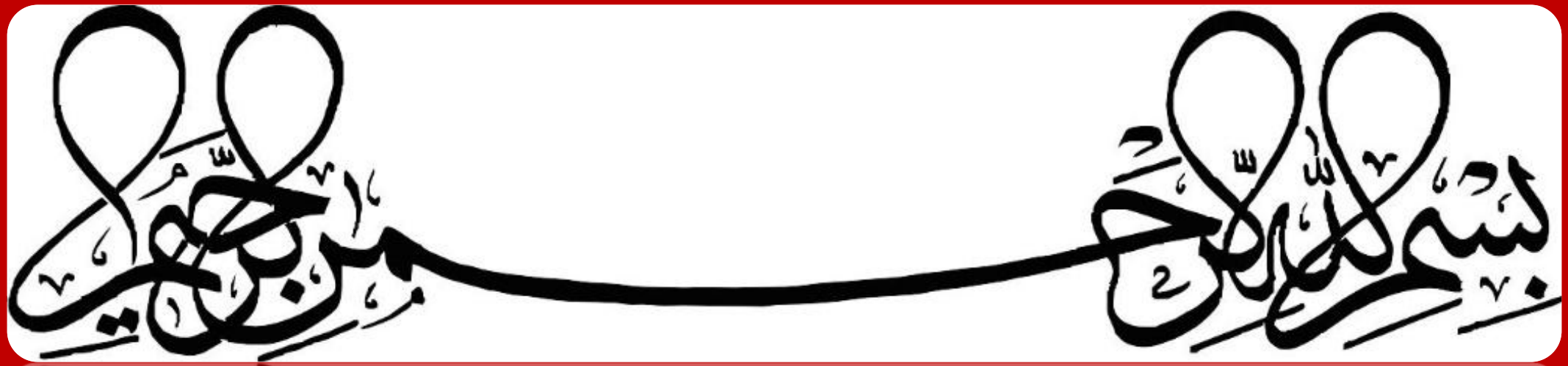
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Anaphylaxis in Emergency Room

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INTRODUCTION

Anaphylaxis is an acute, potentially life-threatening, multisystem syndrome caused by the sudden release of mast cell mediators into the systemic circulation. It most often results from immunoglobulin (Ig)E-mediated reactions to foods, drugs, and insect stings, but any agent capable of inciting a sudden, systemic degranulation of mast cells can produce it.

It can be difficult to recognize because it can mimic other conditions and is variable in its presentation.

Epidemiology and Risk Factors

The exact incidence of anaphylaxis is not known, but recent evidence suggests that it is increasing and Recent literature suggests that over 50% of those patients presenting to EDs were misdiagnosed, and up to 80% did not receive appropriate first line treatment.

increased incidence of anaphylaxis:Pregnant women, infants, teenagers, and elders

Other risk factors include atopy , emotional stress, seasonal occurrence in summer to fall months, higher socioeconomic status, residing in northern locations (potentially correlating with vitamin D levels), and the presence of acute infection.

The dose, frequency,duration, and route of administration of a drug can also affect the tendency to develop an anaphylactic reaction.

ACE inhibitors /Beta-blockers.

Common Triggers for Anaphylaxis

activating mast cells or basophils can potentially precipitate an anaphylactic reaction(up to 60% of adults and 10% of children, an inciting agen cannot be identified)

Foods

Insect Stings

Drugs

Natural Rubber Latex

Radiocontrast Media

Exercise Induced Anaphylaxis

Idiopathic Anaphylaxis

Clinical Features

vary in duration and severity

Commonly affecting an array of organ systems including the skin (80% to 90% of episodes), respiratory tract (70% of episodes), gastrointestinal tract (30% to 45% of episodes), cardiovascular (10% to 45%), and the central nervous system (10% to 15% of episodes.

Symptoms of anaphylaxis usually occur minutes after an exposure, although some reactions may develop hours after encountering the triggering agent.

BOX 109.5

Clinical Criteria for Diagnosis of Anaphylaxis

Anaphylaxis is 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 (eg, generalized hives, itching or flushing, swollen lips-tongue-uvula) *and at least one of the following:*
   a. Respiratory compromise (eg, shortness of breath, wheeze, cough stridor, hypoxemia)
   b. Reduced BP or associated symptoms of end-organ dysfunction (eg, hypotonia [collapse], syncope, incontinence)
2. Two or more of the following occurring rapidly (minutes to several hours) after exposure to a likely allergen or other trigger for that patient:
   a. Involvement of the skin-mucosal tissue (eg, generalized hives, itch-flush, swollen lips-tongue-uvula)
   b. Sudden respiratory compromise (eg, shortness of breath, wheeze, cough, stridor, hypoxemia)
   c. Sudden reduced BP or symptoms of end-organ dysfunction (eg, hypotonia [collapse], syncope, incontinence)
   d. Sudden gastrointestinal symptoms (eg, crampy abdominal pain, vomiting)
3. Reduced BP after exposure to known allergen for that patient (minutes to several hours):
   a. Infants and children: Low systolic BP (age specific) or greater than 30% decrease in systolic BP*
   b. Adults: Systolic BP of less than 90 mm Hg or greater than 30% decrease from that person's baseline

Low systolic blood pressure for children is defined as <70 mm Hg from 1 month to
1 year old, <70 mm Hg + (2 × age) from 1 to 10 years old
<90 mm Hg from 11 to 17 years old.

Clinical Manifestations of Anaphylaxis and Related Pathophysiologic Changes

ORGAN SYSTEM	REACTION	SYMPTOMS	SIGNS	PATHOPHYSIOLOGIC CHANGES
Respiratory tract				
Upper	Rhinitis	Nasal congestion Nasal itching Sneezing	Nasal mucosal edema Rhinorrhea	Increased vascular permeability Vasodilation Stimulation of nerve endings
	Laryngeal edema	Dyspnea Hoarseness Throat tightness Hypersalivation	Laryngeal stridor Supraglottic and glottic edema	As above, plus increased exocrine gland secretions
Lower	Bronchospasm	Cough Wheezing Retrosternal tightness Dyspnea	Cough Wheeze, rhonchi Tachypnea Respiratory distress Cyanosis	As above, plus bronchiole smooth muscle contraction
Cardiovascular system	Circulatory collapse	Lightheadedness Generalized weakness Syncope Ischemic chest pain	Tachycardia Hypotension Shock	Increased vascular permeability Vasodilation Loss of vasomotor tone Increased venous capacitance
	Dysrhythmias	As above, plus palpitations	ECG changes: Tachycardia Nonspecific and ischemic ST-T wave changes Right ventricular strain Premature atrial and ventricular contractions Nodal rhythm Atrial fibrillation	Decreased cardiac output Decreased mediator-induced myocardial suppression Decreased effective plasma volume Decreased preload Decreased afterload Hypoxia and ischemia Dysrhythmias Iatrogenic effects of drugs used in treatment Preexisting heart disease
	Cardiac arrest		Pulseless ECG changes: Ventricular fibrillation Asystole	

Skin	Urticaria	Pruritus Tingling and warmth Flushing Hives	Urticaria Diffuse erythema	Increased vascular permeability Vasodilation
	Angioedema	Nonpruritic extremity, periorbital and perioral swelling	Nonpitting edema, frequently asymmetrical	Increased vascular permeability
Eye	Conjunctivitis	Ocular itching Increased lacrimation Red eye	Conjunctival inflammation	Stimulation of nerve endings
Gastrointestinal tract		Dysphagia Cramping, abdominal pain Nausea and vomiting Diarrhea (rarely bloody) Tenesmus	Nonspecific	Increased secretion of mucus Gastrointestinal smooth muscle contraction
Miscellaneous central nervous system		Apprehension Sense of impending doom Headache Confusion	Anxiety Seizures (rarely) Coma (late)	Secondary to cerebral hypoxia and hypoperfusion Vasodilation
Hematologic	Fibrinolysis and disseminated intravascular coagulation	Abnormal bleeding and bruising	Mucous membrane bleeding, disseminated intravascular coagulation Increased uterine tone Vaginal bleeding	Mediator recruitment and activation Uterine smooth muscle contraction Bladder smooth muscle contraction
Genitourinary		Pelvic pain Urinary incontinence	Urinary incontinence	

Treatment for Anaphylaxis

EMERGENCY MEASURES (TAKEN SIMULTANEOUSLY)

Remove any triggering agent.

Place patient in supine position.

Begin cardiac monitoring, pulse oximetry, and blood pressure autonomic monitoring.

Begin supplemental oxygen if indicated.

Establish large-bore IV lines (eg, 16 or 18 gauge).

Establish a patent airway.

Be prepared for endotracheal intubation with or without rapid sequence intubation.

Be prepared to use adjunct airway technique (eg, awake fiberoptic intubation, surgical airway).

Start rapid infusion of isotonic crystalloid (normal saline):

Adults: 1000 mL IV in the first 5 minutes in the adult (several liters of normal saline may be required)

Pediatrics: 20 to 30 mL/kg IV increments

ANAPHYLAXIS TREATMENT MEDICATIONS

First-Line Agent

Epinephrine is the first-line medication and should be given immediately at the first suspicion of an anaphylactic reaction.

Adult: 0.3 to 0.5 mg IM (1 : 1000 concentration) in anterolateral thigh every 5 to 10 minutes as necessary

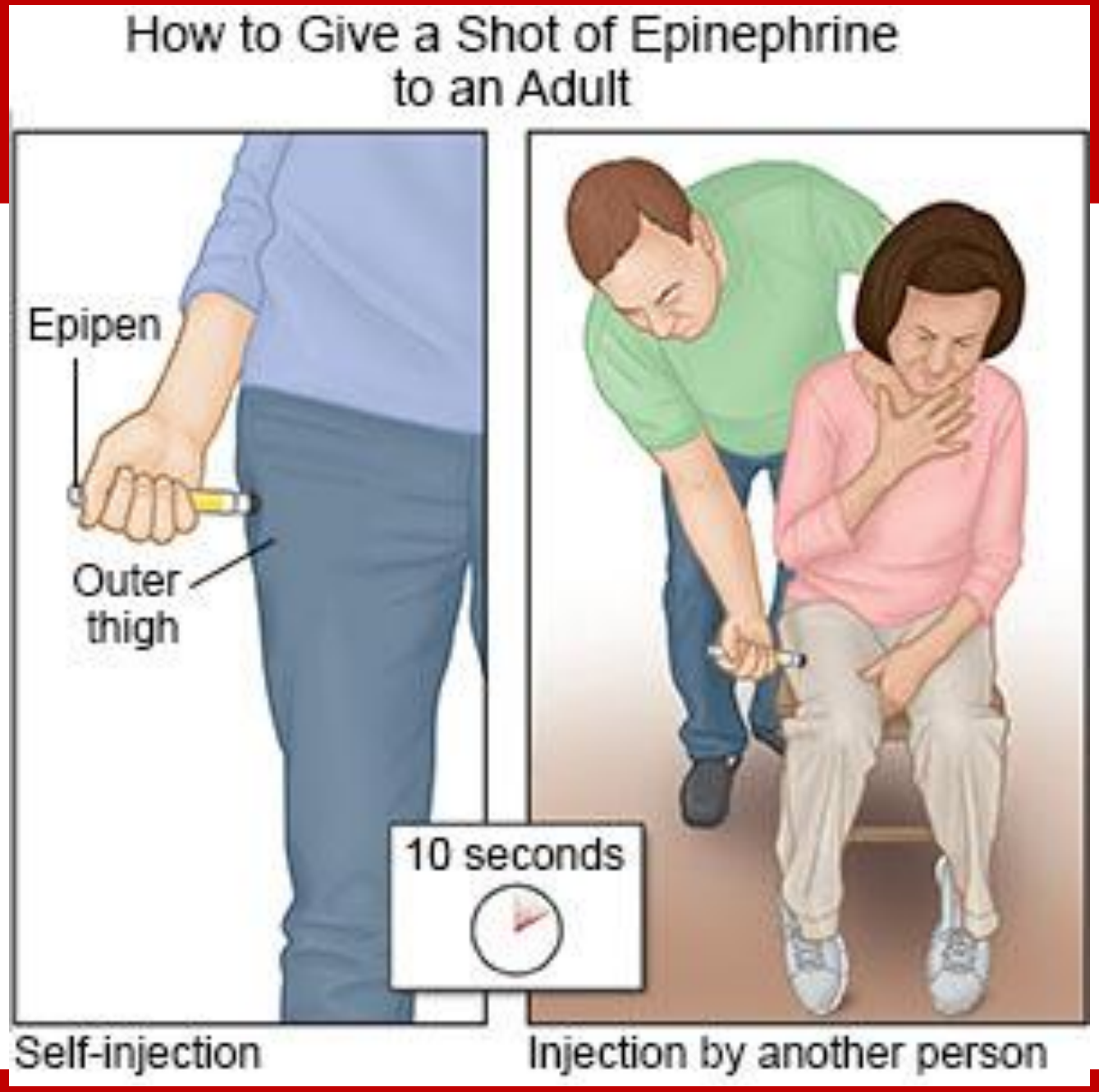
Pediatric: 0.01 mg/kg IM (1 : 1000 concentration) in anterolateral thigh every 5 to 10 minutes as necessary

Alternatively, epinephrine (EpiPen, 0.3 mL; or EpiPen Jr, 0.15 mL) can be administered into anterolateral thigh

Second-Line Agents (Should Not Precede the Administration of Epinephrine)

Antihistamines

Diphenhydramine:	Adults: 50 mg IV or 50 mg oral
	Pediatric: 1 mg/kg IV or oral
Ranitidine:	Adult: 50 mg IV (150 mg oral)
	Pediatric: 1 mg/kg IV or oral


How to Give a Shot of Epinephrine to an Adult
Epipen
Outer thigh
10 seconds
Self-injection
Injection by another person

Aerosolized Beta-Agonists (if Bronchospasm Is Present)

Adult:	Albuterol: 2.5 mg, diluted to 3 mL of normal saline; may be given continuously
	Ipratropium: 0.5 mg in 3 mL of normal saline; repeat as necessary
Pediatric:	Albuterol: 2.5 mg, diluted to 3 mL of normal saline; may be given continuously
	Ipratropium: 0.25 mg in 3 mL of normal saline; repeat as necessary

Glucocorticoids (No Benefit in the Acute Management)

Methylprednisolone:	Adult: 125 to 250 mg IV
	Pediatric: 1 to 2 mg/kg IV
Prednisone/prednisolone:	Adult: 40 to 60 mg oral
	Pediatrics: 1 to 2 mg/kg oral

- **REFRACTORY HYPOTENSION**

Consider continuous IV epinephrine drip (dilute 1 mg (1 mL 1:1000) in 1000 mL of normal saline or D5W to yield a concentration of 1 µg/mL)

Adults: 1 to 10 µg/minute IV (titrated to desired effect)

Pediatrics: 0.1 to 1.5 µg/kg/minute IV (titrated to desired effect)

Dopamine: 5 to 20 µg/kg per minute continuous IV infusion (titrated to desired effect)

Norepinephrine: 0.05 to 0.5 µg/kg per minute (titrated to desired effect)

Phenylephrine: 1 to 5 µg/kg per minute (titrated to desired effect)

Vasopressin: 0.01 to 0.4 units/min (titrated to desired effect

PATIENTS RECEIVING BETA-BLOCKADE

Glucagon: 1 to 5 mg IV over 5 minutes, followed by 5 to 15 µg/min continuous IV infusion

Disposition

Up to 20% of patients may experience a biphasic reaction(within 8 hours but have been reported as far out as 72 hours)

Biphasic reactions are more common in patients who:

have a history of asthma,

ingest the allergen

present with laryngeal edema, wheezing, or gastrointestinal symptom

patients who respond to treatment and experience complete resolution of symptoms can be discharged home after an observation period of 4 to 8 hours

extended observation or hospitalization for patients who

(1) present with protracted anaphylaxis, hypotension or airway involvement

(2) receive IV epinephrine or more than two doses of IM epinephrine

(3) have poor outpatient social support

Prior to discharge

educating the patient about their allergy and anaphylaxis

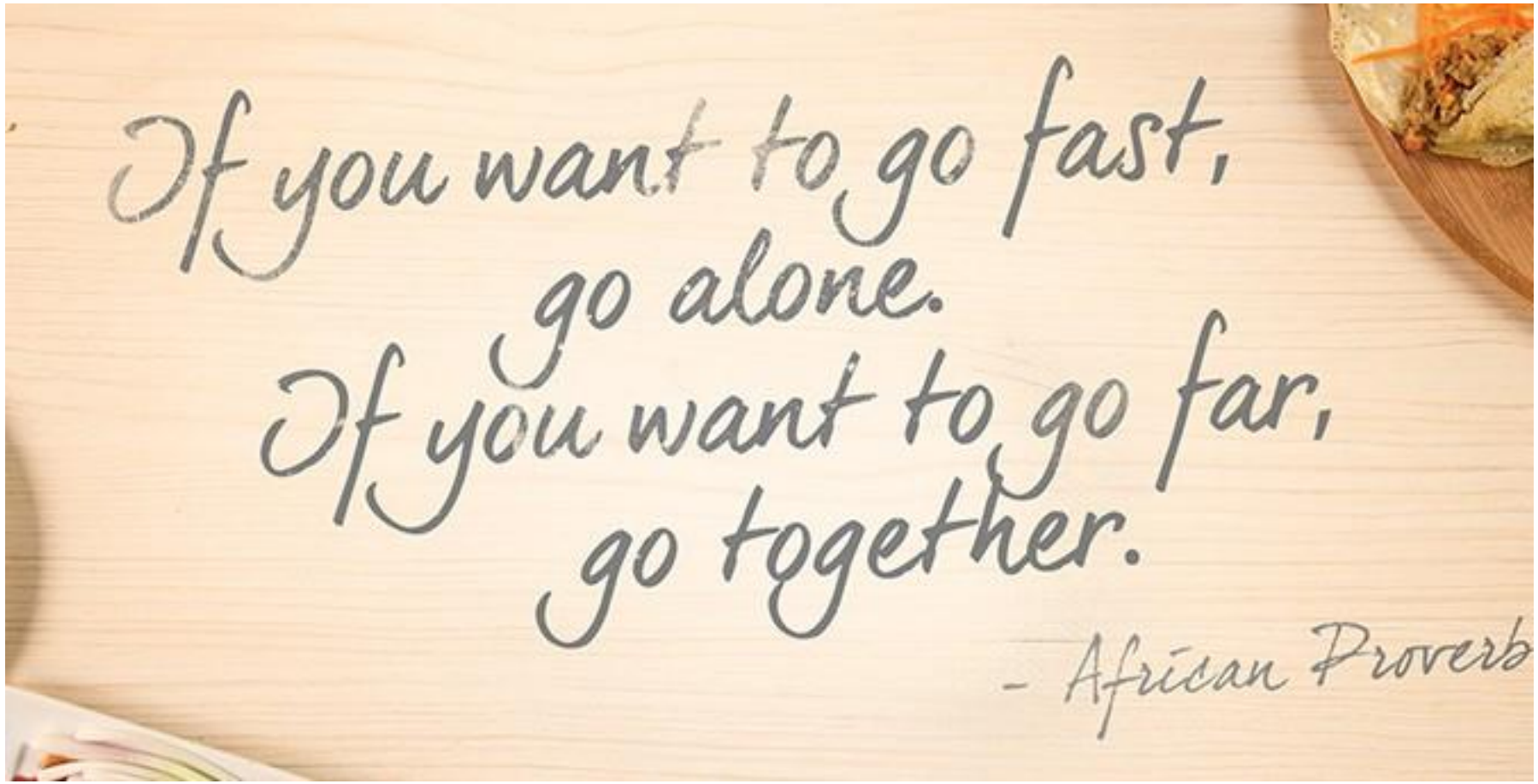
discharged with a prescription for two autoinjectable epinephrine devices, one to remain at their home and the other to be carried with them at all times

Emphasis should be place on timely follow-up, preferably with an allergist-immunologist.

Use medical identification device (eg, bracelet, wallet card).

Table 27-5 Discharge Planning for Patients with Anaphylaxis
Education
Identification of inciting allergen, if possible
Instructions on avoiding future exposure
Instructions on use of medications and epinephrine autoinjector
Advise about personal identification/allergy alert tag
Medications
Diphenhydramine, 25–50 milligrams PO for several days
Prednisone, 40–60 milligrams PO for several days
Epinephrine autoinjector for future reactions
Referral to allergist

Any questions?


If you want to go fast,
go alone.
If you want to go far,
go together.
- African Proverb