

# Calcium, Phosphate and Parathyroid Hormone (PTH)

Patient Information Leaflet



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## Introduction

This leaflet provides information on kidney problems in patients who have kidney function of less than 40% of normal. More rarely, calcium and phosphate problems can occur in people with other kidney diseases.

This is a complicated area. This leaflet is for your information and your clinician will discuss your treatment with you

If you are not someone with kidney failure, on dialysis, or with a kidney transplant and you are aware of some calcium or phosphate problems, you should discuss these with your doctor on an individual basis.

## Bone Disease

Bone disease is very important for patients with kidney failure. Once serious problems have developed, they cannot be fully reversed.

Therefore prevention is better than cure. Blood tests can identify problems at an early stage and treatment can be altered to reduce the chances of serious problems developing.

The kidney plays an important role in maintaining healthy bones which becomes apparent when kidney function is significantly impaired.

Kidney abnormalities can be measured routinely by testing blood for levels of calcium, phosphate and parathyroid hormone (PTH).

## What should I do?

- You need to know that some problems with calcium and phosphate can make you feel ill right away, but other problems with your bones or your heart can develop slowly over years. Preventative treatment will help keep you well.
- You should discuss targets for treatment with your Renal Unit. The simplest target is to keep your blood phosphate level below a certain level.
- You need to understand your diet so that you have the correct daily intake of phosphate. Your clinician can help you with this.
- You should take any prescribed medication regularly as directed. If you are unable to take the medication as prescribed, you should discuss this with your Renal Unit.

Preventative treatment can reduce the chances of irreversible bone damage occurring. However this requires a lot of care and energy from both you and your Renal Unit in hospital.

## What is calcium and why is it important?

Calcium is a mineral that is found throughout the body. Together with phosphate it makes up your bones and gives them strength. You obtain calcium from food your food. Calcium rich foods are dairy products, green vegetables and eggs.

Normal calcium levels in the blood are between 2.2 and 2.6 mmol/l (millimoles per litre). With advanced kidney disease calcium levels may drop.

## What is phosphate?

Phosphate is a mineral in the body. Together with calcium it makes up your bones and gives them strength.

Phosphate is also used in other parts of the body to 'power' muscle and in many other chemical reactions. You obtain phosphate from your food. Dairy products, nuts and meat are three types of food that rich in phosphate.

The normal level of phosphate in the blood is 0.8 to 1.4 mmol/l. At later stages of kidney disease, the kidneys can't excrete excess phosphate so the level goes up.

## What is PTH and why is it important?

Parathyroid hormone (PTH) is a hormone or chemical messenger which is important in controlling the level of calcium in your blood.

PTH is produced by the parathyroid glands. There are usually four parathyroid glands, found in your neck behind the thyroid gland.

If your calcium level in the blood falls, the parathyroid glands normally produce more PTH, which pulls some calcium from the bones into the blood, normalising the level. Extended periods with high levels of PTH in the blood can lead to weakened bones.

If the calcium level in the blood rises above normal, PTH secretion falls and the level of calcium in the blood falls back to normal.

## What is Vitamin D and why is it Important?

A little Vitamin D is absorbed from your food but most is made in the skin in a process that only occurs if the skin is stimulated by sunlight. Even then, Vitamin D has to be converted to an active form in the kidneys.

Vitamin D is important in helping to maintain normal levels of calcium and phosphate in the body, and therefore in maintaining healthy bones, by helping the body to absorb calcium from your food.

Vitamin D levels in your blood are not routinely measured by most Renal Units, as it is not necessary to measure Vitamin D except in very rare cases.

## What Treatment can be given for Calcium, Phosphate and PTH Problems?

The medical term depositing calcium and phosphate in parts of the body other than the bones is called calciphylaxis.

The phosphate binds to calcium in the blood forming 'chalk' which can build up around the body. If phosphate levels remain persistently high chalk deposits can build up in the joints or any where else in the body.

Deposits in the blood vessels can give rise to hardening of the arteries and vessels, and can increase the risk of strokes or heart attacks. Hardened blood vessels may not be able to be used for transplant operations.

There are several treatment options available like:

- Diet.
- Good quality dialysis.
- Vitamin D medication.
- Medication to reduce phosphate absorption (using phosphate binders).
- Kidney transplantation. Unfortunately this does not put everything back to normal
- Medication to lower blood calcium levels (calcimimetics).

In spite of this there is a tendency to high phosphate levels in patients with advanced kidney disease. This is largely because dialysis treatment also cannot replace 100% of kidney function.

## **Surgery to Remove Parathyroid Glands**

In some patients, the parathyroid glands produce too much PTH. The only treatment may be surgery to remove the parathyroid glands. If this applies to you, your Renal Unit team will discuss this with you.

## **What types of bone problems can occur with Kidney Diseases?**

Many patients with kidney disease do not develop bone disease. Like wise, if you suffer from a bone or joint disease, it may not be related to your kidney disease.

Several types of problem may occur with some patients. These problems may be related to the levels of calcium and phosphate in the blood as mentioned above.

Diseases frequently seen in patients with kidney diseases are listed below.

- **Renal osteodystrophy**

Bone disease due to high PTH.

- **Adynamic bone disease**

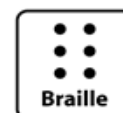
This means that bone turnover (natural bone formation process) is slow.

- **Osteoporosis**

Weakened bones. Osteoarthritis, Amyloid and Gout may all be caused by a build up of chalk in and around the joints.

- **Secondary and tertiary hyperparathyroidism.**

Excessive secretion of parathyroid hormone (PTH) by the parathyroid glands in response to low calcium- and high phosphate levels in blood in patients with advanced kidney diseases.



### **If you require a special edition of this leaflet**

This leaflet is available in large print, Braille, on audio tape or disk and in other languages on request. Please contact:

**Tel No: 0151 529 2906**

**Email: [interpretationandtranslation@aintree.nhs.uk](mailto:interpretationandtranslation@aintree.nhs.uk)**