BACKGROUND

- Reduced plasma vitamin C (vitC) concentrations in HIV may result from abnormal urinary excretion: a renal leak.
- VitC renal leak indicates underlying nutritional dysregulation independent of diet.
- We hypothesized that increased renal leak prevalence in HIV would be associated with deficient vitC concentrations.

METHODS

- We conducted an outpatient cross-sectional convenience sampling of 96 women (40 HIV+, 56 HIV-).
- Clinical and HIV-related history were obtained using structured questionnaires.
- To assess vitC renal leak, subjects fasted overnight, and matched urine and fasting plasma were collected the following morning. VitC was measured by HPLC with coulometric electrochemical detection.
- VitC renal leak was defined as presence of urinary vitC at fasting plasma concentrations below 43.2µM, the vitC Minimum Elimination Threshold (MET) in women. Exploratory outcomes assessed clinical parameters associated with vitC renal leak.

RESULTS

- Women with HIV+ had higher odds of having a vitamin C renal leak compared with women without HIV (p<0.001 Fisher’s Exact).

CONCLUSIONS

- Findings indicate that vitamin C renal leak and vitamin C deficiency could be widespread in individuals with HIV, with potentially higher risk in older individuals and those with medical comorbidities including obesity.
- ART use may contribute to renal leak-mediated vitC deficiency. Comorbidities associated with metabolic and cardiovascular risk (obesity, hypertension, dyslipidemia) may be more relevant than chronic immune activation from HIV.
- Across the four groups (Fabry, diabetes, HIV+, HIV-), there was a relationship between higher renal leak prevalence and lower plasma vitamin C concentrations.
- Beyond HIV, findings underscore how nutritional requirements are altered in chronic diseases and provide new research paths for investigating long-term clinical consequences.
- Findings highlight the need for modifications to dietary recommendations to account for chronic disease.
- Proactive monitoring and preventative measures are needed to mitigate and prevent deficiency in individuals with HIV.

Acknowledgements: We are grateful to subjects who participated in these studies; to the Intramural Research Programs, NIDDK and NINDS, NIH; to the Metabolic Unit Staff, NIDDK Clinical Core Staff, and to the Clinical Center Nutrition Staff, NIH. Funders had no input into study outcomes.