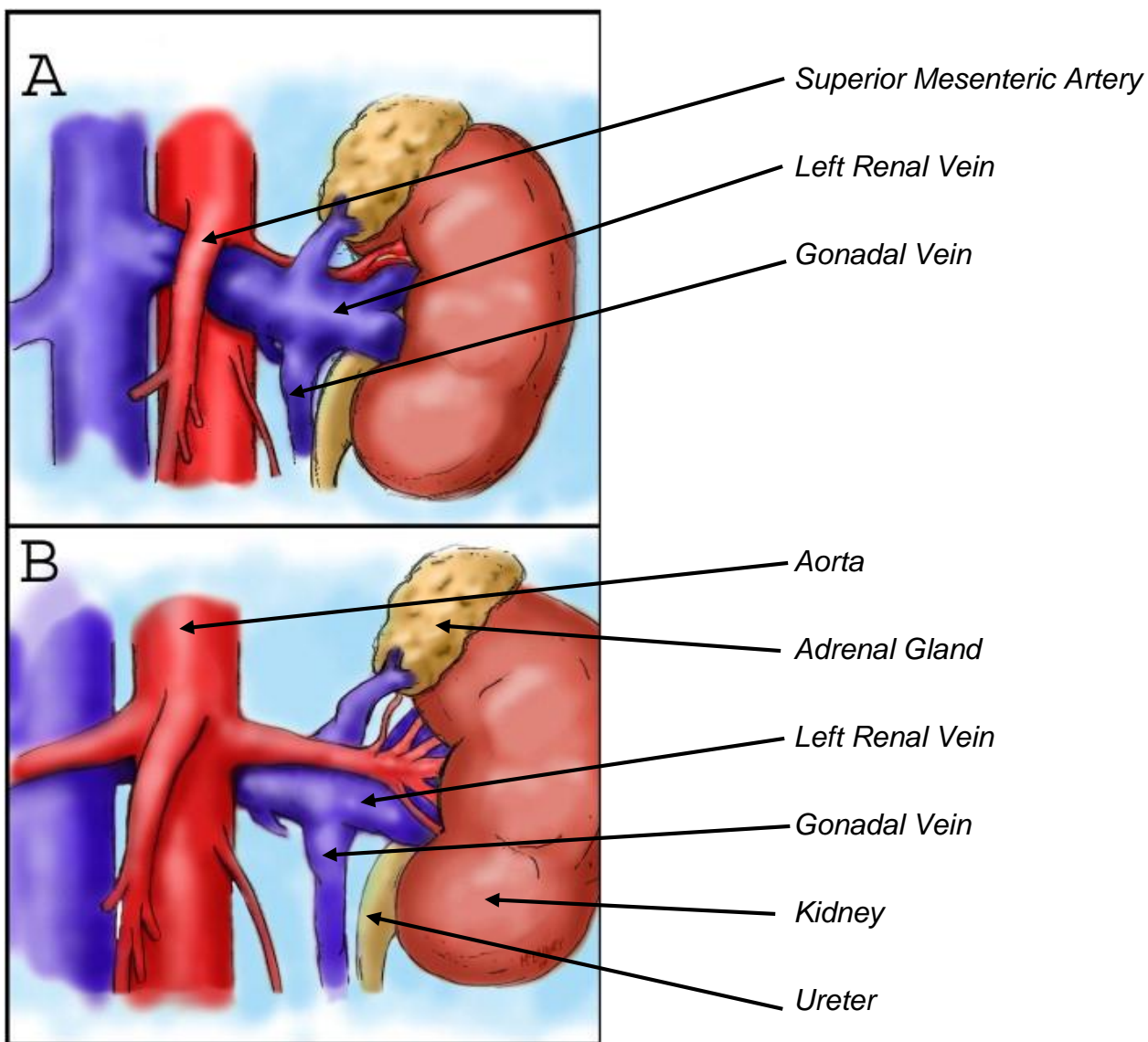


## About Nutcracker Syndrome (NCS)

### What is Nutcracker Syndrome?

Nutcracker Syndrome is a very common condition that is present in almost 50% of women with other forms of pelvic vein disease, such as May Thurner Syndrome and Pelvic Congestion. This is because MTS and PCS are anatomic variants in the structure of abdominal veins that predispose the patient to all three issues.



**Flagship Office:**

14 E 60<sup>th</sup> Street, Suite 501  
New York, NY 10022

**Corporate Office:**

555 Passaic Avenue  
West Caldwell, NJ 07006

P 888-286-6600 | F 800-565-9415 | [www.nycsurgical.net](http://www.nycsurgical.net)

## How did I get Nutcracker Syndrome?

Nutcracker syndrome is a genetic anatomic variant, not really a disease. It is due to the aorta, or another artery going to the intestine - most often the superior mesenteric artery - compressing the left renal vein, or the blood from draining from the left kidney back to the heart. It is present from birth, but can be exacerbated kinking blood vessels and affecting flow by a variety of situations, including weight loss which cause the blood vessels to be more close than normal or surgery which shifts the contents of the abdominal contents.

The worst cases present in childhood – often with left sided kidney problems - given the very high severity of the vein obstruction. When it presents in older individuals, it is usually due to a less severe form that presents slower. Because there is a huge movement towards anti-obesity these days, we are seeing more and more of these cases due to massive weight loss.

## What kind of symptoms does NCS cause?

The symptoms of NCS are mostly silent until it is quite severe. Because we have two kidneys, we are often not aware of kidney failure as the other one compensates. Symptoms that are early indicators of the disease include protein in the urine, microscopic blood in the urine, and other early indicators of early stage kidney malfunction. Flank pain and pelvic pain occur when the lesion is quite severe, but most often this is not the case.

NCS also commonly causes pelvic congestion syndrome in women and varicocele (enlarged testicular veins) in men due to the backing up of blood in branches of the kidney veins.

It can also cause problems with urine flow and backing up of urine into the left kidney due to the pressure of the distended vein on the urine drainage system, or what is called hydro-nephrosis. This can cause things like recurrent urinary tract infections and kidney stones.

Chronic fatigue, lack of energy, and hormonal disturbances can occur due the blockage of the adrenal gland, which is also a branch of the left renal vein in many patients.

145 W Montauk Highway  
Hampton Bays, NY 11946

1062 Northern Blvd  
Roslyn, NY 11576

150 South Pearl Street  
Pearl River, NY 10965

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## So who needs treatment and how is it treated?

In general, if the patient has positive ultrasound findings of kidney vein destruction or blood pooling in the pelvis, as well as a history of abdominal and pelvic symptoms, we take the patient for a diagnostic venogram, which is a study done usually under local anesthesia, that allows us to clearly localize the anatomy, cause, and severity of blood pooling in the pelvis, and other associated lesions such as NCS. Often at this time, we are able to diagnose NCS when we do that initial diagnostic test. We keep the patient awake preferentially so that they can understand the anatomy and why we do what we are doing, and in our experience this has helped tremendously with patient satisfaction.

Almost always, in cases of nutcracker syndrome, PCS (pelvic congestion syndrome) or varicocele exists as well. Typically we treat the PCS first, as that is usually the cause of the patient's symptoms. A discussion is then had with the patient, and another test called IVUS or intravascular ultrasound is done at a second visit. During that test, we can see exactly with tremendous precision how narrow the kidney vein is, and make a decision whether to treat it or not. We can also assess kidney function which can sometimes be useful in helping us to decide whether to treat, and how urgent it is. In most cases, NCS requires treatment, although in some cases we will delay treatment for other reasons, like in a woman expecting to have more children, which may put pressure on a stent.

## What if I don't want to be treated?

The risks to not treating NCS are over the long-term are progressive kidney damage, as well as the risk of complete occlusion of the kidney vein by a clot. Of course, once this happens, the prognosis becomes much worse, and the chance of complete resolution of the problem for less which makes the decision of when to treat somewhat complex.

Very often, we delay treatment in patients. This may be due to factors such as age, the desire to have more children and thus not have a stent in place, and other factors, including the overall kidney function in the affected kidney. This however, requires close follow up with the patient and a discussion with them about their preferences.

The key thing to remember, is as with all venous disorders, NCS is a chronic issue that has been present likely for decades. This being the case, no rushed treatment is necessary. You have time to make a logical decision. It is often best to address NCS when it is diagnosed, but certain factors may delay treatment safely.

Treatment is very safe, benign, with almost no long-term consequences or lifestyle alterations needed

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## What happens after stenting for NCS?

After NCS treatment, usually immediately after, there is a vague feeling of usually mild pain that occurs in the treated area. This is typically due to the stent stretching the vein back open and also the muscles that it lies on top of in the back. This resolves over a few days typically.

As in every stent procedure, your surgeon will prescribe an anticoagulation regimen. Depending on how severe the narrowing was, all patients are placed on aspirin, while in some special instances your physician may prescribe another medication to keep your blood from clotting inside the stented area temporarily. This is because for a short period, the stent stretches the inside of the vein, causing microscopic tears. These tears make the blood more likely to clot for a short time interval immediately after stent placement. This risk typically goes away inside of a month.

If your stent was placed for deep vein thrombosis or clotting, it is possible you will have to remain on blood thinners permanently. If you have formed a clot already, this always makes future procedures more complicated, and the outcomes less positive. This is a discussion also best had with your surgeon.

## What are the risks of treating my NCS?

With any medical procedure, there is a theoretical risk of bleeding as well as infection. In addition, whenever endovascular procedures are performed, such as for NCS, some unique but very rare risks include the possibility of malposition or movement of devices, as well as damage to blood vessels and organs. In our experience at NYC Surgical our complication rate is far below that of most major academic institutions, far below the national average of less than 1 percent. Overall, the risk of these procedures is far lower than conventional surgery, but still present, and must be discussed.

## What is the prognosis after treatment?

After treatment for NCS, the prognosis is excellent with very few recurrences even long term. If it is corrected prior to severe kidney damage, often the kidney will recover to some extent, and progressive decline of kidney function in most cases will be stopped.

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