

Contrast Induced – Acute Kidney Injury (CI-AKI) (Formerly known as contrast induced Nephropathy (CIN))

*For MRI Gadolinium Based Contrast Please see Policy 485.017

PURPOSE

To identify and direct prophylactic treatment of patients at high risk for contrast induced acute kidney injury (CI-AKI) that require administration of intravascular (IV) contrast for diagnostic testing.

SCOPE

This document applies to all patients with physician orders requiring the injection of iodinated contrast for diagnostic imaging (CT scan) or invasive procedures (IR).

DEFINITIONS

CI-AKI: Increase in serum creatinine ≥ 0.05 mg/dl or 25% increase of serum creatinine from baseline value at 48 hours post contrast material injection.

POLICY

CHARACTERISTICS OF CI-AKI: Serum creatinine typically starts rising 24-48 hours after exposure and peaks at 4-7 days. CI-AKI is usually reversible and returns to baseline within two weeks.

Patients at risk for acute kidney injury (AKI) and scheduled for diagnostic or invasive procedures requiring the use of IV contrast will have a serum creatinine measured and GFR or eGFR calculated prior to the procedure.

CI-AKI prophylaxis is based on GFR/eGFR and the urgency of the exam.

- A. Stable outpatients with any risk factors listed below in prevention screening: Within **30 days** prior to intravenous contrast administration.
 - a. Patient over 75
 - b. Congestive Heart Failure
 - c. History of kidney disease as an adult, kidney transplant or kidney surgery
 - d. History of Hypertension requiring Medical Therapy
 - e. History of Diabetes Mellitus
- B. Inpatients: Within **24 hours** of intravenous contrast administration.
- C. Providers not wanting hydration for patients based on urgency of the exam, with a GFR <30 will need to consult with the Radiologist.
- D. If initial study is inadequate and full amount of contrast was injected (e.g., scanner shut down, timing issue or additional scan requested after injection):
 - a. If eGFR is above 60, normal or assumed to be normal (creatinine not drawn due to lack of risk factors), repeat injection is permitted with total contrast load to not exceed 200cc.
 - b. If eGFR is below 60, it is at the Radiologists discretion whether to reinject and repeat the study.
- E. Metformin: In patients taking metformin who are known to have acute kidney injury or severe chronic kidney disease (stage 4 and stage 5; i.e., eGFR <30), metformin should be temporarily discontinued at the time of or prior to the procedure and withheld for 48 hours subsequent to the procedure and reinstated only after renal function has been re-evaluated and found to be normal.

EMERGENCY ROOM CI-AKI PREVENTION SCREENING

Trauma patients: IV fluid resuscitation as indicated. DO NOT DELAY CT WITH CONTRAST FOR PROPHYLAXIS.

***ED and Radiology have a predetermined protocol where the ED have all rights to determine the need for prophylaxis. ED provider will determine the need of hydration as they deem medically appropriate.

When the medical benefit of the exam outweighs the risk of CI-AKI, the procedure may be performed without knowledge of serum creatinine or eGFR. If possible, these patients should receive prophylaxis hydration if they have known risk factors for renal insufficiency. The following criteria will be used to determine the need for renal function screening. **Patients at risk for renal insufficiency that are scheduled for diagnostic or invasive procedures requiring use of iodinated IV contrast to have eGFR in EPIC PRIOR to the procedure.** Please review chart for recommendations.

Appendix 1:

<u>Kidney Disease Stage</u>	<u>eGFR</u>	<u>Recommendations (see additional Information below)</u>	<u>Responsible Provider</u>	<u>Hydration Pre-Recommendation</u>	<u>Hydration Post-Recommendation</u>
Stage 1 or 2	>60	No pre-treatment needed			
Stage 3a	45-59	Reduce dose to 75cc oral hydration pre and post encouraged if diet allows		Encourage 1L (4-6 glasses of water) PO within 24 hr	Encourage 1L (4-6 glasses of water) PO within 24 hr
Stage 3b	30-44	Oral and/or IV pre-treatment are encouraged Reduce dose to 75cc.	It is the responsibility of the ordering provider to order and determine pre and post hydration needs of the patient. Radiology, in collaboration with nephrology have provided recommendations based on ACR and ASN guidelines however, the ordering provider may adjust the hydration orders to suit individual patients needs. Nephrology consults available if needed (call 616-752-6510)	Pre-procedure: Consider 250ml bolus 0.9% sodium chloride prior to study	Post-procedure: Consider 250ml bolus 0.9% sodium chloride post study
Stage 4	<30 (and not on dialysis)	The GFR is <30 but >15 and the use of iodinated contrast is necessary with the benefit outweighing the risk of the iodinated contrast administration.	Informed consent with patient must be with the ordering provider and documentation must be noted in the patient chart. Hydration pre- and post will be ordered by the ordering provider. Nephrology consults available if needed (call 616-752-6510).	Discussion and approval from Radiologist	Discussion and approval from Radiologist
Stage 5	<15 (not on dialysis)	Consult with nephrology and documentation in the patient chart required	The ordering provider will need to consult with nephrology and if determined necessary will do informed consent with the patient and determine post iodinated contrast follow-up needs.	Discussion and approval from Nephrology and Radiologist	Discussion and approval from Nephrology and Radiologist

End Stage Renal Disease	<15 (on dialysis)	Prophylaxis is not indicated for patients on chronic dialysis. Patients with renal insufficiency who require only intermittent or occasional dialysis are at substantial risk with further permanent worsening of their renal function. Patients undergoing dialysis who make more than 1-2 cups of urine/day (100mL) should be considered non-anuric and treated as high-risk patients similar to patients with AKI or eGFR less than 30mL/min/1.73m ² who are not undergoing hemodialysis (stage 4 and stage 5). Reduced dose of 75cc.			
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IODINATED CONTRAST USE:

1. Minimize total amount of iodinated contrast media by avoiding unnecessary angiographic imaging (CT scan, Interventional, Heart and Vascular Procedures).
2. Patients with eGFR less than 45 are considered at risk for CI-AKI. Hydration should be encouraged for all patients without medical contraindication. **Refer to Appendix 1.**
3. The guidelines recommended in Appendix 1 may be modified to suit individual patient needs. Oral hydration is suggested for eGFR 45-59, and IV hydration recommended for eGFR 15-44 unless contraindicated. Discussion of alternative imaging strategies with a nephrologist is encouraged for all patients at risk of CI-AKI. Nephrology can be reached at 616-752-6510.

Please see order form for IV hydration in appendix 3.



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Grand Rapids, MI 49503
Ph. 616-685-6200

FAX

To: _____ **From:** _____

Fax: _____ **Pages:** _____

Phone: _____ **Date:** _____

Re: _____ **CC:** _____

Urgent **For Review** **Please Comment** **Please Reply** **Please Recycle**

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Attn: Referral Scheduler:

The patient below is scheduled at Trinity Health Grand Rapids for a CT or PET-CT procedure with contrast.

_____ We have not received a current/recent Creatinine (within last 30 days) on this patient. Creatinine on file (> 30 days) indicates they may need Hydration Pre and Post Procedure. Please send patient to lab for creatinine level.

_____ Based on their recent creatinine level (within last 30 days) & calculated GFR/eGFR we are recommending Hydration Pre and Post Procedure. See suggested hydration recommendations page 2.

To schedule CT with hydration, please call Trinity Health Grand Rapids Centralized Scheduling 616-685-4000, press 1, option 3 for Radiology.

Fax a recent H&P (last 30 days) and the Hydration order to Centralized Scheduling 616-685-3038.

Please notify your patient of this change.

Patient Name: _____ **DOB:** _____

Scheduled CT Date: _____ **Time:** _____



Radiology in collaboration with Nephrology suggest the following orders for hydration. The ordering provider may determine there are different hydration needs based on patient assessment. If no specific orders are placed the patient will receive hydration with 250ml 0.9% NaCl, 250ml over 1-hour prior to study and 250ml over 1-hour post injection.

Patient's Name: _____ D.O.B. _____

1. Consider alternatives such as Non-contrast CT, MRI, Ultrasound, or Nuclear Med
2. For Inpatients, the care set is listed under "Contrast Nephropathy Prophylaxis" in EPIC.
3. For Outpatients, a current (within 30 days) History and Physical is required.

Outpatient Hydration order form: Please select the recommended hydration orders or individualized hydration pre and post procedure.

Recommendation:

For CT/PET scan patients with GFR/eGFR 30-44:

Hydrate with 250ml 0.9% NaCl IV over 1-hour prior to study and 250ml 0.9% NaCl IV over 1-hour post study

Hydration orders if not using recommendations (please indicate time below)

Hydrate with 0.9 NaCl 3mL/kg/hr infused over "X" hr. And 1.5 mL/kg/hr for "X" hours after contrast injection. We strongly encourage oral hydration (1L) pre-procedure and oral hydration post-procedure for 24 hours.

Pre-Hydration Hours:

- 1
- 2

Post-Procedure IV Hydration Hours:

- 3
- 4
- 5
- 6

Notes/Special Instructions: _____

Physician's Signature: _____

Physician's Printed Name: _____

Date: _____ Time: _____

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