Association of Dietary Potassium Intake with Abdominal Aortic Calcification and Pulse Pressure in US Adults

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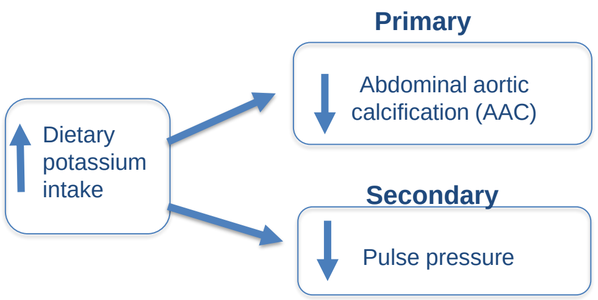
BACKGROUND

- Vascular calcification contributes to cardiovascular morbidity and mortality.
- In a mouse model of atherosclerosis, higher dietary potassium intake attenuated arterial calcification and decreased arterial stiffness. .
- There has been no study that examined these relationships in the general population.

HYPOTHESES



METHODS

Cross sectional study

NHANES 2013-2014

Over 40 years old in the US

Dietary potassium intake (averaged from two recalls)
- Continuous
- Categorized by quartiles (Q1-Q4)

Primary outcome: Abdominal aortic calcification (AAC) (dual energy X-ray absorptiometry on lateral spine;N=2,419
- No calcification (AAC = 0)
- Mild/moderate calcification
- (AAC=1-6)
- Severe calcification (AAC >6)
- Multinominal logistic regression

Secondary outcome: Pulse pressure; N=2,187
- Pulse pressure=SBP-DBP;
- Multivariable linear regression

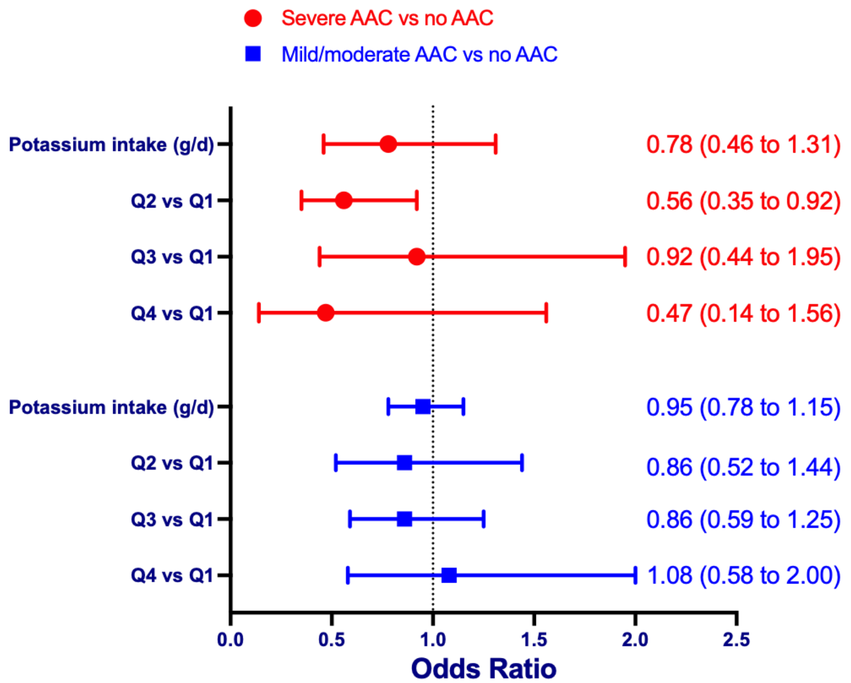
Interaction between dietary sodium and potassium
- Low dietary sodium intake was defined as ≤2.3g/d

RESULTS

Table 1: Weighted demographic characteristics of participants by aortic artery calcification (n=2419)

	No AAC (n=1694)	Mild/moderate AAC (n=506) 20%	Severe AAC (n=219) 8%	P-value
Age				<0.001
40-49 years	34(2)	19(4)	2(0)	
50-59 years	34(2)	30(5)	12(4)	
60-69 years	23(1)	24(3)	23(6)	
>70 years	9(0)	27(4)	63(5)	
Female	52(2)	52(3)	55(6)	0.83
Race/ethnicity				0.06
Non-Hispanic White	69(4)	74(4)	77(5)	
Non-Hispanic Black	11(2)	10(2)	4(1)	
Hispanic	13(3)	9(2)	6 (2)	
Body mass index(kg/m^2)	28.8±0.2	28.3±0.3	27.6±0.8	0.04
Smoking	**41(2)**	**51(5)**	**57(6)**	0.02
Diabetes mellitus	13(1)	22(2)	38(6)	<0.001
Hypertension	55(1)	66(3)	84(4)	<0.001
eGFR(ml/min/1.73m^2)	86±0.6	81±1.1	65±1.5	<0.001
Albuminuria (>=30mg/g)	8(1)	11(2)	18(4)	0.01

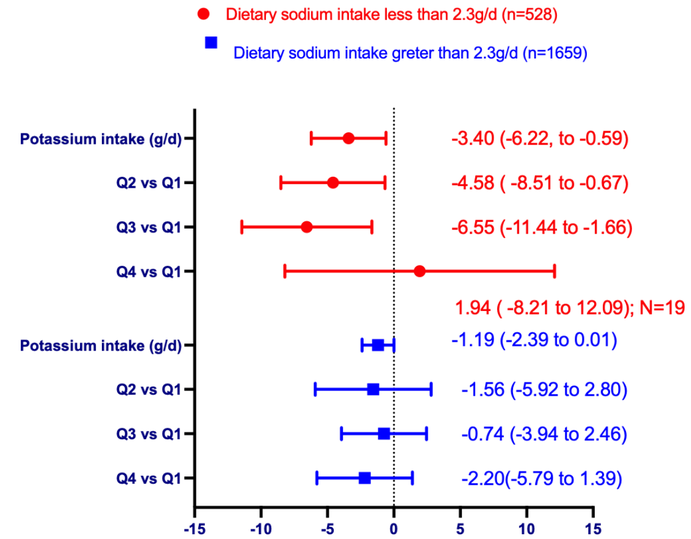
Figure 1: Dietary potassium intake in second quartile was associated with lower odds of having severe AAC



Models were adjusted for age, sex and race/ethnicity, body mass index, hypertension, diabetes, smoking, eGFR, albuminuria, daily caloric intake and physical activity (metabolic equivalent of task).

RESULTS

Figure2: Dietary potassium intake was negatively associated with pulse pressure among participants with low sodium intake



Models were adjusted for age, sex and race/ethnicity, body mass index, blood pressure medications, diabetes, smoking, eGFR, albuminuria, daily caloric intake and physical activity (metabolic equivalent of task).

SUMMARY

- There was a nonlinear association between dietary potassium intake and AAC
  - An inverse relationship was found comparing dietary potassium intake in Q2 with Q1.
- Dietary potassium intake was negatively associated with pulse pressure among participants with low sodium intake.

DISCUSSION & CONCLUSION

Limitations:
- Cross-sectional study
- Dietary potassium intake is subject to recall bias
- Urinary potassium excretion not available

Conclusion:
- Our findings support the potential important benefits of dietary potassium intake on arterial calcification and pulse pressure.
- The nonlinear association between dietary potassium intake and AAC suggests that there might be an optimal level of dietary potassium intake that is beneficial for the prevention of arterial calcification.

References:

1. Sun Y, et al. Dietary potassium regulates vascular calcification and arterial stiffness. *JCI Insight*. 2017.
2. Heffernan KS, Barreira TV. Association between pulse pressure and aortic calcification: Findings from the National Health and Nutrition Examination Survey 2013-2014. *J Clin Hypertens*. 2020.