Patterns of Renal Diseases in Children with Steroids Resistant Nephrotic Syndrome

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ABSTRACT

Objective: To determine the histological pattern of renal diseases in children with steroid resistant nephrotic syndrome.

Methodology: This was a descriptive study conducted at the division of nephrology, Lady Reading Hospital Peshawar, Pakistan from July 2014 to June 2019. We performed renal biopsies of all children under the age of 15years who presented with steroids resistant nephrotic syndrome (SRNS).

Results: Total number of patients was 170. Mean age was 11.76± 4.2yrs. In 33(19.4%) of children, the histological diagnosis was Minimal Change Disease (MCD), followed by Focal Segmental Glomerulosclerosis (FSGS) in 28(16.4%), Mesangio-proliferative GN in 24(14.1%), and IgM Nephropathy in 21(12.3%).

Conclusion: MCD was the most common histological pattern of renal disease among children with SRNS followed by FSGS, Mesangio-proliferative GN and IgM Nephropathy.

Key words: Nephrotic syndrome, child, histopathological patterns

Introduction

Steroid-resistant nephrotic syndrome (SRNS) is a common problem in children and poses significant therapeutic challenge for the treating physicians[1, 2]. The children with SRNS may progress to renal impairment and often end up in end-stage renal disease (ESRD)[3, 4].

FSGS is the leading cause of SRNS in European countries[5] and a very important cause of it in other countries of the world[6-10]. However, hepatitis B infection associated membranous nephropathy (MN) is reported as the main cause of SRNS in South African countries[11] while MCD is the main cause of SRNS from a study reported from Kuwait. Steroids resistant has recently been reported in higher incidences and subsequently been confirmed in other studies from Louisiana in USA, these reports are not consistent with the typical minimal change nephrotic syndrome (NS)[12].

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The current information about the histopathological pattern of SRNS in children is very little in Pakistan[13]. Data from the literature do suggest an ever-changing pattern of histopathology in INS not only in adults but in children as well[14]. It is pertinent to undergo studies and evaluate the histopathological patterns of renal diseases in children with SRNS. It will certainly lead to better management options and improving treatment pathways.
This study is thus designed to determine the spectrum of the histopathological patterns in children with SRNS at our center.

Material and Methods

This was a descriptive study with consecutive sampling carried out at Department of Nephrology, Lady Reading Hospital, Peshawar, from July 2014 to June 2019. During this study a total of 170 renal biopsies were performed from children with steroid resistant nephrotic syndrome under the age of 15years.

After taking an informed consent from the patients and approval from ethical committee of the hospital, renal biopsy was performed and tissue was from the children with steroid resistant nephrotic syndrome. While children having age >15yrs, or having hypertension, solitary kidney situation or abnormal coagulation profile were excluded from this study.

In our study, we performed renal biopsies under real time ultrasound guidance in a prone position, with the patient lied over his/her abdomen and a support put in under his/her abdomen to let the kidney pushed towards the posterior abdominal wall. Then both kidneys were visualized, to have made sure the presence of two kidneys. Skin was wiped clean with povidone iodine and lower pole of the left kidney was marked on the surface of the skin over left lumber region, local anesthetic injected into the skin and deep into the renal capsule as well, renal biopsy needle then locked and inserted under ultrasound guidance. When it was made sure the needle is fully engaged to renal cortex, biopsy gun was fired, renal tissue taken and sent to laboratory in two different preservatives. One for immunofluorescence (IF) in liquid nitrogen and the other for light microscopy (LM) in formalin. To avoid bias all biopsy samples were sent and reported from one center.

Data was acquired through clinical history, physical examination and relevant investigations. All information was recorded on a pre-designed structured proforma. Descriptive statistical analysis (frequency, percentage, ratio, range and mean/SD) was employed for variables of interest. Data storage, processing and analysis was done utilizing SPSS version 21.0. Data was presented in the form of graphs and tables.

Results

A total number of 170 biopsies were carried out during this study. Out of these, 95(56%) were from male and 75(44%) were from females as shown in Table 1.

The mean age was 11.76± 4.2yrs, with a range of 03-15years. In 33(19.4%) of children the histological diagnosis was Minimal Change Disease (MCD), followed by Focal Segmental Glomerulosclerosis (FSGS) in 28(16.4%), Mesangio-proliferative GN 24(14.1%), and IgM Nephropathy 21(12.3%) as shown in Fig 1

Citations

Table 1: Table 1. Number and percentages of the children

	Number	Mean Age
Total Number of Patients	170	11.77
Male	95(56%)	11.28
Female	75(44%)	12.32
03 to 10 Years of Age	53(31%)	8.10
11 to 15 Years of Age	117(69%)	13.40
Male to Female Ratio	1: 08	

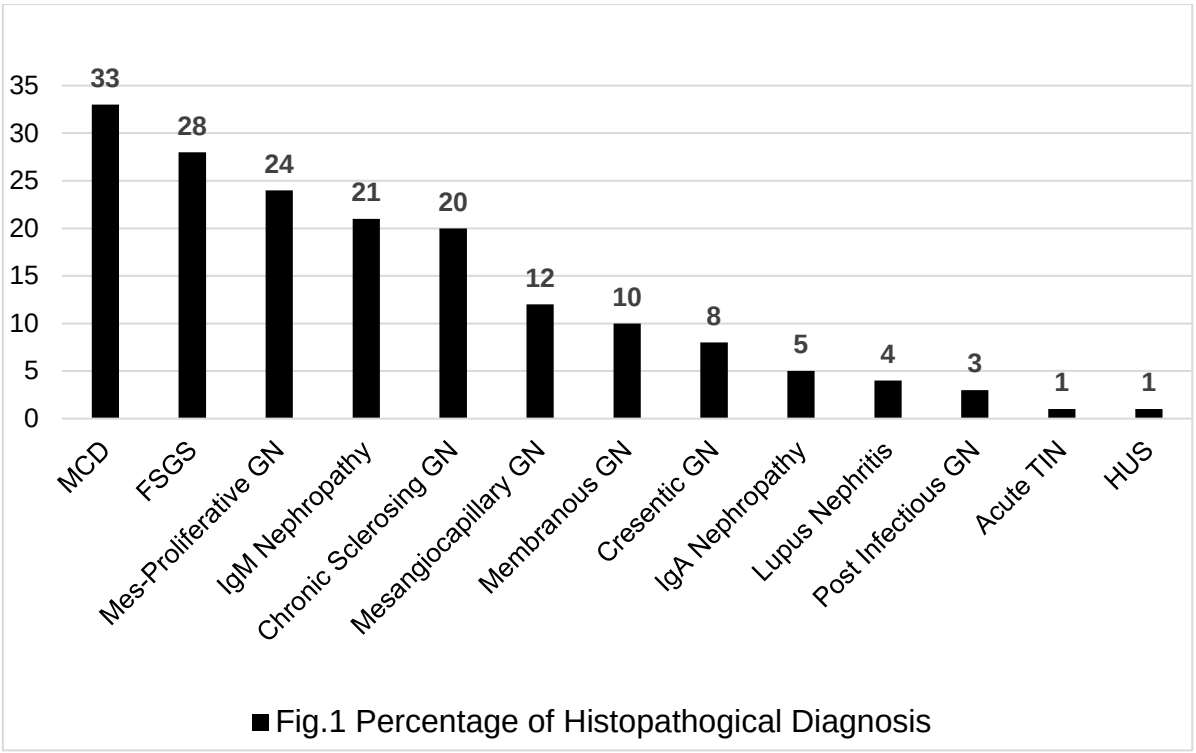

Figure 1: Percentage of Histopathogical Diagnosis

Discussion

Steroids resistance among patients with INS in pediatric population is 10%[15]. The progression of the disease and treatment response mainly depends upon the histological pattern[16]. The current literature report consistent changes in the histological spectrum of the of the glomerular diseases in both children and adults[17].

Our studies reports are in a best comparison with international studies done by Moorani KN et al, their study reported MCD in 32.20%, FSGS in 29.66% and mesangio-proliferative Glomerulonephritis (MPGN) only in 0.84% patients with SRNS[18]. The aforementioned reports were also in comparison with what Lanewala A et al[19] showed i.e MCD as the leading histopathological pattern of INS, followed by FSGS, while a study by Seif EI et al[20] from a leading center in Egypt reported a little different pattern, with FSGS 30.2% as the leading cause of SRNS followed by MCD 24.5%. Other studies also found MCD as more common than FSGS in children with SRNS[4, 10, 21]. Our study reflects the true comparison to the above-mentioned international studies.

A rise in the prevalence of FSGS in children is reported by many authors in the recent years, and since this lesion is more steroid resistant, progressive in nature, long-term prognosis differs as compared to MCD[22, 23]. Increase in the incidence of this lesion throughout the world not only in adults but also the children is also confirmed by some other authors as well[24]. Still the rates of FSGS diagnosis are not uniform across the world as a study from India found FSGS in 50% of cases of SRNS children[16] and similar rate was also reported in the studies from Saudi Arabia and Tunisia[23, 25]. The reasons for the different results are not exactly known, but racial, genetic, or environmental factors play a pivotal role, difference in the disease definition, inclusion criteria and observer variation may also be a reason.

In some earlier reports from literature show slightly decreased frequency of FSGS than that observed in the subgroup of INS with SRNS[26] and it may be partly due to the lower threshold of upper age limit of children included in the present study. As shown by our study, FSGS was also less common than MCD among SRNS patients in studies from Japan, France, and Kuwait[4, 10, 21]. A study done by Pradhan SK et al[27] also showed that MCD was the most common histopathological diagnosis seen in the pediatric population and FSGS as the second most common cause. Overall, MCD is the most common cause of INS in children, especially under six years of age. However, its

incidence in SRNS is lower than that of FSGS in some of the reported studies[22, 23]. While Gulati S et al[16] concluded that FSGS was seen in 58.8% patients along with equal prevalence of 17.6% both for MCD and MPGN.

MN was less common in our children with SRNS as in almost all previously published series on this subject[13, 22, 23, 26].

Conclusion

MCD was the most common histological pattern of renal disease among children with SRNS followed by FSGS, Mesangio-proliferative GN and IgM Nephropathy.

Declaration

Author's contributions

Dr Muhammad Ikram: study design, practical thinking, and over all supervision of the progress from the start to the end.

Dr Shad Muhammad: Help in over-all study data compilation.

Dr Noor Muhammad: Follow up of the data collection.

Dr Khursheed: Practically looked for mistakes and gaps which made a practical work possible.

Dr Furqan: Provided us ideas and work modification during all this process.

Dr Salma Ghulam: Data collection.

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