POCKET GUIDE TO MANAGING PHOSPHORUS

A tool to help patients and caregivers have a more effective dialogue with their healthcare teams.

AAKP is the oldest and largest, fully independent kidney patient organization in the USA.

Join today! AAKP membership is FREE for patients, family members and living donors!

www.aakp.org/join

@kidneypatient @kidneypatients

High Phosphorus (Hyperphosphatemia) QUESTIONS FOR THE DOCTOR

What is phosphorus and what does it do?

Phosphorus is a mineral that naturally occurs in all living matter because it is essential for life! Since it is found in all living matter, it is in many foods we eat! It plays a role in energy production, is part of our genetic "building blocks", and helps maintain all our body's cells and tissues. But did you know phosphorus is the second most abundant mineral in our body? Second, only to calcium and these minerals work together to build strong bones and teeth.

What is hyperphosphatemia? Can we talk simple instead of these big words?

"Hyper" means too much and when "Hyper" is added to "Phosphorus" it means too much phosphorus. The term hyperphosphatemia indicates elevated, or high, levels of phosphorus in the blood.

How will I know if I have high phosphorus in my blood?

Normal Phosphorus Level is between **2.5 - 4.5** mEq/L

Phosphorus levels are one of the many items checked when you have blood drawn for a lab review. A normal phosphorus is between 2.5 to 4.5 mg/dL. Your healthcare team will let you know if you have hyperphosphatemia, or simply, high phosphorus which is a level higher than 4.5 mg dL.

What happens if my phosphorus is too high?

Symptoms of high phosphorus are often "silent" and might remain undetected until discovered during routine blood work. Hyperphosphatemia can affect calcium levels in both the bones and in the blood which may result in low calcium (hypocalcemia) and the symptoms that might be felt with high phosphorus might actually be a result of low calcium! High phosphorus can increase the risk for bone and mineral disease which can result in weakened or brittle bones, and calcification to soft tissues and blood vessels. Symptoms might include:

- Muscle cramps
- Brittle nails and/or dry, coarse hair
- Tingling or numbness in or around the lips, tongue, fingers, or feet.
- Dry skin
- Irritability
- Memory problems
- Abnormal heart rhythm (arrhythmia)

Learn more about high phosphorus at https://bit.ly/AAKPHighPhosphorus or www.TheHiddenPinKidneyDisease.org.

Learn more about bone and mineral disease at https://bit.ly/AAKPBoneDisease

Is it related to my kidney disease, my medications, or both?

High phosphorus may be related to both though prevalently caused by chronic kidney disease (CKD). Kidneys filter excess phosphorus from your body to keep the blood level in a 'normal range'. If your kidneys are not working properly, too much phosphorus will remain in your blood. Other conditions that may cause high phosphorus include hypoparathyroidism, diabetic ketoacidosis, and injuries associated with muscle or cell damage.

Some medications that are hidden sources of phosphorus include:

- Calcium channel blockers
- Pain medications
- Antipsychotics
- Diabetes drugs
- Beta blockers
- Cholesterol-lowering therapy

It's important to note that these medications may increase phosphorus intake by ~80 mg/day which is far lower than phosphorus intake that may be increased from additives which could be as high as 800 mg/day 1 or more! Other medications that may affect phosphorus levels include laxatives, vitamins, and supplements which can lead to high phosphorus, while some medications such as corticosteroids and diuretics may lead to urinary loss of phosphorus. It's very important to review over-the-counter medications and supplements with your healthcare team before using them to help control not only phosphorus, but other minerals that might dangerously increase if your kidneys are not working properly! It's best to be safe!

What medications will control, or lower, phosphorus?

There are a variety of medications that are referred to as phosphate "binders" which bind to the phosphorus in the gut and not allowing it to be absorbed into the bloodstream. The phosphorus is then eliminated in the stool. The key to successful phosphate lowering using

phosphate binders is both the appropriate dose and timing: the binders must be taken with the meals allowing ample opportunity for the phosphors to become 'bound'.

Another new and safe FDA-approved phosphate-lowering medication acts by "blocking" instead of "binding". It simply blocks the phosphorus absorption, does not need to be taken with meals, and with fewer pills needed per day.

I am told I have hyperphosphatemia. Now what happens?

Phosphorus can be managed by both diet, medication, and possibly dialysis depending on the extent of kidney damage. A diet lower in phosphorus in combination with phosphate-lowering medications can be very effective in lowering and maintaining phosphorus levels. Your routine bloodwork will provide guidance in what changes are effective: the goal is to keep phosphorus between 2.5 – 4.5 mg/dL.

Is high phosphorus related to my diet?

Hyperphosphatemia is heavily compounded by the foods you eat. If you have CKD, you will want to know which foods are high in phosphorus, mainly readily absorbable phosphorus, as all foods are not created equal. Portion sizes are important too. Even low phosphorus foods can become risky if portions are doubled or tripled. We must learn to detect hidden sources of phosphorus by looking at the ingredients.

Following a low protein diet (LPD) is lower in phosphorus because phosphorus is higher or more "bioavailable" in high protein foods. Readily absorbable phosphorus comes from food sources that contain more "bioavailable" phosphorus. What does bioavailable refer to? This refers to how much phosphorus will be available for absorption in the gut.

Let's place foods into two groups: organic (natural) and inorganic (unnatural).

Organic, or natural, foods lend to lower phosphorus absorption:

Grains, nuts, seeds, vegetables, and legumes have the lowest "bioavailability". The phosphorus absorption from these foods is ~30-50%. As an example: although 1 cup of cooked lentils have 356 mg of phosphorus, only 30-50% will be absorbed (107-178mg). Another example would be 1 cup of cooked pinto beans which has 275 mg phosphorus and of this, 30-50% will be absorbed in our body: 83-138 mg. With careful planning and portions these highly nutritious foods can be included!

Dairy products, fresh meat, fish, seafood, and poultry have higher bioavailability; the phosphorus absorption from these foods is ~40-60%, and phosphorus in milk is up to 80% absorbed.

Inorganic, or unnatural, foods lend to increased phosphorus absorption:

These are associated with additives or preservatives found in fast foods, canned or bottled beverages, ready-to-eat or convenience foods, and enhanced meats. The phosphorus absorption from these foods is readily absorbable: 90-100%.

How do I find hidden phosphorus or additives?

Phosphorus is not listed on the food label, but hidden phosphorus can be found by looking at the list of ingredients for words that contain PHOS. Some examples of additives containing PHOSphorus include:

- Sodium PHOSphate
- PHOSphoric acid
- HexametaPHOSphate
- Sodium tripolyPHOSphate
- Dicalcium PHOSphate

A dietitian who specializes in kidney disease can provide guidance to appropriate food choices for phosphorus control; visit www.eatright.org to find one. You are the main person in your healthcare team. When it comes to phosphorus control you and your healthcare team will determine the best course of treatment for you.

Phosphorus in our Diet!

Foods to limit or avoid:

Processed foods: hot dogs, deli and/ or processed meats, boxed meals such as macaroni & cheese or hamburger helper, pizza

Dairy Foods: milk, cheese, ice cream, yogurt

Meat/Poultry/Fish: organ meats, sausage, shellfish, fish with bones such as smelt or sardines, convenience meats such as chicken nuggets or tenders (these are processed)

Beverages: chocolate & cocoa, colas, milkshakes, most protein shakes

Nuts/Seeds & Grains*: sunflower seeds, walnuts, cashews, almonds, pine nuts, most nuts and nut butters, whole grains such as spelt, oats, brown rice. Of note, amaranth & quinoa might fall under the category of whole grains, though they are not grains, but rather seeds!

Legumes/Beans & Pulses*: navy, great northern, or soybeans, black eyed peas, dried & fresh green peas, lentils, and edamame

**The phosphorus in Nuts/Seeds & Grains is stored as phytic acid, which is hard for the body to break down, digest, and therefore has lower phosphorus "bioavailability"*

High Phosphorus Foods (Examples):

- Cooked lentils (1 cup) 356 mg
- Milk (1 cup) 252 mg
- Beef roast (3 oz) 190 mg
- Kielbasa (3 oz) 173 mg
- Plain low-fat yogurt (1/2 cup) 163 mg
- Thin crust cheese pizza (1 slice) 148 mg
- Peanuts (1/4 cup) 137 mg
- Cheddar cheese (1 oz) 136 mg

Foods to enjoy in moderation:

Fruits/Vegetables: apples, berries, cherries, grapes, pineapple, bell peppers, carrots, cauliflower, cucumbers, lettuce, cabbage, kale, onion, zucchini

Dairy Foods: cream cheese, brie, parmesan, butter, sherbet, and milk alternatives such as almond, rice, coconut, or soy milk, plant-based yogurt such as coconut yogurt

Meat/Poultry/Fish/ Protein Sources: tofu, egg whites, chicken or turkey (skin removed), tilapia, cod, canned tuna (in water)

Legumes/Beans & Pulses*: garbanzo, fava, black, pinto, kidney, or lima beans, green peas (frozen or canned)

Low Phosphorus Foods (Examples):

- Egg white (1) 5 mg
- Blueberries (1/2 cup) 9 mg
- Golden delicious apple (medium) 17 mg
- Vanilla almond milk (1 cup) 19 mg
- Orange sherbet (1/2 cup) 30 mg
- Cream cheese (1 oz) 30 mg
- Tofu (3 oz soft) 52 mg
- Pasta (1 cup rotini or penne) 62 mg

Helpful Tips:

- Always carry a list of your medications, including over-the-counter medicine or supplements. Include the dose and timing of your medications on your list.
- Know your phosphorus level (goal is 2.5-4.5 mg/dL.
- Know hidden sources of phosphorus and how to detect phosphorus by reviewing the ingredients list.
- Be your own best advocate. Do not hesitate to ask your healthcare team to help you understand action steps to help you stay on track with phosphorus control.

Notes:

Notes:

AAKP
American Association of Kidney Patients

aakp.org | aakp.org/join
info@aakp.org | (800) 749-2257

FOR MORE INFORMATION OR TO JOIN

@kidneypatient
@kidneypatients
@american-association-of-kidney-patients
@kidneypatients
American Association of Kidney Patients

This brochure is supported by an educational donation by

ardelyx®