

The EMS Praxis for Anaphylaxis



***Jeffrey M. Goodloe, MD, NREMT-P,
FACEP***

***Medical Director, Medical Control Board
EMS System for Metropolitan Oklahoma City & Tulsa
Professor & EMS Section Chief***

***Department of Emergency Medicine
University of Oklahoma School of Community Medicine***

Why Anaphylaxis?

Is there really anything new
about an illness that's so old?



Praxis

- Practice as distinguished from theory
- Accepted practice or custom
- **Acts which shape and change the world**



Take Away Goal

- Optimize anaphylaxis outcomes by EMS
 - Patient assessment
 - Clinical intervention
 - The right drug in the right hands at the right time



The face of anaphylaxis?



40 year old female AMS

- Called a friend mins earlier
- Felt funny
- Unresponsive
- BP < 60 mmHg sys
- No urticaria
- No angioedema



World Allergy Organization (WAO) Guidelines for Assessment & Management of Anaphylaxis

Curr Opin Allergy Clin Immunol.
2012;12(4):389-399



WAO Clinical Diagnosis of Anaphylaxis

- “Highly likely when any one of the following three criteria is fulfilled:”

1: **Sudden onset** of an illness (minutes to several hours), with involvement of the **skin, mucosal tissue**, or both (e.g. generalized hives, itching or flushing, swollen lips-tongue-uvula) **AND** at least one of these:

Sudden **respiratory** symptoms and signs

Sudden **reduced BP** or symptoms of end-organ dysfunction



WAO Clinical Diagnosis of Anaphylaxis

- “Highly likely when any one of the following three criteria is fulfilled:”

2: **Two or more** of the following that occur **suddenly after exposure** to a likely allergen or other trigger for that patient (mins to sev hrs):

- Sudden **skin or mucosal** symptoms and signs
- Sudden **respiratory** symptoms and signs
- Sudden **reduced BP** or symptoms of end-organ dysfunction
- Sudden **gastrointestinal** symptoms



WAO Clinical Diagnosis of Anaphylaxis

- “Highly likely when **any one** of the following three criteria is fulfilled:”

3: Reduced BP after exposure to a known allergen for that patient (mins to several hrs):

Infants/children = age specific or >30% drop

Adults = < 90mmHg sys or >30% drop baseline



WAO Definitions

- Not just theory or expert consensus
- Validated in retrospective cohort of ED pts
 - Sensitivity 96.7%, 95% CI 88.8 – 99.9
 - Specificity 82.4%, 95% CI 75.5 – 87.6



Key Definition Takeaway

***Anaphylaxis can
manifest solely as
cardiovascular collapse***



Typical triggers

- Food – most common children/adolescents
 - Nut response can be particularly severe
- Stinging insects (hymenoptera envenomation)
 - Honey bees are the highest risk
 - Don't forget fire ants are in this classification
- Iatrogenic
 - Neuromuscular blocking agents
 - Latex
 - Antibiotics



WAO Emergency Care Guidelines

- Have a written protocol – recognition/treat
- Remove exposure to the trigger
- Assess CABs, mental status, skin, and weight
- Inject epi 0.01 mg/kg of 1:1000 (1 mg/mL)
 - **Up to 0.5 mg adult IM**
 - Up to 0.3 mg child IM
 - Repeat if needed in 5-15 minutes



WAO Emergency Care Guidelines

- Oxygen for respiratory distress
- IV fluid resuscitation
 - 1-2 liters NS
 - 5-10 mL/kg in first 5-10 minutes adult
 - 10 mL/kg in first 5-10 minutes child
- Reassess frequently and regularly



Treatment that makes a difference



Are these on your BLS apparatus?



The Role of EMD Professionals in Anaphylaxis?

EMD

ADVISE TO AVOID PHYSICAL EXERTION
OR ENVIRONMENTAL STRESS (TEMP EXTREMES).
DO NOT MOVE THE PATIENT UNLESS IN DANGER
OPEN AIRWAY IF NOT ALERT AND INEFFECTIVE BREATHING

Give Epinephrine autoinjector if
prescribed for same/similar symptoms.



The Role of BLS Professionals in Anaphylaxis?

EMR

EMT

GENERAL SUPPORTIVE CARE

OBTAIN VITAL SIGNS

O₂ VIA NC, NRB, OR BVM AS APPROPRIATE

APPLY CARDIAC MONITOR (if equipped)

ASSIST PT WITH PT'S OWN ALBUTEROL INHALER/NEBULIZER (when applicable)

EMT OR HIGHER LICENSE:

FOR ANAPHYLAXIS ONLY

ADULT: EPINEPHRINE 1:1000 0.3 mg (0.3 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH

PEDIATRIC: EPINEPHRINE 1:1000 0.15 mg (0.15 mL) AUTOINJECTOR INTRAMUSCULAR INJECTION IN THIGH

OLMC ORDER ONLY FOR EPINEPHRINE IF PT ≥ 50 YEARS OLD, HEART ILLNESS HISTORY, OR BLOOD PRESSURE > 140/90 mmHg

MEASURE END-TIDAL CO₂ & MONITOR WAVEFORM CAPNOGRAPHY (if equipped, ** Mandatory use if pt intubated)

ADULT: APPLY Bi/CPAP IF INDICATED (if equipped)

PLACE SUPRAGLOTTIC AIRWAY IF INDICATED & ONLY IF BVM VENTILATIONS INEFFECTIVE

ADULT & PEDIATRIC WEIGHT ≥15 kg: NEBULIZED ALBUTEROL 5mg & IPRATROPIUM BROMIDE 0.5 mg

PEDIATRIC WEIGHT <15 kg: NEBULIZED ALBUTEROL 2.5mg & IPRATROPIUM BROMIDE 0.25 mg

MAY REPEAT ALBUTEROL ENROUTE X 2 AS NEEDED



The Role of ILS Professionals in Anaphylaxis?

- BLS care plus:

EMT- I85

AEMT

ADULT: INTUBATE IF INDICATED
IV ACCESS

ADULT: IV NS TKO IF SYS BP \geq 100 mmHg WITHOUT HYPOTENSIVE SYMPTOMS

ADULT: IV NS 250 mL BOLUS IF SYS BP $<$ 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA,

ADULT: REPEAT UP TO 2 LITERS NS IF SYS BP REMAINS $<$ 100 mmHg WITH HYPOTENSIVE SYMPTOMS & NO SIGNS OF PULMONARY EDEMA

PEDIATRIC: IV NS TKO IF SYS BP \geq (70 + 2x age in years) mmHg

PEDIATRIC: IV NS 20 mL/kg BOLUS IF SYS BP $<$ (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA

REPEAT UP TO 60mL/kg IF SYS BP REMAINS $<$ (70 + 2x age in years) mmHg & NO SIGNS OF PULMONARY EDEMA



The Role of ALS Professionals in Anaphylaxis?

- BLS + ILS care plus:

PARAMEDIC

MILD REACTION (RASH, ITCH, HIVES) ANTIHISTAMINE

ADULT: DIPHENHYDRAMINE 50 mg IM/IVP

PEDIATRIC: DIPHENHYDRAMINE 1 mg/kg IM/IVP TO MAX OF 50 mg

MODERATE REACTION (SOB, WHEEZING) ANTIHISTAMINE + BRONCHODILATOR + STEROID

DIPHENHYDRAMINE ADMINISTRATION AS IN MILD REACTION & BRONCHODILATOR ADMINISTRATION AS IN EMT ABOVE

ADULT: METHYLPREDNISOLONE 125 mg IM/IVP

PEDIATRIC: METHYLPREDNISOLONE 2 mg/kg IM/IVP, MAX 125 mg

SEVERE REACTION/ANAPHYLAXIS (ANY MILD/MODERATE SX AND/OR SYS BP <100 mmHg ADULT OR < (70 + 2x age in years) mmHg PEDIATRIC)

VASOCONSTRICTOR + ANTIHISTAMINE + BRONCHODILATOR + STEROID

ADULT: EPINEPHRINE 1:1000 0.5 mg (0.5 mL) IM

PEDIATRIC: EPINEPHRINE 1:1000, 0.01 mg/kg, IM NOT TO EXCEED 0.3 mg

DIPHENHYDRAMINE ADMINISTRATION & BRONCHODILATOR ADMINISTRATION AS IN MILD REACTION; STEROID ADMINISTRATION AS ABOVE

IF REFRACTORY ANAPHYLAXIS, ADMINISTER INTRAVASCULAR EPINEPHRINE 1:10,000

ADULT: EPINEPHRINE 1:10,000 1 mg SLOW IV/IOP (OVER 3 MINUTES)

PEDIATRIC: EPINEPHRINE 1:10,000, 0.01 mg/kg SLOW IV/IOP (OVER 3 MINUTES)

ADULT: MEDICATION ASSISTED INTUBATION IF INDICATED

CONTINUOUS ASSESSMENT & TREATMENT PER APPLICABLE PROTOCOL(S)



Recent Anaphylaxis Research Abstracts of Interest

American College of Allergy, Asthma,
and Immunology

Annual Meeting Fall 2012



Do Patients Take Allergies Seriously?

- S. Clark et al.
- Weill Cornell Medical College in New York City
- Nearly 12,000 patients presenting to ED
 - 2002 – 2008
 - **25% with severe anaphylaxis**
 - **Less likely to carry epi and see allergist in prior yr**



Do Patients Know EpiPen Use?

- R. Chaudhry
- Univ of Medicine & Dentistry of New Jersey in Newark
- Most pts thought they had good knowledge (91%)
- None knew about rubbing injection site post injection
- **Most had problem identifying injection side of the autoinjector!**
- Less than 3 mos post-training 71-86% correct steps
- More than 3 mos post-training 29-57% correct steps
- N= 11



Do Paramedics Give Epi?

- N El Sanadi et al.
- Broward County, Florida EMS
- Retrospective review Oct 2010 – June 2012
 - 92 patients allergic reaction
 - 18 self medicated with epi
 - **52 with anaphylaxis**
 - **8 (15%) given epi by medics**
 - 25 (48%) oxygen; 6 (11%) IV fluids; 13 (25%) steroids
 - 10 (19%) albuterol; 42 (81%) diphenhydramine



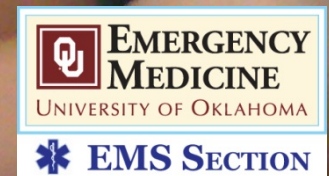
Do Docs Do Better?

- M Zitt et al.
- Survey of 318 physicians – primary/emergency
- Approx 10% emergency didn't give epi
- Approx 20% primary/peds didn't give epi
- Nearly 50% leave the ED without epi Rx
- Few got referred to an allergist





5 Critical Events in EMS Anaphylaxis Care



1- System Activation



2 – Recognize Anaphylaxis

“It’s not always wheezing and hives”



3 – Early Epinephrine Administration



4 – Respiratory/Hemodynamic Support



5 – Destination Care





Protocol Resources

okctulomd.com

“Training & Protocols” tab

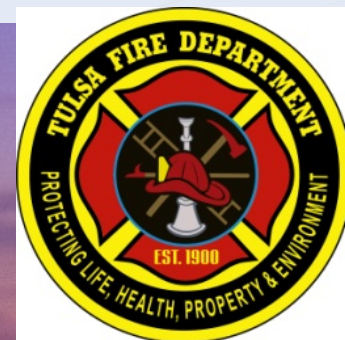
MCB Pre-Hospital Operational Standards

2013 State of Oklahoma EMS Protocols
Field & Reference Editions





TULSA



**EMERGENCY
MEDICINE**
UNIVERSITY OF OKLAHOMA



EMS SECTION



Contact Info:
jeffrey-goodloe@ouhsc.edu
Office of the Medical Director
405-297-7173