

Renovascular Disease

The Facts

Renovascular disease is a progressive condition that causes narrowing or blockage of the renal arteries or veins. These are the blood vessels that take blood to and from the kidneys. It's the general term used for three disorders: renal artery occlusion, renal vein thrombosis, and renal atheroembolism.

The term is most often used to describe diseases affecting the renal arteries since blockage of the renal vein is not very common. Renovascular disease usually affects the elderly. However, young women in their teens to late 30s are at risk of a certain type of renovascular disease called *fibromuscular dysplasia*, a disorder of the muscular lining of the renal arteries that can cause severe high blood pressure.

Renal artery occlusion happens when one or both of the renal arteries are blocked. The arteries carry blood to the kidneys, where waste material is filtered out of the blood.

Renal vein thrombosis occurs when the veins leaving the kidneys (the renal veins) become blocked. The renal veins carry the filtered blood away from the kidneys to the rest of the body.

Renal atheroembolism results from a buildup of fatty material that blocks the renal *arterioles* (the smallest section of blood vessels leading to the capillaries). Cholesterol and lipids (fats) may also build up on the lining of the blood vessels, causing them to narrow.

Causes

People who are at risk for other vascular diseases (blood vessel problems) are also more likely to develop renovascular disease (e.g., seniors). For some people on high blood pressure medications, such as ACE (angiotensin-converting enzyme) inhibitors, the problem may be discovered if side effects such as kidney failure or other severe kidney problems appear. As well, smokers and people with diabetes seem to be more likely to develop renovascular disease, as are people with high blood pressure.

Renal artery occlusion occurs when the renal arteries become closed off, either partially or totally, by an *embolism* (a blood clot or foreign substance that blocks a blood vessel) or hardening of the arteries. Hardening of the

arteries occurs when cholesterol, calcium, and other substances line the arteries. Embolisms can be caused by heart disease, surgery, trauma, or tumours.

Renal vein thrombosis is fairly uncommon, but if there's been a trauma to the back or abdomen, a blood clot may form and get stuck in the renal veins. Sometimes it's a result of other kidney-related conditions (e.g., nephrotic syndrome, kidney cancer). Occasionally, a test or procedure might also trigger an embolism.

Children can also develop renal vein thrombosis, though rarely. Renal vein thrombosis in children under one year old is usually caused by reduced blood flow to the kidneys, severe dehydration, and infants with a condition that forms excessive clots (hypercoagulopathy).

Renal atheroembolism is caused by atherosclerosis. Risk factors for developing atheroembolism include:

- o diabetes
- o family history of the condition
- o heart disease
- o high blood pressure
- o high cholesterol
- o obesity
- o smoking

Symptoms and Complications

There aren't usually any warning signs of renovascular disease, but as the disorder gets worse, high blood pressure and symptoms related to kidney failure may appear. Symptoms of kidney failure may include:

- o bad taste in the mouth
- o chest pain
- o confusion or anxiety
- o fatigue
- o itchy skin (http://healthtools.medbroadcast.com/health_tools.asp?t=142&text_id=6715&channel_id=2063&relation_id=118285&icn=psoriasis_skin)
- o loss of appetite
- o muscle twitching or cramping
- o nausea and vomiting
- o pale or yellowish-brown tinted skin
- o puffy eyes, hands, and feet
- o weight loss

As the kidney failure gets worse and the toxins continue to build up in the body, seizures and mental confusion can occur.

In renal artery occlusion and renal vein thrombosis, there may be no symptoms if only one kidney is blocked, because the other kidney is usually able to handle the work of two. If both kidneys are partially affected, or if one is totally affected and the other is partially affected and the blockages have occurred quickly, the following symptoms may appear:

- o back or side pain
- o blood in the urine
- o fever
- o nausea and vomiting
- o no urine (if there's a total blockage)

In renal atheroembolism, there's a chance that there are embolisms in other parts of the body as well, including the retina in the eye, which in very rare cases may affect vision.

The complications of renovascular disease are serious. As a result of the high blood pressure the condition causes, some of the following complications may occur:

- o blood vessel damage
- o congestive heart failure
- o heart attack
- o kidney damage or failure
- o loss of vision
- o stroke

Renal vein thrombosis has an added complication: blood clots can move from the kidneys to the lungs, causing a pulmonary embolism.

Making the Diagnosis

Renovascular disease, like many kidney diseases, is often only diagnosed after much damage has happened. This is because the symptoms are not easily noticed until other problems appear, such as high blood pressure.

If renal artery occlusion is suspected, a diagnosis is needed as soon as possible to avoid potential kidney damage. Following a physical exam, a doctor may order some of the following tests to check for blockages:

- o abdominal ultrasound
- o blood tests
- o CT or CAT (computed tomography) scan of the abdomen
- o IVP (*intravenous pyelogram*) - an X-ray of the kidneys, ureters (they carry urine from the kidneys to the bladder), and bladder
- o magnetic resonance imaging (MRI) of the abdomen
- o *renal arteriography* - an X-ray that checks the renal arteries using dye
- o *renal scan* or *renal perfusion scintiscan* - a kind of X-ray exam that scans the arteries to the kidneys without using dye

If the doctor thinks the problem may be renal vein thrombosis, they will order a urinalysis to check the urine for protein or red blood cells. Along with the tests for renal artery occlusion, other tests might include an *angiography* (an X-ray taken after dye is injected) of the *vena cava* (the large vein going into the heart) or the renal vein.

In order to diagnose renal atheroembolism, the doctor may need to order various blood tests or do a biopsy to examine kidney tissue. An eye exam might also reveal an embolism in the eye.

Treatment and Prevention

Renal artery occlusion: If the blockage is found early enough and if there's only one functioning kidney, doctors usually start aggressive treatment. They may use medications called thrombolytics (e.g., streptokinase* or urokinase) to dissolve blood clots. This treatment can only be done if the blockage isn't complete and if it's done immediately. Immediate treatment is essential since blood flow to the kidneys is essential. They may also try to prevent more clots by using anticoagulants, such as warfarin or heparin.

In severe cases, surgery might be used to try to clean out the artery. Again, surgery must be done shortly after the blockage occurs. It's generally done if the problem has been caused by trauma rather than by a disease.

If the blockage is only partial, balloon angioplasty or renal artery bypass surgery may be considered to improve kidney function or blood pressure control. Occasionally, high blood pressure can be cured following this procedure.

Renal vein thrombosis: The main treatment is to dissolve or prevent further blood clots. Surgery may also be used. In cases of dehydration, liquids are given to restore the body's fluid balance.

Unfortunately, there's no specific treatment for renal atheroembolism. The goal is to prevent it from getting worse.

Renovascular disease can't always be prevented, although its development can be slowed down by controlling conditions that can cause it, such as high blood pressure and diabetes. Eating a healthy diet is always recommended.

In the case of renal vein thrombosis, some embolisms can be prevented by making sure people don't get dehydrated when they're sick. This means drinking enough fluids, especially when ill, for example, with severe gastroenteritis or the flu. This is particularly important for young children.

The chances of developing renal atheroembolism are less if some of the risk factors, such as smoking and overweight, are eliminated. For people with diabetes, controlling blood sugar is very beneficial to reducing the risk of this condition.