SURVIVOR'S GUIDE

WORST PAIN EVER

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VOLUME 2

For Kidney Stone Warriors

Preface

Inspired by our community of *Kidney Stone Warriors,* this *Survivor's Guide* is a curation of facts and tips for managing kidney stones.

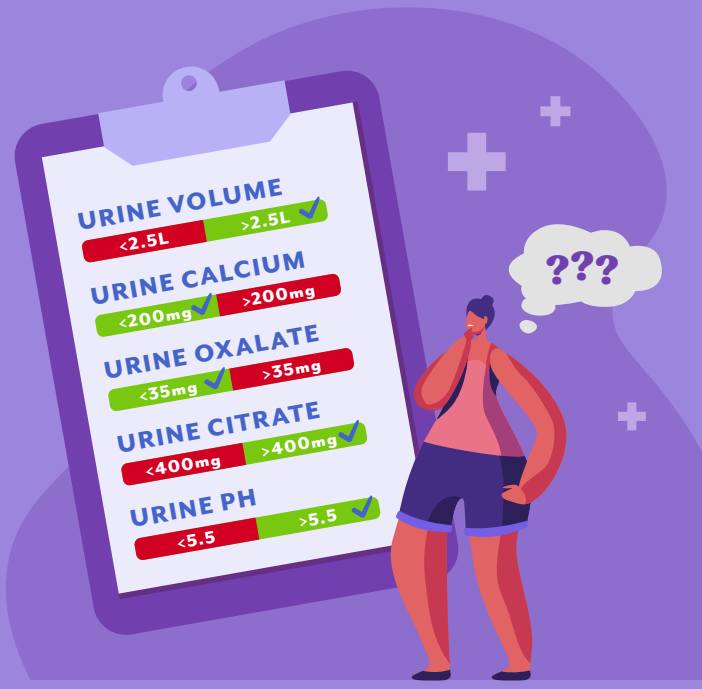
Proudly brought to you by *Worst Pain Ever*, the world's largest kidney stone patient community and powered by Dornier MedTech, a company that engineers urological solutions.

Reading my urinalysis report

What do they mean?

Following a doctor's visit, you may have a 24-hour urinalysis test done to determine the likelihood of kidney stone formation. Unless you have other underlying conditions that can cause kidney stones, such as hyperparathyroidism or certain genetic conditions, this simplified guide° highlights key things to look out for in your urinalysis report and the actions you can take based on your results.

Developed in collaboration with our Medical Advisory Board.



URINE VOLUME

Urine volume is simply the amount of urine your body produces in a day[2].

Is your urine volume higher than 2.5 liters?

No

You need to drink more fluids. How much more? Take 2.5 liters minus the urine volume stated in your report.

Yes

You are sufficiently hydrated! Keep your urine volume above 2.5 liters to reduce your likelihood of forming new stones.

1. Adapted from Coe, Frederic. (2021). *My lab report*. Kidney Stone Evaluation And Treatment Program. Retrieved March 23, 2022, from https://kidneystones.uchicago.edu/my-lab-report/
2. Icahn School of Medicine at Mount Sinai. (2019). *Urine 24-hour volume*. Mount Sinai Health System. Retrieved March 28, 2022, from https://www.mountsinai.org/health-library/tests/urine-24-hour-volume

URINE CALCIUM

While calcium is important for your bones and neuromuscular activity, excessive amounts in your urine can increase your risk of forming kidney stones[3]. Your sugar and sodium intake can also raise your urine calcium and should be minimized[4,5].

Is your urine calcium more than 200 mg?

No — **Your urine calcium is OK.**

Yes

Is your Urine Sodium more than 1500 mg?

- **No** — **Your sodium intake is OK.**
- **Yes** — **Lower your daily sodium intake to below 1500 mg.**

Do you consume Vitamin D supplements?

- **No** — **No further action required.**
- **Yes** — **Limit your consumption to less than 1000 units.**

Have you been tested for hyperparathyroid and hypercalcemia?

- **No** — **Consult your doctor about testing options.**
- **Yes** — **Consider a referral to an endocrinologist if your blood parathyroid hormones or calcium is high.**

3. Medline Plus. (2020, July). *Calcium in Urine Test*. MedlinePlus. Retrieved March 28, 2022, from https://medlineplus.gov/lab-tests/calcium-in-urine-test/

4. Coe, F., MD. (n.d.). *Control Your Salt for Fewer Stones and Stronger Bones*. The University of Chicago. Retrieved March 25, 2022, from https://kidneystones.uchicago.edu/control-your-salt-for-less-stones-and-better-bones/

5. Coe, F., MD. (n.d.). *Sugar: The End of Our Love Affair*. The University of Chicago. Retrieved March 25, 2022, from https://kidneystones.uchicago.edu/sugar-end-love-affair/

URINE OXALATE

Oxalate is a natural end product of your metabolism and leaves your body through your urine. If your urine oxalate levels are too high, it combines with calcium in your urine to form kidney stones[6].

Is your urine oxalate

Below 35 mg

Your urine oxalate is OK.

Between 35mg & 80 mg

Your urine oxalate is high enough to increase your risk of stones. Reduce your consumption of high oxalate foods such as rhubarb, spinach, and almonds. Need a list? Here.

Consume at least 1000 mg of dietary calcium daily. Calcium binds with oxalate in your gut during digestion, reducing its excretion in your urine.

More than 80 mg

Your urine oxalate is very high. Consult a physician to check if you may have any underlying medical conditions and to work out a plan to reduce this.

6. University of Rochester Medical Center. (n.d.). *Oxalate (Urine)*. Health Encyclopedia. Retrieved March 25, 2022, from https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=167&contentid=oxalate_urine

URINE CITRATE

Urinary citrate prevents the formation of calcium stones by forming soluble complexes with calcium ions and hindering crystal growth[7].

Is your urine citrate less than 400 mg?

- **No** → **Your urine citrate is OK.**
- **Yes** → **Your urine citrate is low enough to raise your risk of forming stones.**

Is your blood potassium low or do you take diuretics?

- **No** → **Use alkaline beverages to raise your urine citrate.**
- **Yes** → **Ask your physician about potassium citrate supplements to raise your urine citrate. They will advise you based on your urine pH levels.**

7. Caudarella, R., & Vescini, F. (2009). *Urinary citrate and renal stone disease: the preventive role of alkali citrate treatment.* Archivio italiano di urologia, andrologia : organo ufficiale [di] Societa italiana di ecografia urologica e nefrologica, 81(3), 182–187. https://pubmed.ncbi.nlm.nih.gov/19911682/

URINE pH

pH measures how acidic or alkaline your urine is and is an important indicator of kidney stone risk[8,9].

Is your urine pH higher than 5.5?

No

Your urine is acidic enough to pose a risk of forming uric acid stones.

Is your uric acid level above 750mg?

No

Consult your physician about potassium citrate or sodium bicarbonate supplements.

Yes

Limit your intake of animal protein and alcohol. You may require additional reviews to check for your serum acid levels.

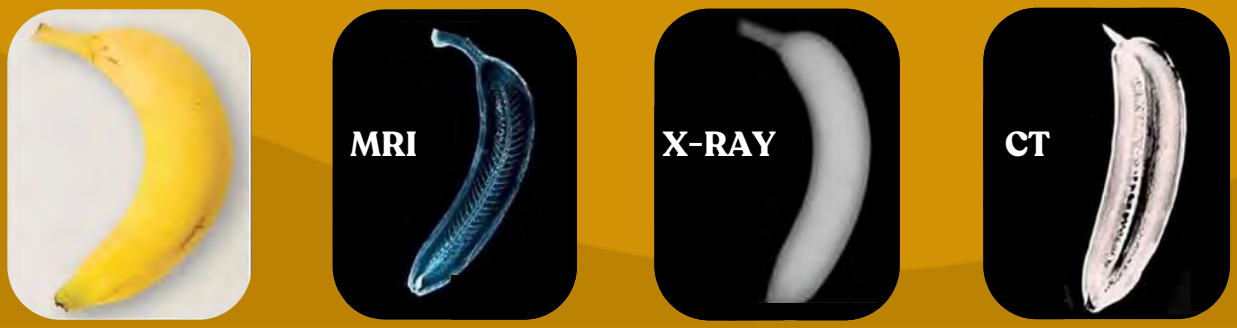
Yes

Your urine is alkaline enough that it does not pose a risk of forming uric acid stones.

8. Nall, R. (2018). *Urine pH: Normal ranges and what they mean*. Medical News Today. Retrieved March 25, 2022, from https://www.medicalnewstoday.com/articles/323957

9. Wagner, C. A., & Mohebbi, N. (2010). *Urinary pH and stone formation*. Journal of Nephrology, 23 Suppl 16, S165–S169. https://doi.org/10.5167/uzh-45805

What is the difference between MRI, X-rays, and CT Scans?



When you show up at the ER with kidney stones, proper imaging is required to determine the location and size of kidney stones. X-rays present less radiation risk compared to CT scans and cost less. However, it has a lower sensitivity rate in picking up stones. Similarly, MRIs have a very low sensitivity rate and can cost up to 3X more! In most cases, MRIs are not requested unless you are pregnant.

This is why most doctors urge patients to get a CT scan, as they have the highest sensitivity rate of all imaging techniques. Low-dose CT scans are often recommended as they reduce the radiation risk by at least 3x, compared to regular CT scans. In short, while CT scans are expensive, they prove to be the most effective, while being relatively cost-efficient[10]. Have a look at the comparison chart below!

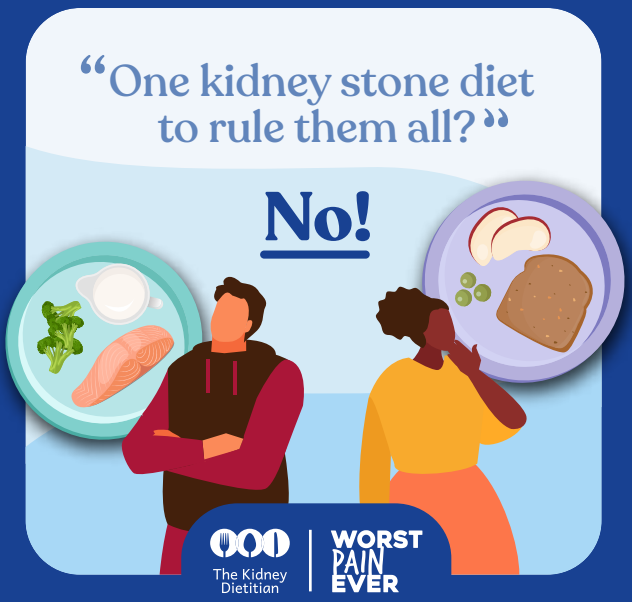
Imaging Modality	Sensitivity* (true positive rate)	Specificity* (true negative rate)	Radiation Exposure	Cost Multiple (relative to that of KUB)
CT	95%	98%	10.0 mSv	10
Low-dose CT	95%	97%	~3.0 mSv	10
Ultrasonography	84%	53%	None	5
KUB (X-ray)	57%	76%	0.7 mSv	1
MRI	82%	98%	None	30

**Published sensitivity and specificity vary widely in the literature for some modalities; therefore, these values are derived from values published by the American College of Radiography and American Urological Association, which have obtained them from pooled data analysis.*

Risk of overexposure to radiation is real, especially for chronic stone formers who may undergo tons of CT scans in their lives. Speak to your doctor about low-dose CT scans, or explore the possibility of using ultrasonography instead.

10. Brisbane, W., Bailey, M. R., & Sorensen, M. D. (2016). An overview of kidney stone imaging techniques. *Nature reviews. Urology*,*13*(11), 654–662. https://doi.org/10.1038/nrurol.2016.154

1. Different Kidney Stone Diet for Everyone

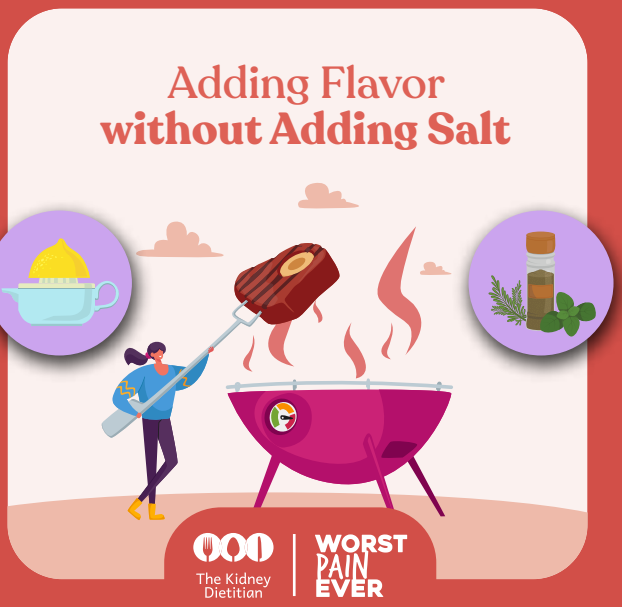


Every kidney stone patient is different! Ideally, your diet should be personalized based on your 24-hour urine test results.

For example, only people who have high urine oxalate need to limit how much oxalate they eat, while a low sodium diet is especially important for people who have high urine calcium.

Talk to your doctor and dietitian to find out what's best for you.

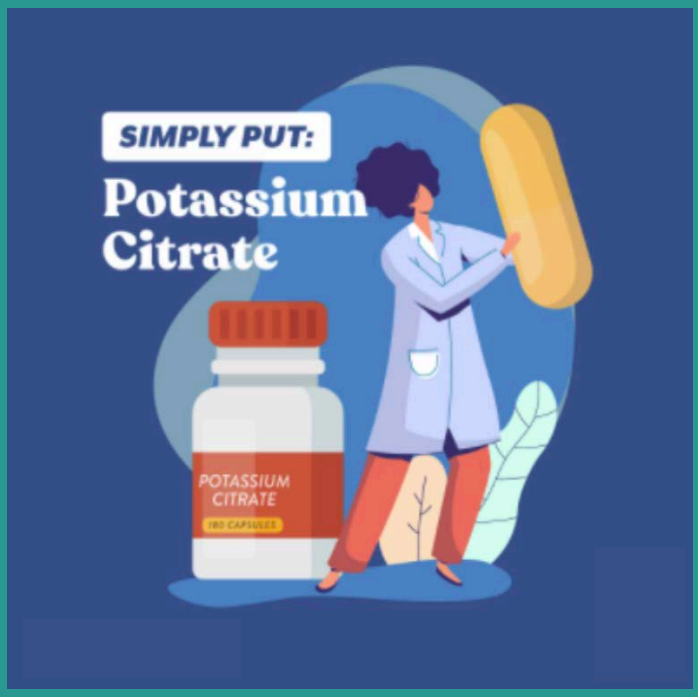
2. Make Delicious Food without Adding Salt



Lowering your sodium intake will reduce your risk of forming most types of kidney stones. Here are the top 3 tips to add flavor to your food without adding more salt.

1. Add acid with flavored vinegar or lemon juice.
2. Try roasting or grilling.This usually adds more flavor than boiling or sauteing.
3. Use plenty of herbs & spices.

Developed in consultation with Melanie Betz MS, RD, CSR, CSG from The Kidney Dietitian (www.thekidneydietitian.org) and the Section of Nephrology department, in the University of Chicago.
With reference to *Medical management of kidney stones: AUA Guideline* (2019).

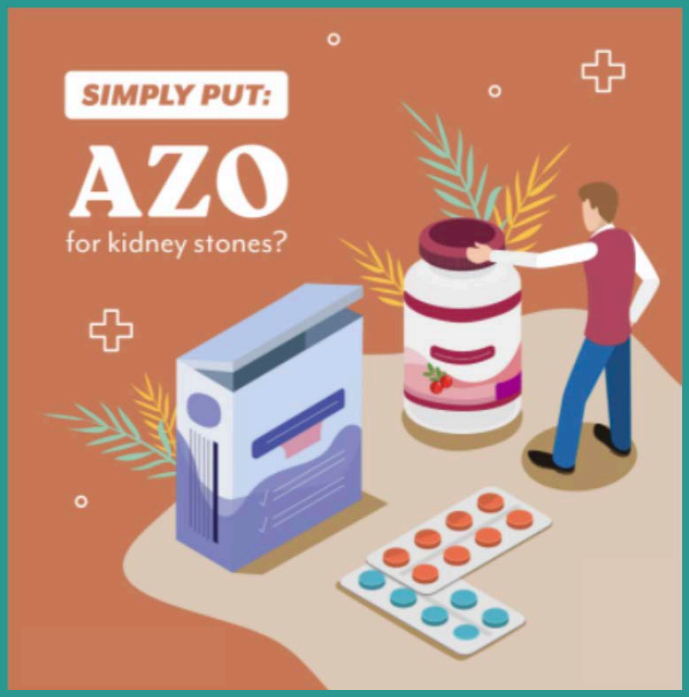


Potassium citrate is prescribed to decrease calcium oxalate stone recurrence in kidney stone patients.

It helps by ...
1. Making urine more alkaline
2. Increasing the absorption of calcium by the kidney
3. Decreasing the release of calcium from bones.

Researchers from Duke University Medical Center found that patients on long-term potassium citrate therapy (i.e. more than 6 months) experienced a significant decrease in stone formation rates, by up to 93%[11]!

Simply put, potassium citrate is generally safe and should be effective in reducing the recurrence of calcium oxalate stones. Consult your doctor for a prescription!



AZO is an over-the-counter pill for urinary pain relief. It eases the pain of passing a lower ureteric stone, and the discomfort of a stent.

Some things to note:
1. Never take AZO for more than 2 days in a row,
2. Seek your doctor's advice before taking the pills, as there could be complications with existing health conditions[12].

11. Robinson, M. R., Leitao, V. A., Haleblian, G. E., Scales, C. D., Chandrashekar, A., Pierre, S. A., & Preminger, G. M. (2009). Impact of long-term potassium citrate therapy on urinary profiles and Recurrent Stone Formation. *Journal of Urology*, 181(3), 1145–1150. https://doi.org/10.1016/j.juro.2008.11.014

12. Norris, R. D., Sur, R. L., Springhart, W. P., Marguet, C. G., Mathias, B. J., Pietrow, P. K., Albala, D. M., & Preminger, G. M. (2008). A prospective, randomized, double-blinded placebo-controlled comparison of extended release Oxybutynin versus phenazopyridine for the management of postoperative ureteral stent discomfort. Urology, 71(5), 792–795. https://doi.org/10.1016/j.urology.2007.11.004

End

Your support means the world to us.

Feeling alone with the *Worst Pain Ever?*
You don't have to! Join our *Kidney Stone Warriors*
Facebook group and reach out to others who get it.

Want to get in touch with us related to partnerships
or feedback on how to improve this *Survivor's Guide?*
Write to us at info@worstpainever.com.

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