India than in other parts of world.[1]

Not many studies have analysed impact of MEST-C score with clinical disease progression.

Correlation among Various Variables

M,E,S,T,C scores were strongly associated with renal failure occurrence and progression(Table 2,3). Further it was noted that renal failure occurred with higher T scores (T1,T2) like in SJ Barbour et al study,[8] Zhang et al study[15] and C scores (C0,C2) like in Wu et al study[7,9,11] This study showed association of M score with renal failure like in VALIGA study,[7] Chinese study[7] but unlike in Wu et al study[7] possibly due to low prevalence. As S,T scores represent chronic, late stage in IgA nephropathy, so these scores predicts renal failure.[7,16,17]

Though this study showed association of E,C score with renal failure, like in Karoui et al study,[18] Chakera et al study[19] suggesting proliferative lesions leading to renal failure which are also amenable to immunsuppressive therapy but unlike in Oxford classification cohort,[20] Wu et al[7] studiespossibly due to widespread use of immunosuppressants influencing the outcome in these studies.

Hypertension was higher in all scores (like in Wu et al study[6]), but was strongly associated with M,C scores.

Nephrotic proteinuria was significantly associated with S score, like in Bellur et al study[21] unlike in SJ Barbour et al study[8] wherein proteinuria was associated with M1 score, but in Wu et al study[7] all scores M1E1S1T1, 2C1,2 were associated with proteinuria.

Microscopic hematuria was associated with M,E,S,T scores though it was significant with S,T scores.

Macroscopic hematuria was associated with M,S,C scores though it was significant with C score.

Chronicity was higher in patients with renal failure, macroscopic hematuria, hypertension but was strongly associated with renal failure, macroscopic hematuria.

IgA staining was found to localize in mesangial/paramesangial areas dominantly compared to capillary wall. It had strong association with M,E,S,C scores and not with T score**.** It had strong association with C3 staining with worse outcome.

Among light chain staining, it was found that Lambda chain staining was dominant. The presence of Lambda staining was of greater intensity by a factor of 3.9, compared to swarnalata et al study.[1] It had strong association with E,S,T scores and not with M,C scores**.** Electrophoresis showed no paraproteinemia in these patients.

In this study, patients were younger, had greater prevalence of hypertension, nephrotic proteinuria, advanced renal failure on presentation like in swarnalata et al study in India but unlike to data quoted in western literature.

MEST-C scores show a significant association with variables like hypertension with M,C scores, renal failure with all M,E,S,T,C scores-though strongly associated with S,T, nephrotic proteinuria with S score, microscopic hematuria with S,T scores and macroscopic hematuria with C score.

The difference in validation among various studies including present study could be related to regional, ethnic differences, selection criteria, presentation time as in Tables 3, 4. This points towards need of development of large database to solve this insufficient statistical power.

Thus, it can be summarized that most predicting risk factors like renal failure, proteinuria, hypertension are strongly correlated with pathological kidney damage on biopsy, which points that combination of clinical and histological risk factors prognostication the IgA nephropathy. But, the importance of this association in looking at early risk prediction, prognosis and its importance in guiding the treatment of disease is not clear at present. Though few studies like SJ Barbour et al[8] concluded that combination of MEST score especially T1,T2,M1 scores with cross sectional clinical

data at biopsy provides early risk prediction in IgA nephropathy, but more studies are required to ascertain it.

LIMITATIONS OF THIS STUDY

First as it is a retrospective study, it is not easy to have control on variables. Second, results cannot be generalized.

CONCLUSIONS

In summary, this study showed that all M,E,S,T,C scores were significantly linked to presence of renal failure and so, with poor renal outcome, like in LV.J et al study[22] though higher scores among T(1,2), C(C2) were noted with presence of renal failure. M,C scores were significantly linked to presence of hypertension. S score was linked to presence of nephrotic proteinuria. S, T scores were linked to microscopic hematuria. C score was linked to macroscopic hematuria. Chronicity was linked to presence of renal failure and macroscopic hematuria. IgA staining was found to localize more in mesangial/paramesangial areas, had strong association with M,E,S,C scores and C3 staining. Among light chain staining, it was found that Lambda chain staining was dominant. Patients were younger, had greater prevalence of hypertension, nephrotic proteinuria, advanced renal failure on presentation like in swarnalata et al study in India but unlike to data quoted in western literature. MEST-C score correlated with various clinical features of IgA nephropathy significantly, which may help in prognostication of the disease.

Ethics Committee Approval

Ethics approval was obtained from Vydehi Institute of Medical Sciences and Research Centre, Bangalore 560066, VIEC/2020/APP/097; Dated: 17.11.2020.

Informed Consent

Written informed consent was obtained from the patients who agreed to take part in the study.

Declaration of Interests

The authors have no conflict of interest to declare.

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Author Contributions

1. **Dr Girish P Vakrani:** Contributed toward management of patients, data collection, Literature search, data analysis, and manuscript preparation.
2. **Dr Nambakam Tanuja Subramanyam:** Contributed toward statistics, Literature search and manuscript preparation.
3. **Dr Priyashree R:** Contributed toward management of patients and statistics.
4. **Dr Yashavantha kumar K Y:** Contributed toward statistics and Literature search.

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