Anaphylaxis: Signs, symptoms, and pathophysiology

Brian A. Snyder
Otterbein University
brian.snyder@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn

Recommended Citation
https://digitalcommons.otterbein.edu/stu_msn/160

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.
**Anaphylaxis: Signs, symptoms, and pathophysiology**

Brian Snyder BSN, CN, NRP
Otterbein University, Westerville, Ohio

**Underlying Pathophysiology**

- A systemic, immediate, hypersensitivity reaction produced by immunological interaction of mediators with mast cells and basophils (Lieberman, 2013).
- Type II hypersensitivity reactions result in the destruction of autoantigens by complement, as in a late phase. The early phase is generated by mast cell and basophil mediators that also initiate the late phase events (Casey, 2013).
- Most cases of anaphylaxis are immunoglobulin E (IgE) mediated. Antibodies are bound to a particular allergen to cause mast cells and basophils, resulting in their activation and degranulation (Arnold, & Williams, 2011).
- A variety of changes occur in the body: including histamine, bradykinin, tumor necrosis factor, platelet activating factor, bradykinin, histamine, serotonin, factor X, and several types of interleukin (Arnold, & Williams, 2011).

**Significance of Pathophysiology**

- Histamine is the main component of granules and, once released, acts mainly via H1 receptors to trigger vasodilation and increased vascular permeability (Casey, 2013).
- Histamine is also released by the smooth muscle in the GI tract causing nausea, vomiting, bloating, abdominal cramps and diarrhea (Casey, 2013).
- Vasodilation of skin vessels may induce urticaria (Casey, 2013).
- Food allergy is the most common trigger of anaphylaxis (Campbell, Li, Nicklas, & Sadosty, 2014).
- No absolute contraindication to H1 receptor activation also causes smooth muscle contraction in the airways, leading to bronchospasm, and in the GI tract causing nausea, vomiting, bloating, abdominal cramps and diarrhea (Casey, 2013).
- Histamine stimulation of H1 receptors in local nerve endings causes pruritus and sometimes pain (Casey, 2013).
- Proteolysis and leukotrienes are even more potent vasoactivators and bronchoconstrictors than histamine. The combined vasoconstrictor effects may be sufficient for loss of up to 35 per cent of circulating volume within 10 minutes (Casey, 2013).
- Anaphylaxis is an emergent, life-threatening condition and quick provider response is essential to the effective treatment of anaphylaxis and, such administration is dependent on correctly diagnosing anaphylaxis (Campbell, Li, Nicklas, & Sadosty, 2014).

**Pathophysiology Process: Case Study**

- A 31-year old anxious appearing woman presents to the emergency department today complaining that she is having an allergic reaction to an unknown source.
- She further states that she is aware of an existing peanut allergy that was described to her in childhood by a parent. The patient states that she is very cautious to not ingest any peanut containing products, so she has never experienced any allergy symptoms that have required medical attention.
- The patient has visible urticaria on her arms and exposed neckled, which also states “hives”. The patient states that she feels a tightness in her chest, and a sensation of nausea; however, she has not “thrown-up”. Initial vital signs are as follows: respiratory rate 15, blood pressure 95/70, oral temperature 37.6°C, heart rate of 100 with a regular radial pulse, on auscultation of the chest, breath sounds are equal, round, and reactive to light at 3 mm., and mucus appears dry with mild to moderate reddening. The patient states her last menstrual period was approximately 4 weeks ago, but has not experienced any changes in her breasts or bladder, has not been otherwise sick. The patient denies illicit drug and/or tobacco use, and drinks 1-2 alcoholic drinks per week. Lastly, the patient describes the only other things in her daily habits that is that yesterday she started a “very strenuous” physical training regimen for an upcoming marathon. There is no significant medical history, and no history of asthma or any allergies (Campbell, Li, Nicklas, & Sadosty, 2014).

**Symptoms**

- **Initial signs and symptoms:**
  - Hives
  - Inflammation
  - **Late phase:**
    - Swelling
    - **Systemic manifestations:**
      - **SKIN:**
        - Swelling/speaking
      - **HEART:**
        - Short of breath, wheezing, repetitive coughing
      - **MOUTH:**
        - Felling something bad is about to happen, anxiety, fear
      - **Gastrointestinal (GI):**
        - Nausea, vomiting, bloating, abdominal cramps and diarrhea
      - **NEURO:**
        - Mental confusion, headache, coma

**Implications for Nursing Care**

- Food allergy is the most common trigger of anaphylaxis in children and adolescents, however other triggers include, but are not limited to drug allergies, chemicals, insect venoms, and exercise (Gupta, 2014).
- Most patients make at least one mistake in administration of autoinjectors; furthermore, most patients make mistakes in administration of epinephrine due to self-administration of the potentially life-saving treatment if the need arises (Trujillo, 2013).
- A large percentage of patients use epinephrine injectors incorrectly; therefore, it is essential that healthcare providers demonstrate for patients the proper use of an epinephrine autoinjector and confirm patient proficiency (Campbell, Li, Nicklas, & Sadosty, 2014).

**References**


**Causess of anaphylaxis**

See the article: http://www.aearlogic.com