Primary malignant nephrosclerosis

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Summary
1. As proposed by Schürmann & MacMahon (1933), we suggest that two types of malignant nephrosclerosis exist.
2. In the type called primary malignant nephrosclerosis, renal vascular lesions precede hypertension.
3. In the second type, called secondary malignant nephrosclerosis, renal vascular lesions are considered to be the consequence of malignant hypertension.

Key words: acute renal failure, haemolytic anaemia, hypertension, malignant nephrosclerosis.

Introduction
Schürmann & MacMahon (1933) believed that two forms of malignant nephrosclerosis existed. One form, beginning imperceptibly with general vasomotor disturbances and progressing gradually towards accelerated hypertension and renal insufficiency, they called 'genuine or endogenous nephrosclerosis'. In the second form, acute renal insufficiency precedes hypertension which develops only in the later stages. Schürmann & MacMahon defined this second form 'exogenous or toxic nephrosclerosis.' Unfortunately, little notice has been taken of their paper and various other terms have been used to define the disease corresponding to Schürmann & MacMahon's 'exogenous malignant nephrosclerosis.' For example, it has been called malignant nephrosclerosis in women (Scheer & Jones, 1967), irreversible post-partum renal failure with microangiopathic haemolytic anaemia (Luke, Talbert, Siegel & Holland, 1970; Ponticelli, Imbasciati, Tarantino, Graziani & Redaelli, 1972), oliguric acute renal failure in malignant hypertension (Mattern, Sommers & Kassirer, 1972) and microangiopathie thrombotique renale (Habib, Courtecuisse, Lecler, Mathieu & Royer, 1969; Sraer, Morel-Maroger, Beaufils, Ardaillou, Helenon & Richet, 1972; Richet, 1976).

Our experience (Bohle, Helmchen, Meyer, Bock, Brüning, Edel, Heimsoth & Scheler, 1973) confirms the concept of Schürmann & MacMahon (1933) that there are two types of malignant nephrosclerosis. In this paper the differences and similarities between the two types are further delineated.

Methods
Kidneys with vascular and glomerular lesions characteristic of malignant nephrosclerosis were obtained from sixty-five patients (biopsy and autopsy material). Paraffin sections (5–8 μm thick) were stained with the PAS reaction or according to Goldner-trichrome respectively, and 0.5 μm thick methacrylate sections were stained by silver impregnation. Material for electron microscopy was obtained from six patients.

Two groups of patients were studied: the first consisted of twenty patients without any history of hypertension, who had developed severe renal insufficiency within a few days. The second group consisted of forty-five other patients who had been hypertensive for several years and had only gradually shown signs of renal insufficiency.

Results
Renal vascular, glomerular and tubular lesions that
Lesions characteristic of malignant nephrosclerosis in man can, as has also been shown in animal experiments (Wilson & Byrom, 1939, 1941; Helmchen & Kneissler, 1976), develop after several years of hypertension.

Renal lesions corresponding to those of malignant nephrosclerosis and developing in normotensive patients, are always preceded by severe haemolytic anaemia and rapidly progressive renal insufficiency.

Progressive renal insufficiency without clinical symptoms of haemolytic anaemia may be observed in patients who, after a long period of hypertension, developed renal vascular and glomerular lesions corresponding to those of the malignant nephrosclerosis.

Morphological signs of malignant nephrosclerosis appeared in kidneys obtained from both groups of patients. In the first group, early features of malignant nephrosclerosis such as intimal oedema, fibrinoid necrosis with thrombosis, glomerular cell proliferation with cell swelling and splitting of the basement membrane were more prominent. The second group, however, more often revealed lesions characteristic of the chronic stage of malignant nephrosclerosis, namely obliterative endarteritis, fibrous vascular occlusions, glomerular capillary collapse, tubular atrophy and interstitial fibrosis.

In kidneys obtained from the first group of patients, a splitting of the glomerular capillary basement membrane was prominent.

Electron-microscopic studies have shown that the splitting of the basement membrane is caused by the production of new basement membrane material, probably by swollen endothelial cells. After the detachment of the lamina densa, the endothelial cells may produce basement membrane material both on the luminal and the original basement membrane side of the cell. In later stages of the disease, the endothelial cells become enveloped in a meshwork of basement membrane material around the whole circumference of the capillary. In the second group of patients usually only a pronounced wrinkling of the glomerular capillary basement membrane with a thickening of the capillary wall (Meyer, Helmchen & Bohle, 1973) can be observed.

Tubular lesions characteristic of acute renal failure predominated in the first group of patients (Bohle, Jahnecke & Rauscher, 1964; Jahnecke, Bohle & Brun, 1963; Bohle, 1967; Bohle, Jahnecke, Meyer & Schubert, 1967a, b). In the second group, however, tubular atrophy with interstitial fibrosis was the prominent lesions.

Malignant nephrosclerosis of the first group affects mainly women during pregnancy, in the post-partum period, or after the use of oral contraceptives (ratio of women to men = 1:0·6). Malignant nephrosclerosis of the second group predominates in men (ratio of women to men = 1:1·6).

Discussion

Our results confirm the thesis of Schümann & MacMahon (1933) regarding two types of malignant nephrosclerosis. Their 'exogenous malignant nephrosclerosis' corresponds to our first-group lesions, developing acutely in normotensive patients, in a disease associated with acute renal failure and severe haemolysis. We call this 'primary malignant nephrosclerosis' because the lesions of the renal vascular system may develop independently of hypertension or precede it. On the other hand, Schümann & MacMahon's 'endogenous malignant nephrosclerosis' corresponds to our second group of patients. In this form, renal vascular lesions characteristic of malignant nephrosclerosis are induced by hypertension, as in experiments in animals (Wilson & Byrom, 1939, 1941; Helmchen & Kneissler, 1976). We call this form 'secondary malignant nephrosclerosis'. It progresses gradually towards renal insufficiency and, according to our observations, without clinical symptoms of haemolytic anaemia.

In our opinion, the various definitions of renal vascular diseases mentioned in the Introduction of this paper do not reflect different diseases but correspond to an entity which we call 'primary malignant nephrosclerosis'.

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References


