THE ANNALS OF PHARMACOTHERAPY

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Using Sevelamer in Kidney Disease

Kidneys are bean-shaped organs located in your back. The biggest job of your two kidneys is to filter waste products from your blood and turn these into urine. The number of people diagnosed with diseases that affect their kidneys is rising. The increase in kidney disease is primarily due to damage caused when people fail to control their blood sugar (diabetes) or have high blood pressure. Over 19 million Americans have mild-to-moderate kidney damage. These individuals do not yet need dialysis, a process by which blood is filtered through a machine to remove waste products. However, by next year (2010), an estimated 600,000 Americans will require dialysis in order to live.

In addition to making urine, kidneys also play important roles in managing other aspects of our health. Appropriate kidney function is necessary to make vitamins that contribute to bone health (vitamin D), to assure proper amounts of minerals like calcium and phosphorus in the body, to assure adequate numbers of red blood cells, and to control cholesterol levels. In addition to dialysis, people with kidney disease may need to take numerous medications to compensate when the kidneys fail to do their job adequately.

One complication associated with kidney disease is high levels of phosphorus in the blood. Normally-functioning kidneys are able to eliminate phosphorus. Damaged kidneys (and even the process of dialysis) are unable to adequately eliminate phosphorus. High blood levels of phosphorus cause damage to organs and blood vessels, and the resulting damage is a leading cause of death in people with kidney disease. Ideally, phosphorus levels in the blood should be between 2.7 and 4.6 mg/dL in people who do not get dialysis and between 3.5 to 5.5 mg/dL for people who are having the dialysis procedure. Another complication of kidney disease is acidosis. This occurs due to failure of the kidneys to filter and remove acids from the blood. Acidosis can further worsen kidney function.

A variety of drugs that bind phosphate and help remove it from the body are available. Ex-

EXAMPLES OF FOODS RICH IN PHOSPHORUS

- Beans and peas
- Bran
- Dried fruit
- Eggs
- Fish
- Garlic
- Nuts
- Meat
- Milk products

Based on "Sevelamer Carbonate" by Mary Barna, Toros Kapoian, and Neeta Bahal O'Mara, ***The Annals of Pharmacotherapy***, **January 2010**, http://dx.doi.org/10.1345/aph.1M291. **For Our Patients** is provided by ***The Annals*** to help explain the latest research and information relating to your medications. These summaries are for informational purposes only and are not a substitute for professional advice from your personal medical provider. If you have questions about this material, you should discuss it with your physician or pharmacist.
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amples of phosphate-binders that you might be familiar with include: aluminum hydroxide, magnesium carbonate, calcium carbonate, calcium acetate, sevelamer hydrochloride, and lanthanum. Many of these drugs have side effects that patients cannot tolerate. In late 2007, sevelamer carbonate was introduced to the American drug market. Because of advantages of this newer formulation, the older derivative, sevelamer hydrochloride, is no longer being manufactured.

Sevelamer carbonate is a large molecule that binds to dietary phosphorus in the digestive tract. This binding prevents phosphorus from being absorbed and it is eliminated with bowel movements. Additionally, the drug binds to cholesterol derivatives in the intestine and can help to lower blood cholesterol levels. Because of the large size of sevelamer carbonate, the drug does not get absorbed into the body and is associated with few side effects, other than gastrointestinal ones.

In clinical studies involving patients with poor kidney function, sevelamer carbonate was shown to work just as well as the hydrochloride formulation for lowering blood levels of phosphorus and work even better than the hydrochloride formulation for lowering cholesterol. In addition, sevelamer carbonate increased blood bicarbonate levels, which may decrease the likelihood of acidosis complications.

In addition to sevelamer carbonate tablets, the new sevelamer formulation will also be available as a powder. This will be especially nice for people who have difficulty swallowing many tablets each day.

Common side effects of sevelamer derivatives include nausea, vomiting, diarrhea, abdominal pain, gas, and constipation. Side effects are less likely to occur with the new sevelamer carbonate formulation compared to the older sevelamer hydrochloride.

The recommended starting dose of sevelamer carbonate tablets is 2 tablets with meals, taken three times each day. Tablets should be swallowed whole. They should not be crushed, broken, or chewed. The powder form is not yet available, but is expected to be sold in two different doses: one will provide 800 mg of drug per packet the other will contain 2400 mg per packet. It is important to remember that even when taking sevelamer carbonate, you still need to decrease your intake of foods that contain phosphorus (Box). Dietary restriction is difficult because phosphorus is found in many foods. Even if you receive dialysis, this procedure removes very little phosphorus, so you will still need to limit your phosphorus intake and use a phosphate binder like sevelamer to keep your phosphorus levels under control.

FOR MORE INFORMATION

American Academy of Family Physicians
http://familydoctor.org/online/famdocen/home/common/kidney/832.printerview.html

Medline Plus
www.nlm.nih.gov/medlineplus/kidneydiseases.html

National Kidney Disease Education Program
www.nkdep.nih.gov/patients/