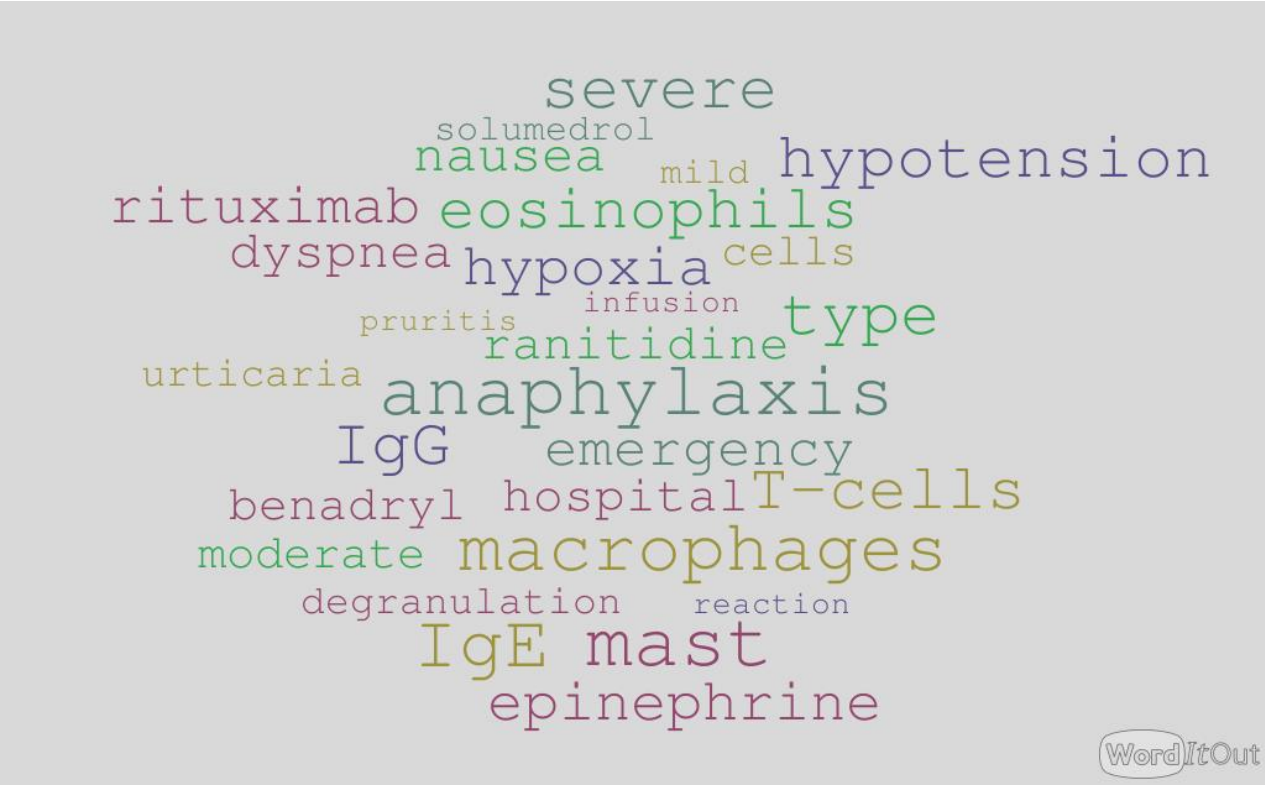
Infusion reactions curriculum



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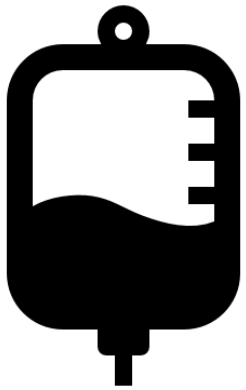
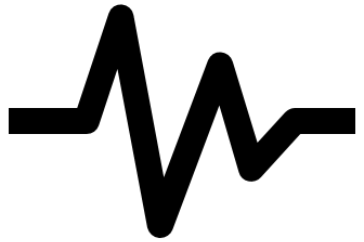
Objectives

- Distinguish between four types of hypersensitivity reactions
- Be able to recognize symptoms and signs of mild, moderate, and severe reactions
- Recognize basic management principles for drug sensitivity reactions

Why is this important?





- Infusion therapies are becoming standard in many fields
- High rate of infusion reactions:
  - Rituximab – 27% of RA with first infusion; <1% severe
  - Infliximab – 20% with first infusion; <3% severe
  - Tocilizumab – 8% with first infusion; 0.2% severe

Hypersensitivity Reaction Types

Type	Immune response	Pathophysiology	Clinical symptoms	Timing
1	IgE	Mast cell and basophil degranulation	Anaphylactic shock Angioedema Urticaria Bronchospasm	1-6 hours
2	IgG and complement (C')	IgG and C'-dependent cytotoxicity	Cytopenia	5-15 days
3	IgM or IgG and complement	Immune complex deposition	Serum sickness Urticaria Vasculitis	7-21 days
4	Cell mediated immunity	Monocytic, eosinophilic, or neutrophilic inflammation Keratinocyte death mediated by CD4/8	Eczema DRESS, maculopapular rash AGEP SJS/TEN	Days to weeks

Immediate Hypersensitivity Reactions

Mechanism	Timeline	Clinical Features
IgE-mediated	Usually after uneventful prior exposure	Urticaria, atopy, anaphylaxis
IgG-mediated	Onset usually after several exposures	Bloating, nausea, headaches
Cytokine release syndrome (anaphylactoid, non-IgE mediated)	Onset varies; immediate to prolonged	Fever and chills

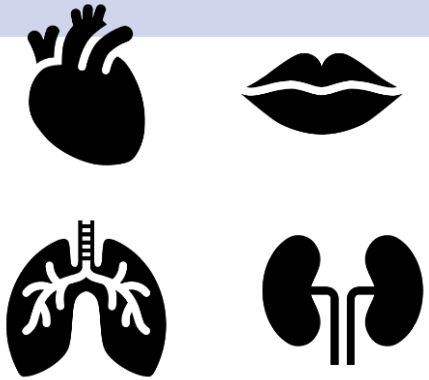
Clinical presentation by severity

Mild

- Limited to one organ system and mild

Moderate

- At least 2 organ systems but hemodynamically normal



Severe

- At least 2 organs systems + hypotension, and/or hypoxia (<92%)

HR BP

Management by severity

Mild (grade 1)

Continue infusion

Moderate (grade 2)

Decrease rate by 50%/ hold and restart at lower rate

Anti-histamines, acetaminophen

Severe (grade 3-4)

Stop infusion

Anaphylaxis algorithm

Activate emergency response

ABC

- IM Epinephrine (1mg/ml) – 0.3-0.5 IM q5-15 min

ABC (cont.)

- Recumbent position
- Give oxygen
- Give IV fluids
- Albuterol PRN for bronchospasm

Adjuncts

- Diphenhydramine 25-50 mg IV, H2-blocker (urticaria, itching)
- Methylprednisolone 125 mg IV
- Telemetry monitoring, continuous pulse ox

Refractory symptoms

- Epinephrine drip- 0.1mcg/kg/min
- Glucagon – BB may prevent response to epinephrine – 1-5 mg IV over 5 min, then 5-15 mcg/min infusion → can cause vomiting

Take Home Points

- Infusion therapies are becoming more and more common and it is important to recognize their severity and know how to manage them
- Anaphylaxis occurs when 2 or more system are involved; anaphylactic shock is associated with hemodynamic instability
- IM epinephrine is key in management and there are NO contraindications
- Fluids, anti-histamines, steroids, and H2-blockers come after epinephrine for supportive care

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Acknowledgments

- Study PIs: Dr. Lisa Criscione-Schreiber and Dr. Elizabeth Hankollari
- Duke Learning and Development Center: Dr. Sophia Stone, Stephen Toback, Devon Henry