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Committee Approvals/Dates:
Oncology Practice Committee: February 2017
Oncology Service Line Executive Committee: February 2017
Chemotherapy Council: April 2017
Pharmacy & Therapeutics Committee: June 2017; August 2021 (interim)

Release Date: June 2017 | Next Review Date: November 2021
Executive Summary
Guideline Overview
This clinical practice guideline contains recommendations for the management of hypersensitivity reactions related to agents used to treat cancer patients. It is compiled from an extensive literature review of current evidence and external clinical practice guidelines related to the management of hypersensitivity reactions.

Key Practice Recommendations
- Hypersensitivity reactions to agents used to treat oncology indications are prevalent and dangerous
- Depending on the symptoms type, presentation of symptoms, and symptom severity, initial management of hypersensitivity reactions can vary
- Medications used to initially manage hypersensitivity reactions include antihistamines, corticosteroids, oxygen, nebulized bronchodilators and intravenous fluids
- During and following a hypersensitivity reaction, patients should be monitored for resolution of symptoms to determine further management
- Please see Appendix B for key practice recommendations for the management of hypersensitivity reactions for medications used to treat cancer

Companion Documents
1. Renal Function-Based Dose Adjustments – Adult – Inpatient/Ambulatory
2. Intravenous Administration of Formulary Medications – Adult – Inpatient/Ambulatory
3. Carboplatin Dosing – Adult – Inpatient/Ambulatory

Scope
Disease/Condition(s): Patients receiving medications used to treat cancer

Clinical Specialty: Adult Oncology

Intended Users: Physicians, Advanced Practice Providers, Nurses, Pharmacists, and Respiratory Therapists

Objective(s): Minimize morbidity by standardizing the management of hypersensitivity reactions caused by medications used to treat cancer

Target Population: Patients greater than or equal to 18 years of age in the inpatient or ambulatory setting who are receiving medications used to treat cancer

Interventions and Practices Considered:
- Identification of hypersensitivity reactions
- Management of hypersensitivity reactions
  - Medication administration
  - Monitoring
Major Outcomes Considered:
- Rates of hypersensitivity reactions
- Emergency medications administered
- Patient outcomes
  - Discontinuation of therapy
  - Hospitalization
  - Mortality
- Total medication infusion time
- Total chair time

Methodology

Methods Used to Collect/Select the Evidence:
Electronic database searches (e.g., PUBMED) were conducted by the guideline author(s) and workgroup members to collect evidence for review. Expert opinion and clinical experience were also considered during discussions of the evidence.

Methods Used to Formulate the Recommendations:
The workgroup members agreed to adopt recommendations developed by external organizations and/or arrived at a consensus through discussion of the literature and expert experience. All recommendations endorsed or developed by the guideline workgroup were reviewed and approved by other stakeholders or committees (as appropriate).

Methods Used to Assess the Quality of the Evidence/Strength of the Recommendations:
Recommendations developed by external organizations maintained the evidence grade assigned within the original source document and were adopted for use at UW Health.

Internally developed recommendations, or those adopted from external sources without an assigned evidence grade, were evaluated by the guideline workgroup using an algorithm adapted from the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology (see Figure 1 in Appendix A).

Rating Scheme for the Strength of the Evidence/Recommendations:
See Appendix A for the rating scheme(s) used within this document.

Definitions
1. Types of reactions\(^1\)
   1.1. Hypersensitivity reactions
      1.1.1. Type I hypersensitivity = caused by IgE-mediated release of histamines, leukotrienes and prostaglandins from mast cells in tissue and basophils in peripheral blood
1.1.1.1. Characterized by rapid contraction of smooth muscle and dilation of capillaries, resulting in urticaria, rash, angioedema, bronchospasm and hypotension

1.2. Infusion reactions
   1.2.1. Caused by cytokine release
      1.2.1.1. Characterized by mild to moderate (flushing, rash, fever, rigors, chills, dyspnea, hypotension) and severe (bronchospasms, hypotension requiring treatment, cardiac dysfunction)

2. Grading of hypersensitivity reactions/infusion reactions (National Cancer Institute Common Terminology Criteria for Adverse Events)¹
   2.1. To be categorized within a Grade, a patient needs to experience only one of the criteria
   2.2. Grade 1
      2.2.1. Transient flushing or rash
      2.2.2. Drug fever ≥38°C (≥100.4°F)
      2.2.3. Intervention not indicated
   2.3. Grade 2
      2.3.1. Rash
      2.3.2. Flushing
      2.3.3. Urticaria (hives)
      2.3.4. Drug fever ≥38°C (≥100.4°F)
      2.3.5. Requires therapy or infusion interruption but responds promptly to symptomatic treatment
      2.3.6. Prophylactic medication indicated for ≥24 hours
   2.4. Grade 3
      2.4.1. Symptomatic bronchospasm, with or without urticaria
      2.4.2. Parenteral medication(s) indicated
      2.4.3. Allergy-related edema/angioedema
      2.4.4. Hypotension
      2.4.5. Prolonged (not rapidly responding to symptomatic medication)
      2.4.6. Recurrence of symptoms following initial improvement
      2.4.7. Hospitalization indicated for other clinical sequelae
   2.5. Grade 4
      2.5.1. Anaphylaxis
      2.5.2. Life-threatening
      2.5.3. Pressor or ventilator support indication
   2.6. Grade 5
      2.6.1. Death

3. Mild-moderate versus severe symptoms¹
   3.1. Mild to moderate (Grades 1 and 2) – characterized by flushing, fevers, chills, dyspnea, and mild hypotension
   3.2. Severe (Grades 3 and 4) – associated with hypotension requiring treatment, cardiac dysfunctions, anaphylaxis and other symptoms

4. Typical presentation of reactions to certain classes of agent used to treat cancer
   4.1. Taxanes² ³
      4.1.1. Timing
4.1.1.1. Reactions occur during the first or second infusion
4.1.1.2. Rapidly, within the first 10 minutes of the infusion
4.1.2. Severity
4.1.2.1. Severe reactions (Grades 3-5) occur in about 2% of patients treated with taxane-based medications
4.2. Platinums
4.2.1. Timing
4.2.1.1. Reactions typically occur only after multiple cycles of therapy
4.2.2. Severity
4.2.2.1. Severe reactions (Grades 3-5) occur in about 2% of patients treated with platinum-based medications
4.3. Monoclonal antibodies
4.3.1. Cetuximab – severe infusion reactions were observed during the first infusion
4.3.2. Rituximab – reactions can occur during any infusion, but there is a higher incidence with the first infusion
4.4. This is not an inclusive list of agents associated with hypersensitivity reactions
4.4.1. Check package insert or other resources for specific agent information on prevalence of hypersensitivity reactions
5. Chair time – the time from pre-medications given to the patient to the end of the medication infusion
6. Purpose of emergency medications in hypersensitivity reactions
6.1. Histamine1 blockers – compete for histamine1 receptors. Histamine is released during hypersensitivity reactions, causing blood vessels to widen and expand. This causes redness, swelling, and inflammation. These medications work to block the effects of histamine (e.g. diphenhydramine, loratadine, cetirizine)
6.2. Histamine2 blockers – compete for histamine2 receptors. Histamine is released during hypersensitivity reactions, causing blood vessels to widen and expand. This causes redness, swelling, and inflammation. These medications work to block the effects of histamine (e.g. famotidine)
6.3. Beta2 agonists – relax bronchial smooth muscle by action on beta2-receptors. Bronchial constriction, shortness of breath, and wheezing can occur during hypersensitivity reactions. These medications work to open up the airway and prevent the constriction (e.g. albuterol)
6.4. Steroids – work to suppress the normal immune response, including neutrophil migration and production of inflammatory markers during a hypersensitivity reaction (e.g. dexamethasone)

Introduction
Systemic chemotherapy agents are critical in the treatment of most cancers; however many of these therapies are associated with possible hypersensitivity reactions. Hypersensitivity reactions can range from mild, such as itching and flushing, to severe; anaphylaxis and even death. Reactions to agents used to treat cancer are unpredictable and the exact mechanism is often unclear. Since the pathophysiology of the reactions is not understood, the reaction may be labeled and categorized incorrectly. The variability in reaction type, lack of consistency in identifying reactions, and inexperience in dealing
with reactions can lead to unpreparedness and unfamiliarity with recognition, grading and management of hypersensitivity. This can then lead to inappropriate medication administration to patients, unnecessary discontinuation of treatment and limited options for future treatment.

Taxane-based chemotherapy, platinum-based chemotherapy and monoclonal antibodies are used in most modern oncology regimens and are associated with the highest incidence of hypersensitivity reactions. The incidence with certain taxane drugs is estimated to be 8-45%, with mild reactions in 40% of patients and severe reactions in 1.3% of patients. With platinum drugs, the incidence of hypersensitivity reactions can range from 12-19%, with severe reactions in 2% of patients. The frequency of reactions increases with increased exposure. Monoclonal antibodies have the highest reported incidence of reactions, rituximab, for example, has an estimated 77% of mild to moderate reactions with infusion. Even though the incidence of severe hypersensitivity reactions is relatively low, the consequences of mismanagement of any reaction can pose a threat to patient safety.

The National Comprehensive Cancer Network (NCCN) guidelines provide recommendations on the management of reactions to platinums, taxanes, liposomal doxorubicin, and biotherapeutic agents. The administration of antihistamines, corticosteroids, epinephrine, oxygen, and nebulized bronchodilators are all recommended, depending on the severity of the reaction. Within the NCCN guideline, there are no recommendations regarding rescue medication timing, dosing or specific medications to use. These are important aspects to the management of chemotherapy-induced hypersensitivity reactions and their inclusion in this guideline will contribute to standardization and patient safety.

**Recommendations**

1. Management of hypersensitivity reactions
   1.1. If the patient experiences any symptom of a hypersensitivity reaction, the infusion of the medication should be stopped and the patient should be assessed (UW Health GRADE HIGH quality evidence, strong recommendation)
   1.2. Symptoms include, but are not limited to:
      1.2.1. Urticaria (hives)
      1.2.2. Itching
      1.2.3. Flushing
      1.2.4. Swelling of the lips and/or tongue
      1.2.5. O2 saturation less than 90%
      1.2.6. Shortness of breath
      1.2.7. Tachypnea (>20 breaths per minute)
      1.2.8. Wheezing
      1.2.9. Bronchial constriction
      1.2.10. Hypotension (decrease in systolic blood pressure of >20 mmHg)
   1.3. Assessment (UW Health GRADE HIGH quality evidence, strong recommendation)
      1.3.1. Patient vitals should be obtained including:
1.3.1.1. Blood pressure
1.3.1.2. Heart rate
1.3.1.3. Respiratory rate
1.3.1.4. $O_2$ saturation
1.3.1.5. Temperature (only if patient complains of flushing or chills)

1.3.2. In addition to vitals, a focused physical assessment should be obtained

1.3.2.1. Focused physical assessment – evaluate patient depending on the symptoms they are experiencing

1.4. After assessment, it should be determine if symptoms require intervention (Table 1)\(^1,7\) (UW Health GRADE LOW quality evidence, strong recommendation)

2. Providers should be notified of any hypersensitivity reaction (UW Health GRADE LOW quality evidence, strong recommendation)

2.1. Providers include, but are not limited to, the physician

2.1.1. Respiratory therapist and pharmacist

2.1.2. Research coordinators

3. If symptoms do not require intervention and no change in vital signs from baseline, the patient should be observed for 15-30 minutes for symptoms to resolve and then, in collaboration with the provider and pharmacist, the infusion should be restarted\(^1,7\) (UW Health GRADE LOW quality evidence, strong recommendation)

3.1. If symptoms are limited to patient reported feeling of minor throat irritation, the patient should be observed for 15-30 minutes, to allow for symptoms to resolve

3.1.1. The provider should be notified of the minor reaction

3.1.1.2. In collaboration with the provider and pharmacist, the medication-specific administration instructions should be referenced to determine if, and at what rate to restart the infusion\(^1,5,7,9\) (UW Health GRADE HIGH quality evidence, strong recommendation)

4. If the patient experiences a mild to moderate or severe reaction, symptom type should be evaluated to determine appropriate intervention\(^1,7\) (UW Health GRADE LOW quality evidence, strong recommendation)

4.1.1. Based on the symptoms, the emergency medications needed should be determined

4.1.1.2. Refer to Table 1

<p>| Table 1. |
|-----------------|---------------------------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Symptoms*</th>
<th>Emergency Medication(s) to Administer</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urticaria (hives)</td>
<td>Diphenhydramine 50 mg IV push + Famotidine 20 mg IV push over at least 2 minutes</td>
<td>Return to baseline = resolution of urticaria, itching, flushing or swelling</td>
</tr>
<tr>
<td>Itching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flushing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swelling of the lips and tongue</td>
<td>Diphenhydramine 50 mg IV push + Famotidine 20 mg IV push over at least 2 minutes</td>
<td>Return to baseline = resolution of swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptom</td>
<td>Treatment</td>
<td>Baseline Criteria</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>O₂ saturation &lt; 90%</td>
<td>Dexamethasone 10 mg IV push, Oxygen via oxy-mask or nasal cannula</td>
<td>Return to baseline = increased O₂ sat to &gt; 90%</td>
</tr>
<tr>
<td>Shortness of breath, Tachypnea (&gt;20 breaths per minute), Wheezing, Bronchial constriction†</td>
<td>Oxygen via oxy-mask or nasal cannula, Albuterol 2.5 mg/3 mL by nebulization, Dexamethasone 10 mg IV push</td>
<td>Return to baseline = resolution of symptoms, Tachypnea resolution (&lt; 20 breaths per minute)</td>
</tr>
<tr>
<td>Hypotension (decrease in systolic blood pressure of &gt;20 mmHg)‡</td>
<td>Sodium Chloride 0.9% 500 mL bolus administered wide open, Dexamethasone 10 mg IV push</td>
<td>Return to baseline = blood pressure back to within 10% of original</td>
</tr>
</tbody>
</table>

*if experiencing ANY of the symptoms within a category, administer the appropriate associated medications (patient does NOT need to be experiencing all symptoms)
†If patient experiences severe bronchial constriction, it may be appropriate to call a rapid response/code blue and consider administration of epinephrine intramuscular (IM) per provider
‡ if patient does not respond to fluid bolus, call a rapid response/code blue and consider administration of epinephrine IM per provider

5. Emergency Medication Administration and Monitoring
5.1. One of more of the following emergency medication administration sections could apply if the patient is experiencing different types of symptoms
5.1.1. If the patient experiences urticaria, itching, and/or flushing, the following should be done⁴,⁷,¹¹,¹³ (UW Health GRADE LOW quality evidence, strong recommendation):
5.1.1.1. Administer diphenhydramine 50 mg intravenously
5.1.1.2. Administer famotidine 20 mg intravenously
5.1.1.3. Monitor for patient to return back to baseline
5.1.1.3.1. Resolution of symptom
5.1.1.3.2. No new symptoms
5.1.1.4. If no new symptoms occur and the previous symptoms have resolved, in collaboration with the provider and pharmacist, the medication-specific administration instructions should be referenced to determine if, and/or at what rate to restart the infusion
5.1.2. If the patient experiences swelling of the lips or tongue, the following should be done (UW Health GRADE Low quality of evidence, strong recommendation):
5.1.2.1. Administer diphenhydramine 50 mg intravenously
5.1.2.2. Administer famotidine 20 mg intravenously
5.1.2.3. Administer dexamethasone 10 mg intravenously
5.1.2.4. Monitor patient for return back to baseline
5.1.2.4.1. Resolution of swelling of lips and/or tongue
5.1.2.5. If the patient returns to baseline, in collaboration with the provider and pharmacist, the medication-specific administration instructions should be referenced to determine if, and/or at what rate to restart the infusion.

5.1.3. If the patient experiences a decrease in oxygen saturation to less than 90%, the following should be done\textsuperscript{4,7,11,13} (\textit{UW Health GRADE LOW quality evidence, strong recommendation})

- **5.1.3.1.** Administer oxygen via oxymask or nasal cannula, whichever device is available.
- **5.1.3.2.** Monitor for patient to return back to baseline
  - **5.1.3.2.1.** Increased oxygen saturation to greater than 90%.
- **5.1.3.3.** If the patient returns to baseline, in collaboration with the provider and pharmacist, the medication-specific administration instructions should be referenced to determine if, and/or at what rate to restart the infusion.

5.1.4. If the patient experiences shortness of breath, tachypnea, wheezing, and/or bronchial constriction, the following should be done\textsuperscript{4,7,11,13} (\textit{UW Health GRADE LOW quality evidence, strong recommendation})

- **5.1.4.1.** Administer oxygen via oxy-mask or nasal cannula, whichever device is available.
- **5.1.4.2.** Administer albuterol 2.5 mg/3 mL by nebulization.
- **5.1.4.3.** Administer dexamethasone 10 mg intravenously.
- **5.1.4.4.** Monitor for patient to return back to baseline
  - **5.1.4.4.1.** Resolution of symptoms.
- **5.1.4.5.** If the patient returns to baseline, in collaboration with the provider and pharmacist, the medication-specific administration instructions should be referenced to determine if, and/or at what rate to restart the infusion.

5.1.5. If the patient experiences hypotension (decrease in systolic blood pressure of >20 mmHg), the following should be done\textsuperscript{4,7,11,13} (\textit{UW Health GRADE LOW quality evidence, strong recommendation})

- **5.1.5.1.** Administer sodium chloride 0.9% 500 milliliter bolus run wide open.
- **5.1.5.2.** Administer dexamethasone 10 mg intravenously.
- **5.1.5.3.** Monitor for patient to return back to baseline
  - **5.1.5.3.1.** Blood pressure within 10% of original value.
- **5.1.5.4.** If the patient returns to baseline, in collaboration with the provider and pharmacist, the medication-specific administration instructions should be referenced to determine if, and/or at what rate to restart the infusion.

5.1.6. If the patient experiences severe bronchial constriction, it may be appropriate to call a code blue and consider administration of epinephrine 1 mg intramuscularly per provider\textsuperscript{1,7} (\textit{UW Health GRADE LOW quality evidence, strong recommendation})

5.1.7. If the patient experiences hypotension and does not respond to the fluid bolus, a code blue should be called and administration of epinephrine 1 mg
intramuscularly should be considered (UW Health GRADE LOW quality evidence, strong recommendation)

5.2. Clinical judgment should always be used when assessing whether or not to administer emergency medications (UW Health GRADE LOW quality evidence, strong recommendation)

5.2.1. Populations who may require dose reductions of emergency medications and/or additional monitoring after administration include, but are not limited to (UW Health GRADE LOW quality evidence, strong recommendation)

5.2.1.1. Elderly patients
5.2.1.2. Diabetics
5.2.1.3. Patients with decreased renal function
5.2.1.4. Patients with baseline lung dysfunction
5.2.1.5. Allergies to other medications or environmental agents

6. The patient should be monitored for 15-30 minutes, depending on the severity of the symptoms¹,² (UW Health GRADE LOW quality evidence, strong recommendation)

6.1. If patient returns to baseline, in collaboration with the physician and pharmacist, the infusion should be restarted

6.1.1. The infusion should be restarted at the last tolerated rate or a lower rate, depending on the medication being infused

6.2. If symptoms worsen, the patient should be reassessed and additional emergency medications should be administered in collaboration with the provider (UW Health GRADE LOW quality evidence, strong recommendation)

6.2.1. If symptoms continue to worsen (e.g., significant decrease in blood pressure, worsening hives or itching, increased oxygen needs) it may be appropriate to call a rapid response/code blue (UW Health GRADE LOW quality evidence, strong recommendation)

7. If the patient does not return to baseline after emergency medication administration, the infusion should be discontinued and collaboration with the provider should determine next steps (UW Health GRADE LOW quality evidence, strong recommendation)

8. Documentation (UW Health GRADE LOW quality evidence, strong recommendation)

8.1. The nurse should document the infusion, infusion rate, reaction, and consequences of the reaction in the electronic medical record

8.1.1. Consequences include restarting the infusion, discontinuing the infusion, and/or patient admission into the hospital

8.1.2. Emergency medications administered can be seen on the medication administration record (MAR)

UW Health Implementation

Potential Benefits:
- Standardized approach to initial management of hypersensitivity reactions
- Increased patient safety
- Maximized efficiency in chemotherapy administration

Potential Harms:
- Inappropriate administration of emergency medications
Qualifying Statements:
- Recommendations are based upon available clinical evidence and expert opinion as indicated by the level of evidence and strength of recommendation
- Patient-specific characteristics and experiences may require deviation from these recommendations
- Recommendations included in this guideline are subject to change with publication of additional evidence

Pertinent UW Health Policies & Procedures
1. Beacon Protocols

Patient Resources
- None identified

Guideline Metrics
- None planned

Implementation Plan/Clinical Tools
1. Guideline will be posted on u-Connect in a dedicated location for Clinical Practice Guidelines.
2. Release of the guideline will be advertised in the Physician/APP Briefing newsletter.
3. Content and hyperlinks within clinical tools, documents, or Health Link related to the guideline recommendations (such as the following) will be reviewed for consistency and modified as appropriate.

Disclaimer
Clinical practice guidelines assist clinicians by providing a framework for the evaluation and treatment of patients. This guideline outlines the preferred approach for most patients. It is not intended to replace a clinician’s judgment or to establish a protocol for all patients. It is understood that some patients will not fit the clinical condition contemplated by a guideline and that a guideline will rarely establish the only appropriate approach to a problem.
Appendix A. Evidence Grading Scheme(s)

Figure 1. GRADE Methodology adapted by UW Health

GRADE Ranking of Evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>We are confident that the effect in the study reflects the actual effect.</td>
</tr>
<tr>
<td>Moderate</td>
<td>We are quite confident that the effect in the study is close to the true effect, but it is also possible it is substantially different.</td>
</tr>
<tr>
<td>Low</td>
<td>The true effect may differ significantly from the estimate.</td>
</tr>
<tr>
<td>Very Low</td>
<td>The true effect is likely to be substantially different from the estimated effect.</td>
</tr>
</tbody>
</table>

GRADE Ratings for Recommendations For or Against Practice

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>The net benefit of the treatment is clear, patient values and circumstances are unlikely to affect the decision.</td>
</tr>
<tr>
<td>Weak/conditional</td>
<td>Recommendation may be conditional upon patient values and preferences, the resources available, or the setting in which the intervention will be implemented.</td>
</tr>
</tbody>
</table>
Appendix B: Summary of Key Practice Recommendations

Figure 2: Initial Management of Hypersensitivity Reactions

If patient experiences a reaction – STOP INFUSION and assess

Obtain BP, HR, RR, O₂ saturation, temperature*
Perform focused physical assessment†

Notify provider(s)

If major symptoms - evaluate symptom type (refer to Table 1)

Administer emergency medications (Table 1)

Monitor 15-30 minutes, depending on the severity of symptoms (Table 1)

If symptoms worsen, re-administer emergency medications as needed

If patient returns to baseline, restart infusion‡

If patient returns to baseline, restart infusion‡

If patient does not return to baseline, discontinue infusion∆

If symptoms do not require intervention and no change in vital signs from baseline, allow 15-30 mins for symptoms to resolve

Restart infusion‡

Effective 08/19/2021. Contact CCKM@uwhealth.org for previous versions.

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Contact: CCKM@uwhealth.org Last Revised: 08/2021
*Take temperature if patient experiences flushing or chills
†Focused physical assessment – evaluate patient depending on the symptoms they are experiencing
Example: if patient is experiencing flushing, look for rash or urticaria
‡Restart infusion in collaboration with provider
∆If symptoms continue worsen (decrease in BP, worsening hives/itching, increased oxygen needs), it may be appropriate to call a rapid response or a Code Blue

<table>
<thead>
<tr>
<th>Table 1.</th>
<th>Symptoms*</th>
<th>Emergency Medication(s) to Administer</th>
<th>Monitoring</th>
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<td>Urticaria (hives) Itching Flushing</td>
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<td>Return to baseline = resolution of urticaria, itching, flushing or swelling</td>
<td></td>
</tr>
<tr>
<td>Swelling of the lips and tongue</td>
<td>Diphenhydramine 50 mg IV push + Famotidine 20 mg IV push over at least 2 minutes + Dexamethasone 10 mg IV push</td>
<td>Return to baseline = resolution of swelling</td>
<td></td>
</tr>
<tr>
<td>O₂ saturation &lt; 90%</td>
<td>Oxygen via oxy-mask or nasal cannula</td>
<td>Return to baseline = increased O₂ sat to &gt; 90%</td>
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</tr>
<tr>
<td>Shortness of breath Tachypnea (&gt;20 breaths per minute) Wheezing Bronchial constriction†</td>
<td>Oxygen via oxy-mask or nasal cannula + Albuterol 2.5 mg/3 mL by nebulization + Dexamethasone 10 mg IV push</td>
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<td>Hypotension (decrease in systolic blood pressure of &gt;20 mmHg)‡</td>
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*if experiencing ANY of the symptoms within a category, administer the appropriate associated medications (patient does NOT need to be experiencing all symptoms)
†If patient experiences severe bronchial constriction, it may be appropriate to call a rapid response/code blue and consider administration of epinephrine intramuscular (IM)
‡if patient does not respond to fluid bolus, call a rapid response/code blue and consider administration of epinephrine IM
References