

# Hypervitaminosis-A in Chronic Kidney Disease: Accumulation of Retinoids and Retinol-Binding Protein

Charles Varnell\*

Department of Health Sciences, University of Nebraska Medical Center and Children's Hospital and Medical Center, 8200 Dodge St, Omaha, NE 68114, USA

## Introduction

Hypervitaminosis-A is a condition that occurs when there is an excessive amount of vitamin A in the body. Vitamin A is an essential nutrient that is necessary for the maintenance of normal vision, immune function and skin health. It is found in two forms: preformed vitamin A, also known as retinol, which is found in animal products such as liver, eggs and milk and provitamin A carotenoids, which are found in plant sources such as carrots, sweet potatoes and spinach. The recommended daily intake of vitamin A for adults is 900 micrograms for men and 700 micrograms for women. However, excessive consumption of vitamin A can lead to hypervitaminosis-A. This condition is more common in individuals who take high-dose vitamin A supplements, as well as those who consume large amounts of animal liver and other animal products.

## Description

Hypervitaminosis-A can lead to a variety of symptoms, including dry and itchy skin, hair loss, bone pain, nausea, vomiting and liver damage. In severe cases, it can even lead to coma or death. The symptoms of hypervitaminosis-A may take weeks or months to develop, as vitamin A is stored in the body's fat tissues and can accumulate over time. One of the risk factors for hypervitaminosis-A is chronic kidney disease (CKD). In patients with CKD, the accumulation of retinoids and retinol-binding protein occurs as a result of decreased renal excretion and increased hepatic retinol production. This leads to elevated levels of vitamin A in the body, which can result in toxicity.

To prevent hypervitaminosis-A, it is important to consume vitamin A in moderation and to avoid taking high-dose vitamin A supplements unless directed by a healthcare professional. It is also important to ensure that the diet contains a variety of foods that provide a balanced intake of all essential nutrients. If you are experiencing symptoms of hypervitaminosis-A, it is important to consult a healthcare professional. The treatment for hypervitaminosis-A may include stopping vitamin A supplements, reducing the intake of vitamin A-rich foods and monitoring liver function. In severe cases, hospitalization may be necessary. Hypervitaminosis-A is a condition that occurs when there is an excessive amount of vitamin A in the body. It can lead to a variety of symptoms, including liver damage and even death. Individuals with CKD are at an increased risk for hypervitaminosis-A and it is important to consume vitamin A in moderation and to consult a healthcare professional if experiencing symptoms.

Retinoids are a class of organic compounds that include vitamin A and its

derivatives. These compounds play important roles in various physiological processes, including vision, immune function and skin health. Retinol-binding protein (RBP) is a carrier protein that transports vitamin A in the bloodstream. Both retinoids and RBP are metabolized in the liver and excreted by the kidneys. However, in certain conditions, such as chronic kidney disease (CKD), the accumulation of retinoids and RBP can occur, leading to potential toxicity. This is due to the fact that as kidney function declines, the excretion of retinoids and RBP decreases, leading to an accumulation in the bloodstream.

The accumulation of retinoids and RBP can lead to a condition known as hypervitaminosis-A, which is characterized by a range of symptoms, including skin irritation, hair loss, joint pain and liver damage. In severe cases, it can even lead to coma or death. The accumulation of retinoids and RBP in CKD patients is thought to be due to the increased production of retinol by the liver in response to decreased renal excretion. In addition, the decreased renal excretion of RBP leads to its accumulation in the bloodstream. The accumulation of retinoids and RBP in CKD patients has been the subject of extensive research in recent years. Studies have shown that the accumulation of these compounds is associated with a range of adverse outcomes, including an increased risk of cardiovascular disease, kidney disease progression and mortality.

In order to prevent the accumulation of retinoids and RBP in CKD patients, it is important to closely monitor kidney function and adjust the intake of vitamin A accordingly. In addition, patients should be advised to avoid high-dose vitamin A supplements, which can increase the risk of hypervitaminosis-A. The accumulation of retinoids and RBP in CKD patients is a well-documented phenomenon that can lead to potential toxicity and adverse health outcomes. It is important for healthcare professionals to be aware of this condition and to closely monitor patients with CKD for signs of hypervitaminosis-A. By taking steps to prevent the accumulation of retinoids and RBP, healthcare professionals can help to ensure that their patients remain healthy and free from the adverse effects of this condition.

Hypervitaminosis-A is a well-known but often underrecognized complication of chronic kidney disease (CKD). It occurs when there is an excess of vitamin A in the body, which can lead to a range of adverse health outcomes. One of the key factors that contribute to the development of hypervitaminosis-A in CKD is the accumulation of retinoids and retinol-binding protein (RBP) in the bloodstream. Retinoids are a group of organic compounds that include vitamin A and its derivatives. They are essential for various physiological processes, including vision, immune function and skin health. RBP is a carrier protein that transports vitamin A in the bloodstream. Both retinoids and RBP are metabolized in the liver and excreted by the kidneys.

However, in CKD patients, the accumulation of retinoids and RBP can occur due to decreased renal excretion. As kidney function declines, the excretion of these compounds decreases, leading to their accumulation in the bloodstream. Additionally, in response to decreased renal excretion, the liver may produce more retinol, which further contributes to the accumulation of retinoids and RBP. The accumulation of retinoids and RBP in CKD patients can lead to hypervitaminosis-A, which is associated with a range of symptoms, including skin irritation, hair loss, joint pain and liver damage. In severe cases, it can even lead to coma or death. Furthermore, studies have shown that the accumulation of these compounds is associated with an increased risk of cardiovascular disease, kidney disease progression and mortality [1-5].

\*Address for Correspondence: Charles Varnell, Department of Health Sciences, University of Nebraska Medical Center and Children's Hospital and Medical Center, 8200 Dodge St, Omaha, NE 68114, USA, E-mail: charlesvarnell@gmail.com

Copyright: © 2023 Varnell C. This is an open-access article distributed under the terms of the creative commons attribution license which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Received: 01 January, 2023, Manuscript No. VTE-23-95689; Editor assigned: 03 January, 2023, PreQC No. P-95689; Reviewed: 17 January, 2023, QC No. Q-95689; Revised: 23 January, 2023, Manuscript No. R-95689; Published: 31 January, 2023, DOI: 10.37421/2376-1318.2023.12.240

---

## Conclusion

To prevent the accumulation of retinoids and RBP in CKD patients, healthcare professionals must closely monitor kidney function and adjust vitamin A intake accordingly. It is also essential to avoid high-dose vitamin A supplements, which can increase the risk of hypervitaminosis-A. In addition, CKD patients may benefit from a diet rich in carotenoids, which are the plant-based precursor to vitamin A. Carotenoids are less bioavailable than preformed vitamin A retinols from animal sources and have a lower risk of toxicity. Hypervitaminosis-A is a well-documented complication of CKD that can lead to potential toxicity and adverse health outcomes. The accumulation of retinoids and RBP in CKD patients is a significant factor contributing to this condition. Healthcare professionals must be aware of this phenomenon and take appropriate measures to prevent the accumulation of retinoids and RBP in their patients. By doing so, they can help to ensure that their patients remain healthy and free from the adverse effects of hypervitaminosis-A.

---

## Acknowledgement

None.

---

## Conflict of Interest

None.

---

## References

1. Jaconi, Stefano, Jean-Hilaire Saurat and Georges Siegenthaler. "Analysis of normal and truncated holo-and apo-retinol-binding protein (RBP) in human serum: Altered ratios in chronic renal failure." *Eur J Endocrinol* 134 (1996): 576-582.
2. Muth, Irene. "Implications of hypervitaminosis-A in chronic renal failure." *J Ren Nutr* 1 (1991): 2-8.
3. Manickavasagar, Baheerathi Andrew J McArdle, Pallavi Yadav and Vanessa Shaw, et al. "Hypervitaminosis-A is prevalent in children with CKD and contributes to hypercalcemia." *Pediatric nephrology* 30 (2015): 317-325.
4. Yatzidis, H, P Digenis and P Fountas. "Hypervitaminosis-A accompanying advanced chronic renal failure." *BMJ* 3 (1975): 352.
5. Silverman, Alan K, Charles N Ellis and John J Voorhees. "Hypervitaminosis-A syndrome: A paradigm of retinoid side effects." *JAAD* 16 (1987): 1027-1039.

**How to cite this article:** Varnell, Charles. "Hypervitaminosis-A in Chronic Kidney Disease: Accumulation of Retinoids and Retinol-Binding Protein." *Vitam Miner* 12 (2023): 240.