Management of Contrast Media Reactions - Adult

Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, call a “code” as appropriate for your area.

Note: Page 1 of this algorithm is intended for Providers; subsequent pages (2-8) are for both Providers and Nurses

**PREVIOUS HISTORY OF REACTIONS**

- Previous history of contrast allergy or high-risk1 of contrast allergy?
  - No → Continue with scheduled procedure
  - Yes → No IV contrast and consider non-contrast or other study if history of severe reaction or anaphylaxis reaction

- Previous anaphylactic or severe reaction to any contrast media?
  - Yes → Consider non-contrast study/alternate study or follow with management below as clinically indicated:
    - 13 hours prior to procedure, and 7 hours prior to procedure:
      - Prednisone2 50 mg PO or
      - Hydrocortisone2 50 mg IV
    - In addition give, 1 hour prior to procedure:
      - Prednisone2 50 mg PO or
      - Hydrocortisone2 50 mg IV and
      - Diphenhydramine 50 mg PO or 25 mg IV
  - No → If emergency procedure required and patient has previous history of mild to moderate reaction:
    - Consider non-contrast study/alternate study or
    - Hydrocortisone2 50 mg IV every 4 hours until procedure is completed and
    - Diphenhydramine 50 mg PO or 25 mg IV, 1 hour prior to procedure

- If allergy or contraindications to steroids or in an emergency, premedicate with diphenhydramine 50 mg PO or 25 mg IV, 30-60 minutes prior to procedure

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1 High risk factors include patients with previous anaphylactic reactions
2 Caution use of steroids in patients with uncontrolled hypertension, diabetes, tuberculosis, systemic fungal infections, peptic ulcer disease, neutropenic colitis or diverticulitis. If allergic, contact primary physician.

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Note: See Appendix A on Page 7 for Reaction Rebound Prevention

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Approved by the Executive Committee of the Medical Staff on 07/08/2019
Management of Contrast Media Reactions - Adult

**PRESENTING SYMPTOMS**

- Urticaria (hives), rash, itching, facial flushing
- Moderate-severe or widely disseminated

**TREATMENT**

- Stop infusion of contrast or hold procedure until improved
- Begin oral hydration of 500 mL water
- If moderate or progressing pruritus:
  - Diphenhydramine 25 mg IV push over 1 minute (may repeat within 5 minutes up to 50 mg total dose) or
  - Hydroxyzine 25 mg PO if allergic to diphenhydramine
- If severe/widely disseminated:
  - Monitor oxygen saturation (pulse oximeter), cardiac monitoring, and vital signs
  - Hydrocortisone 100 mg IV push over 1 minute, if no improvement in 5 minutes
  - Provider to place order for epinephrine (1 mg/mL) 0.5 mg IM for rash if no cardiac contraindications

**DISPOSITION**

- Continue monitoring and transfer to appropriate level of care
- Disposition per Radiology and Primary Care Team
- Document Allergy and enter safety event

- Yes
- No

**DISPOSITION**

- If patient symptoms resolved or stable within 5 minutes?
- Call MERIT Team if in Mays (ACB) or Main; call 911 for ROC or SCRB

**Mild**

- Notify Radiologist

**Note:** See Appendix A on Page 7 for Reaction Rebound Prevention

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1 For Categories of Acute Reactions to Contrast Media see Page 8
2 If patient on beta blockers, consult physician prior to use of epinephrine. Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.
Management of Contrast Media Reactions - Adult

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Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, call a “code” as appropriate for your area.

**PRESENTING SYMPTOMS**

- Hypotension with bradycardia (responsive patient)
  - Position patient in Trendelenburg position
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs
  - Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation ≥ 92%
  - Give sodium chloride 0.9% (NS) 1 L IV bolus to maintain appropriate blood pressure as clinically indicated

- Hypotension with tachycardia
  - Position patient in Trendelenburg position
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs
  - Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation ≥ 92%
  - Give sodium chloride 0.9% (NS) 1 L IV bolus to maintain appropriate blood pressure as clinically indicated

**TREATMENT**

Patient symptoms resolved or stable within 5 minutes?

- Yes
  - Continue monitoring and consider transfer to appropriate level of care

- No
  - Call MERIT Team if in ACB or Main; call 911 for ROC or SCRB
  - Call provider to place order for atropine 0.5 mg IV push over 1 minute for vasovagal reaction
  - Provider to evaluate need to repeat atropine every 5 minutes up to 0.04 mg/kg or 3 mg total dose
  - Continue monitoring vital signs
  - Provider to evaluate need for additional IV fluid bolus

**DISPOSITION**

- Document allergy and enter safety event
- Disposition per Radiology and Primary Care Team

If no improvement, call Code Blue Team 2-7099 and transfer to higher level of care

- Continue monitoring and consider transfer to appropriate level of care

If patient unresponsive at any point, call a “code” as appropriate for your area

- Call Code Blue Team 2-7099, and transfer to ICU

**Note:** See Appendix A on Page 7 for Reaction Rebound Prevention

1. Hypotension is defined as SBP < 90 mmHg or a drop in SBP > 20 mmHg from baseline
2. Bradycardia is defined as HR < 50 bpm
3. Use caution pushing fluids in patients with congestive heart failure to avoid fluid overload
4. Tachycardia is defined as HR > 100 bpm
5. If patient on beta blockers, consult physician prior to use of epinephrine. Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.

Approved by the Executive Committee of the Medical Staff on 07/08/2019

Department of Clinical Effectiveness V4
Management of Contrast Media Reactions - Adult

**Presenting Symptoms**
- Severe hypertension¹
  - Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation ≥ 92%
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs
  - Clonidine 0.2 mg PO for one dose
  - For pheochromocytoma, call Primary Care Team to order phentolamine (Regitine®) 5 mg IV for one dose. Contact Radiologist to order if unable to reach primary provider.
  - Notify Radiologist

- Facial/laryngeal edema (stridor)
  - Epinephrine² (1 mg/mL) 0.5 mg IM if no cardiac contraindications
  - Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation ≥ 92%
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs

**Treatment**
- Continue monitoring, notify DI Urgent Response Team and consider transfer to appropriate level of care
- Epinephrine ² (1 mg/mL) 0.5 mg IM if no cardiac contraindications
- Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation ≥ 92%
- Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs

**Disposition**
- Document allergy and enter safety event
- Disposition per Radiology and Primary Care Team

Yes: Provider to order racemic epinephrine³ (2.25% nebulized solution) 0.5 mL inhaled via nebulizer for one dose
- Consider transfer to appropriate level of care

No: Call Code Blue Team 2-7099 and call Radiologist to bedside

**Note:** See Appendix A on Page 7 for Reaction Rebound Prevention

¹Severe hypertension is defined as SBP ≥ 180 mmHg and/or DBP ≥ 120 mmHg
²If patient on beta blockers, consult physician prior to use of epinephrine. Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.
³Nebulized agent by respiratory therapy preferred over beta agonist inhalers such as albuterol, terbutaline, and metaproterenol

Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, call a “code” as appropriate for your area.
Management of Contrast Media Reactions - Adult

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Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, call a “code” as appropriate for your area.

**PRESENTING SYMPTOMS**

- Respiratory distress (responsive patient)
  - Secure airway, IV access and initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation ≥ 92%
  - Call MERIT and ICU teams
  - Epinephrine^1^ (1 mg/mL) 0.5 mg IM if no cardiac contraindications
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs

- Bronchospasm (wheezing) as determined by provider

**TREATMENT**

- Pulmonary edema as determined by provider
  - Provider to place order for furosemide 40 mg IV push over 2 minutes

  - If receiving beta blockers, call Radiologist to bedside
  - If not receiving beta blockers:
    - Albuterol (2.5 mg nebulized solution) 3 mL inhaled via nebulizer for one dose
    - Provider to determine need for epinephrine^1^ (1 mg/mL) 0.5 mg IM if no cardiac contraindications; may repeat once in 5 minutes if no improvement

  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs

- Patient symptoms improve within 5 minutes?
  - Yes
    - Verify the MERIT team was contacted
    - Continue monitoring and consider transfer to appropriate level of care
  - No
    - Call Code Blue Team 2-7099 as appropriate

- Patient symptoms improve within 5 minutes?
  - Yes
    - Call Code Blue Team 2-7099 and call Radiologist to bedside
  - No
    - Continue monitoring and provider to consider further doses of albuterol as needed
    - Consider transfer to appropriate level of care
    - Document allergy and enter safety event
    - Disposition per Radiology and Primary Care Team

^1^ Note to physician: If resistant to epinephrine, can use glucagon 1-5 mg IV (rapid administration of glucagon can cause GI upset - caution to maintain airway and prevent aspiration). If patient on beta blockers, consult physician prior to use of epinephrine. Administer epinephrine IM into the antero-lateral mid-third portion of the thigh; administration via IM route is preferred regardless of platelet count.

Note: See Appendix A on Page 7 for Reaction Rebound Prevention
Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, call a “code” as appropriate for your area.

**PRESENTING SYMPTOMS**

- Seizures/convulsions
  - Observe and protect patient
  - Turn patient on side to avoid aspiration; ensure suction available
  - Secure airway, IV access and initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation > 92%
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs
  - If seizure activity greater than 1-2 minutes, call provider to order lorazepam 4 mg IV slow push
  - If no IV access, call provider to order rectal diazepam gel 20 mg
  - Call MERIT or Code Blue Team 2-7099
  - Ensure STAT labs¹ are drawn

- Anxiety (panic attack)
  - Assess patient for developing signs and symptoms that may indicate another type of reaction
  - Place on cardiac monitoring [EKG, oxygen saturation (pulse oximetry), heart rate], and monitor vital signs
  - If no identifiable manifestations and normal oxygenation, consider this diagnosis

**TREATMENT**

- Patient symptoms improve within 5 minutes?
  - Yes
    - Continue monitoring and transfer to appropriate level of care
    - Disposition per Radiology and Primary Care Team
    - Document reaction and enter safety event
  - No
    - Call Primary Team
    - Call MERIT if clinically indicated

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¹ STAT labs: CBC, basic metabolic panel with ionized calcium, phosphorus, magnesium, and capillary blood glucose with or without venous blood gas (VBG)
Management of Contrast Media Reactions - Adult

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APPENDIX A: Reaction Rebound Prevention

<table>
<thead>
<tr>
<th>Drug</th>
<th>Recommended Dose</th>
<th>Daily Maximum dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocortisone (Solu-Cortef®)</td>
<td>50 mg IV; administer over 1 minute every 6 hours</td>
<td>200 mg per day</td>
</tr>
<tr>
<td>Methylprednisolone (Solu-Medrol®)</td>
<td>40 mg – 125 mg IV; administer over 1 minute every 6 hours</td>
<td>Maximum dose depends on severity of reaction</td>
</tr>
</tbody>
</table>

Note: While IV corticosteroids may help prevent a short-term recurrence of an allergic-like reaction, they are not useful in the acute treatment of any reaction. However, these may be considered for patients having severe allergic-like manifestations prior to transportation to an emergency department or inpatient unit.
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#### CATEGORIES OF ACUTE REACTIONS

**Mild Reactions**
Signs and symptoms appear self-limited without evidence of progression (e.g., limited urticaria with mild pruritis, transient nausea, one episode of emesis) and include:

<table>
<thead>
<tr>
<th>Allergic-like</th>
<th>Physiologic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited urticaria/pruritus</td>
<td>Limited nausea/vomiting</td>
</tr>
<tr>
<td>Limited cutaneous edema</td>
<td>Transient flushing/warmth/chills</td>
</tr>
<tr>
<td>Limited “itchy”/“scratchy” throat</td>
<td>Headache/dizziness/anxiety/ altered taste</td>
</tr>
<tr>
<td>Nasal congestion</td>
<td>Mild hypertension</td>
</tr>
<tr>
<td>Sneezing/conjunctivitis/rhinorrhea</td>
<td>Vasovagal reaction that resolves spontaneously</td>
</tr>
</tbody>
</table>

**Moderate Reactions**
Signs and symptoms are more pronounced. Some of these reactions have the potential to become severe if not treated and include:

<table>
<thead>
<tr>
<th>Allergic-like</th>
<th>Physiologic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse urticaria/pruritus</td>
<td>Protracted nausea/vomiting</td>
</tr>
<tr>
<td>Diffuse erythema, stable vital signs</td>
<td>Hypertensive urgency</td>
</tr>
<tr>
<td>Facial edema without dyspnea</td>
<td>Isolated chest pain</td>
</tr>
<tr>
<td>Throat tightness or hoarseness without dyspnea</td>
<td>Vasovagal reaction that requires and is responsive to treatment</td>
</tr>
<tr>
<td>Wheezing/bronchospasm without hypoxia</td>
<td></td>
</tr>
</tbody>
</table>

**Severe Reactions**
Signs and symptoms are often life-threatening and can result in permanent morbidity or death if not managed appropriately and severe reactions include:

<table>
<thead>
<tr>
<th>Allergic-like</th>
<th>Physiologic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse edema, or facial edema with dyspnea</td>
<td>Vasovagal reaction resistant to treatment</td>
</tr>
<tr>
<td>Diffuse erythema with hypotension</td>
<td>Arrhythmia</td>
</tr>
<tr>
<td>Laryngeal edema with stridor and/or hypoxia</td>
<td>Convulsions, seizures</td>
</tr>
<tr>
<td>Wheezing/bronchospasm with hypoxia</td>
<td>Hypertensive emergency</td>
</tr>
<tr>
<td>Anaphylactic shock (hypotension plus tachycardia)</td>
<td></td>
</tr>
</tbody>
</table>

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1 Cardiopulmonary arrest is a nonspecific end-stage result that can be caused by a variety of the following severe reactions, both allergic-like and physiologic; if it is unclear what etiology caused the cardiopulmonary arrest, it may be judicious to assume the reaction is/was an allergic-like one. Pulmonary edema is a rare severe reaction that can occur in patients with tenuous cardiac reserve (cardiogenic pulmonary edema) or in patients with normal cardiac function (noncardiogenic pulmonary edema). Noncardiogenic pulmonary edema can be allergic-like or physiologic; if the etiology is unclear, it may be judicious to assume that the reaction is/was an allergic-like one.
SUGGESTED READINGS


Management of Contrast Media Reactions - Adult

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This practice algorithm is based on majority expert opinion of the Contrast Media Reaction Work Group Faculty at the University of Texas MD Anderson Cancer Center. It was developed using a multidisciplinary approach that included input from the following:

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