Anaphylaxis and other office emergencies

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I have no commercial relationships to disclose
Case Presentation 1

78 year old long-term female patient checks in for appointment at 830am

Primary Reason for Visit: routine DM surveillance
46 year old male, new patient

Primary Reason for Visit: red eye OD x 1 week
Primary Health Providers

➢ Optometrists are increasingly being recognized as primary health providers

➢ With that recognition comes increased responsibility/expectation that we can manage medical emergencies efficiently and effectively

➢ Furthermore, we use agents that can directly cause a medical emergency
Primary Health Providers

➢ With the aging of the population, it may be that office emergencies will become more common occurrences.

Important to remember that the first trained provider on the scene often determines pt’s outcome.
Preparation

➢ Appropriate handling of urgent/emergent medical events in your office will of course require initial and refresher training

➢ Participation in this training should occur for all office staff, not just the professional providers: a team that is cross-trained has many advantages
Preparation: Training

- Maintain current CPR training for all staff (q1-2 year refreshers)

- Maintain training on relevant medical devices
  - Operation of cardio-defibrillator
  - Operation of supplemental oxygen tanks
  - Appropriate delivery of supportive medications that may be used in emergency (e.g. Epi-pen)
Preparation: Training

Mock emergency drills in which all office staff participate should occur on a periodic, scheduled basis.
Preparation: Be organized

Emergency care items (devices/meds) should be:

1) Stored in a specific place
2) Maintained in good working order
3) Replaced when expiration date exceeded

Specific staff person should have responsibility to maintain crash cart/kit on a periodic, scheduled basis
Crash Cart / Kit Items

Epipens  (adult/junior)
Benadryl  (oral)
Xantac  (oral)
Albuterol inhaler
Ipatropium inhaler
Aspirin  (oral)
Orange juice  /  sucrose

Stethoscope
Blood Pressure cuffs
Office Defibrillator (?)
* Evaluate responsiveness / consent

Are you OK? May I help you?

* ABC’s

* Then....

Re-evaluate Responsiveness (AVPU)
Pt account of this episode
Hx of Past episodes / outcomes
Medical hx
Medications
Allergies
Acute Medical Conditions that may be encountered in the OD’s office

- Anaphylaxis
- Respiratory decompensation episodes
- Vascular/blood flow disturbance events
- Seizure events
- Hypoglycemia/Hyperglycemia

For some of these conditions; prompt/appropriate Intervention by you has a MAJOR effect on outcome
Anaphylaxis

- Definition: severe systemic hypersensitivity response

- It is a multisystem disorder, which may include systemic hypotension (shock) and airway compromise

Important to remember that mild acute allergic reactions can progress to anaphylaxis and even death
Anaphylaxis

Risk Factors
- Poorly controlled asthma
- Prior anaphylactic reactions

Recurrence rate in those with prior anaphylaxis
- 40-60% in insect stings
- 20-40% for radiocontrast dyes
- 10-20% for penicillin

Common causes: Meds (antibiotics, ASA, NSAIDS) Food (shellfish, nuts, eggs, wheat) Hymenoptera stings, latex
Anaphylaxis

Pathophysiology

- Mast cell/basophil degranulation
- Multi-Mediator release

Classic anaphylaxis (IgE-mediated)
- requires two separate exposures

Other forms of anaphylaxis occur as well (not IgE mediated): final pathway is shared by all forms of anaphylaxis
Anaphylaxis

Clinical Features (usually occur within 60 minutes of exposure)

- Urticaria
- Angio-edema
- Rhinorrhea
- Conjunctivitis
- Bronchospasm
- Edema of tongue/lips
- Abdominal pain/cramping
- Nausea/vomiting/diarrhea
- Hypotension

- Cutaneous
- Respiratory
- GI
- Vascular
Anaphylaxis

Classic progression of symptoms:

1. Pruritus with urticaria (hives)
2. Fullness feeling in throat
3. Increasing anxiety ***
4. Sensation of chest tightness
5. Shortness of breath
6. Lightheadedness
7. Decreased level of consciousness
8. Respiratory distress
9. Circulatory collapse

Lump/Hoarseness
Anaphylaxis

Diagnosis
➢ Any two body systems involved (cutaneous, respiratory, gastrointestinal, cardiovascular)

Differential Diagnosis
1. Vasovagal reactions
2. Cardiovascular dysfunction
3. Status asthmaticus
4. Seizure disorder
5. Foreign body airway obstruction
6. Mastocytosis

Primarily differentiated by Hx and course
Anaphylaxis Treatment

In suspected anaphylaxis, single MOST IMPORTANT intervention is rapid injection of Epinephrine.
Anaphylaxis Treatment

In suspected anaphylaxis, the most important intervention is rapid injection of Epinephrine. Intramuscular injection (thigh) of 1:1000 dilution of epinephrine (0.2–0.5 cc SQ or IM). Repeated injection indicated q 10-30 minutes if progressive respiratory distress.
Anaphylaxis Treatment

Secondary Treatment

- $H^1$ Antihistamine (e.g. diphenhydramine/benadryl): 25-50 mg
- $H^2$ antihistamine (Zantac) 25 mg po
- Albuterol inhaler may be helpful
- Ipatropium inhaler may be helpful
- Consider Trendelenberg position
Anaphylaxis Treatment summary

- Dr. must calmly take control
- Direct staff member to call 911
- Pay attention to ABC’s
- Give Epi-pen early/repeat if necessary
- Give benadryl/albuterol/ipatropium as needed
- Optimize body position (feet up)
- Begin IV fluid if available
Respiratory Distress

In our offices, most likely causes of acute respiratory difficulties in addition to anaphylaxis are:

- Acute asthma or bronchitis attack
- COPD and/or CHF decompensation
- Foreign body in airway
Acute Asthma in Adults

- Asthma is a chronic inflammatory disorder of the upper airways.

- Often characterized by acute, recurrent episodes of wheezing, SOB, chest tightness, coughing due to variable amount of airflow obstruction.
Acute Asthma in Adults

➢ Affects 4-5% of US population
➢ 5-10% of children
➢ 7-10% of elderly

➢ Appears to be increasing in incidence over past 50 years
Asthma

- Inflammation of airways associated with numerous cell types and many inflammatory mediators.

- Acute inflammation events are similar to anaphylactic reaction.

- Chronic inflammation associated with persistent cell damage.
Asthma Triggers

➢ Viral respiratory infections
   (2-8 weeks of increased airway responsiveness)

➢ Exercise

➢ Environmental conditions
   ▪ Outdoor pollutants/antigens
   ▪ Indoor: mold, dander, dustmites
   ▪ Occupational exposures
   ▪ Medications/foods
Asthma Clinical Features

- Dyspnea
- Wheezing
- Cough (usually unproductive)*

May be using accessory muscles

Usually have tachycardia/tachypnea

Altered mental status indicates impending respiratory arrest
Asthma Risk Factors for Death

- Hx of sudden severe episodes
- Prior intubation for asthma
- Prior admission to ICU for asthma

- Admission or ED visit in past month
- 3 or more ED visits in past yr
- 2 or more admissions in past yr

- Current or recent use of corticosteroids
- Comorbid cardiovascular or pulmonary dz
- Low socioeconomic status (if urban)
Asthma management

**SHORT-TERM**

- Goal is to reverse airflow obstruction
- Primarily achieved via inhaled meds
  - **Short acting B-adrenergic agonists** (albuterol)
  - Do not use salmeterol in acute exacerbations
  - **Anticholinergics** (ipatropium)
  - **Corticosteroids** (dexamethasone)
Asthma management

INTERMEDIATE and LONG-TERM

All patients with asthma require focused and regular medical care

Whether a patient with asthma exacerbation in your office needs urgent / emergent care (including initiation of treatment by you) depends on severity of exacerbation
## Decision on whether you should initiate treatment based on severity of exacerbation

<table>
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<th>mod</th>
<th>severe</th>
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<td>++ Agitated</td>
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<tr>
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<td>yes</td>
<td>paradoxical</td>
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<td><strong>Wheeze</strong></td>
<td>Moderate: End of expiration</td>
<td>Loud, all of expiration</td>
<td>Loud: Inhale and expiration</td>
<td>absent</td>
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<tr>
<td><strong>HR</strong></td>
<td>&lt; 100</td>
<td>100-120</td>
<td>&gt;120</td>
<td>bradycardia</td>
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</table>
Asthma management

For children, asthma characteristics are very similar to adults except that risk for respiratory failure is higher.

Also, respiratory rates and pulse rates are higher in children.

<table>
<thead>
<tr>
<th>AGE</th>
<th>Norm resp</th>
<th>AGE</th>
<th>Norm HR</th>
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<td>&lt; 2 mths</td>
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<tr>
<td>6-8 yrs</td>
<td>&lt; 30/m</td>
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# Asthma management

| If asthma severe, EMS should be activated and airflow enhancing meds should be started |
| If asthma exacerbation meets mild/moderate criteria, airflow enhancing meds should be initiated |
| Pt should be monitored closely and EMS should be activated as worsening can occur even after treatment begun |
COPD exacerbation

Progressive airflow obstruction with an associated inflammatory response to noxious particles or gases

Common symptoms

- Chronic cough
- Sputum production
- Dyspnea
COPD exacerbation

- 4th most common cause of death in US
- 3rd most common cause of hospitalization
- Only leading cause of death that is increasing in prevalence

- COPD affects ~10% of people over 55
- Mortality of patients hospitalized for exacerbation is 5-14%
  (24% if admitted to ICU; 60% in next yr)
COPD exacerbation

- Cigarette smoking accounts for 80-90% of the risk for COPD
- However, only 15% of smokers get COPD

- COPD decompensation caused by such factors as: URI, cardiac dysfunction, smoking, noxious environmental exposures, misuse or adverse reaction to medications
- Results in increasing hypoxia
COPD exacerbation

Clinical Signs:
- Tachypnea
- Tachycardia
- Increased BP
- Cyanosis
- Change in mental status

- May see pursed lip exhalation, accessory muscle use, diaphoresis
COPD exacerbation

Management:

- Increase O\textsuperscript{2} rate/volume
- Inhaled Albuterol (B\textsubscript{2} agonist)
- Inhaled Ipatropium (anticholinergic)
- Activate EMS

- Monitor patient closely for worsening status
CHF exacerbation

**Congestive heart failure**

- Leading cause of hospitalization in people over 65
- Poor prognosis once diagnosed
  - Mortality = 35% in 2 yrs;
- At 6 years post diagnosis, mortality rate is 80% in males; 65% in females
- b-natriuretic peptide: blood test that aids predicting prognosis
CHF exacerbation

- Clinically: see acute severe respiratory distress, hypertension, cool diaphoretic skin, JVD, peripher edema
CHF exacerbation

Management:
- Activate EMS
- Prepare for CPR (monitor ABC’s)

- Of note, clinically it can be difficult to differentiate CHF from other conditions (especially COPD)

Although bronchodilators will not help in CHF, one metered dose will not likely cause significant adverse reactions either
Pulmonary Embolism

Caused by hypercoagulability
(thrombophilia: excess platelets)

Categories:
1. Malignancy
2. Post-surgical (stasis/venous injury)
3. Hormonal: estrogen use/pregnancy
4. Genetic/Inherited
Pulmonary Embolism

Clinical Features

1. SOB/dyspnea
   a) Can be INTERMITTENT
2. Tachypnea
3. Chest Pain
4. Tachycardia, often with Low BP
5. Cardiac arrest

NOTE: Highly variable symptom/sign complex
Pulmonary Embolism

**Treatment**

1. Supportive: ABC’s/CPR as needed
2. If pt seems to have signs and symptoms of PE, advise relatively urgent medical care as PE is a major cause of mortality in this country
SUMMARY: Respiratory compromise management

Pay attention to SOB, dyspnea

Consider inhaled bronchodilators

Provide supportive care (CPR, 911)
Vascular Events

Acute Coronary Syndrome

Ischemic heart dz: leading cause of death in US

Clinical features
- Chest Pain (*discomfort*)
  --radiation to arm/neck/jaw
- Nausea/Vomiting
- Diaphoresis
- Dyspnea
- Lightheadedness

Female symptomology can differ

Unusual fatigue
Sleep disturbance
Shortness of breath
Indigestion
Vascular Events

Treatment Acute Coronary Syndrome

CPR ***
Activate EMS (unless definite angina)
Sublingual NTG
Timely Defibrillation

90% of cardiac deaths occur within 2 hours of chest pain onset (in part due to cardiac denial)
Vascular Events

Cerebrovascular Accident / Stroke

3rd leading cause of death
Leading cause of disability
20% die within year of first stroke
One third less than 65 y.o.

80-90% ischemic;
10-20% hemorrhagic
Vascular Events

Cerebrovascular Accident / Stroke

Multiple clinical presentations given varied vascular distributions and underlying pathophysiologies

Usually characterized by focal acute or sub-acute neurologic deficits
Cerebrovascular accident / stroke

Clinical characteristics

Focal neurologic deficits
- Vision change / diplopia
- Numbness, weakness, tingling: hemi-distribution
- Disorientation/speech problems
- Trouble walking/loss of balance
- Sudden, severe headache
Vascular Events

Specific Issues of Concern in CVA

Acute Severe Headache suggests brain hemorrhage
Vascular Events

Syncope

Transient loss of consciousness

Lack of nutrients to brainstem RAS (reticular activating system):

- Vasovagal
- Orthostatic
- Cardiac
- Idiopathic
Vascular Events

Syncope

Vasovagal etiology: often precipitated by emotional response (pain/fear)

Abnormal/hypersensitive autonomic response leads to vasospasm/brain hypoperfusion

Prodrome usually occurs (blurred vision, pallor, dizziness, nausea, diaphoresis)
Vascular Events

Syncope

Cardiac etiology: Can be sign of serious underlying illness

Orthostatic hypotension: positional

Many medications & comorbid illnesses can trigger syncope
Vascular Events

Syncope Management

Positional: feet up (Trendelenberg)
Hyperventilation maneuver
Assess conditions that led to episode
Consider medical evaluation to rule out cardiac or other important medical etiology
Vascular Events

Treatment

CPR / supportive intervention
Activate EMS as necessary

Driving
Seizure Disorder

Abnormal neurologic episode caused by inappropriate brain neuron discharge

- Epilepsy (brain tendency for seizure)
- Metabolic disorders
- Alcohol/drug withdrawal
- Brain mass / stroke
- Head trauma
Seizure Disorder

Generalized seizures: simultaneous global activation of cerebral cortex neurons causing loss of consciousness

May or may not have motor manifestations (tonic-clonic)

Attacks last 60-90 seconds
Post-ictal confusion/fatigue (up to hrs)
Seizure Disorder

Management

Try to prevent injury / falling

No acute tx indicated

First time seizures need comprehensive neurologic evaluation
Diabetic Hypoglycemia

Hypoglycemia: Rapid CNS effects

- Lethargy/Altered consciousness
- Confusion
- Alteration
- Agitation/combativeness
- Seizure

- Tachycardia
- Anxiety/Nervousness
- Nausea/vomiting
- Tremor
- Palpitations

TREATMENT: Glucose ingestion

e.g. Three or four glucose tablets. 1/2 cup of juice. 1/2 cup regular (not diet) soda.
# Diabetic Hyperglycemia

**Hyperglycemia:** can mimic hypoglycemia symptoms

<table>
<thead>
<tr>
<th>Increased thirst</th>
<th>Tachypnea</th>
</tr>
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<tbody>
<tr>
<td>Frequent urination</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Numbness/tingling in feet</td>
<td>Lethargy/altered consciousness</td>
</tr>
<tr>
<td>Headache</td>
<td>Confusion</td>
</tr>
<tr>
<td>Feeling sick</td>
<td><strong>TREATMENT:</strong> Glucose ingestion even if not sure if symptoms are hyperglycemia is suspected</td>
</tr>
</tbody>
</table>
| Abdominal pain | }
SUMMARY

Important skills:
- Prompt recognition of developing condition
- Calm leadership approach
- Have someone activate EMS
- Supportive treatment
  - CPR
  - Adjunctive airway meds prn
- Smooth, informative handoff to EMS
- Consider implementing regular disaster drills