

Kidney Health Information

Calcification

Calcification is the deposition of calcium salts, like chalk. This occurs normally in bone, but under certain conditions calcium deposits form in other body tissues and organs, causing a variety of problems.

- in those with chronic kidney disease (CKD) ‘vascular’ calcification is particularly important. This is the formation of calcium and phosphate deposits in the arteries and veins. It is particularly likely in those treated by dialysis. It can be so severe that blood vessels show up on x-rays
- patients with a lot of vascular calcification are at greater risk of dying, perhaps because their blood vessels are stiffer than usual
- some people are not able to have a transplant because their arteries are so severely affected
- renal bone disease is also associated with calcification. Renal bone disease can occur as a result of long standing severe CKD.



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Calcification happens when calcium and phosphate are out of balance in the blood

How are the kidneys involved?

As well as filtering waste from the blood into urine, one of the other things the kidneys do is some essential processing of vitamin D. Without it you can get a type of bone disease, osteomalacia, (renal rickets) and low blood calcium levels. This is why most patients with kidney disease take alfacalcidol or calcitriol.

- one of the important changes in stage 4 CKD (sometimes earlier) is a build up of phosphate levels in the blood
- low calcium, low vitamin D levels, and high phosphate lead to the Parathyroid glands in the neck producing too much parathyroid hormone (PTH) in an attempt to correct the abnormality
- in time, too much PTH seems to combine with the calcium and phosphate changes to cause calcification.

Common Symptoms and Features

- in earlier kidney disease there may be none at all
- signs of high calcium and phosphate include itchy skin and red eyes
- eventually bones may become weak, brittle and painful
- in patients with vascular calcification, hardening of the arteries forces the heart to work harder
- in those that are severely affected, dialysis may be more difficult because of the impaired heart and circulatory condition
- calcification can also occur in any of the body's tissues and organs.

Complications in dialysis

- it is now thought possible that some of the measures to prevent 'bone disease' in dialysis patients may worsen calcification by increasing the levels of calcium in the blood
- children on haemodialysis have particular problems, in that they need extra calcium and phosphate for bone growth

Certain groups are more likely to be affected by calcification:

- elderly people
- men
- those with diabetes
- those that have been undergoing dialysis for a long time
- those using calcium-based phosphate binders.

Treatments – aim to relieve symptoms and prevent complications

- the levels of phosphate in the blood can be helped by keeping down the amount of phosphate in your diet
- dialysis removes some phosphate from the blood, more dialysis can help



Phosphate / calcium balance

- it is important that sessions are not missed or shortened
- phosphate binders taken with food control the amount of phosphate that you take in from each meal. Commonly used binders contain calcium (calcium acetate, calcium carbonate). Other types may be less effective, more expensive, or have other problems. Research is needed to find out which are best.

Finding out more:

For information on bone disease from EdREN:

<http://renux.dmed.ed.ac.uk/EdREN/EdRenINFObits/CRFLong.html#Anchor-Bones-44591>

For information on phosphate from EdREN:

http://renux.dmed.ed.ac.uk/EdREN/EdRenINFObits/Diet_CRF.html#anchor16865706.

Below is some information on our recent projects into calcification.

Kidney Research UK in partnership with the Genzyme Corporation, in 2003, awarded a three-year research project to Dr David Wheeler at the Royal Free and University College Medical School, London: A study assessing whether calcification of the arteries is common in patients with chronic kidney failure, what causes this process to occur and how it progresses as kidney function declines.

“Using newly available techniques, our team will study the causes and consequences of arterial calcification in 300 patients before they start dialysis; we hope that this will enable us to identify treatment that will help to protect patient’s arteries.”

2005. Dr Leslie Rees. Great Ormond Street Hospital. A study of the causes of deposition of calcium in the blood vessels of children starting dialysis or undergoing renal transplantation.

The effects of calcium, phosphate and parathyroid hormone on calcification in children with renal failure.

2004 Dr Mhairi Sigrist. Derby City General Hospital.

The causes and cardio-vascular consequences of vascular calcification in those with chronic kidney disease. Mhairi studied a large group of dialysis and pre-dialysis patients over a year to find out who developed the most calcification – and why.

Please be aware that we have made every effort to ensure this information is accurate, however we cannot guarantee that there are no mistakes. Also, the best management plans for individual patients may vary from those outlined here. Only the doctors caring for the patient will be able to advise on this. Please consult your own doctor.

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