

# Focal Glomerulonephritis\*

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## Definition

Focal glomerulonephritis is a form of glomerulonephritis in which only a certain number of glomeruli show lesions, the others being normal. It is a feature of most cases that the glomeruli affected show an involvement of only a portion of the tuft, a change that will be referred to as a local lesion. In general, focal glomerulonephritis can occur as a manifestation of well-recognized entities such as systemic lupus erythematosus, polyarteritis nodosa, subacute bacterial endocarditis, or Schönlein-Henoch syndrome; it can also occur apart from these diseases with a variety of clinical pictures (Heptinstall and Joeke, 1961).

## Focal Glomerulonephritis as Part of Systemic Disease

In its early stages, systemic lupus erythematosus affects the glomeruli in a focal way. The affected glomeruli show a predominantly local involvement in which one or two adjacent lobules show necrotizing or proliferative changes. In the later stages of lupus nephritis, most of the glomeruli are affected, but the tendency to localized involvement of individual glomeruli is often apparent even in advanced cases.

Polyarteritis in the classical form shows no glomerular changes apart

from those of ischemia, but, in what is often referred to as the microscopic form (Davson, Ball and Platt, 1948), the glomeruli are involved. The changes here are essentially focal, and, even in advanced cases, one frequently sees a significant number of glomeruli not showing involvement. The glomerular lesion is, almost invariably, a necrotizing change usually affecting only part of the tuft, which is rendered eosinophilic and structureless. A proliferative change may be seen in the affected part of the tuft, and the epithelium lining Bowman's capsule is frequently excited, producing crescents. In some cases, the glomeruli show extensive proliferative changes in both tuft and cells lining Bowman's capsule, giving a picture that resembles rapidly progressive glomerulonephritis.

Subacute bacterial endocarditis has long been recognized as a cause of focal glomerulonephritis, the appearance of which is no different with this condition than when it appears apart from systemic disease. This will be described later. The way in which the lesion is produced in endocarditis is unknown, but the two main possibilities are either that it is embolic from the valvular vegetations, or that it reflects some immunologic mechanism.

Schönlein-Henoch purpura has long been known to give rise to a form of nephritis. Up to the time of the renal biopsy, the only picture recognized was that of a florid proliferative glomerulonephritis accompanied by extensive crescent for-

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mation in the patient with a rapidly progressing azotemic course. However, the more usual renal manifestation is much milder, with complete recovery occurring, as a rule. This form has been shown on biopsy to have either no recognizable lesion or a picture of a mild focal glomerulonephritis of the type to be described.

#### **Focal Glomerulonephritis not Associated with Systemic Disease**

The majority of cases diagnosed as focal glomerulonephritis on biopsy do not present clinically with the above-mentioned systemic illnesses. Their presentation is varied. Some patients are first seen with a nephrotic syndrome having no clinical features distinguishable from other causes of this syndrome; others have recurrent attacks of hematuria which may take place over periods of years; some may have hemoptysis and an abnormal urine noted on urinalysis; still others have urinary abnormalities or other symptoms or signs referable to the kidney. Skin rashes and joint pains have been noted in a good proportion of patients. The prognosis in most of these nonspecific cases is good, the exception being the group with hemoptysis, the so-called Goodpasture's syndrome. In this, the patients develop a rapidly progressive glomerulonephritis with death in uremia. In such cases the renal pathology changes drastically over a relatively short time from a focal glomerulonephritis to a widespread florid glomerulonephritis with extensive crescent formation (Johnson and McGovern, 1962; Benoit et al., 1964).

The pathology of focal glomerulonephritis not associated with systemic disease consists of a certain number of the glomeruli showing changes that are usually localized to one or two lobules of the tuft, although in exceptional cases the tuft is diffusely involved. The usual localized change consists of an increase in cell nuclei, often accom-

panied by necrosis, although one may occur without the other. There is sometimes proliferation of adjacent epithelium lining Bowman's capsule, and adhesions may form. Localized areas of solidification are the main features of certain cases, and these appear to be later lesions, as judged by studies utilizing sequential biopsies. It is of interest that necroses have not been seen in personally studied cases of the nephrotic syndrome. The tubules are frequently unaffected, but focal loss may be found in those cases with most extensive glomerular change. Lymphocytes and plasma cells may be seen in the interstitium, and increased fibrosis is present in those cells with tubular loss. In my own experience, arterial changes have not been very impressive.

#### **Discussion**

Very little has been written about focal glomerulonephritis not associated with systemic disease. This is almost certainly because it is either an early manifestation of disease or because it represents a mild illness and, therefore, has never been encountered in an autopsy service. Its recognition is largely a result of extended use of the renal biopsy.

It is important that conditions which might be confused with focal glomerulonephritis should be excluded by the pathologist dealing with renal biopsies. In the first place, it is essential that some of the glomeruli be normal, and this obvious fact should always be borne in mind. This is important in the differential diagnosis from resolving acute diffuse glomerulonephritis. In this latter condition there is a widespread proliferative lesion in all glomeruli; during resolution, the number of cells decreases at a fairly even rate in all glomeruli, the cells in the mesangium decreasing more slowly than others. In certain cases of acute diffuse glomerulonephritis, some glomeruli show one or two lobules

to be more severely affected than others. These lobules have greater numbers of nuclei than their neighbors. It is reasonable to assume that such glomeruli might resolve more slowly than others, so that an appearance resembling a focal glomerulonephritis could be produced. The contrast between these more severely affected glomeruli and the others would become accentuated during resolution, but mesangial hypercellularity would still be present in those with less severe initial involvement. We still cannot be certain, however, of the antecedent picture in the kidney of those cases showing partial solidification of an occasional glomerulus on biopsy. It is conceivable that some of these might be the end result of what was originally a diffuse process, the affected glomeruli representing those that were irreparably damaged during the acute phase. For this reason, it seems best to include in the diagnosis of focal glomerulonephritis only those cases showing proliferative or necrotizing lesions.

Proliferative changes in both the tuft and the cells lining Bowman's capsule may be seen around the periphery of infarcts. These changes could be confused with focal glomerulonephritis if this area were to be sampled by the biopsy needle. It is of interest that these changes may be a likely cause of the glomerular lesions of subacute bacterial endocarditis in which infarcts of the kidney are commonly encountered.

In cases of chronic pyelonephritis with hypertension, it is not unusual to see what has been referred to as alterative glomerulitis. In this condition certain glomeruli show localized nuclear proliferation with pyknosis of some of the nuclei, and sometimes necrosis occurs in the tufts. Loss of surrounding tubules and other stigmata of chronic pyelonephritis should help to exclude a diagnosis of alterative glomerulitis.

In malignant hypertension, the glomeruli may show necrosis of part of the tuft with an occasional

cellular increase. The necrosis in this case is usually in continuity with a necrotic arteriole, and other vascular changes of severe hypertension are present.

In many renal biopsies, scattered, completely hyalinized glomeruli are frequently found. The question invariably arises as to how this finding should be interpreted. This is often impossible to determine, especially in the older age group where aging and ischemic changes are present. In a young person, hyalinized glomeruli are more likely to be of significance, but, even here, their presence in small numbers should not be taken as indicative of old glomerulonephritis, nor should focal glomerulonephritis be diagnosed solely on the basis of their presence.

#### Course of Focal Glomerulonephritis

In general, it has been my experience that, in focal glomerulonephritis not associated with systemic disease, the prognosis has been good. In sequential biopsies I have observed that healing of the localized glomerular lesions takes place with the production of localized scars. The exception to this is the group of cases associated with hemoptysis (Goodpasture's syndrome), in which an apparently benign-looking focal glomerulonephritis has changed into a widespread florid glomerulonephritis with rapid death from renal failure. Some of the cases associated with recurrent hematuria may, after many years, develop permanent renal impairment, but the proportion of such is not great.

In focal glomerulonephritis occurring as a manifestation of polyarteritis or systemic lupus, the progress of the lesion is quite different.

#### Etiology

Little can be said of the etiology of focal glomerulonephritis, but the varied circumstances under which

it is encountered make it unlikely that there is any common etiologic factor.

#### References

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