

Drugs that are used for other G.N. include Prednisone, Cyclophosphamide or Chlorambucil and blood thinning agents including Warfarin, Dipyrimadole (Persantin) and Aspirin. The aim of treatment is to reduce inflammation and stop clotting within the filters. Each of these drugs has side effects beyond the scope of this pamphlet and the drugs are sometimes used in combination when renal damage is getting worse or the urine protein is heavy. The response to treatment varies. It is important that patients taking these drugs understand the risks of the drugs and attend their physician for follow up to prevent further complications. Newer drugs are also being evaluated in the treatment of these disorders.

## 9 WHAT ARE THE CHANCES OF GETTING RENAL FAILURE AND NEEDING DIALYSIS?

Mild forms of G.N. are common and do not lead to kidney failure. Severe forms of G.N. are much less common but are more likely to cause kidney failure. These are usually associated with high blood pressure, larger amounts of protein in the urine and abnormal kidney function as well as signs of scarring, thickened blood vessels and damaged glomeruli in the kidney biopsy. Rarely, patients with severe disorders such as Goodpastures syndrome and rapidly progressive glomerulonephritis will have kidney failure when they are first seen and the chances of recovery are poor.

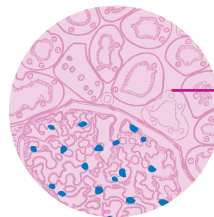
G.N. is the most common group of disorders causing kidney failure in Australia. Although the most common condition diagnosed in this group is IgA glomerulonephritis, most people with IgA glomerulonephritis do not end up with kidney failure.

The vast majority of patients with mild glomerular disease, e.g. blood in the urine detected only on routine examination or mild proteinuria, require only regular follow up to ensure that their kidney function remains unchanged and their blood pressure is normal.

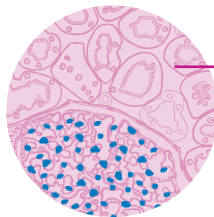
## Diagnosis of Glomerulonephritis in a Kidney Biopsy, Under a Microscope



Glomeruli (filters) in outer section of kidney - one million (1,000,000) in each kidney

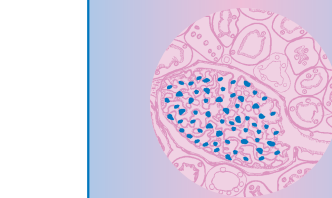


Microscopy of a normal glomerulus



Microscopy of glomerulus with G.N. - showing increase in number of cells

# Glomerulonephritis



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Publications of the Renal Resource Centre are endorsed by  
 The Australian and New Zealand Society of Nephrology.



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## 1 WHAT IS GLOMERULONEPHRITIS?

Glomerulonephritis (G.N.) means inflammation of the glomeruli, the filtering units of the kidneys. This condition is not due to infection or cancer of the kidney and cannot be spread to other people. Both kidneys are always involved.

## 2 WHAT ARE GLOMERULI?

The glomeruli are the filters of the kidneys which filter the blood and make urine. Normally, large molecules such as proteins and cells such as red blood cells or white blood cells do not pass through the filter and are retained within the blood because they are so important for health. Small molecules pass completely through the filters. Most of these are completely reabsorbed back into the blood since they are so important in maintaining the right chemical balance of the body e.g. glucose, salt etc. Other molecules which are not required for body functions are passed freely into the urine, for example urea, uric acid, creatinine etc.

## 3 WHAT ARE THE EFFECTS OF DAMAGE TO THE GLOMERULI?

There are two main effects. Firstly, substances which are normally retained in the circulation escape into the urine through the filtration mechanism. As a consequence, protein and red cells appear in the urine and can be detected by a dip stick urine test. Protein in the urine is called proteinuria and blood in the urine is haematuria. The amount of protein can be measured by collecting urine for a 24 hour period. Normally there is very little protein in the urine but a large amount of protein in the urine can lead to swelling of the legs (oedema). The red cells which escape in the urine can be present in small numbers detected only with a microscope or dip stick, or occasionally blood can be

seen in the urine in the toilet. The presence of visible blood in the urine does not necessarily mean more severe damage or a worse outlook.

Secondly, if the damage gets worse, the filter shuts down and that function of the kidney is lost. If sufficient damage occurs to enough glomeruli, kidney failure may occur.

## 4 WHO GETS GLOMERULONEPHRITIS?

The answer to this question is not clear. It appears that some people are prone to this disorder if they come into contact with a particular stimulus or trigger. Some of these triggers are known, e.g. some types of streptococcal skin and throat infections. Even when these are present in epidemics, only a small number of people will develop G.N.

For most people with G.N., the trigger is unknown.

## 5 HOW IS THE DIAGNOSIS OF GLOMERULONEPHRITIS MADE?

G.N. is suspected when blood and/or protein are found in the urine. However, there are many causes for blood or protein to be present in the urine. The diagnosis of G.N. is suspected most often after inspection of the urine under a microscope which can indicate that the source of bleeding is from the glomeruli rather than elsewhere in the urinary tract. The greater the degree of protein in the urine, the more likely the cause is G.N. High blood pressure and sometimes reduced kidney function are also associated with G.N.

The diagnosis can be confirmed by performing a kidney biopsy. This involves a one or two day hospital admission. A small needle is used to obtain a small sample of kidney tissue under local anaesthetic. The biopsy procedure takes about 10 minutes. The kidney is localised by ultrasound or x-ray and the kidney tissue is sampled while the patient lies on his or her stomach. Patients stay in hospital until the risk of any

complications such as bleeding into the urine or around the kidney has been assessed. Some bleeding occurs in about 5% of patients. To allow the scar in the kidney to heal properly, heavy exertion or repetitive bending should be avoided for 2-4 weeks after the biopsy. Medications likely to increase bleeding e.g. Aspirin, should be avoided before and after the biopsy.

The kidney tissue is then examined under a microscope by three techniques so there are three parts to the final report on the biopsy. This final report is usually available in one to two weeks.

The pathologists can describe changes in the biopsy which allow for specific patterns to be recognised and a diagnosis made. The diagnosis and description of the biopsy is important for predicting the likely progress, response to treatment and outcome of G.N.

## 6 HOW MUCH VARIATION IS THERE IN OUTCOME WITH GLOMERULONEPHRITIS?

The outlook for patients with G.N. varies from complete recovery at one end of the spectrum, to total kidney failure at the other end.

Often if renal function is normal, despite evidence of G.N., such as blood in the urine detected by dipstick or under the microscope, the outlook is likely to be good. These patients will however, still require regular follow up.

## 7 WHAT TREATMENT IS AVAILABLE?

If treatment is needed, the type will depend very much on the renal biopsy diagnosis. For example, in minimal change nephrotic syndrome where the glomeruli appear normal, initially all patients respond to Prednisone, a drug in the Cortisone group. On the other hand, virtually all patients with IgA Nephropathy are resistant to known therapies.