

**TO:** CLINICAL PROVIDERS, RADIOLOGY AND PHARMACY STAFF

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**SUBJECT:** IV HYDRATION FOR CONTRAST RELATED AKI (CONTRAST INDUCED NEPHROPATHY) PREVENTION – EPIC ORDER SET

**DATE:** AUGUST 13TH, 2019

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**Situation:** There are no standard IV hydration ordering pathways in Epic for prevention of contrast related acute kidney injury (AKI) in high risk patients prior to receiving IV iodinated contrast for a CT scan.

**Background:** Volume expansion is thought to help reduce risk of contrast related AKI, especially in high risk patients and has been mentioned as treatment option by two different guidelines, the American College of Radiology Manual on Contrast Media and the Kidney Disease Improving Global Outcomes Clinical Practice Guidelines for Acute Kidney Injury. Isotonic IV fluids are preferred, such as sodium chloride 0.9%. While the volume and the IV rate have ranged in clinical trials, many of the trials suggest IV hydration should be started at least one hour before contrast exposure and continued for 3-6 hours after contrast media administration.<sup>1,2,3,4</sup> Of note, this policy deals specifically for minimizing potential risk of contrast related AKI prior to CT scan (not arterial contrast injection with angiography).

**Assessment:**

An order set/panel in Epic containing standard IV hydration for prevention of contrast related AKI prior to IV contrast is needed for a CT for both inpatients and outpatients (including ED) who are at high risk<sup>5-14</sup> based on available literature and key physician stakeholders input in Nephrology, Radiology, and Cardiology.

**Recommendations:** IV hydration for inpatients or outpatients with eGFR >30 mL/min/1.73m<sup>2</sup> is NOT routinely recommended prior to receiving IV iodinated contrast at doses given during CT scans<sup>5</sup> with exception of some cardiac patients that may be at higher risk. Currently, YNHH, Bridgeport Hospital and Greenwich Hospital Radiology Departments have capability to offer hydration between 9am-3pm Monday-Friday for out-patients that qualify. An in-patient order set has also been created with a provider notification of availability if the patient's eGFR is <30 and a CT scan with IV contrast is ordered. The inpatient recommendations assume no significant aortic stenosis or diminished ejection fraction. The recommendations below should NEVER supersede clinical judgment on the amount of IV volume a patient can handle.

- **Inpatients:** eGFR ≤30 mL/min/1.73m<sup>2</sup>: Sodium chloride 0.9% IV at 3 mL/kg/hr for 1 hr before IV contrast and 1 mL/kg/hr for 6 hours post IV contrast, BASED ON ACTUAL BODY WEIGHT
- **ED patients without history of CHF/Severe Aortic Stenosis:** eGFR ≤30 mL/min/1.73m<sup>2</sup>: Sodium chloride 0.9% IV at 3 mL/kg/hr for 1 hour before IV contrast and 3 mL/kg/hr for 1 hour post IV contrast. BASED ON ACTUAL BODY WEIGHT
- **ED patients with history CHF/Severe Aortic Stenosis:** eGFR ≤30 mL/min/1.73m<sup>2</sup>: Sodium chloride 0.9% IV at 3 mL/kg for 1 hour before IV contrast and 3 mL/kg/hr for 1 hour post IV contrast, BASED ON IDEAL BODY WEIGHT
- **Outpatients without history of CHF/Severe Aortic Stenosis:** eGFR ≤30 mL/min/1.73m<sup>2</sup>: Sodium chloride 0.9% IV at 3 mL/kg/hr for 1 hour before IV contrast and 3 mL/kg/hr for 1 hour post IV contrast. BASED ON ACTUAL BODY WEIGHT
- **Outpatients with history CHF/Severe Aortic Stenosis:**

- eGFR  $\leq$ 30 mL/min/1.73m<sup>2</sup>: Sodium chloride 0.9% IV at 3 mL/kg for 1 hour before IV contrast and 3 mL/kg/hr for 1 hour post IV contrast, BASED ON IDEAL BODY WEIGHT
- eGFR between 30-45 mL/min/1.73m<sup>2</sup>: Sodium chloride 0.9% IV at 3 mL/kg/hr for 1 hour before IV contrast only, BASED ON IDEAL BODY WEIGHT

## Out-patient order screen shots

New question added to all CT scan with IV contrast orders for OUT-PATIENTS

CT Chest w IV Contrast ✓ Accept ✗ Cancel

Status:

Expected Date:          Approx.

Expires:

Priority:

Class:

Reason for Exam:

Permission to access/deaccess patient's port per Radiology Protocol?

Does this patient have eGFR < 30 or eGFR of 31- 45 with history of CHF or Aortic Stenosis? Click Yes button if you want to order the optional outpatient IV hydration order set available for these patients (offered at Greenwich, Bridgeport and Yale Only)

Sched Inst:

Comments:

[Show Additional Order Details](#)

BPA that will launch after signing CT scan order if “Yes” button is clicked requesting IV hydration. Three order panels are available for OUT-PATIENTS with guidelines on which to use and ability to cancel BPA if clinician decided not to order any hydration after reviewing available order sets.

BestPractice Advisory - Zzzcardiant, Lauriefive

Important (1)

IV hydration to prevent kidney injury

Please click **ORDER** button on one of the order sets listed below based on your patient's eGFR and cardiac history then click **ACCEPT** button to place order.

Hydration is NOT usually indicated for patients on dialysis.

If you do not want to place an order for IV hydration please click **Cancel- No IV hydration needed** button and then click **ACCEPT** button.

Last EGFRAFRAMER: Not on file  
 Last EGFRNONAFRAM: Not on file

Order	Do Not Order	PATIENTS WITHOUT A HISTORY OF CHF/AORTIC STENOSIS WITH EGFR < OR EQUAL TO 30
Order	Do Not Order	PATIENTS WITH A HISTORY OF CHF/AORTIC STENOSIS WITH EGFR < OR EQUAL TO 30
Order	Do Not Order	PATIENTS WITH A HISTORY OF CHF/AORTIC STENOSIS WITH EGFR BETWEEN 31 TO 45

ⓧ Acknowledge Reason

✓ Accept Cancel

## In-patient order screen shots

Screen shot of BPA that will fire for in-patients if eGFR (within 48 hours) is under 30 and CT scan with contrast ordered. This will allow clinician to launch order set if hydration is desired.

The screenshot shows a clinical decision support system interface. On the left, a 'BestPractice Advisory - Zzzwillow, Hydrationone' is displayed. The advisory title is circled with a '2'. The text reads: 'IV hydration to prevent kidney injury', 'Based on recent eGFR, your patient may benefit from IV hydration before and after their contrast enhanced CT.', 'Hydration is NOT usually indicated for patients on dialysis.', and 'Last EGFRFRAMER: Not on file. Last EGFRNONAFRAM, Collected: 7/8/2019 9:27 AM = 29 mL/min/1.73m2'. At the bottom of the advisory, there are buttons for 'Open Order Set' (circled with a '3'), 'Do Not Open', and 'IV Hydration for Contrast Induced Nephropathy Prevention Preview'. There are also 'Accept' and 'Cancel' buttons. On the right, the 'Orders' tab is active, showing a search for 'img202' and a 'New Orders' section. A red box highlights the 'New Orders' section, which contains a circled '1' and a red alert icon next to the order: 'CT Chest w IV Contrast Routine, 1 TIME IMAGING, First occurrence today at 1052'.

In-patient order set for fluids is one hour prior and six hours after CT scan with contrast. This should only be used in patients that can tolerate IV fluids.

The screenshot shows the 'Order Sets' page for 'IV Hydration for Contrast Induced Nephropathy Prevention'. The page includes a 'Clear All Orders' button. Below the title, there is a red warning: 'IV hydration for inpatients or outpatients with eGFR >30 mL/min/1.73m2 is not routinely recommended prior to receiving IV iodinated contrast at doses given during CT scans.' Under the 'INPATIENT' section, there are two order sets. The first is 'sodium chloride 0.9% IV for prehydration (contrast induced nephropathy)' with a circled '3' next to the 'CT Hydration, Sign & Hold' button. The second is 'sodium chloride 0.9% IV post-hydration (for contrast induced nephropathy)' with a circled '4' next to the 'CT Hydration, Sign & Hold' button.

ED patients will also have the 2 order sets available for patients with eGFR under 30.

Orders

Order Sets

IV Hydration for Contrast Induced Nephropathy Prevention [Personalize](#) [^](#)

IV hydration for inpatients or outpatients with eGFR >30 mL/min/1.73m<sup>2</sup> is not routinely recommended prior to receiving IV iodinated contrast at doses given during CT scans.

▼ INPATIENT

▼ EMERGENCY DEPARTMENT

Patients without a History of CHF/Aortic Stenosis with eGFR <= 30

Patients WITH a History of CHF/Aortic Stenosis with eGFR < OR EQUAL TO 30

CT technologists will receive this notification when scheduling exam for in-patients. This will allow for communication between CT department and nursing to properly time hydration in relation to scheduled time for CT scan. Schedulers will receive this notification when scheduling exam for out-patients.

Ancillary Orders

⚠ IV hydration has been ordered prior to this patient's CT scan w IV contrast. Inpatients: CT Techs will contact floor nurse to provide scheduled time of CT scan so IV hydration can be timed properly. Outpatients: CT should be scheduled Monday - Friday 9am - 3pm at Bridgeport Hospital, Greenwich Hospital or Yale New Haven Hospital (YSC or SRC only, SRC Preferred)

1

Continue Cancel

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