

# Regression of kidney malfunction upon watermelon consumption

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## Abstract

Kidney failure is an irreversible progressive malfunction which often develops into chronic kidney disease (CKD) and end-stage renal disease (ESRD). The spectrum of CKD varies from proteinuria to elevated creatinine and ESRD. This case report describes a 60-year-old man, who despite being at the stage four of CKD for 4 years, had a case history of amelioration of renal function upon watermelon consumption.

## Introduction

Chronic kidney malfunction is an irreversible progressive process, which often leads to chronic kidney disease (CKD) and end-stage renal disease (ESRD). Its chief causes include diabetes, high blood pressure, secondary glomerulonephritis (GN), conventional cystic diseases, interstitial nephritis, chronic pyelonephritis, secondary GN and vasculitis. Chronic renal failure (CRF) is defined as the irreversible progressive decline in kidney functionality. This progressive failure is represented by a gradual increase in plasma creatinine along with a decrease in glomerular filtration rate. The aim of treatment is to apply an alternative treatment using dialysis or kidney transplant before uremia symptoms appear (1).

Stages of CRF include decrease in kidney functionality, kidney failure and ESRD. The intensity of the decline in kidney functionality and presence of CRF depend on underlying dysfunction, proportion of proteinuria and existence or non-existence of hypertension. In patients who had proteinuria or hypertension, the disease progression was faster (2,3).

CKD consists of five stages. Stage one is related to kidney damage with near normal glomerular filtration rate (GFR) (90 cc/min). At the first stage of kidney disease, the aim of treatment is to slow down the pace of CKD and to reduce the risk of heart and coronary

## Core tip

Chronic kidney malfunction is an irreversible progressive process, which often leads to chronic kidney disease (CKD) and end-stage renal disease (ESRD). Stages of CRF include decrease in kidney functionality, kidney failure and ESRD. The intensity of the decline in kidney functionality and presence of CRF depend on underlying dysfunction, proportion of proteinuria and existence or non-existence of hypertension.

diseases. Stage two concerns kidney damage with a minor decrease in GFR (between 60 and 89 cc/min). An assessment on the progression of CKD is a key point in the diagnosis and treatment of the disease. Additionally, modalities require to slow the reduction process of glomerular damage are also crucial. Stage three refers to the decrease in the average of GFR (between 30 and 59 cc/min). When a CKD reaches this point, disorders such as anemia and bone complications should be examined. Stage four is related to a significant reduction in GFR (between 15 and 29 cc/min), and finally stage five, which is the last stage of kidney disease (GFR lower than 15 cc/min), requires dialysis or kidney transplant (4). It is recommended for CKD patients to follow a healthy diet. However, there is no consensus on the type of foods. Generally, low-protein diets as well as low-salt diets

are recommended. Nevertheless, such diets may even increase mortality and morbidity due to malnutrition (5). In this case report, we present a male patient with CKD, who was able to reach a stable state following watermelon consumption.

### Case Report

The patient is a 60-year-old man with symptoms of kidney disease, who has regularly visited by his physician for five years. The patient's laboratory results on the primary visit were as follows: serum BUN=75 mg/dL, serum creatinine=9.6 mg/dL and blood pressure was 120/80 mm Hg. The patient was a diabetic since the age of 30.

The patient was examined, and then started to receive conventional treatments. He was recommended to visit the doctor regularly. In next visits, his blood pressure was 120/80 mm Hg. His creatinine level rose from 2 to 9.6 mg/dL and his BUN level drastically increased from 27 to 48 mg/dL, when he was operated for his colonic cancer. Since he was a diabetic, the patient received the conventional treatments for diabetes. He stated that he consumed a significant amount of watermelon on a daily regimen, without changing the drugs. Meanwhile, serum creatinine regressed to 1.7 mg/dL.

### Discussion

The universal prevalence of CKD has been reported to be between 8% and 16% (6,7). Its prevalence rates by country are; 9.3% in Norway, 11% in the US, 16% in Australia, 9.07% in Malaysia and 13.5% in England (5,6). CKD prevalence has been studied at different stages by Coresh et al. According to that study, 3.3% were at stage one, 3% were at stage two, 0.75% were at stage three, 0.2% were at stage four and 0.2% were at stage five. In their study, age has been described as a key predictor of CKD, as 11% of the people older than 65 who were not suffering high blood pressure or diabetes were at stage three or higher stages (8). CKD is a progressing disease. The patients at stage one will show symptoms of kidney damage despite having a GFR near 90 cc/min. At stage three, the symptoms start to develop and at stage four they experience a significant decrease in their GFR levels. At stage five, GFR drops to a level lower than 15 cc/min and the patient will need to kidney transplant or dialysis (8).

The common hypothesis is that the patient suffering CKD will also suffer from progressing nephropathy with varying paces of advancement. Proteinuria and hypertension, are key factors for the pace of development being increased (9). Most of the people suffering from CKD experience a progressing decrease in their kidney functionality. However, some of clinical trials show that some patients had sustained kidney functionality during the follow-ups (10). There was no similar case in the relevant scientific literature. In some sources, there are some points about the benefits of watermelon consumption for kidney patients. For instance, in one source it has been recommended that patients suffering CKD at various stages should benefit from watermelon

consumption except in terminal phase of renal function, while there is the risk of hyperkalemia (11). In another source it has been claimed that consuming watermelon in the early stages of CKD is permitted and can be even of help due to its diuretic characteristic. In any case, since these patients have special conditions, nutrition should not be dismissed (12).

In another source, patients suffering hyperkalemia and those at stage three or higher of CKD have been urged not to consume watermelon (13). In most of the reviewed resources, the benefits of watermelon have been mentioned but in no resource there has been any reference to its effect on the reduction of blood urea and creatinine of CKD patients. These foretold benefits of watermelon are due to its compounds. Watermelon contains an important anti-oxidant called lycopene which is useful in improving prostate cancer. Some studies have indicated that the consumption of lycopene prevents kidney damages due to its biochemical and histopathological parameters (8,14). Citrulline and arginine are some of the other compounds existed in watermelon. They contribute to a healthy blood flow. In some sources it has been stated that adding compliments containing arginine to the diet is helpful especially for kidney failure patients. This modality may have a potential effect on treating kidney diseases by stopping biochemical processes that produce non-nitric oxide (which reduces the asymmetric activity of dimethylarginine) (15-23). Watermelon is a nutrient full of anti-oxidants. The effects of anti-oxidants in preventing different diseases and their progression have been confirmed in various studies (19,24).

### Conclusion

Therefore, it can be claimed that a reduction in BUN and creatinine level has occurred in our patient after consuming a significant amount of watermelon and the consequent increase in anti-oxidants level in his blood as well as the subsequent effect of these compounds on kidney function. The disease has not further developed despite high urea and creatinine level in the patient's blood. Furthermore, these parameters have decreased gradually over the years. He has now a BUN level of 24 mg/dL and creatinine level of 1.5 mg/dL. There also has been a significant rise in these parameters whenever he stopped consuming watermelon and a decrease back to the previous levels whenever he resumed watermelon consumption.

### Authors' contribution

All authors contributed to the manuscript equally. MRT managed and handled the patient. RM and AH prepared the primary draft. MRT edited and finalized the manuscript. All authors read and signed the final paper.

### Conflicts of interest

The authors declared no competing interests.

### Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors. The

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