

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.*

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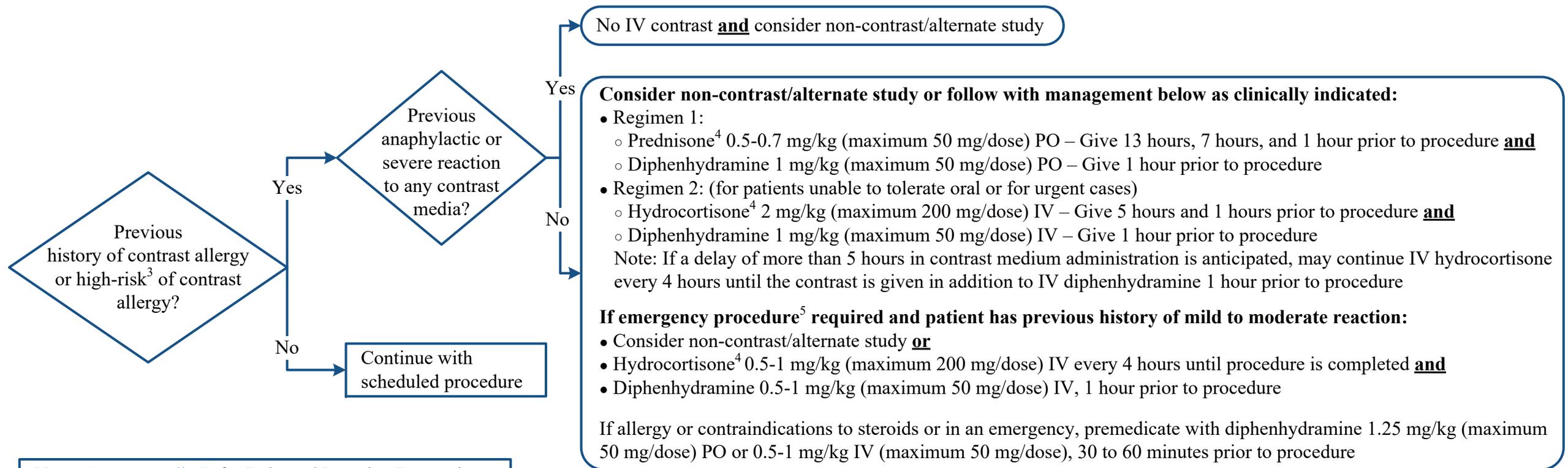
Any signs or symptoms of hypersensitivity reaction/allergic reaction, **notify Responding Provider¹ and activate the appropriate emergency response process for your area.**

If available, notify MERIT: 713-792-7090

Note: Page 2 of this algorithm is intended for Providers; subsequent pages (3-9) are for both Providers and Nurses

PREVIOUS HISTORY OF REACTIONS²

PROPHYLACTIC TREATMENT



Note: See [Appendix B](#) for Rebound Reaction Prevention

¹ Applicable provider may include: local provider in the area where the reaction occurs, anesthesiologist, radiation oncology team, diagnostic imaging team/radiologist, etc.

² See [Appendix A](#) for Categories of Acute Reactions to Contrast Media

³ High risk factors include patients with previous anaphylactic reactions to food or medication

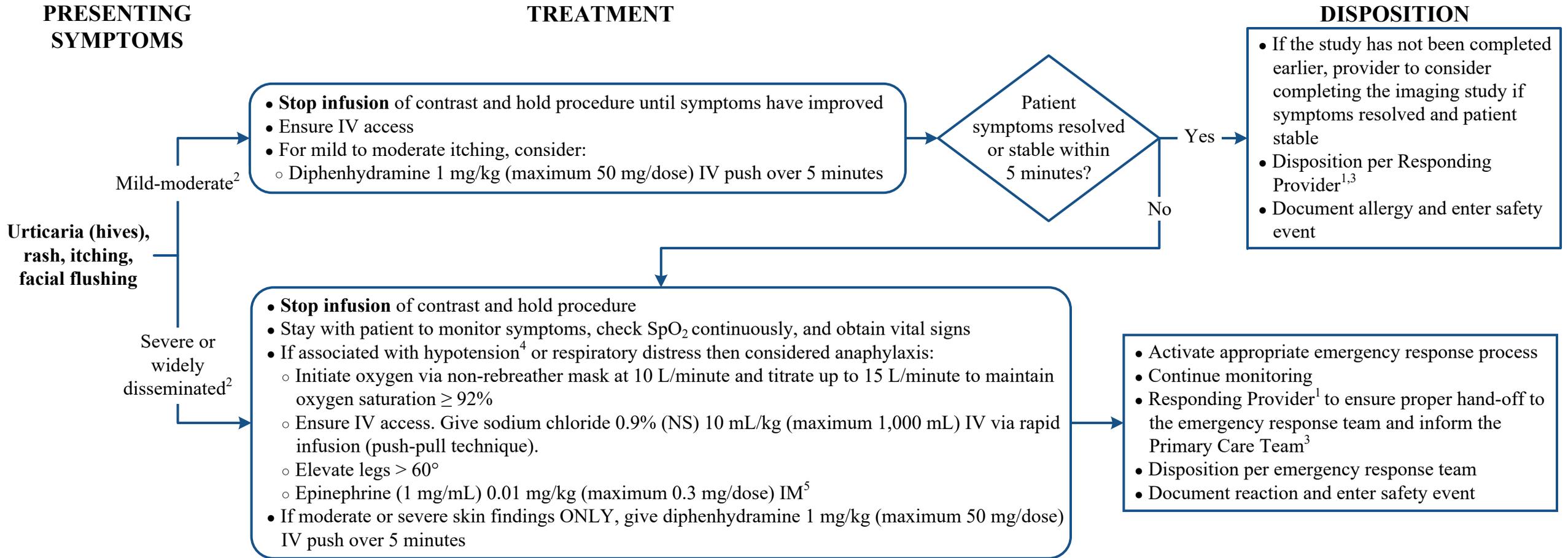
⁴ Caution use of steroids in patients receiving Chimeric Antigen Receptor (CAR) - T cell therapy, uncontrolled hypertension, diabetes, tuberculosis, systemic fungal infections, peptic ulcer disease, neutropenic colitis, or diverticulitis. If allergic, contact primary provider. If patient has received CAR-T cell therapy (as denoted in the patient banner in the EHR), contact Pediatric Stem Cell Transplant service.

⁵ If the patient has an allergy to steroids and/or requires an emergency procedure, discussion between the radiologist and Primary Care Team is indicated, if feasible

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Note: See [Appendix B](#) for Rebound Reaction Prevention

¹ Applicable provider may include: local provider in the area where the reaction occurs, anesthesiologist, radiation oncology team, diagnostic imaging team/radiologist, etc.

² See [Appendix A](#) for Categories of Acute Reactions to Contrast Media

³ Communicate the contrast media reaction event to the Primary Care Team so that precautionary measures are considered for future scans

⁴ Hypotension is defined as: Age 0 – 28 days: SBP < 60 mmHg; Age 1 – 12 months: SBP < 70 mmHg; Age 1 – 10 years: SBP < [70 mmHg + (age in years x 2)]; Age > 10 years: SBP < 90 mmHg

⁵ Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.

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PRESENTING SYMPTOMS

TREATMENT

DISPOSITION

Hypotension² with bradycardia³/vasovagal reaction (responsive patient)

- Airway positioning to ensure patency and suction as needed. Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$.
- Ensure IV access
- Monitor vital signs
- Elevate legs $> 60^\circ$
- Give sodium chloride 0.9% (NS) 10 mL/kg⁴ IV (maximum 1,000 mL) via rapid infusion (push-pull technique)

- Activate appropriate emergency response process
- Continue monitoring
- Initiate CPR if HR < 60 bpm with poor perfusion

- Responding Provider¹:
- Evaluate and consider:
 - Atropine 0.02 mg/kg (maximum 1 mg for infants/children and 2 mg for adolescent) IV push over 1 minute for vasovagal reaction
 - Ensure proper hand-off to the emergency response team and inform the Primary Care Team⁵

- Disposition per emergency response team
- Document allergy and enter safety event

Hypotension² with tachycardia⁶ (anaphylaxis)

- Airway positioning to ensure patency and suction as needed. Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$.
- Ensure IV access
- Monitor vital signs
- Elevate legs $> 60^\circ$
- Give sodium chloride 0.9% (NS) 10 mL/kg² IV (maximum 1,000 mL) via rapid infusion (push-pull technique)
- Give epinephrine (1 mg/mL) 0.01 mg/kg IM⁷ (maximum 0.3 mg/dose)

- Activate appropriate emergency response process
- Continue monitoring

- Responding Provider¹:
- Evaluate and consider:
 - Repeating epinephrine every 5 minutes if symptoms persist/progress
 - Ensure proper hand-off to the emergency response team and inform the Primary Care Team⁵

Note: See [Appendix B](#) for Rebound Reaction Prevention

CPR = cardiopulmonary resuscitation

¹ Applicable provider may include: local provider in the area where the reaction occurs, anesthesiologist, radiation oncology team, diagnostic imaging team/radiologist, etc.

² Hypotension is defined as: Age 0 – 28 days: SBP < 60 mmHg; Age 1 – 12 months: SBP < 70 mmHg; Age 1 – 10 years: SBP $< [70 \text{ mmHg} + (\text{age in years} \times 2)]$; Age > 10 years: SBP < 90 mmHg

³ Bradycardia is defined as: Age 0 – 1 year: HR < 100 bpm; Age 2 – 4 years: HR < 80 bpm; Age 5 – 12 years: HR < 70 bpm; Age 13 – 17 years: HR < 60 bpm

⁴ In patients with myocardial dysfunction or history of dysfunction, provider to consider normal saline 5-10 mL/kg while continuously monitoring for signs of fluid overload

⁵ Communicate the contrast media reaction event to the Primary Care Team so that precautionary measures are considered for future scans

⁶ Tachycardia is defined as: Age 0 – 28 days: HR > 160 bpm; Age 1 – 12 months: HR > 140 bpm; Age 1 – 10 years: HR > 120 bpm; Age > 10 years: HR > 110 bpm

⁷ Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.

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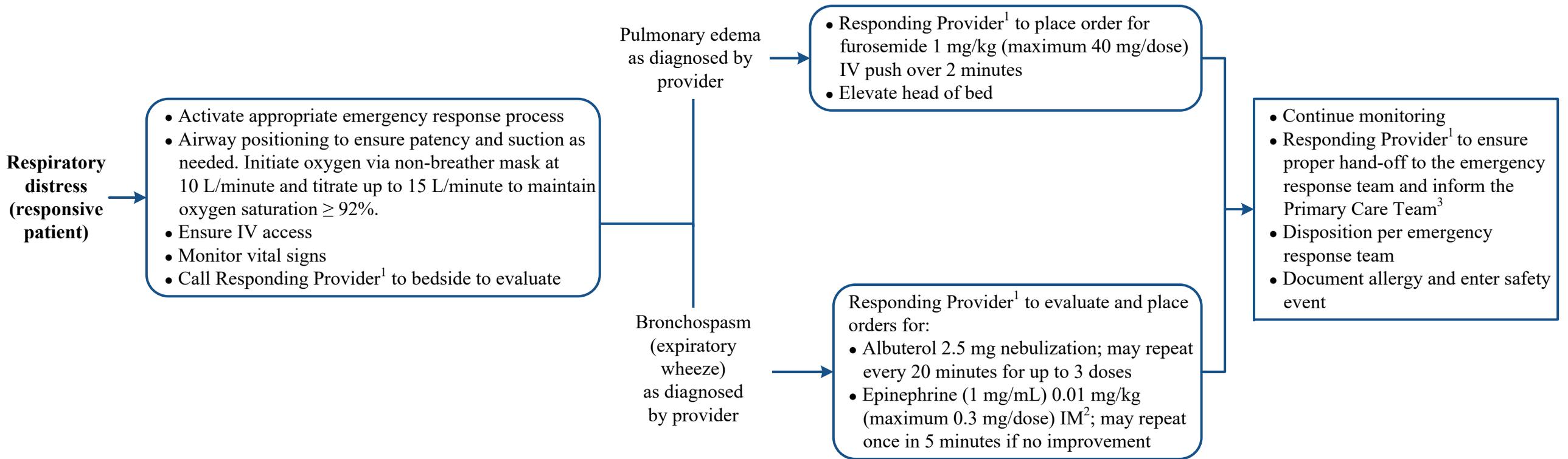
Any signs or symptoms of hypersensitivity reaction/allergic reaction, **notify Responding Provider¹ and activate the appropriate emergency response process for your area.**

If available, notify MERIT: 713-792-7090

PRESENTING SYMPTOMS

TREATMENT

DISPOSITION



Note: See [Appendix B](#) for Rebound Reaction Prevention

¹ Applicable provider may include: local provider in the area where the reaction occurs, anesthesiologist, radiation oncology team, diagnostic imaging team/radiologist, etc.

² Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.

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PRESENTING SYMPTOMS

TREATMENT

DISPOSITION

**Laryngeal edema
(inspiratory stridor)**

- Activate appropriate emergency response process
- Airway positioning to ensure patency and suction as needed
- Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$
- Ensure IV access
- Monitor vital signs
- Give epinephrine (1 mg/mL) 0.01 mg/kg (maximum 0.3 mg/dose) IM²

- Responding Provider¹ to evaluate and consider:
- Repeating epinephrine (1 mg/mL) 0.01 mg/kg (maximum 0.3 mg/dose) IM² once in 5 minutes if no improvement

**Seizures/
convulsions**

- Activate appropriate emergency response process
- Airway positioning to ensure patency, turn patient on side to avoid aspiration and suction as needed. If available, consider calling STAT Airway Team if airway is compromised.
- Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$
- Ensure IV access
- Monitor vital signs

- Responding Provider¹ to evaluate and order if available:
- If seizure activity > 1 minute, order lorazepam 0.05-0.1 mg/kg (maximum 4 mg/dose) IV; may repeat in 10 minutes
 - If no IV access, order diazepam gel rectally (note-round dose to nearest 2.5 mg, not to exceed 20 mg/dose)
 - 2-5 years: 0.5 mg/kg
 - 6-11 years: 0.3 mg/kg
 - 12 years and older: 0.2 mg/kg

- Continue monitoring
- Responding Provider¹ to ensure proper hand-off to the emergency response team and inform the Primary Care Team³
- Disposition per emergency response team
- Document allergy and enter safety event

Note: See [Appendix B](#) for Rebound Reaction Prevention

¹ Applicable provider may include: local provider in the area where the reaction occurs, anesthesiologist, radiation oncology team, diagnostic imaging team/radiologist, etc.

² Administer epinephrine IM into the antero-lateral mid-third portion of the thigh. Administration via IM route is preferred regardless of platelet count.

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APPENDIX A: Categories of Acute Reactions To Contrast Media

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:

Allergic-like

Limited urticaria/pruritus
 Limited cutaneous edema
 Limited "itchy"/ "scratchy" throat
 Nasal congestion
 Sneezing/conjunctivitis/rhinorrhea

Physiologic

Limited nausea/vomiting
 Transient flushing/warmth/chills
 Headache/dizziness/anxiety/altered taste
 Mild hypertension
 Vasovagal reaction that resolves spontaneously

Moderate Reactions

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

Allergic-like

Diffuse urticaria/pruritus
 Diffuse erythema, stable vital signs
 Facial edema without dyspnea
 Throat tightness or hoarseness without dyspnea
 Wheezing/bronchospasm without hypoxia

Physiologic

Protracted nausea/vomiting
 Hypertensive urgency
 Isolated chest pain
 Vasovagal reaction that requires and is responsive to treatment

Severe Reactions¹

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

Allergic-like

Diffuse edema, or facial edema with dyspnea
 Diffuse erythema with hypotension
 Laryngeal edema with stridor and/or hypoxia
 Wheezing/bronchospasm with hypoxia
 Anaphylactic shock (hypotension plus tachycardia)

Physiologic

Vasovagal reaction resistant to treatment
 Arrhythmia
 Convulsions, seizures
 Hypertensive emergency

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.

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APPENDIX B: Rebound Reaction Prevention

Drug	Recommended Dose	Maximum Dose
Hydrocortisone	5 mg/kg IV for 1 dose; administer over 1-2 minutes	200 mg
Methylprednisolone	1 mg/kg IV for 1 dose; administer over 1-2 minutes	40 mg

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 the Acute Cancer Care Center, local emergency center, or inpatient unit.

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SUGGESTED READINGS

ACR Committee on Drugs and Contrast Media. (2023). *ACR manual on contrast media*. American College of Radiology. Retrieved from: <https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Contrast-Manual>

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DEVELOPMENT CREDITS

This practice consensus statement is based on majority opinion of the Contrast Media Reaction workgroup at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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