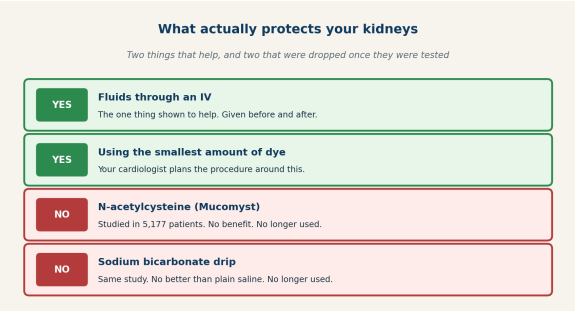
Contrast Dye and Your Kidneys

What the dye does, who is actually at risk, and what protects you

Fluids help. Two treatments you may have heard of do not.



Online: https://go.riasalimd.com/contrast-kidney-guide

Rias KS Ali, MD FACC

Board Certified in Interventional Cardiology & Cardiovascular Disease

4740 Mile Stretch Drive, Holiday FL 34690 | Office: (727) 943-5200 | Fax: (727) 943-5201 | RiasAliMD.com

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Names & Terms You Will Hear

Term	Meaning
Contrast	The liquid used to make blood vessels show up on an X-ray or a scan. Most people call it dye.
Iodinated contrast	The type used for heart catheterization and CT scans.
Contrast-associated acute kidney injury	The current medical term for a temporary drop in kidney function after contrast. You may also hear the older term, contrast-induced nephropathy.
Creatinine	A waste product measured in your blood. It goes up when the kidneys are filtering less.
eGFR	Estimated glomerular filtration rate. The main kidney number, calculated from your creatinine. Higher is better.
Nephrotoxic	Something that can be hard on the kidneys. Contrast is mildly nephrotoxic in the right circumstances.
Hydration	Giving fluids, usually through an IV, before and after the procedure.

Do not refuse a needed heart test out of fear for your kidneys. For most people the contrast risk is small and temporary, while an undetected blockage is neither. If you are worried, tell your cardiologist before the procedure. There is almost always a plan that manages both.

Contrast Dye and Your Kidneys?

- Contrast is a liquid that shows up bright on X-ray. Without it, blood vessels are nearly invisible, so we could not see a blockage.
- It is used for cardiac catheterization, coronary angiograms, stent procedures, and many CT scans.
- It is cleared from your body by your kidneys, usually within about 24 hours.
- In some people it can cause a temporary drop in kidney filtering, usually seen on a blood test two to three days later.
- In the large majority of people this either does not happen, or it happens, causes no symptoms, and recovers on its own.
- The risk is much lower than the reputation suggests, and it is highest in a specific group we can identify beforehand.

Why It Matters

- The fear of kidney damage sometimes leads people to refuse a test that would have found a serious blockage. That trade is usually the wrong way round.
- For most people with normal kidney function, the risk from contrast is very low.
- For people with reduced kidney function, especially alongside diabetes, the risk is real and worth planning around. That planning is what this guide describes.
- The plan is simple: check your kidney number first, give fluids, use the smallest amount of dye that still answers the question, and recheck afterwards if you were higher risk.
- Two treatments that were widely used for years turned out not to work. A trial called PRESERVE randomly assigned 5,177 patients having elective angiography.
- PRESERVE found no benefit from sodium bicarbonate over ordinary saline, and no benefit from N-acetylcysteine over placebo, for kidney injury or for death, dialysis, or a lasting rise in creatinine at 90 days. Both were dropped from routine care.

Measure	Does it help?	What the evidence says
IV fluids before and after	Yes	The mainstay of prevention. Isotonic saline is standard.
Using less contrast	Yes	Lower dose means lower risk. Planned by your cardiologist.
N-acetylcysteine (Mucomyst)	No	PRESERVE, 5,177 patients: no benefit over placebo.
Sodium bicarbonate drip	No	PRESERVE: no better than ordinary saline.

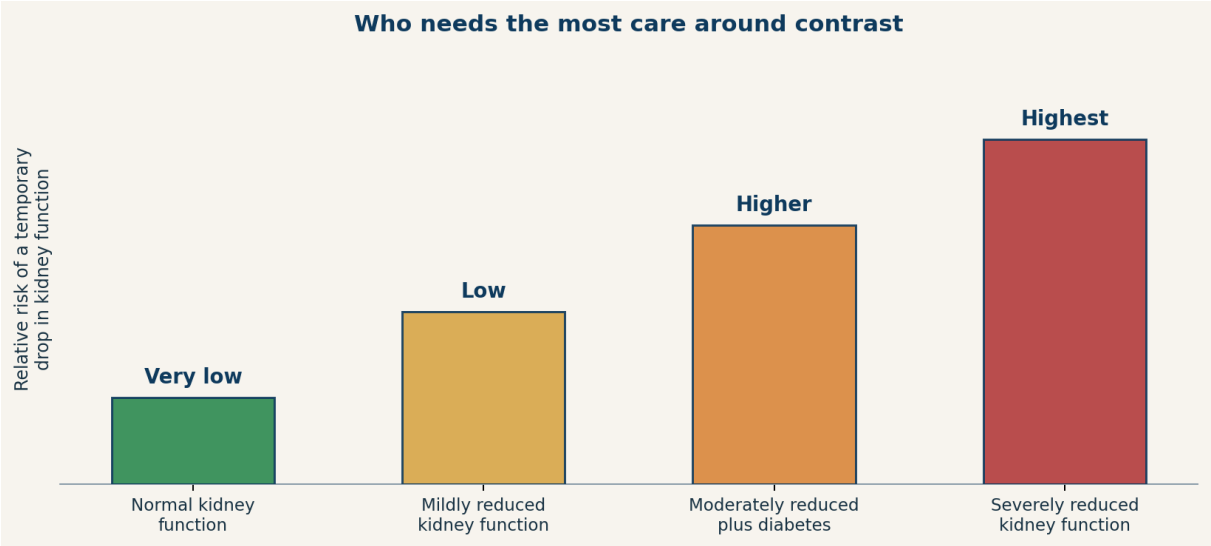
Why Two Common Treatments Were Dropped

- For years, many patients were given N-acetylcysteine, often called Mucomyst, before a procedure with contrast.
- Many also received a sodium bicarbonate drip instead of ordinary saline.
- Both made biological sense and both were widely used. Neither had been properly tested at scale.
- The PRESERVE trial randomly assigned 5,177 patients scheduled for elective angiography, testing both questions at once.
- There was no difference in kidney injury, and no difference in death, dialysis, or a lasting rise in creatinine at 90 days.
- Both were dropped from routine practice. This is a good example of medicine correcting itself when the evidence arrives.
- If someone offers you Mucomyst before a heart procedure, it is reasonable to ask why.

Risk Factors

Some patients are more likely to develop this condition. Knowing your risk helps your care team take extra precautions.

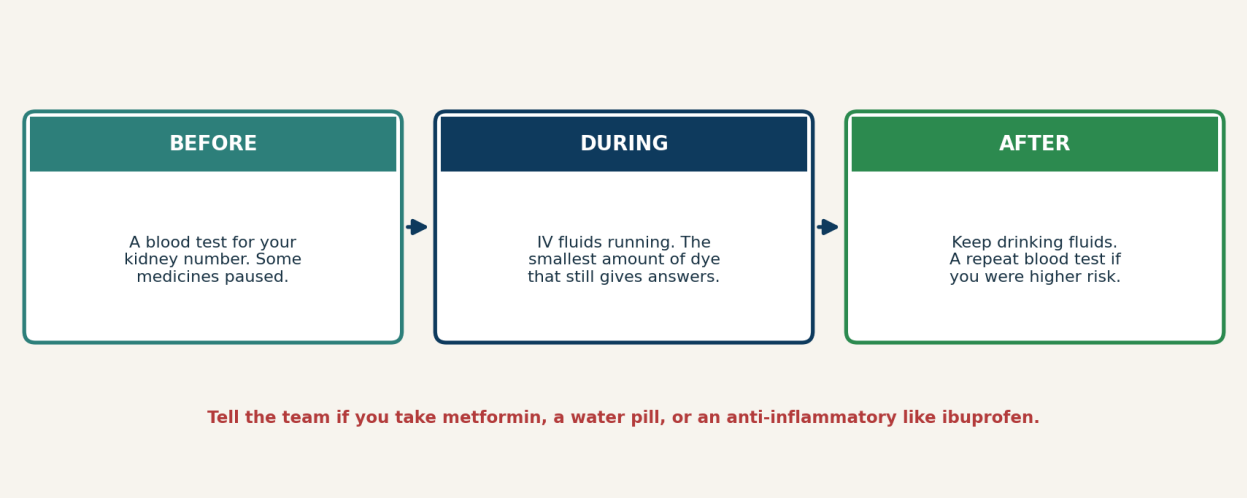
Risk Factor	Why It Increases Risk
Reduced kidney function before the procedure	The single strongest predictor. The lower your eGFR, the more care the plan needs.
Diabetes, especially with kidney involvement	Diabetes plus reduced kidney function is a higher-risk combination than either alone.
Being dehydrated	The most fixable risk factor on this list, and the reason we give fluids.
A large amount of contrast	More dye means more risk. This is why your cardiologist plans the procedure to use as little as possible.
Two contrast studies close together	Your kidneys have not finished clearing the first dose. Tell us about any recent scan with dye.
Certain medicines around the procedure	Water pills, anti-inflammatories like ibuprofen or naproxen, and some blood pressure medicines can add strain at the wrong moment.
Heart failure or low blood pressure	Both reduce blood flow to the kidneys, which makes them less able to handle the extra work.



Risk is not the same for everyone. It rises with reduced kidney function and rises further when diabetes is also present. This is why the plan is built around your kidney number rather than applied identically to everybody.

Treatment Options

- You will have a blood test before the procedure to check your kidney number.
- If you are at higher risk, you will get fluids through an IV before and after. This is the main protection, and it is the one thing with good evidence behind it.
- Your cardiologist uses the smallest amount of dye that will still answer the question.
- Some medicines get paused around the procedure. Which ones depends on your kidney number, and the team will tell you specifically.
- If you take metformin, you may be asked to hold it for a period after the procedure. This is not because metformin harms the kidneys. It is because if your kidney function did drop, metformin could build up.
- Drink fluids normally afterwards unless you have been told to limit them, which some people with heart failure are.
- If you were higher risk, expect a repeat blood test in the following days.



What happens around your procedure. The kidney number is checked first, fluids run before and after, and a repeat blood test follows for anyone at higher risk.

Comfort Measures at Home (No Medication Needed)

These simple steps support healing and ease symptoms. Use them alongside any medication your doctor prescribes.

- Drink normally in the day or two before, unless you have been told to fast or to limit fluids.
- Bring an accurate list of every medicine and supplement, including anything you take only occasionally.
- Mention any scan with dye you have had in the past few weeks.
- Tell the team if you have ever had a reaction to contrast before.
- Ask what your kidney number is. It is a useful number to know and to track over time.
- After the procedure, keep drinking unless told otherwise, and take it easy for the rest of the day.

Related guides from our practice.
Cardiac Catheterization and Coronary Angiogram — the procedures where most cardiac contrast is given.
Angioplasty and Stents — treatment during the same visit.
Coronary CT Angiography — a scan that also uses contrast.
Heart and Kidney Disease — how the two organs affect each other.
Diabetes and the Heart — why diabetes changes the kidney plan.

Risks, Benefits, and Alternatives

Every choice has trade-offs. Use this table to start the shared decision conversation.

Option	Risks	Benefits	Alternatives
Having the procedure with contrast	A temporary drop in kidney filtering, most often with no symptoms and full recovery. A lasting problem is uncommon and mostly limited to those already having significant kidney disease. Allergic-type reactions are a separate and uncommon risk.	We can actually see the blood vessels. A blockage can be found and often treated in the same visit. Without contrast the pictures do not answer the question.	A stress test with no dye, though it shows blood flow rather than the arteries themselves. A cardiac MRI in some cases. Or accepting that the question stays unanswered.
IV fluids before and after	Needs an IV and some extra time. Has to be used carefully if you have heart failure, since too much fluid causes its own problems.	The one measure with consistent evidence. Simple, cheap, and widely available.	Drinking fluids by mouth, which is being studied and may be reasonable for lower-risk outpatients, but IV is the standard when risk is meaningful.
N-acetylcysteine or a bicarbonate drip	No meaningful risk, but no benefit either. Using them can create false reassurance and adds cost and time.	None demonstrated. PRESERVE tested both in 5,177 patients and found nothing.	IV fluids and careful contrast use, which is what replaced them.
Skipping the test to protect the kidneys	The heart question goes unanswered. A significant blockage may be missed. For most people this is a far larger risk than the contrast itself.	No contrast exposure at all.	Having the test with a proper kidney-protection plan, which is almost always the better trade.

Common Misconceptions

Myth	Reality
Contrast dye will damage my kidneys for good.	For the great majority of people it does not. Where a drop happens it is usually temporary, causes no symptoms, and recovers within one to two weeks. Lasting kidney damage is uncommon and is largely confined to people who already had significant kidney disease.
I should take Mucomyst before my procedure.	It was standard for years, then it was properly tested. In PRESERVE, 5,177 patients were randomly assigned, and N-acetylcysteine made no difference to kidney injury or to death, dialysis, or a lasting creatinine rise at 90 days. It is no longer part of routine care.
A bicarbonate drip is better than regular saline.	The same trial tested exactly that comparison and found no difference. Ordinary isotonic saline is what is used.
Contrast dye is the same thing as an iodine or shellfish allergy.	They are separate issues. A shellfish allergy does not predict a contrast reaction. What matters is whether you have reacted to contrast itself before, so tell us about that specifically.
Metformin damages the kidneys, so I have to stop it.	Metformin does not harm the kidneys. The concern runs the other way. If your kidney function dropped after contrast, metformin could accumulate. That is why it may be held for a short period and restarted once the kidney number is confirmed stable.
If my kidneys are bad, I cannot have a heart catheterization at all.	Reduced kidney function is a reason to plan carefully, not usually a reason to refuse. Fluids, minimal dye, and follow-up testing let most people proceed safely.
I will be able to feel it if my kidneys are affected.	Almost always you will not. There are no symptoms. It shows up only on a blood test, which is why the follow-up test matters for higher-risk patients.

The Metformin Question, Answered Plainly

- Metformin does not damage your kidneys. This is the most common misunderstanding about it.
- The concern runs the other way. Your kidneys clear metformin from your body.
- If contrast caused a temporary drop in kidney filtering, metformin could build up to higher levels than intended.
- That is why it is sometimes held for a period after the procedure, not before.
- Whether it is held at all depends on your kidney number. Many people with normal function do not need to stop it.
- Ask specifically when to restart, and do not restart on your own if you were told to wait for a blood test.

Possible Complications

Knowing what can go wrong helps you spot problems early. Most complications are uncommon, especially with treatment.

Where / What	What Can Happen
A temporary drop in kidney filtering	The main one. It shows up as a rise in creatinine on a blood test two to three days after, usually with no symptoms at all, and usually back to baseline within one to two weeks.
A lasting reduction in kidney function	Uncommon, and mostly limited to people who already had significant kidney disease before the procedure.
Needing dialysis	Rare after a planned procedure with a proper prevention plan. The risk is higher in emergency situations, where there is less time to prepare.
Fluid overload from the IV fluids	A real consideration if you have heart failure. Watch for new shortness of breath or swelling, and tell the team so they can adjust the rate.
An allergic-type reaction to the contrast	A separate issue from the kidneys. Usually mild, such as itching or hives. Tell us if you have ever reacted to contrast before, since we can pre-treat.
Metformin building up while kidney function is reduced	The reason metformin may be held. Uncommon, and avoided by the hold-and-recheck plan.

Weighing the Test Against the Risk

- The question is never whether contrast carries risk. It is whether that risk is larger than the risk of not knowing.
- A significant blockage that goes undetected carries a far greater risk than a temporary rise in creatinine.
- For people with normal kidney function, this is not a close call.
- For people with significantly reduced kidney function, it is a real discussion, and one worth having openly with your cardiologist.
- Alternatives exist. A stress test avoids dye but shows blood flow rather than the arteries themselves.
- If you are worried, say so before the procedure rather than after. There is usually more that can be planned than people realize.

Points to Know

If you remember nothing else, remember these key points.

- For most people with normal kidney function, the risk from contrast is very low.
- IV fluids are the main protection. That is the intervention with real evidence behind it.
- N-acetylcysteine and bicarbonate drips were tested in 5,177 patients and did not work. They are no longer routine care.
- Tell us about any scan with dye in the past few weeks.
- Bring a complete medicine list. Water pills and anti-inflammatories matter here.
- If you take metformin, expect a short hold afterwards, and ask when to restart.
- A kidney effect causes no symptoms. If you were higher risk, keep the follow-up blood test.
- Refusing a needed heart test to protect your kidneys is usually the riskier choice.

When to Call Us - and When to Call 911

If you are not sure, call. We would rather hear from you twice than miss a real problem.

- Passing much less urine than usual in the day or two after. Call us right away.
- New or worsening shortness of breath, or new swelling in the legs. Call us right away, since this can mean too much fluid.
- Hives, itching, wheezing, or facial swelling after the procedure. Call 911 if breathing is affected.
- Nausea, vomiting, confusion, or unusual drowsiness in the days after. Call us the same day.
- Feeling generally unwell with muscle aches while back on metformin, before your kidney number was rechecked. Call us the same day.
- If you are unsure whether to restart a medicine that was held. Call us rather than guessing.
- If you miss your follow-up blood test. Call us to reschedule it.
- Chest pain, severe breathlessness, or fainting. Call 911.

Office: (727) 943-5200

Trusted Resources

The links below are the trusted resources Dr. Ali used to write this guide and that he recommends you visit for more information. Each is a clickable link in the digital version and a Short.io tracked URL on the printed version.

- National Kidney Foundation — Estimated Glomerular Filtration Rate (eGFR) - What your kidney number means and how to follow it.
- MedlinePlus (NIH) — Contrast Dye - Plain-language explanation of what contrast is and how it is used.
- Cleveland Clinic — Cardiac Catheterization - What happens during the procedure where most cardiac contrast is given.
- SCAI — Preventing Contrast-Related Kidney Injury - The interventional cardiology society's guidance on minimizing risk.

Sources Used to Build This Guide

Every recommendation in this guide is grounded in one or more of the studies, guidelines, or trusted resources below. Short links are tracked so Dr. Ali can see which references patients are reading; nothing personally identifying is captured.

- PRESERVE trial — Weisbord SD et al., Outcomes after Angiography with Sodium Bicarbonate and Acetylcysteine, N Engl J Med 2018 *[Primary Trial]*
  The 5,177-patient randomized trial that found no benefit from sodium bicarbonate over saline, and none from N-acetylcysteine over placebo, for kidney injury or 90-day death/dialysis/sustained creatinine rise. This is why the guide says those two treatments are no longer used.
- PRESERVE: The End or the Beginning of a New Era in Prevention of Contrast-Associated Acute Kidney Injury? — American Journal of Kidney Diseases *[Peer Reviewed]*
  Nephrology commentary interpreting PRESERVE and what remains standard, used for the plain-language summary of current practice.
- Contrast-associated acute kidney injury — BJA Education *[Peer Reviewed]*
  Source for the modern terminology (contrast-associated rather than contrast-induced), the risk-factor list, and the role of isotonic intravenous fluid.
- SCAI — Quality Initiatives for Prevention of Contrast-Induced Acute Kidney Injury *[Society]*
  Interventional cardiology society guidance on minimizing contrast volume and hydrating around cardiac catheterization.
- NICE guidance summary — Acute kidney injury: adults receiving iodine-based contrast media *[Guideline]*
  Guideline framing for who should be assessed before contrast and what monitoring follows.
- National Kidney Foundation — Estimated Glomerular Filtration Rate (eGFR) *[Patient Education]*
  Plain-language explanation of the kidney number patients are told before a procedure.
- MedlinePlus (NIH) — Contrast Dye *[Patient Education]*
  NIH plain-language description of what contrast dye is and how it is used in imaging.
- Cleveland Clinic — Cardiac Catheterization *[Patient Education]*
  Patient-facing context for the procedure in which most cardiology patients receive contrast.

About This Guide

Rias KS Ali, MD FACC | Board Certified in Interventional Cardiology & Cardiovascular Disease

4740 Mile Stretch Drive, Holiday FL 34690 | Office: (727) 943-5200 | Fax: (727) 943-5201 | RiasAliMD.com

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Reviewer note: Reviewed against the PRESERVE trial, SCAI quality guidance, NICE, and the Cleveland Clinic and National Kidney Foundation patient pages. Ours adds: a cover that names the two prevention treatments that were tested and dropped, a before-during-after timeline, a risk ladder showing who actually needs extra care, and a straight answer on metformin.

Disclaimer

This guide is for educational purposes only and does not replace medical advice from your physician. Recommendations may not apply to every patient. Always follow the specific instructions of Dr. Ali and your care team. In an emergency call 911 or go to the nearest emergency department.

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