



Since 1974, portions of most biopsies (about 90%) were also subjected to immunofluorescence microscopy. Fresh tissue was snap frozen by immersion in isopentane cooled to  $-160^{\circ}\text{C}$  with liquid nitrogen. Cryostat sections cut at 4  $\mu\text{m}$  were overlaid with commercially prepared fluorescein conjugated antisera (Hoechst-Behring Laboratories) to human IgG, IgA, IgD, IgE, IgM, C3 and fibrinogen, incubated at  $37^{\circ}\text{C}$  in a moist chamber for 30 minutes, washed in phosphate buffered saline (pH 7.2), mounted with glycerol/phosphate buffer and examined by fluorescent microscopy. In addition, the presence of hepatitis B surface antigen (HBsAg) was tested for by a standard indirect immunofluorescent technique

using commercially prepared rabbit antiserum to HBsAg.<sup>5</sup>

**RESULTS**

Tables 2 and 3 show the histological diagnoses as well as the age, sex and racial distribution of 504 patients with the nephrotic syndrome. 347 patients (68.8%) were Chinese, 79 Malays (15.7%), 69 Indians (13.7%) and 9 Orang Asli (1.8%). The male:female ratio was 1.3. During the same 11 year period, there were 168,891 admissions to the University Hospital (excluding Obstetrics and Gynaecology patients) comprising 50.1% Chinese, 19.8% Malays, 27.8% Indians and 2.3% Orang Asli, with a male:female ratio of 1.5.

TABLE 1  
CLINICAL SYNDROMES/PRESENTATIONS OF  
1000 BIOPSIED MALAYSIAN PATIENTS

Clinical Syndrome/Presentation	Number	%
Nephrotic Syndrome	504	50.4
Nephritic Syndrome	51	5.1
Asymptomatic Proteinuria	56	5.6
Haematuria	34	3.4
Proteinuria + Haematuria	77	7.7
Hypertension	19	1.9
Acute Renal Failure	10	1.0
Chronic Renal Failure	49	4.9
Systemic Lupus Erythematosus	147	14.7
Others (Including Unknown)	53	5.3
Total	1000	100.0

**Minimal Change Nephritis**

Forty-five percent of all biopsied patients with the nephrotic syndrome (227/504) had minimal change nephritis. These included 75 patients (14.9%) with mild prominence of the mesangial cells and stroma without occlusion of glomerular capillaries or hypercellularity (Fig. 1) and 9 patients (1.8%) where occasional glomeruli were obsolescent (focal global sclerosis). Isolated mesangial deposits of IgM were present in many of the biopsies. The main abnormality observed on electron micro-

scopy was foot-process fusion of the glomerular capillary epithelial cells (Fig. 2). Males were more often affected than females, with an overall male:female ratio of 1.8. 57% of the patients were over 15 years old. 70% of the patients were Chinese, 15% Malays, 13% Indians and 2% Orang Asli. Minimal change nephritis was the commonest biopsy finding in the nephrotic syndrome. It was observed in 62% of biopsied subjects 14 years old and below and in 37% of those aged 15 years and above.

TABLE 2

RENAL BIOPSIES FROM 504 MALAYSIAN PATIENTS WITH THE NEPHROTIC SYNDROME : HISTOLOGICAL DIAGNOSES AND AGE DISTRIBUTION

Histological Diagnosis	<5 yr	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	≥ 60	Total
Minimal Change Nephritis	23	32	43	39	35	17	14	7	8	4	—	3	2	227
Focal Glomerulosclerosis	2	10	6	6	3	6	3	—	1	2	—	—	—	39
Proliferative Glomerulonephritis	3	8	13	22	23	15	10	13	1	6	6	—	2	122
Membranous Glomerulonephritis	—	—	6	8	11	5	2	5	6	—	4	2	—	49
Lupus Nephritis	1	1	4	3	8	4	1	3	1	5	1	—	—	32
Berger's Disease	—	1	—	2	2	—	—	—	—	1	—	—	—	6
<b>Amyloid</b>	—	—	—	—	—	—	—	—	<b>1</b>	2	—	—	1	4
End Stage	1	1	1	1	1	1	—	<b>1</b>	—	—	—	—	—	7
Others	1	—	2	1	2	2	3	—	2	—	—	1	4	18
Total	<b>31</b>	<b>53</b>	<b>75</b>	<b>82</b>	<b>85</b>	<b>50</b>	<b>33</b>	<b>29</b>	<b>20</b>	<b>20</b>	<b>11</b>	<b>6</b>	<b>9</b>	<b>504</b>

TABLE 3

RENAL BIOPSIES FROM 504 **MALAYSIAN** PATIENTS WITH THE **NEPHROTIC** SYNDROME:  
HISTOLOGICAL DIAGNOSIS, SEX AND RACIAL DISTRIBUTION

HISTOLOGICAL DIAGNOSIS	NUMBER	%	MALE: FEMALE RATIO	R A C E			
				MALAYS (%)	CHINESE (%)	INDIANS (%)	OTHERS (%)
MINIMAL CHANGE NEPHRITIS	227	45.0	1.8	15.4	69.6	13.2	1.8
FOCAL GLOMERULOSCLEROSIS	39	7.7	1.2	18.0	69.2	12.8	
<b>PROLIFERATIVE GLOMERULONEPHRITIS</b>	<b>122</b>	24.2	1.3	15.6	70.5	11.4	2.5
MEMBRANOUS GLOMERULONEPHRITIS	49	9.7	1.3	20.4	65.3	14.3	
LUPUS NEPHRITIS	32	6.4	0.1	6.3	78.1	15.6	
BERGER'S DISEASE	6	1.2	0.2	16.7	33.3	33.3	16.7
<b>AMYLOID</b>	4	0.8	0.3		50.0	50.0	
END STAGE	7	1.4	2.5	42.8	28.6	28.6	
OTHERS	18	3.6	2.0	11.1	72.2	11.1	5.6
TOTAL	<b>504</b>	<b>100.0</b>	1.3	15.7	68.8	13.7	1.8

LEGEND TO FIGURES

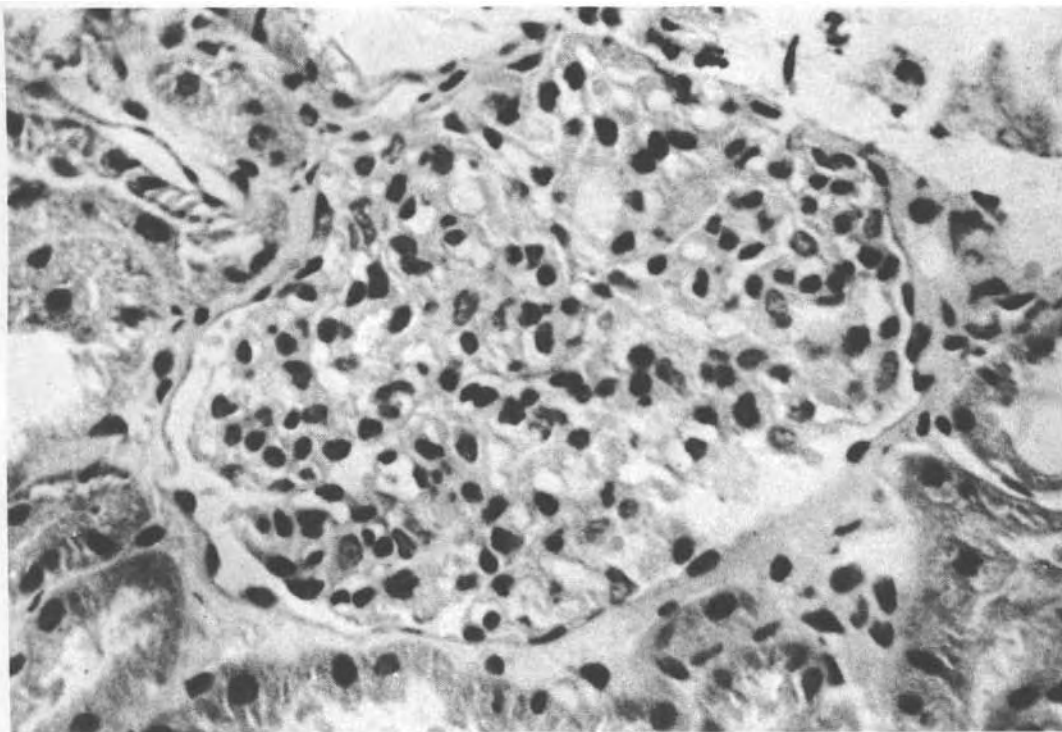


FIG. 1 : Glomerulus in minimal change nephritis exhibiting mild prominence of mesangial cells and stroma. There is no occlusion of glomerular capillaries. H & E X 400.

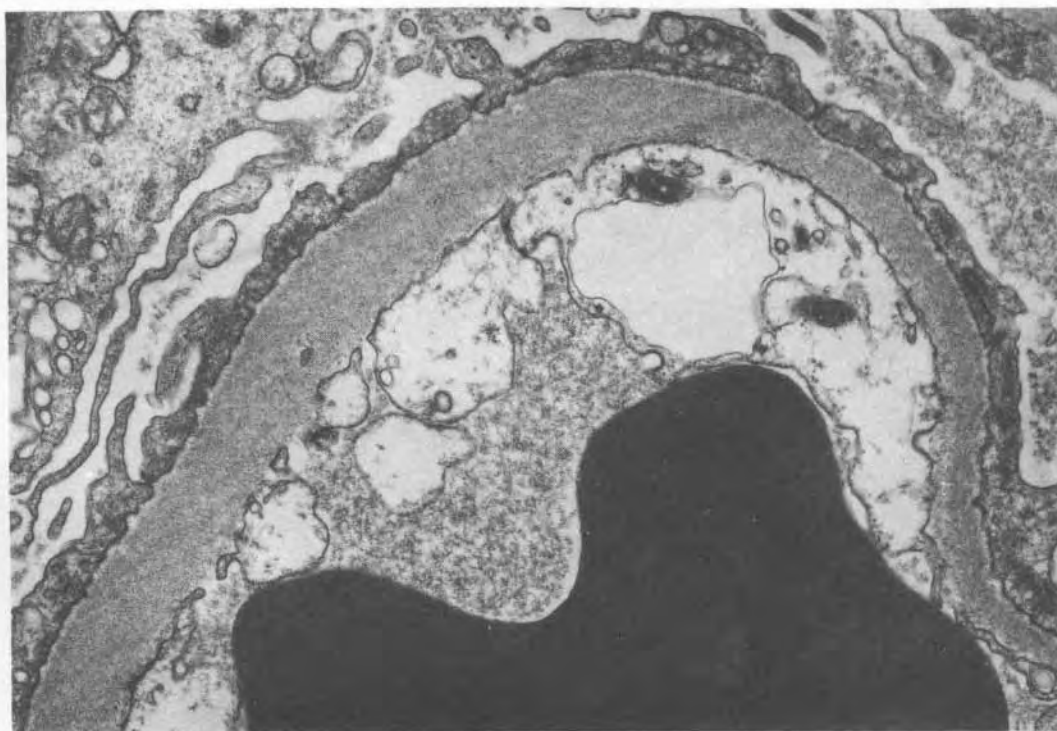


FIG. 2 : Electron micrograph of a glomerular capillary in a case of minimal change nephritis, showing foot-process fusion of epithelial cells. X 18,500.

**Focal glomerulosclerosis (segmental hyalinosis)**

Focal and segmental hyalinosis without significant cellular proliferation (Fig. 3) was present in 7.7% (391504) of the patients. On immunofluorescence microscopy, deposits of IgG and C3 were localised to the abnormal glomerular segments. Both sexes were equally represented. 69% of the patients were Chinese.

**Proliferative glomerulonephritis**

Twenty-four percent (1221504) of the patients had proliferative glomerulonephritis. Tables 2 and 3 show the age, sex and race distribution and Table 4 the histological types. Diffuse mesangioproliferative glomerulonephritis (Fig. 4) was the commonest type.

**Membranous glomerulonephritis**

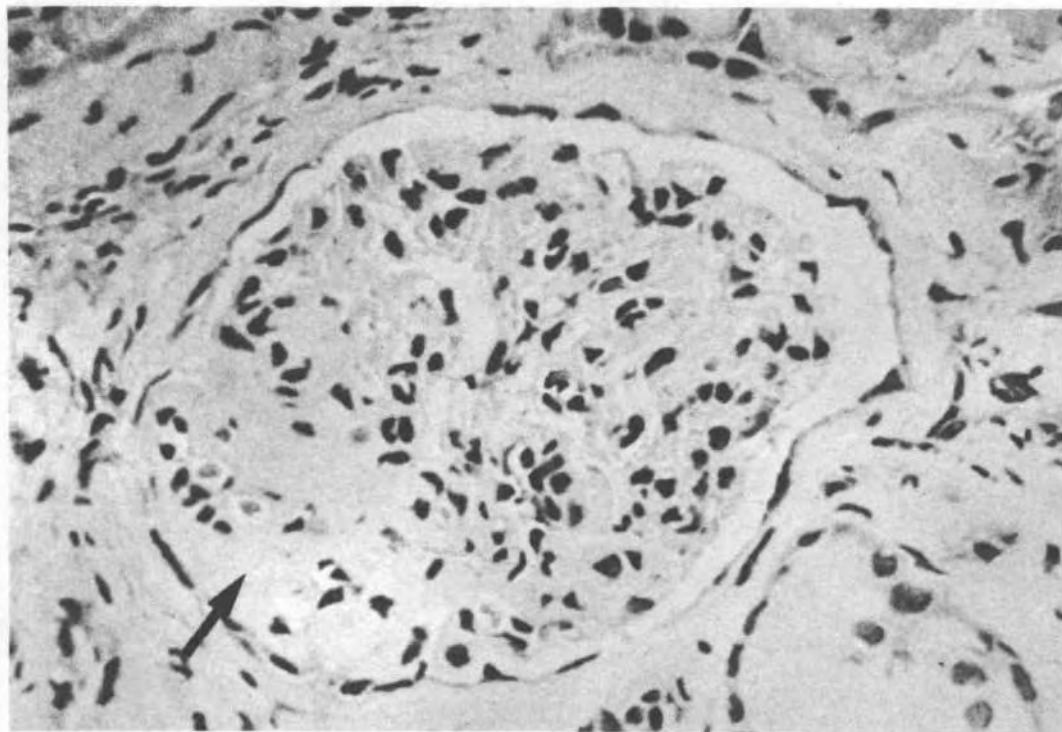
Only 49 patients (9.7%) had membranous glomerulonephritis. A typical case would exhibit diffuse thickening of the capillary loops (Fig. 5) due to spiking of the basement membrane, best demonstrated by silver stains (Fig. 6). Epimembranous trichrome red immune deposits were often easily discernable between the spikes. These findings were easily confirmed by electron microscopy (Fig. 7) and the finding of diffuse granular fluorescent deposits of immune-complexes along the

glomerular capillary walls on immunofluorescence examination (Fig. 8). All patients were above 10 years old and 35 patients (71%) were above 20 years old (Table 3).

**Secondary glomerular disease**

Lupus nephritis was the commonest type of secondary glomerular disease, accounting for 6.4% (321504) of all patients with the nephrotic syndrome. Biopsies from a total of 184 Malaysian patients with lupus nephritis, including 32 patients with the nephrotic syndrome, were available for study. The histological types have been reported elsewhere.<sup>6</sup> The patients were mainly young Chinese women. A remarkable finding was the presence of HBsAg in glomerular immune complexes in 60% of the biopsies.<sup>5</sup>

Biopsies from 6 patients showed the typical features of Berger's disease with prominent mesangial deposits of IgA on immunofluorescence. Four patients had amyloidosis and seven had end stage lesions. Other biopsies were from patients with diabetes mellitus (6 patients), congenital nephrotic syndrome (1 patient), interstitial nephritis (6 patients) and lesions that could not readily be classified into any of the above categories (5 patients).



**FIG. 3** : Focal segmental glomerulosclerosis. A glomerulus showing segmental hyalinisation (arrow). H & E X 400.

TABLE 4

HISTOLOGICAL TYPES OF PROLIFERATIVE GLOMERULONEPHRITIS IN 122 PATIENTS WITH THE NEPHROTIC SYNDROME

HISTOLOGICAL DIAGNOSIS	NUMBER	%
ACUTE DIFFUSE PROLIFERATIVE	7	5.7
MESANGIAL PROLIFERATIVE	67	54.9
MESANGIO-CAPILLARY	16	13.1
CRESCENTIC		
(a) < 70% CRESCENTS	4	3.3
(b) ≥ 70% CRESCENTS	5	4.1
FOCAL PROLIFERATIVE	13	10.7
UNCLASSIFIED	10	8.2
<b>TOTAL</b>	<b>122</b>	<b>100.0</b>

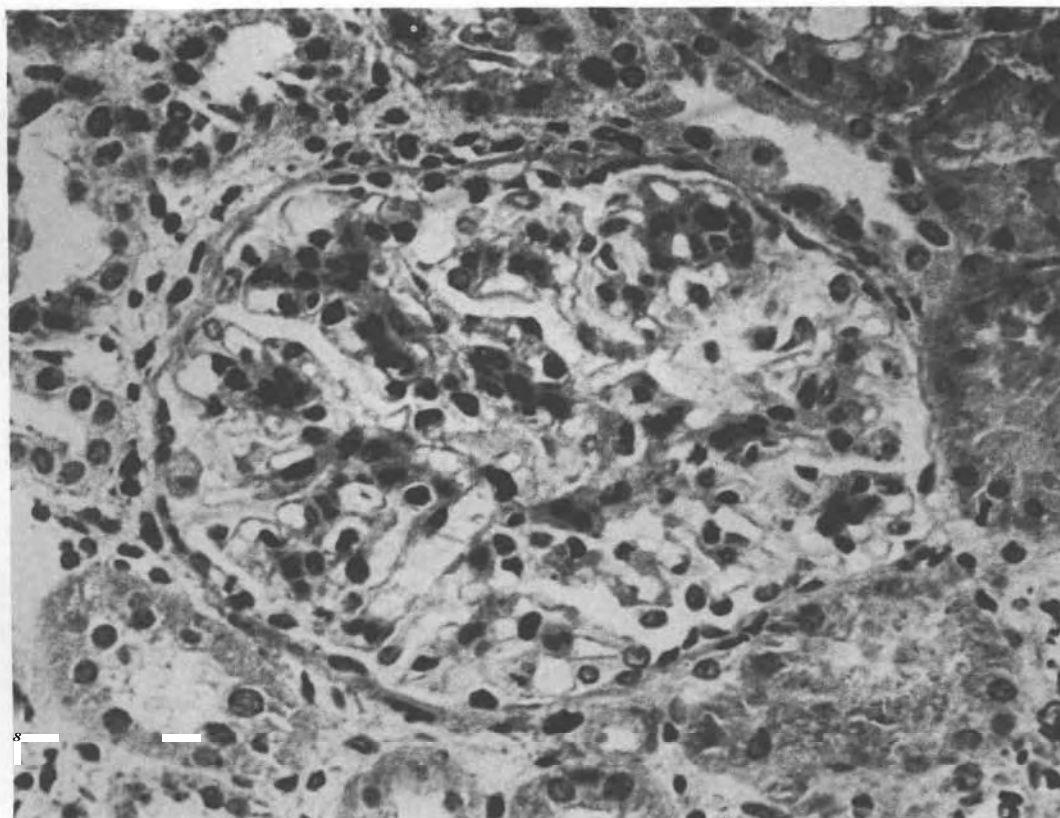


FIG.4 : A glomerulus in diffuse mesangioproliferative glomerulonephritis showing unequivocal increase in mesangial cells and stroma. H & E X 400.









