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Persistent Creatinine and Uric Acid Elevation in an Active Athletic Male: A Case Report

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ABSTRACT

Whey Protein (WP) and other protein-fortified supplements are frequently recommended as nutritional supplements to aid in muscle hypertrophy and myogenesis during resistance training. This case report presents a 36-year-old athletic male with elevated creatinine and uric acid levels during routine laboratory evaluation. The patient had no history of kidney disease, diabetes, or hypertension. Upon further examination, it was revealed that the patient had been regularly consuming whey protein as a dietary supplement for two months. Given the potential association between the elevated creatinine and uric acid levels and the use of whey protein, the patient was advised to discontinue the supplement. The patient then switched to protein-fortified milk in an effort to mitigate the possible harmful connection between the dietary intake and the laboratory findings. However, despite the dietary change, the increased levels of creatinine and uric acid persisted. This observation suggests that the elevated levels may be attributed to chronic whey protein consumption along with high protein dietary consumption. The case highlights the potential adverse effects of protein supplementation, particularly whey protein, on renal function.

Keywords: Creatinine, Uric acid, Whey protein, High-protein diet, Dietary supplement, Kidney health.

INTRODUCTION

Milk protein is predominantly composed of two main components, Whey Protein (WP) and casein, accounting for approximately 20% and 80%, respectively. WP is widely recognized and utilized as a popular protein supplement available in powdered form. It contains essential nutritional elements and functional bioactive compounds that offer significant value. WP is commonly marketed as a dietary supplement to aid in muscle development during resistance training. Due to its fast digestion rate, WP provides a quick supply of amino acids that the muscles can utilize for repairing and rebuilding muscular tissue. While WP has been reported to enhance glycogen storage, antioxidation and lipid metabolism in relation to aerobic exercises, there are limited studies exploring the beneficial synergistic effects of WP in combination with long-term aerobic exercise training on biochemical profiles in specific tissues. Many studies have highlighted the beneficial effects of whey protein and its isolates, such as antioxidant properties and the ability to regulate lipid metabolism. It is believed that the bioactive components of whey protein contribute to its diverse potential health benefits. A systemic review showed that the findings from the clinical evidence suggest that WP acts as a beneficial ergogenic aid, positively impacting amino acids, creatinine kinase and myoglobin levels [1-5].

CASE PRESENTATION

On the other hand, a high-protein diet, typically defined as consuming more than 1.2 grams of protein per kilogram of body weight per day, induces significant changes in renal function and renal hemodynamics. High protein intake increases renal blood flow and glomerular filtration rate, leading to more efficient excretion of protein-derived nitrogenous waste products. On the other hand, glomerular hyperfiltration has been well-documented in both animal models and human clinical studies. Glomerular hyperfiltration, along with increased urinary albumin excretion, can have detrimental effects on the kidney and other organs over extended period of time. The use of creatine supplements is widespread among athletes and those who exercise regularly, as it is believed to enhance muscle mass, performance and recovery. Moreover, a huge body of evidence demonstrates that taking creatine supplements at recommended doses (typically 3-5 grams per day) is generally well-tolerated by most individuals. Skeletal muscle breaks down creatine and phosphocreatine naturally, forming creatinine. Factors like muscle mass, dietary intake, consumption of creatine supplements and creatine-rich foods can increase both blood and urinary creatinine levels, reaching high levels. Studies suggest short-term rises in creatine levels are unlikely to indicate a decrease in kidney function. However, interpreting blood creatinine levels and estimated creatinine clearance is crucial for assessing kidney health in individuals with high-meat diets or creatine supplements. It is crucial to emphasize the importance of monitoring for individuals with specific dietary preferences or medical conditions. On the other hand, studies have shown that glomerular injury caused by increased intraglomerular pressure and flow can lead to progressive glomerular damage and sclerosis. As a result, adopting a low protein diet may be beneficial for managing kidney health and Chronic Kidney Disease (CKD). The adoption of such diets varies among individuals, and more research is needed to better understand the specific benefits and challenges of implementing low-protein diets in the management of CKD [5-9].

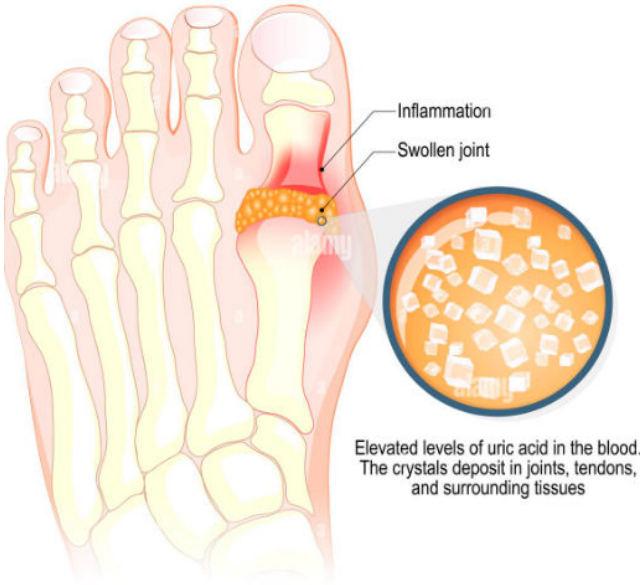

Figure1 Formation of uric acid in blood

In this case presentation, a 36-year-old athletic male with no history of kidney issues, diabetes, or hypertension had an elevated creatinine level of 133 mcmol/L during routine laboratory evaluation. The patient had been consuming whey protein as a dietary supplement for duration of two months, averaging 60 grams per day, and had also been taking approximately 10 grams of creatine per day, prior to the initial laboratory report. Considering the potential association between the elevated creatinine and uric acid levels and the use of whey protein and creatine, the patient was advised to discontinue the supplements and routinely monitor the renal function. Despite this dietary change and discontinuation of the supplements, the elevated levels persisted (114 mcmol/L) along with an elevated uric acid level of 487 mcmol/L. This suggests that the elevated creatinine and uric acid levels could not be only related to the whey protein supplement but could also be attributed to other factors, including high-protein meals [10].

The patient was also advised to increase fluid intake and adjust protein daily intake. A repeat laboratory evaluation was performed after 5 months, which showed a slight decrease in creatinine levels to 113 mcmol/L and remained almost the same (114 mcmol/L) after the second follow-up. The microalbumin/creatinine urine ratio is a diagnostic

test utilized to evaluate kidney function and identify early indications of kidney damage. The patient's microalbumin/ creatinine urine ratio showed normal values, which differ from the creatinine value. Although there was a slight increase in creatinine levels despite lifestyle modifications, it highlights the interpersonal variations among healthy individuals and underscores the importance of regular laboratory monitoring of kidney function [11].

DISCUSSION

Protein is crucial for muscle repair, recovery, and overall performance. Athletes have higher protein requirements than sedentary individuals due to increased demand for protein synthesis and tissue repair. Traditionally, athletes have consumed protein from animal-based sources like whey, casein and meat, as well as plant-based sources like soy, pea, and rice. Recent research has shown the potential benefits of specific types of protein, such as whey protein, for post-workout recovery. On the other hand, healthy individuals typically do not experience negative effects from consuming a high protein diet, while those with pre-existing kidney conditions should be prudent in their protein intake to safeguard their kidney health [12-17].

This case report highlights the potential adverse effects of chronic protein supplementation, particularly whey protein, creatine and high-protein meals, on renal function. It is well established that a high-protein diet can increase the workload of the kidneys, leading to increased creatinine levels. The mechanism behind this is related to the increased production of urea, which is a by-product of protein metabolism. Although the microalbumin/creatinine urine ratio in the patient indicated values within the normal range, extended glomerular hyperfiltration may contribute to the initiation and progression of renal disease by increasing the risk of irreversible nephron injury [18].

Whey protein is a commonly consumed protein supplement, particularly among athletes and bodybuilders, due to its high bioavailability and rapid absorption. The increased consumption of whey protein in this patient led to increased creatinine levels, which resolved upon discontinuation of the supplement [19].

CONCLUSION

In conclusion, this case report highlights the importance of monitoring creatinine levels in individuals who consume protein supplements, particularly whey protein. Individuals with normal renal function should be advised to limit their protein intake and monitor creatinine levels regularly to prevent potential adverse effects on renal function. Further studies are needed to better understand the effects of whey protein supplementation on renal function and to establish safe levels of consumption.

REFERENCES

[1] Chen WC, et al. Whey protein improves exercise performance and biochemical profiles in trained mice. *Medicine & Science in Sports & Exercise*. Vol. 46, No. 8, 2014, pp. 1517.

[2] Krissansen GW. Emerging health properties of whey proteins and their clinical implications. *Journal of the American College of Nutrition*. Vol. 26, No. 6, 2007, pp. 713S-23S.

[3] Madureira AR, et al. Invited review: Physiological properties of bioactive peptides obtained from whey proteins. *Journal of Dairy Science*. Vol. 93, No. 2, 2010, pp. 437-455.

[4] Farup J, et al. Whey protein hydrolysate augments tendon and muscle hypertrophy independent of resistance exercise contraction mode. *Scandinavian Journal of Medicine & Science in Sports*. Vol. 24, No. 5, 2014, pp. 788-798.

[5] Morifuji M, et al. Post-exercise carbohydrate plus whey protein hydrolysates supplementation increases skeletal muscle glycogen level in rats. *Amino acids*. Vol. 38, 2010, pp. 1109-1115.

[6] Elia D, et al. Effect of soy-and whey protein-isolate supplemented diet on the redox parameters of trained mice. *European Journal of Nutrition*. Vol.45, 2006, pp. 259-266.

[7] Lam FC, et al. Effectiveness of whey protein supplements on the serum levels of amino acid, creatinine kinase and myoglobin of athletes: A systematic review and meta-analysis. *Systematic Reviews*. Vol.8, 2019, pp. 1-2.

[8] Kalantar-Zadeh K, et al. North American experience with Low protein diet for Non-dialysis-dependent chronic kidney disease. *BMC Nephrology*. Vol.17, 2016, pp. 1-11.

[9] Fouque D and Aparicio M. Eleven reasons to control the protein intake of patients with chronic kidney disease. *Nature Clinical Practice Nephrology*. Vol. 3, No. 7, 2007, pp. 383-392.

[10] Li Z, Treyzon L, Chen S, Yan E, Thames G, Carpenter CL. Protein-enriched meal replacements do not adversely affect liver, kidney or bone density: An outpatient randomized controlled trial. *Nutrition Journal*. Vol.9, 2010, pp. 1-72.

[11] Schwingshackl L and Hoffmann G. Comparison of high vs. normal/low protein diets on renal function in subjects without chronic kidney disease: A systematic review and meta-analysis. *PLoS One*. Vol. 9, No. 5, 2014, pp. e97656.

[12] Antonio J, et al. Common questions and misconceptions about creatine supplementation: What does the scientific evidence really show?. *Journal of the International Society of Sports Nutrition*. Vol. 18, No. 1, 2021, pp. 1-13.

[13] Wyss M and Kaddurah-Daouk R. Creatine and creatinine metabolism. *Physiological Reviews*. Vol. 80, No. 3, 2000, pp. 1107-1213.

[14] Greenhaff P. Renal dysfunction accompanying oral creatine supplements. *Lancet*. Vol. 352, No.9123, 1998, pp. 233.

[15] Persky AM, Rawson ES. Safety of creatine supplementation. *Subcellular Biochemistry*. Vol.46, 2007, pp. 275–289.

[16] Ko GJ, et al. Dietary protein intake and chronic kidney disease. *Current Opinion in Clinical Nutrition & Metabolic Care*. Vol. 20, No. 1, 2017, pp. 77-85.

[17] Bellizzi V. Low-protein diet or nutritional therapy in chronic kidney disease?. *Blood Purification*. Vol. 36, No. 1, 2013, pp. 41-46.

[18] Hoffman JR, and Falvo MJ. Protein–which is best? *Journal of Sports Science and Medicine*. Vol. 3, No. 3, 2004, pp. 118.

[19] Poortmans JR, and Dellalieux O. Do regular high protein diets have potential health risks on kidney function in athletes?. *International Journal of Sport Nutrition and Exercise.* Vol.10, No.1, 2000, pp. 28-38.