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Calcium pyrophosphate deposition (Pseudogout)

Calcium pyrophosphate is a substance produced in the cartilages of the joints. It can become deposited as crystals on joint tissues. This is called calcium pyrophosphate deposition. Calcium pyrophosphate deposition can cause a number of problems of which the most well known is pseudogout.

This is almost identical to gout, causing attacks of pain and swelling in one or more joints. Some people develop damage to the joint, causing a type of long-term arthritis. Calcium pyrophosphate deposition may cause no symptoms and is sometimes picked up on an X-ray done for an unrelated condition.

Unlike gout, there is no special treatment for pseudogout. Rest, ice packs and anti-inflammatory medicines are the main forms of treatment.

What is pseudogout (calcium pyrophosphate deposition)?

Calcium pyrophosphate (CPP) crystals (sometimes called pseudogout crystals) can become deposited on cartilage and various other tissues in and around joints. This is known as CPP deposition (CPPD).

Some people have CPPD on the cartilages that cover their joints. This is known as chondrocalcinosis. It may cause no symptoms but may be picked up on an X-ray. Other people may have an attack of joint pain and swelling identical to [gout](#). This is called pseudogout, or acute CPP crystal arthritis.

There is also a longer-term condition called chronic CPP crystal inflammatory arthritis. Some people with [osteoarthritis](#) get CPPD and, when this causes symptoms, it is referred to as osteoarthritis with CPPD.

What causes pseudogout?

Pseudogout is caused by calcium pyrophosphate deposition (CPPD).

What causes calcium pyrophosphate deposition disease?

Calcium pyrophosphate deposition disease is just a term that incorporates all problems caused by deposition of CPP crystals – mainly acute attacks of pseudogout and chronic CPP crystal inflammatory arthritis.

What causes calcium pyrophosphate crystals?

There can be many reasons why CPP forms crystals which settle on the tissues in and around the joints.

Some people inherit a fault in one of the basic units of genetic information (a gene) which makes them more prone to develop CPP crystals in the joints.

What triggers pseudogout?

An attack of pseudogout is triggered by CPP crystal formation. Several conditions can trigger crystal formation, including:

- Lack of fluid ([dehydration](#)).
- An attack of any severe illness.
- Overactivity of the parathyroid glands ([hyperparathyroidism](#)).
- [Long-term use of steroid medicine](#).
- Underactive thyroid gland ([hypothyroidism](#)).
- Any cause of [arthritis](#).
- An illness which causes too much iron in the body ([haemochromatosis](#)).
- An inherited illness causing a build-up of copper in the body ([Wilson's disease](#)).
- An illness caused by an increased level of growth hormone in the body ([acromegaly](#)).
- [Kidney dialysis](#).

- Surgery or injury.
- Low magnesium level in the blood (hypomagnesaemia).

How common is pseudogout (calcium pyrophosphate deposition)?

CPPD is more common as you get older. X-ray studies show that over half of people over the age of 80 have changes typical of CPPD. One English study calculated that 7–10 people out of 100 over the age of 60 have CPP crystals which accumulate on cartilage (chondrocalcinosis). Men and women are equally affected.

Figures from America suggest that every year about 1 in 100,000 people experience an acute attack of pseudogout.

What are the symptoms of pseudogout (calcium pyrophosphate deposition)?

CPP crystals which accumulate on cartilage (chondrocalcinosis) may cause no symptoms but may just be picked up on an X-ray.

Is pseudogout painful?

Acute CPP crystal arthritis, or pseudogout, may cause exactly the same symptoms as gout. Thus, there will be pain, warmth, redness and swelling of one or more joints. Any joint can be involved but the knees are most commonly affected, followed by the wrists, shoulders, ankles, hands and feet.

Chronic CPP crystal arthritis resembles osteoarthritis. It causes longer-term damage to joints, with pain and stiffness. Knees, hips, shoulders and wrists are most often affected.

What is the difference between pseudogout and gout?

It's always a problem sorting out pseudogout vs [gout](#), as they can cause identical symptoms. The difference only becomes apparent when tests show that the problem is the formation of CPP crystals rather than uric acid crystals.

How is pseudogout diagnosed?

X-rays (radiology) may be helpful. They show shadows that look like straight lines typical of chondrocalcinosis. Scans may also be useful. Looking at joint fluid that has been removed with a syringe and needle under the microscope may show typical CPP crystals.

Tests may be needed to rule out other causes.

Is there a pseudogout blood test?

Unlike gout, pseudogout cannot be diagnosed on a blood test alone.

What else could it be?

There are several other conditions that can cause joint pain and swelling. These include gout, infection (septic arthritis), osteoarthritis and rheumatoid arthritis.

What is the treatment for pseudogout?

Chondrocalcinosis which produces no symptoms does not need any treatment.

Ice packs and rest may be helpful. Painkillers and anti-inflammatory medicines are usually given to help the pain and inflammation. Other treatments sometimes tried include draining any fluid with a syringe and needle, injecting steroid liquid into the joint and taking steroid tablets.

Can pseudogout be cured?

Pseudogout cannot be cured but treatment is available to relieve the symptoms until the attack settles.

Chronic CPP crystal arthritis treatment

Chronic CPP crystal arthritis is usually treated in the same way as pseudogout, with painkillers and anti-inflammatory medicines. Other medicines that have been tried are called methotrexate and hydroxychloroquine.

However, little evidence has been found to support the effectiveness of methotrexate in this condition, and it is now no longer used. More research is needed into specific therapies for pseudogout.

Does colchicine work for pseudogout?

[Colchicine](#), often used in the treatment of gout, is also sometimes helpful in pseudogout management. In pseudogout, colchicine has been found to reduce inflammation and slow the production of CPP crystals. It can therefore be used as a treatment for an acute attack of pseudogout and as a preventative treatment in people who have frequent attacks.

Is there a pseudogout diet?

Unlike gout, no specific diet has been found to be helpful in pseudogout and there's no link between pseudogout and alcohol. However, since lack of fluid (dehydration) is a trigger factor for CPP crystal deposition, it makes sense to keep up your fluid intake.

Surgery

Chronic CPP crystal arthritis affecting a large joint sometimes requires surgery.

What is the outlook (prognosis)?

Attacks of pseudogout usually settle in about ten days. Chronic CPP crystal arthritis can cause long-term joint damage and difficulties with mobility. If CPPD is caused by another illness, the seriousness will depend on the underlying condition.

Can pseudogout be prevented?

Unlike gout, there is no treatment or diet that can prevent the formation of CPP crystals. If an underlying condition caused an episode of pseudogout (eg, lack of fluid (dehydration) or low magnesium levels), treating this may prevent further attacks.

Like osteoarthritis, the damage from chronic CPP crystal arthritis can be limited by keeping your weight normal and getting a moderate amount of exercise.

Further reading

- [EULAR recommendations for calcium pyrophosphate deposition – Part I: terminology and diagnosis](#); European League Against Rheumatism (2011)
- [EULAR recommendations for calcium pyrophosphate deposition – Part II Management](#); European League Against Rheumatism (2011)
- [Stack J, McCarthy G](#); Calcium pyrophosphate deposition (CPPD) disease – Treatment options. *Best Pract Res Clin Rheumatol.* 2021 Dec;35(4):101720. doi: 10.1016/j.berh.2021.101720. Epub 2021 Oct 28.
- [Zamora EA, Naik R](#); Calcium Pyrophosphate Deposition Disease.

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Authored by:	Peer Reviewed by: Dr Colin Tidy, MRCP	
Originally Published: 19/11/2023	Next review date: 21/08/2023	Document ID: doc_28411

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