Kidney Infection (Pyelonephritis)

A Pain in the Side

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Introduction
Pyelonephritis is the result of a progressive urinary tract infection, when a lower urinary infection travels upward into the upper urinary system. The lower urinary infections originate in the bladder and urethra, while the upper urinary infections involve the ureters and the kidneys. The kidneys filter the blood, so pyelonephritis can be potentially dangerous because an infection could then spread into the bloodstream. Women tend to be at higher risk because their urethras are shorter (which is the same reason they are more prone to urinary tract infections as well).

The kidneys are responsible for distributing minerals, regulating acidity in the body, managing the body’s fluid levels, and releasing hormones that have a number of different biological functions. So it’s extremely important to keep our kidneys healthy, since they provide so many vital functions. The symptoms of pyelonephritis may be similar to the symptoms of a urinary tract infection: painful urination, urgency, and frequency. However, once things progress and the kidneys become involved, then more severe symptoms may become apparent. They include back pain or flank pain, fever, feeling sick, and nausea and vomiting.[1] There may also be a number of changes observable in the urine, including blood, cloudiness, or even a foul smell. This is due to the bacteria and from the immune system trying to clear the infection.

The bacteria responsible for pyelonephritis include \(E. \text{ coli}\) and \(Klebsiella\). Any health conditions that reduce urine flow make pyelonephritis more likely, for example prostate issues like benign prostatic hypertrophy, abdominal masses, or stones in the bladder or kidneys. Kidney stones themselves actually provide a location for bacteria to accumulate
while evading the immune system. People with health conditions that decrease the effects of the immune system are also at higher risk, including diabetics.

**Diagnosis**

Pyelonephritis may be diagnosed if the above-mentioned signs and symptoms are present, or if there has been a preceding urinary infection. Physical exams may help to rule in pyelonephritis, especially if there are vital signs that indicate an infection (such as fever), or pain or tenderness over the kidneys. Various urine tests may be conducted, including a urinalysis. A microscopic analysis of the urine will typically show signs of infection — this includes bacteria and white blood cells. A urine culture can be done, which involves growing the bacteria that is found in the urine. This then helps in figuring out which antibiotics may be the most effective in treating the infection. Finally, imaging of some kind may be used; typically, the most common ones in this situation are a CT scan (which will take a rapid series of X-rays) or an ultrasound.[2]

**Conventional Treatment**

The conventional treatment of pyelonephritis is with antibiotics. Because pyelonephritis is potentially life-threatening and the symptoms are severe, it is strongly recommended to always go with antibiotic treatment. If the urine culture has been completed, an antibiotic can be selected that the bacteria will be sensitive to. We will discuss natural remedies in a moment, but they are not recommended as the alternative: they are only suggested as preventative measures or as add-on treatments. For most cases of pyelonephritis, hospitalization is not required. It would only be suggested in severe cases, or where intravenous antibiotics may have become necessary to ensure the treatment reaches the kidneys.

Most cases of pyelonephritis are acute, so they go away without any issues and do not cause any long-lasting damage to the kidneys. Some cases are chronic, and usually
these cases are caused by defects to the kidneys. Children who have repeated urinary tract infections will sometimes have scarring in their kidneys, and this can eventually lead to kidney failure.

**Natural Treatments**

Aside from birth defects or other long-standing issues, many cases of pyelonephritis can be avoided by keeping the kidneys healthy. The first suggestion is to always keep the body well hydrated. This prevents the formation of kidney stones by diluting the urine and keeps the kidneys functioning properly. Losing weight and maintaining a healthy weight is another lifestyle-based suggestion that can reduce the burden on the kidneys. Exercise is always good for preventing health problems. When it comes to the kidneys, certain types of exercise may be better suited. Because the kidneys are not secured like some organs, they float around. Activities like running can therefore cause them to get bumped around and can cause microtrauma. Other forms of exercise that don’t cause such a strong impact on the body may be more favourable, such as swimming, for example.

There are a few dietary suggestions that can help with kidney health and the prevention of pyelonephritis. The first is to follow a diet that is regulated in terms of protein, especially animal protein. All proteins add a burden to the kidneys, but proteins are also essential for life. Using moderation is the best approach here, or speaking with a health-care provider who can help identify what your unique protein needs are. Kidney stones are most common in those that consume a lot of animal meat, so if you are at risk or have a predisposition of some kind, decreasing protein intake may be a good idea. Other dietary items that can harm the kidneys are foods that contain phosphorus. It is found in most foods, but pop and processed foods are especially high in phosphorus. If the kidneys are not functioning well, phosphorus can accumulate in the body and can cause issues with the cardiovascular system and with the bones.[3]

Certain fruits and vegetables may also aid with kidney health. For example, berries are an excellent source of antioxidants and contain vitamin C.[4] Garlic and onions are also very health-promoting. They act as anti-inflammatory substances and also help to improve the activity of the immune system, which could help clear infection. Finally, reducing simple sugars is of great importance. Sugar by itself can temporarily cause
immune suppression, making it harder to clear the infection. Sugar also feeds bacteria, so it is doubly harmful.

**Supplements**
There are certain nutritional supplements that may be protective to the kidneys, and even for pyelonephritis in particular. For instance, probiotics have been shown to assist the kidneys in processing waste materials and reducing the risk of kidney stones. As a side benefit, probiotics are one of the absolute best protective mechanisms against urinary tract infections, so they can also indirectly help in the prevention of pyelonephritis. If a course of antibiotics has been taken, probiotics can also be an excellent choice, as they can repopulate the digestive tract with health bacteria, preventing side effects like constipation and diarrhea. Certain vitamins may help support kidney health, including vitamin C and various B vitamins. Vitamin C helps to maintain kidney health through various mechanisms, and can also help with certain types of kidney stones. Too much of a good thing can be harmful, so speak with your health-care practitioner to see if it is right for you. Some B vitamins are helpful at preventing stones as well, so adding a B-complex vitamin to your routine may not be a bad idea. Vitamin D is also a kidney protective vitamin. If there is kidney dysfunction, the nutrient $L$-carnitine may be depleted and thus could be worth supplementing. Herbal supplements may not be safe for everyone. Some supplements contain phosphorus and some are harder on the kidneys, so caution is advised.

**Final Thoughts**
Pyelonephritis can be a recurrent and dangerous condition. The main symptoms can resemble a urinary tract infection, but then get more severe as bacteria progress up the urinary tract. More severe symptoms warrant a visit to your health-care provider. The diagnosis may be done through history, physical exam, imaging, bloodwork, urine culture, or any combination of the above. The treatment of choice is always antibiotics. However, natural treatments can help with prevention and may work as add-ons to antibiotic treatment. Diet and lifestyle are extremely important to kidney health. Staying hydrated is number one. Decreasing protein intake and phosphorus intake may lower the burden placed on the kidneys. Incorporating low-impact exercises and watching weight may also help. Increasing fruits and vegetables is an ongoing recommendation. Finally, many vitamins are helpful and kidney-protective, or
may become deficient in cases of kidney disease so may be worthwhile supplementing, including vitamin C, D, and B-complex vitamins. Please speak with your naturopathic doctor if you are interested in more information on pyelonephritis.

References