

Renal biopsies in Johor: a 7-year study

JJ KHOO, MBBS, MPath.

Department of Pathology, Hospital Sultanah Aminah, Johor Bahru.

Abstract

Consecutive renal biopsies received from 1994 to 2000 in Johor Bahru were reviewed. There were 441 cases, of which 407 were adequate biopsies (92.3%). Lupus nephritis formed the largest diagnostic entity (126 cases, 31.0%). This reflected the high prevalence of systemic lupus erythematosus (SLE) patients in Malaysia. The most common histological pattern of lupus nephritis was diffuse proliferative glomerulonephritis: WHO Class IV (96 cases, 76.2%). Other diagnostic entities were minimal change disease (28.5%), proliferative glomerulonephritis (10.6%), IgA nephropathy (9.8%), focal glomerulosclerosis (4.9%), membranous glomerulonephritis (4.4%), transplant rejection (3.9%), end stage nephropathy (3.4%) and others (3.4%). The morphological pattern of renal biopsies in Johor was similar to that reported in the University Hospital Kuala Lumpur.

Key words: Renal biopsy, glomerulonephritis, systemic lupus erythematosus.

INTRODUCTION

Traditionally, the services of processing and reporting of renal biopsy tissues have been provided by the various teaching hospitals in Malaysia, namely University Hospital Kuala Lumpur, Universiti Kebangsaan Malaysia and Universiti Sains Malaysia. Renal physicians in the various state hospitals performed the renal biopsy and made special arrangements to send the specimens to one of the three academic institutions above for processing and reporting. This created inconvenience and delay in management of patients with renal diseases. In addition, fresh tissues for immunofluorescence studies had to be sent in the shortest possible time to the various laboratories. For hospitals far away from Kuala Lumpur e.g. Hospital Sultanah Aminah, Johor Bahru (HSAJB), the logistic problems could be tremendous.

In order to overcome this problem, HSAJB started its own renal biopsy diagnostic service in January 1994. Since then, specimens from Johor need no longer be sent to University Hospital Kuala Lumpur for reporting.

This study analysed all the renal biopsies reported in HSAJB from 1994 to 2000. It also compared the pattern of renal disease reported with that from the University Hospital Kuala Lumpur (1970-81 and 1982-91) to see any difference in pattern over the years.

MATERIALS AND METHODS

A retrospective study was done on all renal biopsies received by the Department of Pathology, HSAJB from 1994 to 2000. The histological slides and clinical records of the patients were reviewed. The cases were analysed according to demographic profile, clinical presentation and histological type of renal disease. For lupus nephritis, the histological classification was also analysed.

All renal biopsies were received in 10% buffered formalin and processed for light microscopical examination. The paraffin-embedded biopsy materials were sectioned at 1 to 2 micron thickness and stained with the Haematoxylin and eosin, Periodic acid Schiff, silver methanamine, Masson's trichrome and Martius scarlet blue. Biopsies were considered adequate when there was a minimum of 5 glomeruli present.

Additional fresh tissues received were immediately sectioned (cryostat) and frozen sections were stained for immunoreactivity against IgG, IgA, IgM, C3, C4 and fibrinogen for immunofluorescence (IF) examination. When there was no fresh tissue for IF examination or no glomerulus seen in the frozen section, immunoperoxidase staining of the paraffin-embedded tissue was done instead. These sections were stained for immunoreactivity against IgG, IgA, IgM, C3, C4 and fibrinogen.

RESULTS

From January 1994 to December 2000, a total of 441 renal biopsies were received in HSAJB. 407 samples (92.3%) contained adequate renal cortex for analysis. 357 (87.7% of adequate biopsies) had tissue for immunofluorescence examination.

Demographic profile

The age range of patients was 9 months to 65 years. 42.6% of the cases were from the 21 to 40 years age-group. The male to female ratio was almost equal (1:1.11).

The ethnic distribution of patients were: Malays (58%), Chinese (35%), Indians (5%) and others (2%). The percentage of Chinese who had renal biopsy was higher than the percentage of Chinese patients (26%) who were admitted to the hospital during this period. The ethnic distribution of admissions to HSAJB from 1994 to 2000 were: Malays (54%), Chinese (26%), Indians (17%) and others (3%).

Clinical presentation

Approximately 45.8% of biopsied patients presented with the nephrotic syndrome. Other modes of presentation included the nephritic syndrome, clinical features of systemic lupus erythematosus, proteinuria, haematuria and acute renal impairment.

Histological pattern

Minimal change nephritis formed the most common diagnostic entity (28.5%) in primary glomerulonephritis (GN). This was followed by proliferative glomerulonephritis (10.6%), focal glomerulosclerosis (4.9%) and membranous glomerulonephritis (4.4%).

Of the secondary glomerulopathies, lupus nephritis formed the most common group (31%) followed by IgA nephropathy (9.8%). 3.4% of the renal biopsies showed end stage renal disease. Transplant rejection made up another 3.9% of the cases.

The other types of glomerular disease (3.4%) included tubulointerstitial nephritis, acute tubular necrosis, acute cortical necrosis, amyloidosis, diabetic glomerulosclerosis and hemolytic uraemic syndrome.

37% of the proliferative glomerulonephritis showed features of post-streptococcal acute diffuse proliferative GN while 9.3% showed rapidly progressive glomerulonephritis with extensive crescent formation.

Table 1 shows the histological patterns of the renal biopsies reported in the hospital during the study period. Table 2 compares the above with that reported in the University Hospital Kuala Lumpur from 1970-81 and 1982-91¹. The patterns were essentially similar and showed that in the three studies, minimal change disease formed the predominant diagnostic entity for primary glomerular disease while lupus nephritis formed the most frequent secondary glomerular disease.

There was a higher proportion of minimal change disease in our study as compared to that in University Hospital Kuala Lumpur. A probable reason could be that the biopsy criteria for nephrotic syndrome might have been lower in Johor as compared to that in the University

Hospital Kuala Lumpur.

Lupus nephritis formed the major secondary glomerular disease in all the 3 studies. There was a higher percentage of cases in our study as compared to that in the University Hospital

TABLE 1: Histological patterns of renal biopsies reported in Hospital Sultanah Aminah, Johor Bahru.

Pattern	No. of cases (%)	
Minimal change disease	116	(28.5)
Focal glomerulosclerosis.	20	(4.9)
Proliferative glomerulonephritis	43	(10.6)
Membranous GN	18	(4.4)
IgA Nephropathy	40	(9.8)
Lupus Nephritis	126	(31.0)
End Stage	14	(3.4)
Others	14	(3.4)
Transplant Rejection	16	(3.9)
Total	407	(100)

Kuala Lumpur for the period 1970-81 and 1982-91. The percentage of renal biopsies for patients with lupus nephritis had increased compared to the earlier years. However, this might not have been due to an actual increase in the number of patients with systemic lupus erythematosus. It could be that in recent years, renal physicians perform more renal biopsies for patients with SLE. Renal biopsy examination gives a more accurate assessment of the patients' renal involvement and hence helps the physicians in their decision on the use of more potent cytotoxics e.g. cyclophosphamide and methyl-prednisolone.

There were 126 cases of lupus nephritis in our study. These made up 31% of the renal biopsies reported in this period. The male to female ratio was 1:5. This ratio reflected the female predominance in SLE patients. However, this ratio was lower than the ratio of patients with systemic lupus erythematosus (1:9)².

The ethnic distribution of patients with lupus nephritis showed that 57.9% were Malays, 39.7% Chinese and 2.4% Indians. This distribution showed that there was a higher percentage of Chinese patients with lupus nephritis compared to the percentage of Chinese patients (26%) admitted into Hospital Sultanah Aminah, Johor Bahru.

The major histological pattern of lupus nephritis was diffuse proliferative glomerulonephritis WHO Class IV³. There were 96 such cases (76.2%). There were 13 cases (10.3%) of diffuse membranous

glomerulonephritis (Class V) and 10 cases (7.9%) of pure mesangiopathy lupus nephritis (Class II). 3.2% of the lupus nephritis had advanced sclerosing glomerulonephritis (Class VI) and only 1.6% of the cases were focal segmental glomerulonephritis (Class III). None of the cases with clinical presentation of SLE had a normal renal biopsy report. Figure 1 shows the pie chart distribution of the patterns of lupus nephritis encountered.

DISCUSSION

The findings of this study did not differ much from those reported from the University Hospital Kuala Lumpur from 1970 to 1991¹. The slight variation in percentage of the different histological renal patterns could be explained by the different biopsy criteria that developed over the years and the difference in practice of the doctors in different centres. Since 1994, Hospital Sultanah Aminah, Johor Bahru had successfully set up the diagnostic histopathology service for renal biopsies and had since provided an essential supportive role in the management of both adult and paediatric renal patients in this hospital. With this setup, the Hospital Sultanah Aminah no longer sends renal biopsies to the University Hospital Kuala Lumpur for reporting circumventing problems related to packaging and transportation, such as freezing artifacts and delay in transport.⁴ With this, tissue received from the hospital could be immediately processed and the time for transportation reduced. This

TABLE 2: Comparison of the histological patterns of renal biopsies between Hospital Sultanah Aminah, JB and University Hospital, Kuala Lumpur'

Pattern	Percentage of biopsies		
	HSAJB n=407	UHKL(1970-81) n=1000	UHKL(1982-91) n=1000
Minimal Change Disease	28.5	25.7	20.7
Focal Glomerulosclerosis	4.9	5.4	2.9
Proliferative GN	10.6	24.8	16.0
Membranous GN	4.4	5.5	5.5
IgA Nephropathy	9.8	5.8	18.5
Lupus Nephritis	31.0	18.4	24.9
End Stage	3.4	4.0	3.1
Others*	3.4	10.4	8.4
Transplant Rejection**	3.9		

Note: For UHKL studies, transplant rejection** cases were not separately classified but included into the category **others***

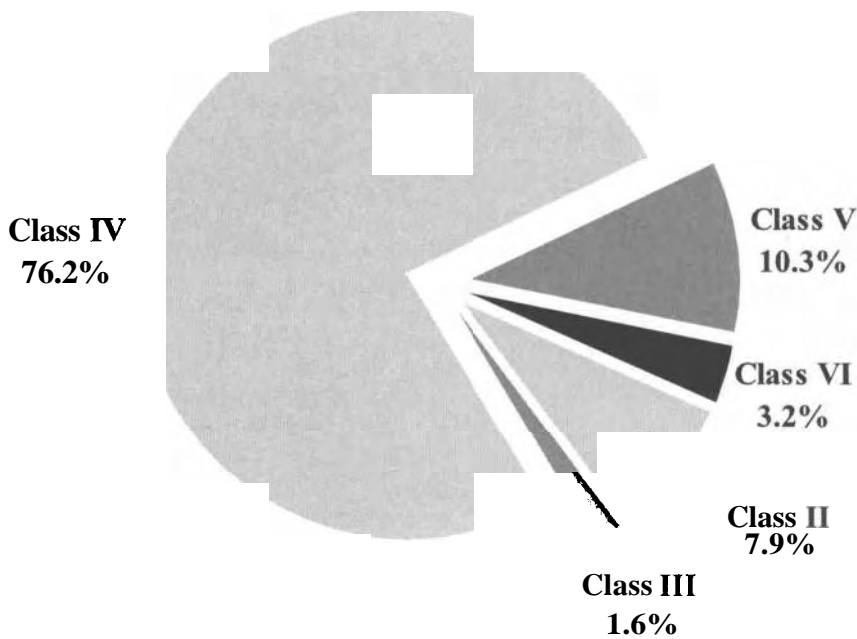


Fig. 1: Distribution of **lupus nephritis** according to **WHO Class** in biopsies from Hospital Sultanah Aminah, JB

obviously reduced the turnaround time as compared to if the tissue had to be sent to the University Hospital Kuala Lumpur.

The comparability of results from the in-house service at HSAJB with that of the University Hospital Kuala Lumpur shows that a successful renal biopsy diagnostic service can be set up at the State hospital. Such developments should be encouraged to improve the quality of service given to the renal patients in the respective state hospitals.

ACKNOWLEDGEMENTS

I would like to thank **Mr.C.S. Chui** and **Miss C.W. Chin** for their assistance in data analysis.

REFERENCES

1. Looi LM. The **pattern** of renal disease in Malaysia. *Malays J Pathol* 1994;16(1):19-21.
2. Bevra HH. Systemic Lupus Erythematosus. In: Braunwald, Fauci, Kasper, **Hauser**, Longo, Jameson (eds). *Harrison's Principles of Internal Medicine*. (15th ed). International:McGraw-Hill, 2001:1922-1927.
3. **Kashgarian** M, Hayslett JP. Renal involvement in Systemic Lupus Erythematosus. In: Tisher CC, Brenner BM (eds). *Renal Pathology: with clinical and functional correlations* (2nd. Ed). Philadelphia: **Lippincott**, 1989: 442-471.
4. Looi LM. Preliminary report of a renal histopathology service for outside centres (abstract). *Malays J Pathol* 1991; 13:59-60.