Useful Resources

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Medical Advisory Board

If you have any questions or comments or would like to get involved, we would love to hear from you.

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What is HypoPARAthyroidism/ Pseudohypoparathyroidism?

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What is hypoparathyroidism and pseudohypoparathyroidism?

Hypoparathyroidism (Hypopara or HPTH) is a rare medical condition which is characterized by hypocalcemia (low blood calcium), hyperphosphatemia (high phosphate levels), and low or inappropriately normal levels of parathyroid hormone (PTH).

Pseudohypoparathyroidism (PHP) is characterized by hypocalcemia and hyperphospatemia. Unlike hypoparathyroidism, however, it is not a defect in the PTH production, but rather, peripheral resistance to the PTH hormone.[1]

Common Causes of Hypoparathyroidism

Surgical: Damage or removal of parathyroid glands after neck surgery e.g. thyroidectomy, laryngectomy, or parathyroidectomy.

Isolated: A group of disorders in which hypoparathyroidism is the only endocrine or developmental defect. Isolated hypoparathyroidism may be caused by genetic defects that impair secretion of PTH from the parathyroid glands.

Idiopathic: A term that refers to cases of isolated hypoparathyroidism where the cause is as yet unknown.

Complex Syndromes in Which Hypoparathyroidism Occurs: Hypoparathyroidism can also occur as a component of complex genetic or congenital syndromes in which a variety of tissues or organs are affected. Including DiGeorge syndrome, Hypoparathyroidism-deafness-renal dysplasia (HDR) syndrome, or autoimmune polyglandular syndrome type 1 (APS Type 1), Kenny-Caffey syndrome and Sanjad-Sakati syndrome.

Pseudohypoparathyroidism: Specific target cells of PTH in the kidneys fail to respond appropriately to PTH. Patients with PHP type 1a also have additional hormone defects (e.g. hypothyroidism, growth hormone deficiency, hypogonadism) and physical abnormalities, such as short stature, obesity, shortened fingers or toes, and subcutaneous bone formation, which are collectively termed Albright Hereditary Osteodystrophy (AHO).

PHP type 1a is due to mutations in the copy of the GNAS gene that has been inherited from the mother. Identical defects on the paternal GNAS gene lead to AHO with normal hormone action (termed pseudopseudohypoparathyroidism) or progressive osseous heteroplasia, a condition characterized by extensive ectopic ossification (bone formation). Other patients with PHP have a normal physical appearance and no additional endocrine defects. This form of PHP is termed PHP type 1b, and is due to imprinting defects that block expression of the maternal copy of the GNAS gene.

Pathophysiology of Hypoparathyroidism & Pseudohypoparathyroidism

When untreated, all forms of hypoparathyroidism and pseudohypoparathyroidism are associated with hypocalcemia and hyperphosphatemia. **The degree of hypocalcemia and hyperphosphatemia can be highly variable from patient to patient, and even within an individual patient, can fluctuate over time.** The lack of PTH, or lack of PTH effect, leads to inadequate synthesis of calcitriol (1,25 dihydroxyvitamin D), the most active form of Vitamin D. The lack of calcitriol impairs absorption of calcium from the GI tract and blocks release of calcium from storage sites in the skeleton, thus leading to low levels of calcium in the blood. The lack of PTH affect also causes excessive reabsorption of phosphate in the kidney, which leads to hyperphosphatemia.

Symptoms of Hypoparathyroidism and Pseudohypoparathyroidism

The signs and symptoms of hypoparathyroidism and pseudohypoparathyroidism are largely the result of hypocalcemia. Symptoms can include fatigue, brain fog, memory problems, depression, irritability/anxiety, cramping, tetany, seizures, congestive heart failure. Bronchospasm and laryngospasm, often simulating a severe asthma attack, can occur as well.

Signs and symptoms of tetany: The hands, forearms, and feet may contort in characteristic pattern, with thumb adduction followed by joint flexion/extension, wrist and elbow. This can be painful. The Chvostek sign is a sign of latent tetany, and can be elicited by tapping on the facial nerve on the cheek in front of the ear, which results in a twitch of the corner of the mouth. The Trousseau sign is the contortion of the hand, and occurs either spontaneously with marked hypocalcemia or with milder degrees of hypocalcemia after inflating a blood pressure cuff on the upper arm for 2 to 3 minutes.

Other Physical Changes: Cataracts, changes in hair and nail texture, changes in skin pigment and texture, and resistance to skin infections.

Treatment of hypoparathyroidism

Traditionally, patients receive, dependent upon their situation, calcitriol (an active form of Vitamin D_3) and calcium. The long term effects of this type management can include kidney failure, cataracts, soft tissue calcifications, and changes in heart function. Recently, the United States Food and Drug Administration (FDA) approved a synthetic version of the parathyroid hormone as a therapeutic option for patients with hypoparathyroidism. It has been shown to maintain serum calcium while reducing the need for calcitriol and calcium supplementation. It is hoped that it will also reduce or eliminate the long term effects of the traditional calcium and calcitriol regimen.