

IV CONTRAST SHORTAGE GUIDELINES

The global shortage in iodinated contrast media has had a tremendous impact on the delivery of health care in the United States and will continue to challenge health care providers as production and inventory seek to meet demand. Current estimates report a reduction in supplies over the next 6 – 8 weeks.

Iodinated contrast media is used in many advanced imaging procedures impacting the diagnostic potential and, at times, the interventional approach to patient care. Limited supplies will burden all fields of medicine with significant impact on the assessment of patients with critical illness and potentially life-threatening conditions that typically require iodinated contrast media enhanced imaging.

The emergency department serves an undifferentiated patient population spanning the entire spectrum of medical illness and traumatic injury with a high utilization of iodinated contrast media enhanced imaging.

To ensure that the most critically ill patients with a high clinical suspicion of a life-threatening condition receive a clinically indicated iodinated contrast media enhanced study, restrictions are necessary, and rationing has become mandatory. Prioritization of patients with acute traumatic injury and critical neurologic, cardiac, and vascular conditions will require providers to emphasize the critical assessment of a patient's presentation and probability of disease. Additionally, health care providers will be required to evaluate alternative strategies to aid in diagnosis and therapeutic intervention. Without rationing and restriction, iodinated contrast media supplies will be depleted, and no enhanced studies will be performed. We advocate rationing to maintain iodinated contrast media for the most critical and life-threatening patient assessments until production and inventory return.

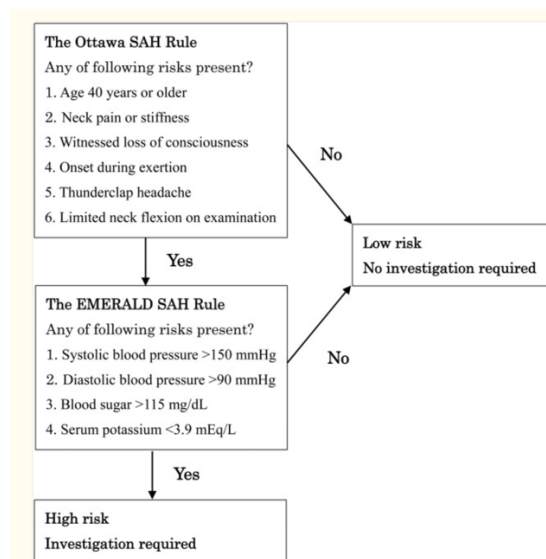
We have groups four areas of critical relevance to the practice of emergency medicine: acute trauma, neurologic, and cardiopulmonary conditions and have discussed the impact and risk associated with alternative strategies in the less likely to be life-threatening areas including intraabdominal and infectious conditions.

TRAUMA:

- Non-contrasted studies vs. contrasted studies based on severity and likelihood of injury with non-contrasted studies for lower acuity patients.
- Implementation of lower-dose, weight-based contrast administration for patients requiring contrast enhanced studies.
- Limited use of certain studies (CTA neck) without clinical indication.
- Reliance on outside hospital studies to reduce repeat imaging for outside hospital transfers
- Alternative imaging strategies (ultrasound) and diagnostic assessments (ABIs) coupled with consultation and non-contrasted studies to decrease contrast utilization.

NEUROLOGIC:

- Code Stroke activation:
 - Non-contrasted CT head followed by decision to proceed to CTA.
 - Risk assessment and discussion between ED and neurology attendings.
 - Contrast will be limited to situations where the study would direct further treatment options (e.g. thrombolytics or thrombectomy).
 - Increased use of MRI for further evaluation.
- Subarachnoid hemorrhage (SAH).
 - Headache (HA) is common (2% all ED visits). 1-3% will be due to SAH.
 - Pre-test probability
 - Ottawa Subarachnoid Hemorrhage (SAH) Rule for Headache Evaluation
 - <https://www.mdcalc.com/ottawa-subarachnoid-hemorrhage-sah-rule-headache-evaluation#evidence>
 - Please note many limitations with important exclusion criteria.
 - EMERALD SAH Rule:
 - [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5020742/#:~:text=Our%20new%20rule%20\(namely%2C%20the,\(3.90%20mmol%2FL\).](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5020742/#:~:text=Our%20new%20rule%20(namely%2C%20the,(3.90%20mmol%2FL).)
 - *"In conclusion, despite the necessity of blood testing, our EMERALD SAH Rule shows higher specificity than the previous Ottawa SAH Rule while maintaining equal sensitivity."*



- Non-contrasted CT head: very sensitive when performed soon after HA onset.
 - < 6 hours ~ 100% sensitivity
 - 6-12 hours 98% sensitivity
 - 12-24 hours 93% sensitivity
 - 24 hours – 5 days <60% sensitivity
- Lumbar puncture
 - Opening pressure > 20 in 60% of patients

- Elevated RBC count
 - Tube 1 vs. Tube 4
 - Decreasing RBCs can occur in SAH only reliable if RBC in tube 4 is normal
 - Traumatic tap suspected
 - Tube 4 RBC count < 500 has NPV of 100% for SAH.
- Xanthochromia
 - Takes ~ 2 hours to develop after hemorrhage
 - Beware false negatives if measured early)
 - Sensitivity 93%, Specificity 95%
 - *Highest after 12 hours

VASCULAR:

- Prioritization of contrast use will be for assessment of aneurysm with concern for acute rupture or dissection.
- For the initial evaluation of peripheral vascular disease and critical limb ischemia consider using alternative studies such as obtaining *bedside ABI* measurements and *arterial ultrasound studies*. If high suspicion for critical limb ischemia, early consultation with Vascular Surgery can help guide further evaluation and imaging techniques.
- **Limit contrast to situations where the study will dictate urgent intervention.**
 - CTA with run-off for peripheral vascular disease, acute arterial occlusion
 - Arterial U/S and ABI
 - Consultation with Vascular Surgery and initiation of heparin drip(if no contraindications)
- If you have low to moderate suspicion of necrotizing soft tissue infection consider use of plain film radiography or non-contrasted CT to aid in diagnosis. Plain films, while not very sensitive for the diagnosis, may reveal gas in the soft tissue which is very specific. Contrasted CT is well accepted as the early imaging modality of choice when concerned for necrotizing infection, and even non-contrasted scans can aid in the diagnosis. MRI is a gold standard study and is very sensitive for the diagnosis however may not always be feasible.
- If you have high clinical suspicion for necrotizing infection, early engagement of surgical teams can help expedite care and assist with any imaging modality decisions.

CARDIOPULMONARY:

- CTA chest for PTE
 - Pre-test probability
 - PERC
 - Well's
 - Chest radiograph
 - V/Q scan
 - Impact of chest radiographs
 - Normal vs. abnormal
 - Consistent with clinical presentation

- Discussion with radiology
 - CXR: PA and lateral
 - D-dimer
 - Age-adjusted
 - Risk-adjusted
 - PERT team consultation
 - Bedside echocardiogram
 - The hemodynamically unstable patient
- Dual energy CT scanner: if a contrasted study is indicated, a lower contrast dose will be given and the study done on a dual energy scanner for better resolution.
 - HED patients will need to be sent to Main for this
 - GFED has a dual energy scanner.

The impact on other services and assessments.

Acute Care Surgery:

- Non-contrasted studies
- Alternative strategies and imaging modalities
- Early consultation: radiology and surgery

In all situations where IV contrast is ordered for radiology studies, please discuss with the Radiology Attending (4-1450, available 24/7) for the best option for each patient.