Hisopathological spectrum of glomerular disease in Nepal: a seven-year retrospective study

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ABSTRACT

We analyzed 137 cases of renal biopsies at the Department of Pathology from 2001 to 2007. The average age was 30.6 years (range, 13-72) for males and 32.9 years (range, 11-75) for females. The male to female ratio was 1.6: 1. The most common clinical syndromes for performing renal biopsy were nephrotic syndrome (81.6%) followed by asymptomatic urinary abnormalities (5.8%), nephritic syndrome (3.6%), hypertension (2.9%), chronic kidney disease (2.2%), acute renal failure (2.2%), cirrhosis (0.7%) and transplant rejection (0.7%). The major glomerular diseases in descending order of frequency were membranous glomerulonephritis (MGN; 42.3%), membranoproliferative glomerulonephritis (MPGN; 21.9%), minimal change disease (MCD; 10.2%), focal segmental glomerulosclerosis (FSGS; 8.0%), IgA nephropathy (2.9%), post infectious glomerulonephritis (GN) (2.2%), chronic GN (2.2%), tubulointerstitial nephritis (TIN; 1.5%), lupus nephritis (1.5%), focal proliferative GN (1.5%), C1q nephropathy (1.5%), amyloidosis (1.5%) and other minor form of glomerular diseases (2.8%). The pattern of glomerulonephritis in our study is different from the reports of other developing countries. It could be due to various races and altered environmental condition. The information obtained from these results can be used as baseline data for making efficient research in Nepalese population in the future. The higher frequency of MGN and MPGN among Nepalese in comparison with other developing countries deserves further evaluation.

Keywords: Renal biopsy, glomerulonephritis, Nepal.

INTRODUCTION

The prevalence of glomerular disease is different in various regions of the world, according to race, age, geographical, etiological, cultural and economic differences. Glomerular diseases continue to be the leading cause of end-stage renal disease globally. Glomerulonephritis (GNs) remain the third most common cause of end stage renal failure.[1] Hence, it is important to recognize the pattern of these diseases in any given geographical area.

There is no published data regarding the frequency of different GNs in Nepal. It is estimated that approximately 2.6 million people could be suffering from some degree of kidney illness. In this study, we aim to find the overall distribution pattern of glomerular disease based on renal biopsy. We also compared our results with the reports from other countries.

MATERIALS AND METHODS

We received a total of 180 cases of renal biopsies, including one case of renal allograft biopsy from 2001 to 2007, at the department of Pathology, National Kidney Center. Forty three cases of renal biopsies were excluded from the analysis due to inadequate or insufficient materials. All the biopsies were done at National Kidney Center by a single nephrologist (RKK) as an outpatient procedure. All the biopsies were read by a single renal pathologist (GA). A total of 137 cases were studied and classified according to W.H. O classification. The renal biopsy specimens for light microscopy (LM) were immediately fixed in 10% formalin. After conventional processing, the sections were stained with Hematoxylin and Eosin stain (H & E) and Periodic acid-Schiff stain (PAS). The total number of glomeruli per fragment of renal tissue was counted.

Immunofluorescent (IF) examination was performed in 21 cases. The biopsy specimen for IF were kept in normal saline and transported to Ranbaxy Clinical Reference Laboratories in India. The IF study included: immunoglobulin (IgG, IgM and IgA), complement component (C3 and C1q), Kappa and Lambda. Clinical information was obtained from the biopsy requisition forms.

RESULTS

We reviewed a total of 180 cases of renal biopsies over a period of 7 years, from 2001 to 2007. Out of 180 cases, 43 cases (28 without glomeruli and 15 with one or two glomeruli) of renal biopsies were excluded from our study due to inadequate or insufficient materials. Specimen adequacy were divided as optimal (at least 6 glomeruli/ fragment), suboptimal (three to five glomeruli/fragment),

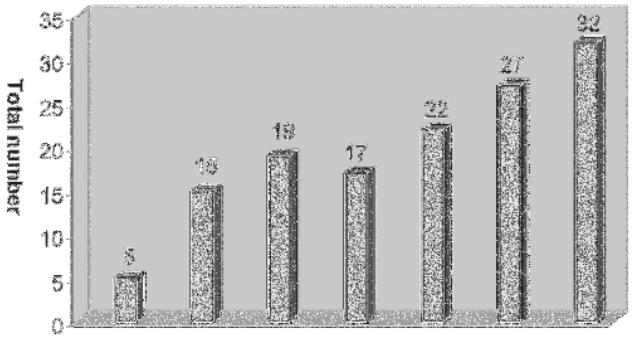

Fig.1. Number of renal biopsies over 7 years period (2001-2007)

and marginal (one to two glomeruli/fragment) specimens on LM. There were 93 (67.9%) cases of optimal specimens, 24 (17.5%) suboptimal and 20 (14.6%) marginal specimens. The maximum number of glomeruli found per fragment was 46. The number of renal biopsy specimens received over 7 years period is presented in Fig.1.

Out of 137 cases, there were 86 (62.8%) males and 51 (37.2%) females. The average age was 30.6 years (range, 13-72) for males and 32.9 years (range, 11-75) for females. The male to female ratio was 1.6: 1. The most common clinical syndromes for performing renal biopsy were nephrotic syndrome (81.6%) followed by asymptomatic urinary abnormalities (5.8%), nephritic syndrome (3.6%), hypertension (2.9%), chronic kidney disease (2.2%), acute renal failure (2.2%), cirrhosis (0.7%) and transplant rejection (0.7%) (Table-1). The major glomerular diseases in descending order of frequency were membranous GN (MGN; 42.3%), membranoproliferative GN (MPGN; 21.9%), minimal change disease (MCD; 10.2%), focal segmental glomerulosclerosis (FSGS; 8.0%), IgA nephropathy (2.9%), post infectious GN (2.2%), chronic GN (2.2%), tubulointerstitial nephritis (TIN; 1.5%), lupus nephritis (1.5%), focal proliferative GN (1.5%), C1q nephropathy (1.5%), amyloidosis (1.5%) and other minor form of glomerular diseases (2.8%)(Table-2).

DISCUSSION

Renal biopsy is a fundamental tool in the diagnosis of multiple glomerular diseases. This report provides information about the occurrence of renal diseases diagnosed by renal biopsy, over a period of 7 years in a single center. To our knowledge, this is the first systematic review of histological data from Nepal. At our center, the first patient submitted to this technique, at 2001,

Table-1: Frequency of clinical syndromes according to age group

Clinical syndrome	Total n (%)	< 30 yrs	30-60 yrs	60-90 yrs
Nephrotic	112 (81.6%)	66	41	5
AUA	8 (5.8%)	2	5	1
Nephritic	5 (3.6%)	4	1	0
HTN	4 (2.9%)	3	1	0
CKD	3 (2.2%)	2	1	0
ARF	3 (2.2%)	0	2	1
Cirrhosis	1 (0.7%)	0	0	1
Transplant rejection	1 (0.7)	0	1	0

showed minimal change disease (MCD). Out of 137 cases, there were 86 (62.8%) males and 51 (37.2%) females. The mean age was 30.6 years (range, 13-72) for males and 32.9 years (range, 11-75) for females. The male to female ratio was 1.6: 1. Of the 10,002 renal biopsies, Chen H, et al reported almost similar findings as ours, the mean age being 31.4 (ranging from 1 to 78 years), with a male to female ratio of 1.3:1.[2]

Nephrotic syndrome was the most frequent clinical presentation at all age group, accounting for 81.6% of

Table-2: Distribution of glomerular diseases

Glomerular diseases	Total n (%)	Male	Female	Biopsy source
MGN	58 (42.3)	40	18	Native kidney
MPGN	30 (21.9)	17	13	Native kidney
MCD	14 (10.2)	8	6	Native kidney
FSGS	11 (8.0)	5	6	Native kidney
IgA nephropathy	4 (2.9)	2	2	Native kidney
Post infectious GN	3 (2.2)	3	0	Native kidney
Chronic GN	3 (2.2)	1	2	Native kidney
TIN	2 (1.5)	2	0	Native kidney
Lupus nephritis	2 (1.5)	0	2	Native kidney
Focal proliferative GN	2 (1.5)	2	0	Native kidney
C1q nephropathy	2 (1.5))	2	0	Native kidney
Amyloidosis	2 (1.5)	2	0	Native kidney
Wegner's granulomatosis	1 (0.7)	1	0	Native kidney
Diabetic nephropathy	1 (0.7)	1	0	Native kidney
Arteriosclerosis	1 (0.7)	0	1	Native kidney
CNI toxicity	1 (0.7)	0	1	Renal allograft

MGN, membranous glomerulonephritis, MPGN, membranous proliferative glomerulonephritis, MCD, minimal change disease, TIN, tubulointerstitial nephritis, M, male, F, female

all cases. There was a predominance of indication of biopsies in less than the third decades of life. The other clinical manifestations were asymptomatic urinary abnormalities (5.8%), nephritic syndrome (3.6%), hypertension (2.9%), chronic kidney disease (2.2%), acute renal failure (2.2%), cirrhosis (0.7%) and transplant rejection (0.7%). The cirrhotic patient was an elderly lady with pathologic diagnosis of MGN. The only one renal allograft biopsy was done after 4 years of transplantation and the biopsy findings was consistent with cyclosporine toxicity (CNI).

In our study, MGN was the most common form of GN (42.3%) followed by MPGN (21.9%), MCD (10.2%), FSGS (8.0%), IgA nephropathy (2.9%), post infectious GN (2.2%), chronic GN (2.2%), tubulointerstitial nephritis (1.5%), lupus nephritis (1.5%), focal proliferative GN (1.5%), C1q nephropathy (1.5%), primary renal amyloidosis (1.5%) and other minor form of glomerular diseases (2.8%). The most common form of MGN in our series is comparable to the report from Iran.[3]

MCD has a variable geographic distribution, being more common in Asia than in North America or Europe.[4] In Korea[5] and Thailand,[6] the MCD comprised 26.6% and 45.8% of total primary glomerular diseases. In contrast, MCD comprised only 10.2% of the total biopsies in our series.

The FSGS is the most common form GNs in Brazil,[7] India, [8] Bahrain,[9] Croatia,[10] and Sudan.[11] In contrast with these reports, the FSGS (8%) is the forth most common diseases in our study. It is interesting to point out that the second most common glomerular diseases in our study is MPGN, similar to that of China[2,] Bahrain[9] Croatia,[10] and Sudan.[11]

IgA nephropathy is the most frequent disease among patient with primary GN, ranging from 40% in China,[2] 34.5% in Czech Republic[12] and 18.8% in Italy.[13] Since the larger numbers of biopsies were not evaluated by IF in our study, the frequency of IgA nephropathy (2.9%) could be of lower frequency than in reality.

The renal biopsy was a significant underpinning for many of the great advances seen in the understanding of renal diseases during the last 50 years and continue to play an important role. Our study is mainly based on LM findings. We have no IF and electron microscopy facilities to provide useful diagnostic information on renal biopsy. However, the information obtained from these results can be used as baseline data for making efficient research in Nepalese population in the future. The higher frequency of MGN and MPGN in Nepalese population compared to other developing countries deserves further evaluation.

ACKNOWLEDGEMENTS

Part of this work was presented in abstract form at the 7th International Congress of the nephrologists, urologists and transplant surgeon of South Asia Region in March, 2008, Kathmandu, Nepal. We thank to Professor Dr. Kim Solez, University of Alberta, Canada, for his helpful suggestion.

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