

MH IV Contrast Conservation Guidance – Click TOC Item to Follow

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General – Updated 5.12.22

- Reduce IV contrast load on body CTs by 25%
- Reduce IV contrast load on CT angiography (EXCEPT FOR RUN OFFS) by 20%
- All chest cts aside from angiograms/pulmonary arteriograms should generally be Non Contrast
 - **Excluding pediatrics**
- No IV Contrast for pyelonephritis; use non-contrast or ultrasound
- No IV Contrast for trip and/or fall trauma unless free fluid seen or patient is high risk and/or clinically unstable
- Curtail all elective CTs as best as able

Pharmacy – Updated 5.12.22

- Allowing for split dosing of single use product presentations w/in automated contrast system as long as done w/in 4 hours and vial is only punctured once.
- Allowing for repackaging of contrast under clean room environment but limiting beyond use dating at this time of 8 hours for bulk packaging and 4 hours for single use packaging (i.e. seeing this as useful option for pain clinic uses)

Guidance for Conservation of Iodinated Contrast Agents as it Relates to Acute Stroke – Updated 5.6.22

Recommendations: The following priorities should help structure acute decision making regarding the use of CT angiography in acute stroke.

Priority 1 Patients: Patients presenting with sudden onset neurological deficits that are suggestive of a large vessel occlusion with a time last known well of 24 hours require a CTA to be done emergently.

- **Symptoms that localize to the MCA:** Contralateral hemiparesis +/- hemianesthesia, eye deviation away from hemiparesis, aphasia, neglect
- **Symptoms that localize to the ACA:** Contralateral leg weakness +/- proximal arm weakness +/- sensory deficits

Contact Moriah Folsom for updates or corrections. Edited: 5/13/22

- **Symptoms that localize to the posterior circulation:** Sudden onset depressed level of consciousness or coma, quadriplegia or hemiplegia, cranial nerve deficits (diplopia, dysarthria, dysphagia), nystagmus, vertigo, N/V, ataxia (DDx peripheral vertigo), visual field cut

Priority 2 patients: Patients with sudden onset focal neurological deficits that could be due to a large vessel occlusion but lack the features of priority 1 patients should undergo CTA unless there is a critical shortage of contrast.

Patients who should NOT undergo CTA emergently. Consider non-urgent MRI/MRA if stroke is considered likely after initial evaluation:

- **Patients with non-disabling symptoms:**
 - Isolated sensory loss or paresthesias, mild dysarthria or isolated facial palsy, mild weakness of a limb that does not impair hand function or gait, mild aphasia that does not impair a patient's ability to effectively communicate, speech that is slow or stuttering, but otherwise intact (no dysarthria, no aphasia)
- **Patients with non-localizing symptoms:**
 - Non-specific dizziness/lightheadedness, isolated headache that is not a thunderclap headache, confusion/disorientation without any localizing signs, bilateral numbness, isolated dysarthria
 - NOTE: Non-localizing symptoms *could be* due to a stroke, especially if accompanied by other localizing signs/symptoms of stroke, are acute in onset, are in a patient with significant vascular risk factors. A complete neurological examination is required to assess for objective findings of neurological deficits.
- **Patients transferred from outside hospitals** who have had prior CTA that is available in Impax should not have repeat CTAs on arrival to MMC, rather should only have CT perfusion studies.
- If the initial head CT shows **hemorrhage**, a CTA should not automatically follow. Images should be rapidly reviewed by Neurology and Radiology:
 - **Indications for URGENT vascular imaging in the setting of intracranial hemorrhage** AND medical futility is not suspected based on extent of hemorrhage on head CT: Subarachnoid hemorrhage, primary intraventricular hemorrhage, parenchymal hematoma immediately adjacent to large vessels, suspected or known history of infective endocarditis, age ≤ 50
 - Radiographic abnormalities suspicion for underlying vascular malformation or central venous thrombosis

Cardiovascular Service Line – Updated 5.10.22

Conservation:

- Avoid opening contrast for routine vascular
- Cath: Eliminate ventriculograms unless highly indicated (STEMI)
- EP: Eliminated CT for pulmonary vein anatomy
- EP: limit contrast for Bi-V and ablation cases

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- Dilute contrast

Active triage

- Thoracic Aneurysm, AAA
- TAVR urgent cases only
 - Diagnostic cath-delay low risk
- Delay CTO cases

Alternative Modality Use

- Switch optiray for Conray or CO2 in vascular hybrid
- AAA- use ultrasound
- Thoracic aneurysms-when feasible non-contrast CT for surveillance
- CTA coronary-substitute nuclear cardiac stress or cardiac cath

Local vs MMC Cath: Triage tool – UNITE

- GRACE 2 (30 day CV mortality): High Risk ≥ 145
- Additional clinical risk factors:
 - Hemodynamic instability or cardiogenic shock
 - Recurrent chest pain refractory to Med Rx
 - Recurrent dynamic ST changes particularly with intermittent ST elev
 - Life-threatening arrhythmia or cardiac arrest
 - Mechanical complications of MI
 - Acute CHF
 - High pretest probability of requiring PCI (clinical story, ECG, trop, Previous Dz, recent functional study)

Contrast Preservation in the Work-Up of PE – Updated 5.13.22

Once a patient is deemed low risk for PE (by using clinical gestalt, Well's criteria, etc) providers must use PERC criteria to determine the need to order a D-Dimer.

If the patient PERCs positive, then order a D-Dimer and use YEARS criteria to guide further testing. YEARS uses D Dimer cutoffs as opposed to a low, fixed upper limit of normal. (If no YEARS criteria are present, use an upper limit of normal of ≥ 1000 . If any YEARS criteria are present, use ≥ 500 .)

Other mitigation methods could include:

- Use of Ultrasound for DVT to rule in the diagnosis of PE if positive. CTA could then be avoided if the patient is low risk and hemodynamically stable.
- (Use of V/Q in low risk patients with normal CXRs could be considered, however, there is also a shortage of xenon and not all LHS have access to nuclear medicine.)
 - This approach is challenged by limited access to US and V/Q across the system. It would frequently require empiric anticoagulation pending the test.

Note that this approach (the use of empiric anticoagulation and a delayed alternative study) would be best suited for stable, low risk patients. Further, it should be understood that some patients (patients that will need admission regardless of the result) that are empirically anticoagulated and awaiting delayed testing, may need to be admitted with testing pending to avoid ED boarding.

<https://www.acep.org/globalassets/new-pdfs/clinical-policies/clinical.policy.suspected.acute.venous.thromboembolic.disease.pdf>

<https://www.mdcalc.com/perc-rule-pulmonary-embolism>

<https://www.mdcalc.com/years-algorithm-pulmonary-embolism-pe>

Pulmonary embolism rule-out criteria (PERC)

Used to exclude PE in patients known to have a low pre-test probability (< 15%)

Criteria
Age \geq 50
Heart rate \geq 100
Oxygen saturations \leq 94%
Previous DVT or PE
Recent surgery or trauma in the past 4 weeks
Haemoptysis
Unilateral leg swelling
Oestrogen use (e.g. HRT, contraceptives)

If **all** of the above are absent the post-test probability of PE is < 2%

PassMedicine

PE continued on next page...

TABLE 1

The YEARS algorithm: diagnostic procedure in the event of suspicion of PE (9)

YEARS criteria:

- Clinical signs of DVT
- Hemoptysis
- PE most likely diagnosis (treating physician's judgment)

No criteria fulfilled		≥ 1 criteria fulfilled	
D-dimers <1000 ng/mL	D-dimers >1000 ng/mL	D-dimers <500 ng/mL	D-dimers >500 ng/mL
PE excluded	CTPA	PE excluded	CTPA

CTPA, Computer tomography pulmonary angiography; DVT, deep vein thrombosis; PE, pulmonary embolism

Vascular Surgery OR/Cath Protocol Guidance for Contrast Conservation – Updated 5.13.22:

OR supply and decision for transition:

- Currently, we have 110 vials of Omnipaque, which equates to just over two weeks supply.
 - When the Omnipaque runs out, we will convert to Conray 60%.

Our surgeons are all aware of this and we will:

- Postpone angiogram procedures for elective conditions (this is quite rare currently anyway)
- Give clear expectations at OR briefing of contrast needs to only open what is likely to be used/needed. Our OR techs and nurses are involved in this.
- Consider CO₂ angiography when appropriate for patient condition/anatomy
- We already only use ½ strength for all studies but will use lower concentrations when feasible and with adjuncts (i.e. in insufflator)

Vascular Surgery Ambulatory Care Guidance for Contrast Conservation – Updated 5.13.22:

In order to keep patients on the same surveillance schedule, the following can be done. Please note, this excludes most 1 month follow-up CTAs after repair (those should generally proceed as close to scheduled as possible with contrast as ordered. If questions on those specific test needs, please ask the providers on case by case basis)

For **thoracic aneurysm/TEVAR** monitoring, we can get non-con CTs just to assess for growth. 1 months scans may be able to be done via NCCT with appropriate modifications in our surveillance protocols otherwise (i.e. down the line get a CTA).

For **EVAR** surveillance we can continue Duplex as scheduled. If a CTA was ordered in a long term surveillance patient please ask on a case by case basis whether a NCCT can be substituted. 1 months scans may be able to be done via NCCT or duplex with appropriate modifications in our surveillance protocols otherwise (i.e. down the line get a CTA)

For occlusive disease, in lieu of a **CTA A/P** with runoff we can use arterial duplex more liberally. On case by case basis for suspected aortoiliac disease could elect for diagnostic angiogram. An angiogram compared to CTA uses far less contrast overall and we could supplement with CO₂. We may be able to increase SMHC volume to 4 studies per day if they are likely to be diagnostic. This will have to be decided by the providers.

Oncology – Updated 5.10.22

<u>Tier Level</u>	<u>Description</u>	<u>Examples</u>
Tier 1	Evaluation for life-threatening signs/symptoms or for “time critical” emergent diagnoses	<ul style="list-style-type: none"> • Stroke • Trauma • R/o pulmonary embolus • Acute abdominal pain with peritoneal signs
Tier 2	Acute, higher-risk symptoms or to inform urgent/ acute treatment decisions	<ul style="list-style-type: none"> • Diagnostic test for cancer signs/symptoms (e.g., unexplained weight loss, hemoptysis, etc.) • Initial staging of a cancer diagnosis • Evaluation of interim response to cancer treatment <i>while on active treatment with measurable disease</i> or when future treatment decisions would be impacted by imaging results • Evaluation of palpable mass not appropriate for U/S or MR imaging • Acute abdominal pain without peritoneal signs
Tier 3	Imaging related to clinical trials/contract research	<ul style="list-style-type: none"> • If patient does not meet Tier #1 or #2 above <u>and</u> when imaging “with contrast” is explicitly required by research protocol
Tier 4	Chronic, lower-risk symptoms	<ul style="list-style-type: none"> • Evaluation of interim response to <i>adjuvant cancer treatment in patients without measurable disease</i> • Chronic abdominal pain
Tier 5	Chronic disease surveillance/follow-up	<ul style="list-style-type: none"> • Routine <i>cancer surveillance after conclusion of active treatment</i> (e.g., neck cancer surveillance)
Tier 6	Elective diagnostic or screening tests	<ul style="list-style-type: none"> • Surgical planning for a non-urgent/non-emergent surgery • Non-emergent coronary artery CT with contrast

MaineHealth

Links to Resources from the ACR Committee on Drugs and Contrast Media:

[Statement and Recommendations](#)

[ACR Contrast Manual](#)

[APPENDIX A: Contrast Media Specifications Table](#)

[ACR Appropriateness Criteria: Use AC Portal to search for alternative imaging studies for a given indication by clicking on the “Explore by scenario” icon.](#)

[CDC: Protect Patients Against Preventable Harm from Improper Use of Single-Dose/Single-Use Vials](#)

[ASHP: Considerations for Imaging Contrast Shortage Management and Conservation](#)

Regional Stakeholders

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