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RESEARCH ARTICLE

A review of renal biopsy results in Iraqi children with glomerular diseases

Dr. Rasim M. Khamass [1], Prof. Dr. Mahjoob N. Al-Naddawi [2], Dr. Areej E. Kadhom.[3]

1. FICMS (Paediatric Nephrology), FICMS (Paediatrics), CABP, DCH, MBChB. Department of Paediatric Nephrology, Al-Karama Teaching Hospital, Baghdad, Iraq.
2. MRCP-UK, FRCP-ED/Lond, MBChB. Department of Paediatrics, College of Medicine, Baghdad University, Baghdad, Iraq.
3. PhD (Pathology), MSc (Pathology), MBChB. Department of Laboratory, Baghdad Teaching Hospital, Medical City Center, Baghdad, Iraq.

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Corresponding Author

Dr. Rasim M. Khamass

Abstract

Background:
Renal biopsy is a fundamental standard in renal tissue analysis to establish the histopathological diagnosis and to determine the extent of damage in renal disease.

Objectives:
To study the histopathological results of renal biopsies in Iraqi children with glomerular diseases.

Subjects, materials and methods:
Analysis was done on 200 renal biopsy results of Iraqi paediatric who underwent percutaneous renal biopsy, collected from departments of Paediatric Nephrology in Baghdad covering a ten years period from 2004 to 2013.

Results:
For the 200 patients included in this study, 55% were males and 45% were females. The mean age was 7.8 $\pm$ SE of 4.1 years. The most frequent histopathological diagnosis was minimal change disease reported in 86 (43%) renal biopsies followed by focal segmental glomerulosclerosis found in 36 (18%) renal biopsies.

Conclusions:
Minimal change disease was the main histopathological diagnosis for renal biopsies in Iraq

Introduction

The gold standard for renal tissue analysis is the renal biopsy. It is regularly carried out to establish histological diagnoses of renal diseases and to determine the degree of damage in kidneys. Renal biopsies were not introduced as a clinical diagnostic tool until the 1960s, when Jones silver stain and the new techniques of electron microscopy (EM) and immunofluorescence (IF) became available.[1] Renal biopsy is now able to provide a tissue diagnosis in more than 95% of cases.[2] Patients with renal disease often present with nephrotic syndrome (NS), acute kidney injury (AKI), or chronic kidney disease (CKD) which are merely patterns of kidney disease that can have many causes. To aid the management of such patients, the histological analysis of a renal biopsy sample should therefore aim to identify a specific diagnosis, reflect the level of disease activity and provide information to allow informed decisions about treatment.[3] More units are now moving towards performing percutaneous renal biopsy as a day-case procedure, given

that most complications that develop will present within the immediate post-biopsy period.[4] Renal tissue should be studied by light microscopic techniques using Hematoxylin and Eosin stains (H&E), immunohistochemistry (IHC), IF, and EM. With the recent surge of application of molecular biology techniques to the study of renal disease, studies in human beings have commenced. Studying renal biopsies by real time reverse transcription polymerase chain reaction (RT-PCR) have been used successfully on small cores and even single isolated glomeruli from human biopsies, and in situ hybridization techniques are in progression.[5]

This study aims to analyze the results of renal biopsy in Iraqi paediatric patients and to compare findings to other studies worldwide.

Patients, materials and Methods:

A cross sectional study for the results of percutaneous renal biopsy of 200 patients at tertiary Paediatric Nephrology Centers was done, 96 biopsies were from Al-Karama teaching hospital, 68 biopsies from Central Child teaching hospital and 36 biopsies were from Children Welfare teaching hospital. All the included renal biopsies were performed over 10 years' period from January 2004 to December 2013 and collected over three months' period.

These renal biopsies were performed under ultrasound guidance with a biopsy gun by nephrologists then were examined and diagnosed by senior pathologists. All the specimens were studied under light microscope after staining with Hematoxylin & Eosin (H&E). All the findings of the already stained H&E samples were recorded from the patients' reports. One third of the specimens were studied under immunofluorescent microscope after immunofluorescence staining using polyclonal antisera against human IgG, IgM, IgA, C3, C1q while only four cases have records of electron microscopy study.

All the results were analyzed and calculated using the Statistical Package for the Social Sciences (SPSS) 19.0 software and the Microsoft Office Excel software 2007. Only *P* values less than 0.05 were considered statistically significant.

Results:

From a total of 200 patients, there were 110 (55 %) male patients and 90 (45 %) female patients with a male to female ratio (M: F) of 1.22:1. The age range was from 6 months to17 years with the mean age of 7.8 years $\pm$ SE of 4.1 years.

Renal biopsy was more encountered at the age group of less than 6 years old with a frequency of 70 cases (35%) 44 cases of them were males and 26 were females. While the least frequency was found in the age group of 16 – 17 years old being only 8 cases (4 %), 5 cases of them were males and 3 were females. There is no statistical significant association between gender and mentioned age group (p = 0.279) (Figure 1).

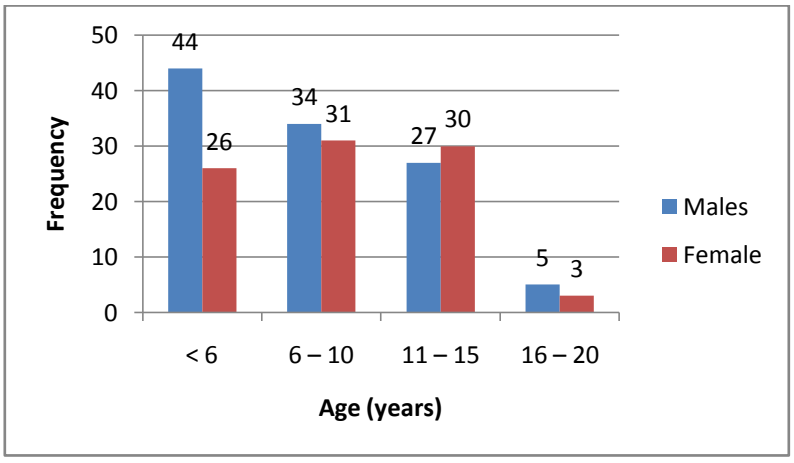

Figure (1) Distribution of patients according to age and gender.

The most frequent histopathological diagnosis was minimal change disease (MCD) found in 86 (43%) renal biopsies followed by focal segmental glomerulosclerosis (FSGS) reported in 36 (18%) renal biopsies. The least frequency was observed in post infectious glomerulonephritis, cresentic glomerulonephritis, IgM nephropathy, diffuse mesengial sclerosis (DMS) and congenital nephrotic syndrome reported in 2 (1%) of the renal biopsies for each (Figure2).

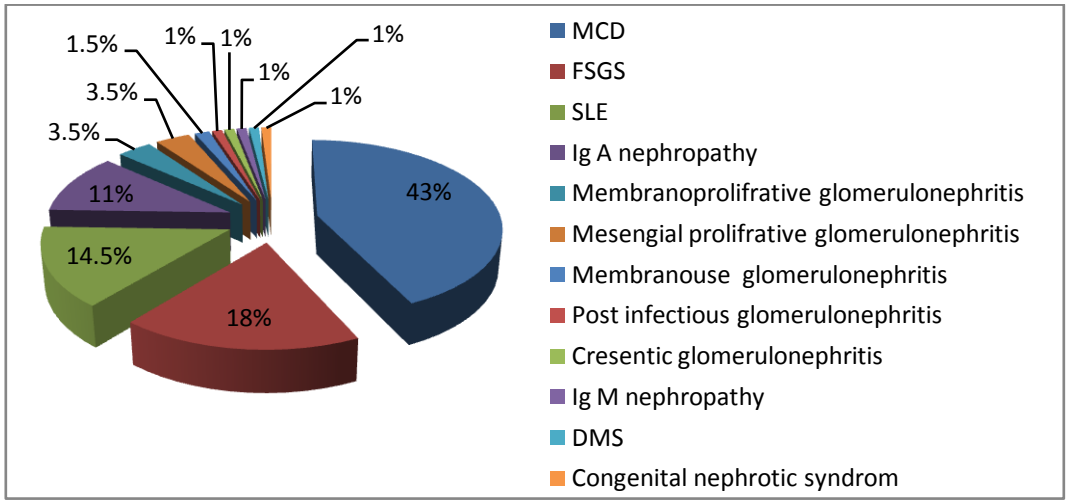

Figure (2) Final histopathological diagnoses in renal biopsies.

Out of 200 renal biopsies that were included in this study, 200 (100 %) were examined with H&E by light microscope, 57 (28.5 %) were examined with immunofluorescence by fluorescent microscope and only 4 biopsies (2%) were examined by electron microscope (Table 1).

Table (1) Distribution of histopathological diagnosis according to assessment method:

Disease \ Method	LM	IF	EM	Total
MCD	86	12	0	86
FSGS	36	7	3	36
SLE	29	15	0	29
Ig A nephropathy	22	17	0	22
Membranoproliferative glomerulonephritis	7	0	0	7
Mesengial prolifrative glomerulonephritis	7	1	0	7
Membranouse glomerulonephritis	3	1	0	3
Post infectious glomerulonephritis	2	0	0	2
Cresentic glomerulonephritis	2	0	0	2
Ig M nephropathy	2	2	0	2
DMS	2	2	1	2
Congenital nephrotic syndrome	2	0	0	2
Total	**200**	**57**	**4**	**200**

Discussion:

This study provides information on the histopathological diagnoses of renal biopsy in paediatric patients over a 10 years period covering three Paediatric Renal Centers in Baghdad. Out of 200 renal biopsies were included in this study, 110 (55%) were males and 90 (45%) were females. Male to female ratio was 1.29:1. These findings were in harmony with a study done in Czech in 2004 [6], where out of 710 patients (53.2%) of the paediatric patients were males and (46.8%) were females. In contrast to a previous Iraqi study published in 2010 [7] and out of 100 patients, males were (70%), females were (30%) with male to female ratio of 2.3: 1. Perhaps, that could be explained by the divergence in the sample sizes between these studies. At the time of diagnosis the age of the patients ranged from 6 months to 17 years. This was to some extent similar to the findings of the same mentioned Iraqi study [7], with age ranged from 1 month to 15 years. Mean age of the patients was 7.8 years, which is slightly lower than that was reported in the Czech study [6] where the mean age was 10 years; this possibly due to ethnic divergence between Iraqis and other populations.

By inspecting the histopathological patterns of this study and out of the 200 patients, MCD was the most common histopathological diagnosis found in 86 (43%) patients. This was approximate to the findings of other studies in Pakistan 2011 [8] and in Iran in 2003 [9] where MCD was reported in 24.1% and 18.5% of the patients, respectively, but it was distinct from the results of previous studies in Jordan [10] and in Serbia [11] where FSGS was the commonest histopathological pattern among others with frequencies of 39.1% and 20.9% of the patients, respectively. In contrast to a study done in Czech [6], IgA was the most frequent diagnosis observed in 28.6% of the patients. This variance could be explained due to depending on morphology alone in most of the time in assessing renal biopsy and lack of access to immunofluoresent and electron microscopes in our centers.

This study demonstrates an obvious lack in using immunofluorescence in assessing renal biopsies where only 28.5% of our patients' biopsies were sent to be examined by immunofluorescent microscope. Also, a severe deficiency in assessment by electron microscope is observed where only 2% of the renal biopsies in this study were assessed by this method. This reflects missing important techniques that may be of a great value in classifying renal biopsies in their correct categories and diagnoses.

Conclusion:

Minimal change disease (MCD) was the main histopathological diagnosis for renal biopsies in Iraq. There is a lack of regular use immunofluorescence and electron microscope techniques as adjacent to light microscope in assessing renal biopsies.

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