

Histological Profile and Outcome of Infantile Nephrotic Syndrome

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Abstract:

Background and Objectives: Infantile Nephrotic Syndrome is defined as nephrotic syndrome presenting between 3 and 12 months of age. The clinical utility of biopsy result with respect to prognosis and management is unclear in the era of increased genetic testing. In the present study we retrospectively investigated the histopathological finding, clinical course and outcome of children who presented with Infantile Nephrotic Syndrome.

Material and Methods: The study was conducted from January 2010 to January 2016, at the department of pediatrics SVPPGIP & SCB Medical College, Cuttack, Odisha. All nephrotic children, presented between 3 and 12 months of life were included in the study. Their demographic data, renal histological finding, drug response pattern and treatment outcome were analyzed in the study.

Results and Discussion: The study group included 7 males and 9 females infants. The mean age at presentation was 9.6 months. Hypertension was recorded in 4 (25%) and microscopic hematuria was present in 6 (37%) infants. Histopathology of renal tissue revealed MCD in 6 (37.5%), FSGS in 4 (25%), DMS in 3 (18%), IgMN in 3 (18%). Steroid resistant nephrotic syndrome (SRNS) was most common clinical course 7(43%), followed by SDNS 6(37%) and FRNS in 3(18%) cases. Most of the children 11(68%) responded to combination of oral Cyclosporine A and Prednisolone.

Conclusion: In our study, MCD was most common histological finding and majority of infants were resistance to steroid at the initial presentation.

Keywords-: Infantile Nephrotic Syndrome, Renal Biopsy.

Abbreviations:

MCD -: Minimal Change Disease
FSGS -: Focal Segmental Glomerulosclerosis
DMS -: Diffuse Mesangial Sclerosis
IgMN -: IgM Nephropathy
SRNS -: Steroid Resistance Nephrotic Syndrome
SDNS -: Steroid Dependent Nephrotic Syndrome
FRNS -: Frequent Relapsing Nephrotic Syndrome
FSGS -: Focal Segmental Glomerular Sclerosis.
CyA -: Cyclosporine A
LM -: Light Microscopy
IF -: Immunofluorescence.

I. Introduction

Infantile Nephrotic Syndrome is defined as nephrotic syndrome presenting between 3 and 12 months of age. The clinical utility of biopsy result with respect to prognosis and management is unclear in the era of increased genetic testing. In the present study we retrospectively investigated the histopathological finding, clinical course and outcome of children who presented with Infantile Nephrotic Syndrome. Infantile Nephrotic Syndrome requires intensive therapy otherwise, death may occur in early childhood^{1,2}. The features due to hypoproteinemia will be generalized edema, abdominal distension, ascites, umbilical hernia and wide cranial sutures and fontanelle. There are other associated features like hypothyroidism, hypotonia, dyslipidemia. Cardiac abnormalities like hypertrophy and mild pulmonary stenosis³.

Before 1987, all infant with Infantile Nephrotic Syndrome died by the age of 3 years. After availability of Intravenous albumin infusion, elective bilateral nephrectomy, renal transplantation and nutritional support, mortality have fallen upto 30%¹. Majority is caused by genetic defect in glomerular filtration barrier particularly Nephrin and podocin.⁴

Objective

The present study was investigated the histopathological finding and clinical course of the children presented with Infantile Nephrotic Syndrome.

II. Materials & Methods

This study was conducted from January 2010 to January 2016, at the department of pediatrics SVPPGIP & SCB Medical College, Cuttack, Odisha. The demographic profile, clinical data, laboratory data, renal biopsy finding and various therapies received were retrieved from the case sheet. All nephrotic children presenting between 3-12months who consented for renal biopsy were included in the study. Infantile Nephrotic Syndrome were subjected to renal biopsy after taking consent from parents and legal guardian. All the data collected were entered in Microsoft excel 2010 and analyzed. All children were treated as per the Indian Society of Pediatric Nephrology (ISPN) protocol.

III. Results

The study cohort included 16 patients 7 males and 9 females infants. The mean age at presentation was 9.6 months. Hypertension was recorded in 4 (25%) and microscopic hematuria was present in 6 (37%) infants. Histopathology of renal tissue revealed MCD in 6 (37.5%), FSGS in 4 (25%), DMS in 3 (18%), IgMN in 3 (18%) cases. The renal histopathological finding of 10 months old is shown in the **Fig 1 & 2**. Steroid resistant nephrotic syndrome (SRNS) was most common 7(43%) clinical course, followed by SDNS 6(37%) and FRNS in 3(18%) children. Most of the children 11(68%) responded to combination of oral Cyclosporine A and Prednisolone during one year follow up.

Figure 1 Light Microscopy showing normal glomeruli with few tubular casts with unremarkable blood vessels and interstitium (Hematoxylin and Eosin stain, original magnification x200).

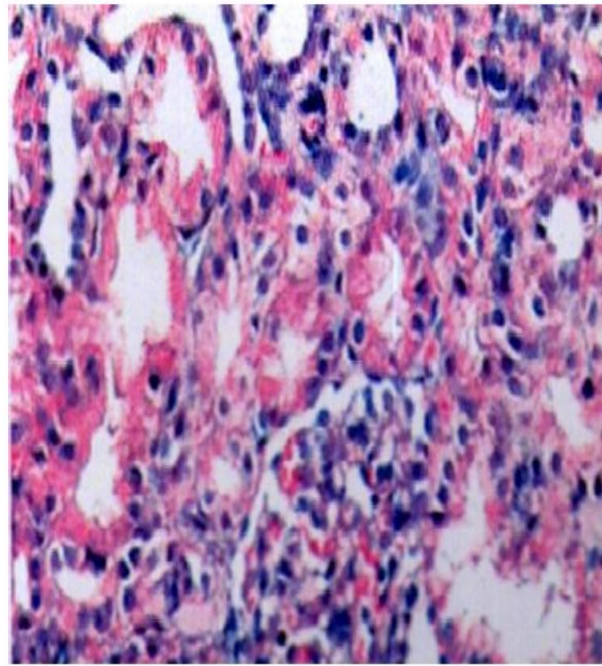


Figure 1.LM : 10 months old girl child with steroid resistance nephrotic syndrome. Light Microscopy of renal histopathology showed all the glomeruli are within normal limit of morphology. The interstitium and blood vessels are unremarkable.

Figure 2 Direct Immuno-fluorescence showing granular mesangial deposits of IgM (3+). Original magnification x200.

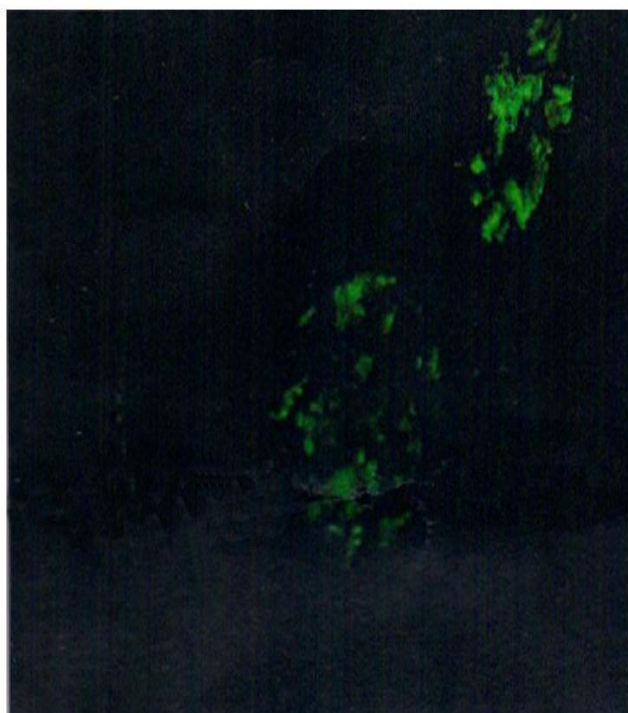


Figure 2. IF: All glomeruli showed granular mesangial deposits of IgM (3+). Negative for IgG, IgA, C3c, C1q, kappa and lambda suggestive of IgM Nephropathy.

Table 1. Histological Pattern seen in various studies.

Sr. no.	Study	MCD	FSGS	DMS	IgMN
1.	Present Study	37.5%	25%	18%	18%
2.	BeateBanaszak et al ⁸ Study 1	25%	17.9%	-	-
3.	BeateBanaszak et al ⁸ Study 2	9%	20.4%	-	-
4.	Srinivastava et al ⁶	57%	-	5%	-

V. Discussion

Annual incidence of 2 to 7 children per 100,000 ISKD, MCD(77%),FSGS(8%),MPGN in membranous Glomerular Nephritis. Increase incidence of Resistance to steroid therapy in FSGS needs Biopsy. All renal biopsy needed triaging for immunofluorescence and electron microscopy, the standard IF includes-IgG,IgA,IgM,C3,C4,C1q.⁵ In our study we had MCD 37.5%,FSGS 25%,DMS 18%,and IgMN 18% as shown in the **Table 1**.

Srinivastava et al. in 1975 found in renal biopsy that out of 150 children,85(57%) showed minimal lesion, 8(5%) cases of mesangiocapillary,4(2.5%) cases mesangioproliferative,2(1.2%) proliferative with extensive glomerulosclerosis,8(5%) advanced nonspecific,9(6%) mild proliferative between 6 months to 16years. This study done long back in 1975,⁶so in recent years lot of changes have occurred. AnjaK.Buscher et al. found that Mutation of podocytes gene are associated with steroid resistance nephrotic syndrome. Their results found that mutation in 52% of families. 68% of patient with non genetic SRNS responded to cyclosporine. Most of them achieved complete remission.⁷ BeateBanaszak et al studied in two group from 1986-1995 (76 patients) and than from 1996-2005 (105 patients). They found that Primary Steroid Resistance in 15.8% vs 31.4%. MCNS 25% vs 9%,Mesangial proliferative glomerulonephritis 46.4% vs 61.3%, FSGS 17.9% vs 20.4%, MPGN 7.1% vs 6.8%, Membranous Glomerulonephritis 3.6% vs 0% among the two groups respectively.⁸ In our cases 68%, receiving prednisolone and cyclosporine had remission. No genetic study was done in our cases.

IV. Conclusion

There is high incidence of Steroid Resistance Nephrotic Syndrome in children presented with Infantile Nephrotic Syndrome. Minimal Change Disease is most common renal histological finding and majority of

children responded to oral Cyclosporine A therapy. However in view of high prevalence of steroid resistance, long term follow up is required.

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