

# Understanding Secondary Hyperparathyroidism (SHPT) in Chronic Kidney Disease (CKD)

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## Introduction

Secondary hyperparathyroidism (SHPT) refers to an excessive secretion of parathyroid hormone (PTH) by the parathyroid glands in response to chronic hypocalcemia and/or hyperphosphatemia, typically due to impaired renal function. SHPT is a common complication of chronic kidney disease (CKD), particularly in patients with end-stage renal disease (ESRD) requiring dialysis. The excessive PTH secretion can lead to abnormal bone metabolism, ectopic calcification, and other systemic complications. Treatment strategies for SHPT in CKD may include dietary modifications, vitamin D supplementation, phosphate binders, and medications to suppress PTH secretion.

Chronic kidney disease (CKD) is a progressive and irreversible condition characterized by the gradual loss of kidney function over time. The kidneys are responsible for filtering waste and excess fluids from the blood, and when they are damaged, they cannot perform this function effectively. CKD is usually asymptomatic in its early stages, and symptoms may only become apparent as the condition progresses. Some common symptoms of CKD include fatigue, weakness, difficulty concentrating, decreased appetite, weight loss, and swelling of the feet and ankles. CKD is often caused by underlying conditions such as diabetes, high blood pressure, and autoimmune disorders, and it can increase the risk of other serious health complications, such as heart disease and stroke. Treatment for CKD may include medications to manage underlying conditions, lifestyle changes, and in severe cases, dialysis or kidney transplantation. Early detection and management of CKD can help slow its progression and improve outcomes for affected individuals.

## Description

Chronic kidney disease (CKD) is a condition that leads to the gradual loss of kidney function and can cause a secondary disorder known as secondary hyperparathyroidism (SHPT). This condition is common in patients with end-stage renal disease (ESRD) requiring dialysis. As CKD progresses, vitamin D production is reduced, leading to decreased absorption of calcium and phosphorus in the intestinal tract, causing persistently elevated levels of parathyroid hormone (PTH). This hormone not only decreases the expression of calcium-sensing receptors and sensors of blood calcium levels, but also secretes fibroblast growth factor 23 (FGF23), which promotes renal excretion of phosphorus. However, FGF23 also reduces active vitamin D production, thereby further enhancing PTH secretion. Excessive PTH secretion disrupts normal bone mineral metabolism, leading to ectopic calcification due to high calcium and phosphorus levels, and increased fracture risk due to accelerated bone resorption. Early detection and management of CKD can help slow

the progression of SHPT, and treatment strategies may include dietary modifications, vitamin D supplementation, phosphate binders, and medications to suppress PTH secretion.

Chronic kidney disease (CKD) is a condition in which the kidneys gradually lose function over time, leading to a range of complications. One of the most common complications of CKD is secondary hyperparathyroidism (SHPT), a disorder that affects the parathyroid glands and can cause a range of symptoms and complications. The parathyroid glands are small glands located in the neck, adjacent to the thyroid gland. These glands are responsible for producing parathyroid hormone (PTH), a hormone that helps regulate the levels of calcium and phosphorus in the body.

In patients with CKD, the kidneys are no longer able to effectively regulate the levels of calcium and phosphorus in the blood. As a result, the parathyroid glands may begin to produce excess PTH, leading to a condition known as secondary hyperparathyroidism (SHPT). In SHPT, the excess PTH can cause a range of complications, including weakened bones, increased risk of fractures, and calcification of soft tissues such as blood vessels and organs. As CKD progresses, the kidneys become less able to produce and activate vitamin D, a hormone that plays a key role in regulating the absorption of calcium and phosphorus in the body. This can lead to decreased levels of calcium and phosphorus in the blood, which can trigger the parathyroid glands to produce more PTH.

Additionally, as the kidneys become less able to excrete phosphorus, the levels of a hormone called fibroblast growth factor 23 (FGF23) can also rise. FGF23 is produced by the bone and is responsible for increasing the excretion of phosphorus in the urine. However, in CKD patients, FGF23 can also suppress the production of vitamin D, leading to further increases in PTH levels. Together, these factors can lead to a vicious cycle in which PTH levels continue to rise, leading to bone loss and calcification of soft tissues. In its early stages, SHPT may not cause any symptoms. However, as the condition progresses, patients may experience symptoms such as Bone pain or tenderness, Fractures, Muscle weakness, Fatigue, Itching, Joint pain, Increased risk of infections [1-5].

## Conclusion

SHPT is typically diagnosed through a combination of blood tests and imaging studies. Blood tests can be used to measure levels of PTH, calcium, phosphorus, and vitamin D. Imaging studies such as X-rays or bone scans may be used to evaluate bone density and detect signs of calcification. Treatment for SHPT depends on the severity of the condition and may involve a combination of medications, lifestyle modifications, and surgical intervention. Medications commonly used to treat SHPT include vitamin D supplements, phosphate binders, and medications that suppress the production of PTH. In severe cases, surgical removal of the parathyroid glands may be necessary. Lifestyle modifications such as a low-phosphorus diet and regular exercise can also help manage SHPT and prevent complications. Secondary hyperparathyroidism (SHPT) is a common complication of chronic kidney disease (CKD) that can cause a range of symptoms and complications. If you have CKD, it's important to work closely with your healthcare provider to ensure that your kidney function is monitored regularly and that any complications are addressed promptly.

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## Conflict of Interest

None.

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