

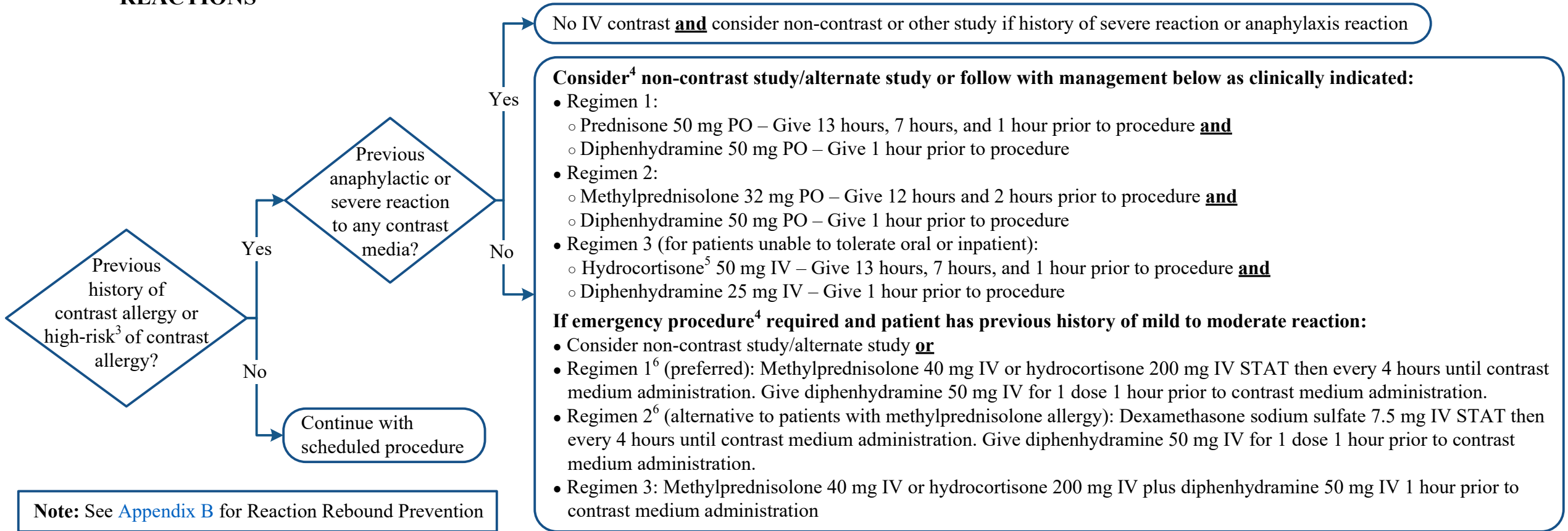
Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional 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.

Any signs or symptoms of HSR/allergic reaction, notify Responding Provider¹ and activate the appropriate emergency response process 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 REACTIONS²

PROPHYLACTIC TREATMENT



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

¹ Appropriate provider may include: anesthesiologist, radiation oncology team, or diagnostic imaging team/radiologist

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

³ High risk factors include patients with previous anaphylactic reactions

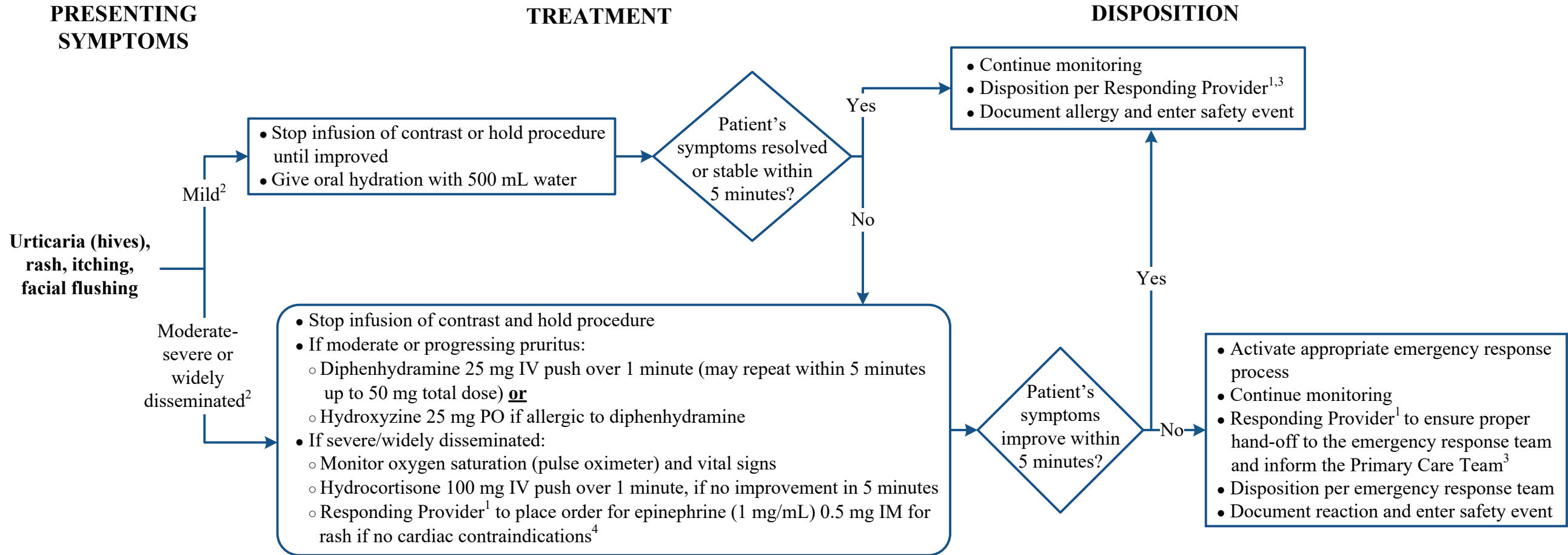
⁴ If the patient has an allergy to steroids and/or requires an emergency procedure, discussion between the radiologist and Primary Care Team is indicated, if feasible.

⁵ 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.

⁶ This regimen usually is 4-5 hours in duration

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¹ Appropriate provider may include: anesthesiologist, radiation oncology team, or diagnostic imaging team/radiologist

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 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 B](#) for Reaction Rebound Prevention

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PRESENTING SYMPTOMS

TREATMENT

DISPOSITION

Hypotension² with bradycardia³/vagal reaction (responsive patient)

- Position patient in Trendelenburg position
- Monitor vital signs
- Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$
- Give sodium chloride 0.9% (NS) 1 L IV bolus⁴ to maintain appropriate blood pressure as clinically indicated

- Activate appropriate emergency response process
- Continue monitoring

- Responding Provider¹:
- Evaluate and order atropine 0.5 mg IV push over 1 minute for vasovagal reaction if appropriate monitoring is available. May repeat atropine every 5 minutes up to 0.04 mg/kg or 3 mg total dose.
 - Evaluate and order additional IV fluid bolus
 - Ensure proper hand-off to the emergency response team and inform the Primary Care Team⁵

Hypotension² with tachycardia⁶

- Position patient in Trendelenburg position
- Monitor vital signs
- Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$
- Give sodium chloride 0.9% (NS) 1 L IV bolus⁴ to maintain appropriate blood pressure as clinically indicated

- Activate appropriate emergency response process
- Continue monitoring

- Responding Provider¹:
- Evaluate and order epinephrine (1 mg/mL) 0.5 mg IM⁷ if no cardiac contraindications
 - Evaluate and order additional IV fluid bolus
 - 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

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

¹ Appropriate provider may include: anesthesiologist, radiation oncology team, or diagnostic imaging team/radiologist

² Hypotension is defined as SBP < 90 mmHg **or** a drop in SBP > 20 mmHg from baseline

³ Bradycardia is defined as HR < 50 bpm

⁴ Use caution pushing fluids in patients with congestive heart failure to avoid 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 HR > 100 bpm

⁷ 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.

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PRESENTING SYMPTOMS

TREATMENT

DISPOSITION

Severe hypertension²

- Initiate oxygen via non-rebreather mask at 10 L/minute and titrate up to 15 L/minute to maintain oxygen saturation $\geq 92\%$
- Monitor vital signs
- Activate appropriate emergency response process

- Clonidine 0.2 mg PO for one dose
- For pheochromocytoma, call Primary Care Team to order phentolamine 5 mg IV for one dose. Contact Responding Provider¹ to order if unable to reach primary provider.

- 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

Facial/laryngeal edema (stridor)

- Epinephrine⁴ (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 $\geq 92\%$
- Monitor vital signs
- Activate appropriate emergency response process

Responding Provider¹ to evaluate and order racemic epinephrine⁵ (2.25% nebulized solution) 0.5 mL inhaled via nebulizer for one dose

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

¹ Appropriate provider may include: anesthesiologist, radiation oncology team, or diagnostic imaging team/radiologist

² Severe hypertension is defined as SBP ≥ 180 mmHg **and/or** DBP ≥ 120 mmHg

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

⁴ 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.

⁵ Nebulized agent by respiratory therapy preferred over beta agonist inhalers such as albuterol, terbutaline, and metaproterenol

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PRESENTING SYMPTOMS

TREATMENT

DISPOSITION

Respiratory distress (responsive patient)

- Activate appropriate emergency response process
- 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 $\geq 92\%$
- Monitor vital signs
- Call Responding Provider¹ to bedside to evaluate

Pulmonary edema as determined by provider

Responding Provider¹ to place order for furosemide 40 mg IV push over 2 minutes

Bronchospasm (wheezing) as determined by provider

Responding Provider¹ to evaluate and place orders for:

- Albuterol (2.5 mg nebulized solution) 3 mL inhaled via nebulizer for one dose. Consider further doses of albuterol as needed.
- Epinephrine³ (1 mg/mL) 0.5 mg IM if no cardiac contraindications; may repeat once in 5 minutes if no improvement

- Continue monitoring
- Responding Provider¹ to ensure proper hand-off to the emergency response team and inform the Primary Care Team²
- Disposition per emergency response team
- Document allergy and enter safety event

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

¹ Appropriate provider may include: anesthesiologist, radiation oncology team, or diagnostic imaging team/radiologist
² Communicate the contrast media reaction event to the Primary Care Team so that precautionary measures are considered for future scans
³ 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.

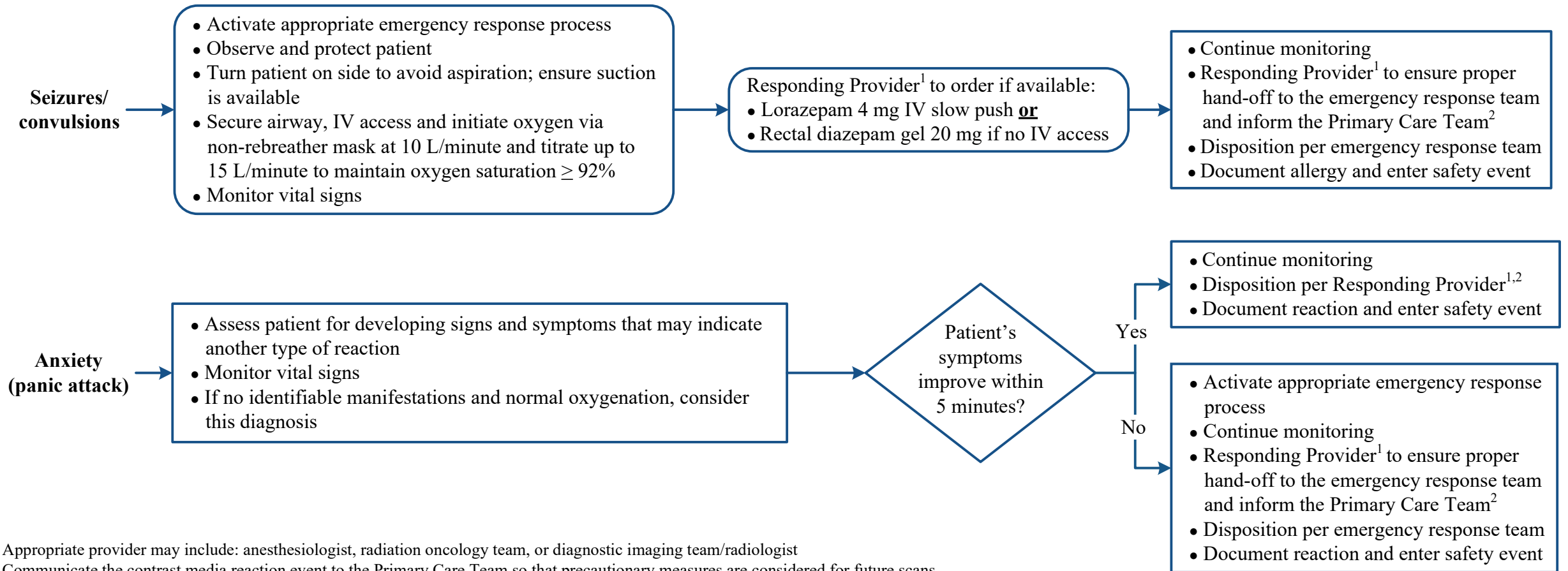
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PRESENTING SYMPTOMS

TREATMENT

DISPOSITION



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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:	
<p style="text-align: center;">Allergic-like</p> <ul style="list-style-type: none"> Limited urticaria/pruritus Limited cutaneous edema Limited “itchy”/ “scratchy” throat Nasal congestion Sneezing/conjunctivitis/rhinorrhea 	<p style="text-align: center;">Physiologic</p> <ul style="list-style-type: none"> 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:	
<p style="text-align: center;">Allergic-like</p> <ul style="list-style-type: none"> Diffuse urticaria/pruritus Diffuse erythema, stable vital signs Facial edema without dyspnea Throat tightness or hoarseness without dyspnea Wheezing/bronchospasm without hypoxia 	<p style="text-align: center;">Physiologic</p> <ul style="list-style-type: none"> 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 or death if not managed appropriately and severe reactions include:	
<p style="text-align: center;">Allergic-like</p> <ul style="list-style-type: none"> 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) 	<p style="text-align: center;">Physiologic</p> <ul style="list-style-type: none"> 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: Reaction Rebound Prevention

Drug	Recommended Dose	Daily Maximum dose
Hydrocortisone	50 mg IV; administer over 1 minute every 6 hours	200 mg per day
Methylprednisolone	40 mg – 125 mg IV; administer over 1 minute every 6 hours	Maximum dose depends on severity of reaction

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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SUGGESTED READINGS

ACR Committee on Drugs and Contrast Media. (2021). *ACR manual on contrast media*. American College of Radiology. Retrieved from:
https://www.acr.org/-/media/ACR/Files/Clinical-Resources/Contrast_Media.pdf

Simons, F. E. R. (2010). Anaphylaxis. *The Journal of Allergy and Clinical Immunology*, 125(2 Suppl 2), S161–S181. doi:10.1016/j.jaci.2009.12.981

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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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