Individualized Nutrition for Kidney Stone Prevention

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Objectives

Understand the undervalued complications of kidney stones.

Describe specific urine risk factors that contribute to kidney stones.

Understand how to individualize MNT based on 24-hour urine test results and kidney stone type.

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Why Do We Care?

Increased Risk Of:

- Osteoporosis
- Hypertension
- Heart Disease
- Chronic Kidney Disease
- $\,\circ\,$ Kidney injury from obstruction or scarring
- Infection



Symptoms

Nothing!

Hematuria

Flank pain

Sensation of urinary frequency

Pain w/ urination

Nausea/vomiting





















				•						
24	• H(JUI	r Ui	rine	e Ie	est				
Stone	Risk Fa	ctors / 0	Goal: <4 Cysti s ci	Goal eening:	l: 30-40m Ne tive	g(ish) e (04/20/	Goal: <4	G	ioal: <1	
DATE	SAMPLE ID	Vol 24	SS CaOx	Ca 24	0x 24	Cit 24	SS CaP	рН	SS UA	UA 24
03/02/20	S26101135	2.65	3.37	59	93*	462	0.30	7.078	0.06	0.728
	G	oal: ≥2.5	L G	oal: <200	Omg G	foal: >50 700mg	⁾⁻ Go	Dal: 5.8-6.2	2	Goal: 0.6-0
Dieta	ry Facto	ors								
DATE	SAMPLE ID	Na 24	K 24	Mg 24	P 24	Nh4 24	CI 24	Sul 24	UUN 24	PCR
03/02/20) S26101135	207	<mark>89</mark>	135	0.499	19	205	32	9.05	1.3
	Goa	al: ~100m	Eq				Prote	in Intake (1) + 1111N	g): I * 6 25	Goal: 0













Very High Oxalate Foods

Spinach (755mg per ½ cup, cooked)

Almonds (122mg per ¼ cup)

Bran (46mg per 1 cup)

Rhubarb (31mg per ½ cup)

Raspberries (48mg per 1 cup)

Beets (76mg per ½ cup)

Potato, w/ skin (97mg per potato)

Navy beans (76mg per ½ cup, cooked)

	DASH Score Quintiles						
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	P for Trend	
HPFS							
Median DASH score	16	21	24	27	31		
Cases of new stones	445	416	370	260	226		
Person-years	113,406	123,848	127,562	110,087	112,924		
Age-adjusted RR	1.0	0.89	0.79	0.66	0.57	< 0.001	
95% CI	(Ref)	(0.78 to 1.02)	(0.68 to 0.90)	(0.56 to 0.77)	(0.49 to 0.68)		
Multivariate RR ^b	1.0	0.89	0.77	0.64	0.55	< 0.001	
95% CI	(Ref)	(0.77 to 1.01)	(0.67 to 0.89)	(0.54 to 0.74)	(0.46 to 0.65)		
NHS I							
Median DASH score	17	21	24	27	31		
Cases of new stones	452	372	354	259	238		
Person-years	263,851	248,556	279,617	244,572	252,017		
Age-adjusted RR	1.0	0.89	0.76	0.64	0.58	< 0.001	
95% CI	(Ref)	(0.77 to 1.02)	(0.66 to 0.87)	(0.55 to 0.74)	(0.49 to 0.67)		
Multivariate RR ^b	1.0	0.89	0.76	0.64	0.58	< 0.001	
95% CI	(Ref)	(0.77 to 1.02)	(0.65 to 0.87)	(0.54 to 0.74)	(0.49 to 0.68)		
NHS II							
Median DASH score	17	21	24	27	31		
Cases of new stones	581	547	411	414	300		
Person-years	229,342	244,892	221,988	233,327	217,330		
Age-adjusted RR	1.0	0.88	0.73	0.71	0.55	< 0.001	
95% CI	(Ref)	(0.79 to 0.99)	(0.65 to 0.83)	(0.62 to 0.80)	(0.48 to 0.63)		
Multivariate RR ^b	1.0	0.92	0.77	0.75	0.60	< 0.001	
95% CI	(Ref)	(0.81 to 1.03)	(0.68 to 0.88)	(0.66 to 0.86)	(0.52 to 0.70)		

in DASH scores in HPFS, NHS I, and NHS II are from 1990, 1990, and 1991. However, updated period-specific DASH ive purposes,

For instatute puppess, median DAAP scores in APS, VPS 1, and VPS in are inclined 1770, 1770, and 1771. However, updated period-specific DAAP scores were used in the prospective analyses. ¹Multivariate model includes age, body mass index, total energy intake, use of thiazide diuretics (yes or no), fluid intake (quintiles), caffeine (quintiles), alcohol use (seven categories), history of hypertension, and history of diabetes.

Potential Dangers of a Low Oxalate Diet

Most all fruits and vegetablesLower intake of bicarbonate precursorsCalcium (all types), uric acidLower urine citrate, lower urine pHLeafy green vegetables, beans, nuts, seeds, whole grains, chocolateLower magnesium intakeCalcium oxalateLower urine magnesiumWhole grains, nuts, seeds, some fruits and vegetablesLower consumption of prebiotics from fiberCalcium oxalateHigher urine oxalate due to lower oxalate degrading capacity of gu microbesNuts, seeds, tubers, some whole grainsLower phytate intakeCalcium (all types)Lower urine phytate	Dietary Effect of Restriction	Specific Stone Risk	Mechanism for Stone Risk
Lower magnesium intake Calcium oxalate Lower urine magnesium Lower dy grains, nuts, seeds, too colate Lower consumption of prebiotics Calcium oxalate Higher urine oxalate due to lower oxalate degrading capacity of gumicrobes Whole grains, nuts, seeds, tubers, some whole grains Lower phytate intake Calcium (all types) Lower urine phytate	Lower intake of bicarbonate precursors	Calcium (all types), uric acid	Lower urine citrate, lower urine pH
Whole grains, nuts, seeds, tobers, some whole grains Lower consumption of prebiotics from fiber Calcium oxalate Higher urine oxalate due to lower oxalate due to lower oxalate degrading capacity of guided experiments Nuts, seeds, tubers, some whole grains Lower phytate intake Calcium (all types) Lower urine phytate	Lower magnesium intake	Calcium oxalate	Lower urine magnesium
Nuts, seeds, tubers, some whole grains Lower phytate intake Calcium (all types) Lower urine phytate	Lower consumption of prebiotics from fiber	Calcium oxalate	Higher urine oxalate due to lower oxalate degrading capacity of gut microbes
	Lower phytate intake	Calcium (all types)	Lower urine phytate
	Lower phytate intake	Calcium (all types)	Lower urine phytate
		Dietary Effect of Restriction Lower intake of bicarbonate precursors Lower magnesium intake Lower consumption of prebiotics from fiber Lower phytate intake	Dietary Effect of Restriction Specific Stone Risk Lower intake of bicarbonate precursors Calcium (all types), uric acid Lower magnesium intake Calcium oxalate Lower consumption of prebiotics from fiber Calcium oxalate Lower phytate intake Calcium (all types)













Citric Acid	Nutrition Facts Serving Size 2/5 packet (2g) (makes 8 fl oz) Servings Per Container 75 Amount Per Serving Calories 5 % Daily Value*			
		Total Fat 0g 0% Sodium 35mg 1%		
Beverage	Citrate (mEq)	Total Carbohydrate Og 0%		
1 liter Crystal Light Lemonade	20	Sugars Og		
2		Frotein og		
½ cup lemon or lime juice	20	Not a significant source of Calories from Fat, Saturated Fat, Trans Fat, Cholesterol, Dietary Fiber, Vitamin A, Vitamin C, Calcium, and Iron.		
1 liter diet lemon-lime soda	8-10	*Percent Daily Values are based on a 2,000 calorie diet.		
2	0 10	INGREDIENTS CITRIC ACID POTASSIUM CITRATE SODIUM CITRATE ASPARTANCE MACINESTIM OXIDE MATTODEXTRIN		
1 packet Moonstone Beverage	25	CONTAINS LESS THAN 2% OF NATURAL FLAVOR, ACESULFAME POTASSIUM, SOY LECITHIN, ARTIFICIAL COLOR, YELLOW 5		
	10	BHA (PRESERVES FRESHNESS).		
I packet Litholyte	10	CONTAINS: SOY.		
		DISTRIBUTED BY KRAFT FOODS GROUP, INC.		
		NURTHFIELD, IL DUUSS-2753 USA		
		Kraft		
		NO CAFFEINE + LOW SODIUM		





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