Management of Contrast Media Reactions - Adult

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson's specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, in either the Main Building or in Mays Clinic, call the Code Blue Team at 713-792-7099. For all other buildings (other on-campus buildings, off-campus, and skybridges), dial 911 and call Radiologist to bedside.

**PREVIOUS HISTORY OF REACTIONS**

- **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
    - 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.
  - **No**
    - Continue with scheduled procedure

- **Previous history of contrast allergy or high-risk¹ of contrast allergy?**
  - **Yes**
  - Continue with scheduled procedure
  - **No**

**PROPHYLACTIC TREATMENT**

- No IV contrast and consider non-contrast or other study if history of severe reaction or anaphylaxis reaction

---

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.

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

Department of Clinical Effectiveness V3
Approved by The Executive Committee of the Medical Staff on 05/30/2017
Management of Contrast Media Reactions - Adult

Presenting Symptoms

Urticaria (hives), rash, itching, facial flushing

TREATMENT

Stop infusion of contrast or hold procedure until improved

Patient symptoms resolved or stable within 3-5 minutes?

Yes

Continue monitoring and transfer to appropriate level of care

No

Mild

Stop infusion of contrast or hold procedure until improved

Patient symptoms resolved or stable within 3-5 minutes?

Yes

Continue monitoring and transfer to appropriate level of care

No

Moderate-
Severe or widely disseminated

If moderate or progressing pruritus:
- Diphenhydramine 25 mg PO/IM/IV, (may repeat up to 50 mg total dose) or
- Hydroxyzine 25 mg PO/IM 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, give:
- Epinephrine (1:1,000) 0.5 mL subcutaneously if no cardiac contraindications

Patient symptoms improve within 3-5 minutes?

Yes

Continue monitoring and transfer to appropriate level of care

No

Call MERIT Team if in ACB or Main, call 911 for ROC or SCRB

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

\[\text{\footnotesize 1 Use epinephrine with caution in patients on beta blockers}\]
Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, in either the Main Building or in Mays Clinic, call the Code Blue Team at 713-792-7099. For all other buildings (other on-campus buildings, off-campus, and skybridges), dial 911 and call Radiologist to bedside.

**PRESENTING SYMPTOMS**

- **Hypotension with Bradycardia/Vagal Reaction (responsive patient)**
  - Elevate legs; Trendelenburg position, monitor EKG, oxygen saturation (pulse oximetry)
  - Oxygen 6-10 L/minute via face mask
  - Bolus IV fluids¹ (Ringer’s lactate or NS) to maintain appropriate blood pressure as clinically indicated

- **Hypotension with Tachycardia**
  - Elevate legs; Trendelenburg position, monitor EKG, oxygen saturation (pulse oximetry), and blood pressure
  - Oxygen 6-10 L/minute via face mask
  - Rapid administration of 1-3 L fluid¹ (Ringer’s lactate or NS)¹

---

**TREATMENT**

- **Patient symptoms resolved or stable within 3-5 minutes?**
  - **Yes**
    - Continue monitoring and consider transfer to appropriate level of care
  - **No**
    - Continue monitoring vital signs and repeat atropine every 3-5 minutes up to 0.04 mg/kg or 3 mg total dose

- **Epinephrine (1:1,000) 0.5 mL subcutaneously**
  - **Yes**
    - Continue monitoring and consider transfer to appropriate level of care
  - **No**
    - Call Code Blue Team 2-7099, call Radiologist to bedside and transfer to ICU

---

¹ Use caution pushing fluids in patients with congestive heart failure to avoid fluid overload.

*Note: See Appendix A on page 7 for Reaction Rebound Prevention*
Management of Contrast Media Reactions - Adult

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, in either the Main Building or in Mays Clinic, call the Code Blue Team at 713-792-7099. For all other buildings (other on-campus buildings, off-campus, and skybridges), dial 911 and call Radiologist to bedside.

PRESENTING SYMPTOMS

Severe Hypertension
- Oxygen 6-10 L/minute via face mask. Monitor EKG, oxygen saturation (pulse oximetry), blood pressure.
- Clonidine 0.2 mg PO loading dose followed by 0.1 mg PO per hour until blood pressure has lowered or for a total dose of clonidine 0.8 mg has been administered.
- For pheochromocytoma, call primary physician and Radiologist: phentolamine (Regitine®) 5 mg IV for one dose.

Facial/Laryngeal Edema (stridor)
- Epinephrine¹ (1:1,000) 0.5 mL subcutaneously
- Oxygen 6-10 L/minute via face mask, titrate to oxygen saturation greater than or equal to 92%
- Monitor EKG and saturation (pulse oximetry)

TREATMENT

Patient symptoms resolved or stable within 3-5 minutes?
Yes
- Racemic epinephrine² 2.25% nebulized with 1-3 inhalations until relief
- Consider transfer to appropriate level of care

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

Continue monitoring, notify DI Urgent Response Team and consider transfer to appropriate level of care

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

¹ Use epinephrine with caution in patients on beta blockers
² Nebulized agent by respiratory therapy preferred over beta agonist inhalers such as albuterol, terbutaline, and metaproterenol.
Management of Contrast Media Reactions - Adult

Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, in either the Main Building or in Mays Clinic, call the Code Blue Team at 713-792-7099. For all other buildings (other on-campus buildings, off-campus, and skybridges), dial 911 and call Radiologist to bedside.

Presenting Symptoms

Respiratory Distress (responsive patient)

- Secure airway, IV access and initiate oxygen via non-rebreather mask at 10-15 L/minute. If unavailable give oxygen via face mask at 6-10 L/minute
- Call MERIT and ICU teams
- Epinephrine¹ (1:1,000) 0.5 mL subcutaneously every 3-5 minutes
- Monitor oxygen saturation (pulse oximetry), EKG, and vital signs

Bronchospasm (wheezing)

- Oxygen 6-10 L/minute via face mask. Monitor EKG and oxygen saturation (pulse oximetry).
- If receiving beta blockers, call Radiologist to bedside
- If not receiving beta blockers:
  - Beta-agonist inhaler or nebulized agent per Respiratory Care²,³
  - Epinephrine¹ (1:1,000) 0.5 mL subcutaneously.

Pulmonary Edema

- Give furosemide 40 mg IV over 2 minutes

Patient symptoms improve within 3-5 minutes?

- Yes
  - Verify the MERIT team was contacted
  - Continue monitoring and consider transfer to appropriate level of care

- No
  - Verify the MERIT team was contacted
  - Call Code Blue Team 2-7099 as appropriate

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

¹ 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).
² Albuterol nebulization - 0.083% (2.5 mg/3 mL)
³ Nebulized agent by respiratory therapy preferred over beta agonist inhalers such as albuterol, terbutaline, and metaproterenol.
Management of Contrast Media Reactions - Adult

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population, MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

Any signs or symptoms of HSR/allergic reaction, notify Radiologist. If patient unresponsive at any point, in either the Main Building or in Mays Clinic, call the Code Blue Team at 713-792-7099. For all other buildings (other on-campus buildings, off-campus, and skybridges), dial 911 and call Radiologist to bedside.

**PRESENTING SYMPTOMS**

- 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 10-15 L/minute.
  - If unavailable give oxygen via face mask at 6-10 L/minute.
- Monitor oxygen saturation (pulse oximetry), EKG, and vital signs
- If seizure activity greater than 1-2 minutes give lorazepam 4 mg IV slow push
- If no IV access, give rectal diazepam gel 20 mg
- Call MERIT or Code Blue Team 2-7099
- Ensure STAT labs are drawn

**TREATMENT**

**Seizures/Convulsions**

- Assess patient for developing signs and symptoms that may indicate another type of reaction
- Monitor oxygen saturation (pulse oximetry), EKG, and vital signs
- If no identifiable manifestations and normal oxygenation, consider this diagnosis

**Anxiety (Panic Attack)**

- If not resolved within 5-15 minutes:
  - Call Primary Team
  - Call MERIT if clinically indicated

---

1 STAT labs: CBC, Basic Metabolic Panel (Sodium, Potassium, Chloride, Bicarbonate, Glucose, BUN, Creatinine, Phosphorus, Calcium), Magnesium, Ionized Calcium, Accucheck with or without Venous Blood Gas (VBG).
## 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; over 1-2 minutes every 6 hours</td>
<td>200 mg per day</td>
</tr>
<tr>
<td>Methylprednisolone (Solu-Medrol®)</td>
<td>40 mg – 125 mg IV; over 1-2 minutes 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.
## CATEGORIES OF REACTIONS TO CONTRAST MEDIA

### Mild Reactions

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

<table>
<thead>
<tr>
<th>Altered taste</th>
<th>Cough</th>
<th>Headache</th>
<th>Nausea, vomiting</th>
<th>Sweats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Dizziness</td>
<td>Itching</td>
<td>Pallor</td>
<td>Swelling of eyes or face</td>
</tr>
<tr>
<td>Chills</td>
<td>Flushing</td>
<td>Nasal stuffiness</td>
<td>Rash, hives</td>
<td>Warmth</td>
</tr>
</tbody>
</table>

Treatment: Requires observation to confirm resolution and/or lack of progression but usually no treatment. Patient reassurance is usually helpful.

### Moderate Reactions

Signs and symptoms are more pronounced. Moderate degree of clinically evident focal or systemic signs or symptoms, including:

<table>
<thead>
<tr>
<th>Bronchospasm, wheezing</th>
<th>Hypertension</th>
<th>Mild hypotension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea</td>
<td>Laryngeal edema</td>
<td>Tachycardia/bradycardia</td>
</tr>
<tr>
<td>Generalized or diffuse erythema</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Treatment: Clinical findings in moderate reactions frequently require prompt treatment. Those situations require close, careful observation for possible progression to a life-threatening event.

### Severe Reactions

Signs and symptoms are often life-threatening, including:

<table>
<thead>
<tr>
<th>Cardiopulmonary arrest</th>
<th>Convulsions</th>
<th>Profound hypotension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically manifest arrhythmias</td>
<td>Laryngeal edema (severe or rapidly progressing)</td>
<td>Unresponsiveness</td>
</tr>
</tbody>
</table>

Treatment: Requires prompt recognition and aggressive treatment; manifestations and treatment frequently require hospitalization.
SUGGESTED READINGS


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:

Aziz Benamar, MBA, BSRT
Olga Fleckenstein*
Laura Michaud, PhD, PharmD†
Aliya Qayyum, MD
Joseph Steele, MD†
Danna G. Stone, MBA, BSN, RN, CRN
Susan Spivey, PharmD
Shirlene Tabao, MSN, RN, OCN*

† Core Development Team Leads
* Clinical Effectiveness Development Team