

Potential Benefit of Inorganic Nitrate in Acute Kidney Injury and Renal Cell Cancer

Dear Editor-in-Chief

We were interested to read the article of Carpentier et al. (1) examining the effect of inorganic nitrate supplementation on renal function before and after exercise. There has been extensive debate about the potential benefits and possible harms of nitrate. However, we were surprised by the statement “A few publications pointed out that nitrate and nitric [sic] excess exposure is associated with increased risk of renal cell carcinoma and acute kidney injury.” The referenced article by Mian’s group (4) shows that in a pediatric population with acute kidney injury (AKI), urinary nitrate excretion is reduced. There are no published data to support the claim that nitrate or nitrite exposure is associated with AKI. The kidney avidly retains nitrate with a fractional reabsorption rate in the order of 95% with no evidence of a transport maximum (3). This suggests that nitrate is unlikely to be harmful to the kidney. There are data from animal models to suggest that nitrate and nitrite may protect against AKI in some circumstances, notably after administration of intravenous contrast (5) and ischemia reperfusion injury (6).

It is noteworthy that the association with renal cell carcinoma was found only in those with the highest meat intake in the referenced study (7), a finding mirrored in the study of Dellavalle et al. (2). Given that vegetables are the largest source of nitrate in the diet and what is known about the enterosalivary circulation of nitrate and nitrite (3), meat is an inappropriate proxy for nitrate and nitrite exposure. It is also noteworthy that where high nitrate intake would be obtained through consumption of green leafy and cruciferous vegetables, there is profound reduction in risk of renal cell cancer (8). On the wider question of nitrate and cancer, the Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives declared, “Overall, the epidemiological studies showed no consistently increased risk for cancer with increasing consumption of nitrate.” These data, combined with the

results of the epidemiological studies considered by the Committee at its 44th meeting, do not provide evidence that nitrate is carcinogenic to humans (3).

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