Case Discussion

Presenter: R1 李岱晃
Supervisor: VS 蕭蔚全
990602

Discussion

Syncope

- The abrupt and **transient loss of consciousness** associated with **absence of postural tone**
- In general population about 19%
- 1~3% ED visit and admissions in USA

Syncope

- Without any impairment of consciousness
  - Falls
  - Cataplexy
  - Drop attacks
  - Psychogenic pseudo-syncope
  - Transient ischemic attacks (TIA) of carotid origin
- With partial or complete loss of consciousness
  - Metabolic disorders
  - Epilepsy
  - Intoxications
  - Vertebro-basilar transient ischemic attack

Life-threatening conditions

- Cardiovascular syncope
  - Arrhythmia
  - Ischemia (ACS, MI)
  - Structural Abnormalities
- Significant hemorrhage
- Pulmonary embolism
- Subarachnoid hemorrhage

Significant hemorrhage

- Trauma with significant blood loss
- Gastrointestinal bleeding
- Tissue rupture: aortic aneurysm, spleen, ovarian cyst, ectopic pregnancy, retroperitoneal hemorrhage

Cardiovascular syncope

- Arrhythmia
  1. Ventricular tachycardia
  2. Long QT syndrome
  3. Brugada syndrome (RBBB with V1-V3 ST elevation)
  4. Bradycardia: Mobitz type II or 3rd degree heart block
  5. Significant sinus pause >3 seconds
- Structural Abnormalities
  1. Valvular heart disease: aortic stenosis, mitral stenosis
  2. Cardiomyopathy (ischemic, dilated, hypertrophic)
  3. Atrial myxoma
  4. Cardiac tamponade

Other Cause

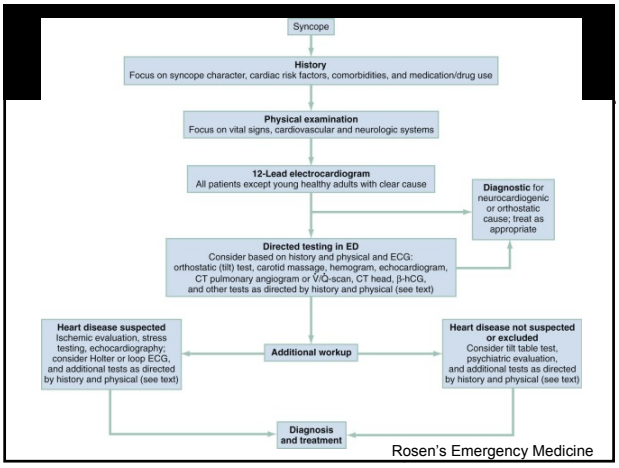
- Neurocardiogenic syncope
- Carotid sinus hypersensitivity
- Orthostatic syncope
- Medication related syncope
  - QT interval prolong drug, β blocker, OHA, etc

History

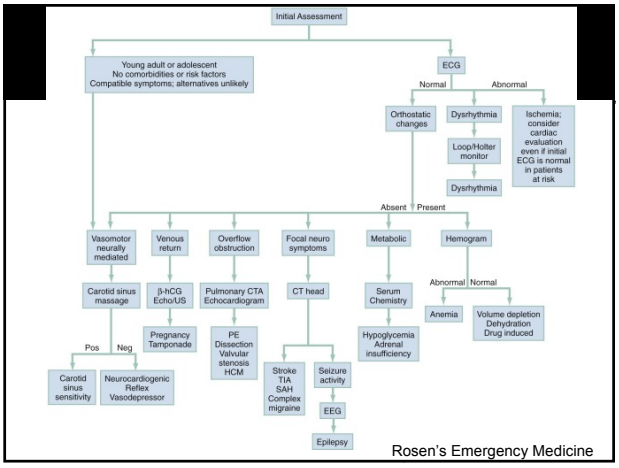
- From patient and witness
- Character of the syncope type
  - Rate of onset, Position, Duration and rate of recovery
- Preceding and post syncope events
- Association symptoms
- Medical history and medication

Examination

- Physical examination (Orthostatic change)
- EKG
- Lab(Routine blood, e-, U/A, etc)
- Image
- EEG



Rosen's Emergency Medicine



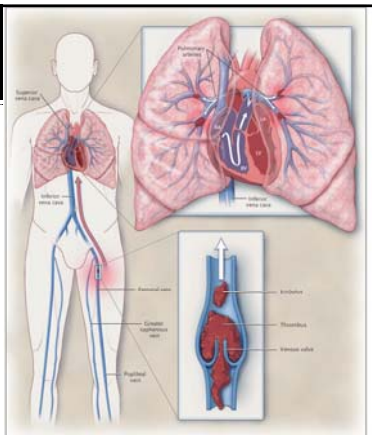
Rosen's Emergency Medicine

San Francisco Syncope Rule

- CHESS
- • **C** - History of congestive heart failure
- • **H** - Hematocrit < 30%
- • **E** - Abnormal EKG
- • **S** - Shortness of breath
- • **S** - Triage systolic blood pressure < 90
- Sensitivity :74-98% and specificity:56%

Pulmonary Embolism

- Pulmonary embolism and deep venous thrombosis represent the spectrum of one disease.
  - About 79% patients with PE have DVT in their legs
  - Up to 50% patients with proximal DVT have PE



N Engl J Med 2008;358:1037-52

Risk factor

- Surgery: Total hip and knee replacement, surgery for hip fracture, trauma and spinal cord injury
- Prolonged air or ground travel
- A sedentary lifestyle and occupations involving long periods of sitting merit awareness
- Advancing age (>40y/o)
- Cancer
- Antiphospholipid antibodies
- Hereditary factors

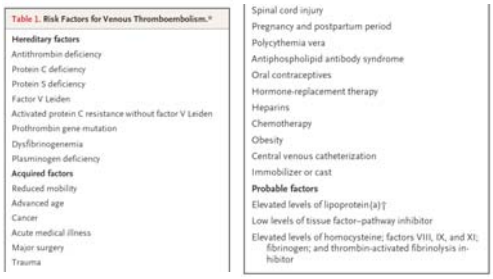


Table 1. Risk Factors for Venous Thromboembolism.*

Hereditary factors	Spinal cord injury
Antithrombin deficiency	Pregnancy and postpartum period
Protein C deficiency	Polycythemia vera
Protein S deficiency	Antiphospholipid antibody syndrome
Factor V Leiden	Oral contraceptives
Activated protein C resistance without factor V Leiden	Hormone-replacement therapy
Prothrombin gene mutation	Heparins
Dysfibrinogenemia	Chemotherapy
Plasminogen deficiency	Obesity
Acquired factors	Central venous catheterization
Reduced mobility	Immobilizer or cast
Advanced age	**Probable factors**
Cancer	Elevated levels of lipoprotein(a)†
Acute medical illness	Low levels of tissue factor–pathway inhibitor
Major surgery	Elevated levels of homocysteine; factors VIII, IX, and XI; fibrinogen; and thrombin-activated fibrinolysis inhibitor
Trauma	

Since as many as 50% of patients diagnosed with PE have no identifiable classic risk factors for thrombosis

N Engl J Med 2008;358:1037-

Symptom and sign

- SOB
- Dyspnea
- Chest pain
- Cough
- Tachypnea
- Tachycardia
- Dizziness or syncope
- Focal chest pain, fever, unilateral rales, hemoptysis
- Evdicine of deep-vein thrombosis
- JVE

Diagnosis

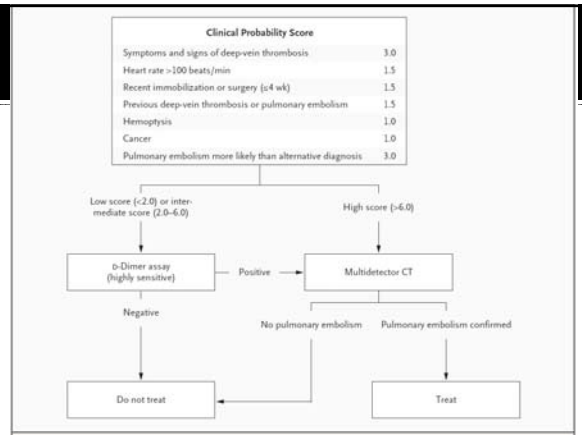
Lab

- ELISA D-dimer:
  - high sensitivity (96 to 98%)
  - ↑ while infection, cancer, trauma, other inflammatory states
- EKG: , tacycarida, S1, Q3, T3 pattern, right bundle-branch block, P-wave pulmonale, or right axis deviation

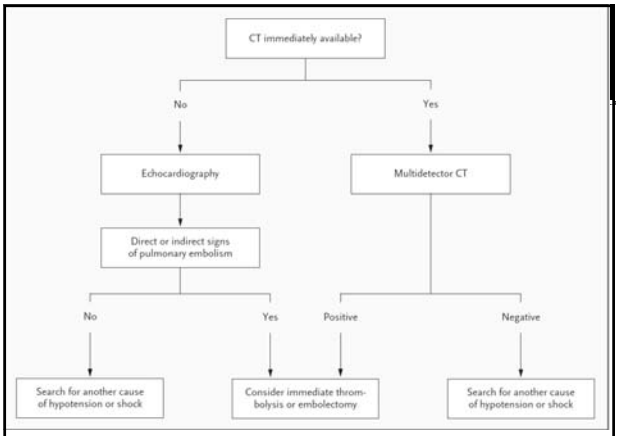
Diagnosis

Image

- CXR
- Ventilation–perfusion scanning
- CTA
- MRI
- Standard pulmonary arteriography
- Imaging for detecting DVT



N Engl J Med 2008;359:2804-13.



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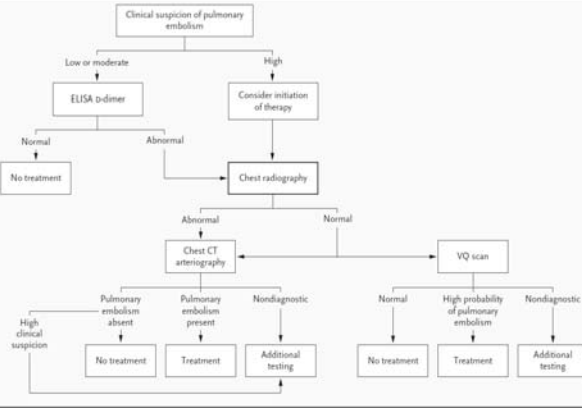

N Engl J Med 2008;359:2804-13

Syncope in PE

- Drop in cardiac output, hypotension , and ↓ cerebral perfusion
- Arrhythmia: Cardiac strain induce by embolism
- Vagal response

Syncope as an emergency department presentation of pulmonary embolism. J Emerg Med 1998; 16:27–31.

Syncope in PE

- Syncope as an initial presentation of pulmonary embolism occurs in 10% of patients
- Patients with acute PE and syncope have similar characteristics to those withoutsyncope.
- Syncope does not seem to determine a poor prognosis.

European Journal of Emergency Medicine 11:208–209

Treatment

- Anticoagulant
- Thrombolysis
- Surgical and Interventional Treatment

Anticoagulant

- Heparin
  - 80 IU/kg as an IV bolus, followed by continuous infusion at the rate of 18 IU/kg/hr
  - Heparininduced thrombocytopenia
- LMWH
  - Not use in patient with arterial hypotension or shock
  - Enoxaparin: 1.0 mg/kg every 12 hr or 1.5 mg/kg once daily
  - Tinzaparin: 175 U/kg once daily
- Fondaparinux
  - 5 mg (BW<50 kg); 7.5 mg (BW 50–100 kg); or 10 mg (BW >100 kg) once daily
  - No use in severe renal impairment

Thrombolysis

- Within 48hrs after S/S: greatest benefit
- 14days: still effective
- Significant risk of bleeding
  - 13% cumulative rate of major bleeding
  - 1.8% rate of ICH or fatal hemorrhage.
- For patient with arterial hypotension or shock

Thrombolysis

Table 2. Thrombolytic Agents and Regimens and Contraindications to Thrombolysis.

Agent	Regimen	Contraindications to Thrombolysis*
Streptokinase†	250,000 U as a loading dose over a 30-min period, followed by 100,000 U/hr over a period of 12–24 hr; accelerated regimen, 1.5 million IU over a 2-hr period‡	Absolute — history of hemorrhagic stroke or stroke of unknown origin, ischemic stroke in previous 6 mo, central nervous system neoplasms, major trauma, surgery, or head injury in previous 3 wk Relative — transient ischemic attack in previous 6 mo, oral anticoagulation, pregnancy or first postpartum week, noncompressible puncture sites, traumatic resuscitation, refractory hypertension (systolic pressure, >180 mm Hg), advanced liver disease, infective endocarditis, active peptic ulcer
Urokinase†§	4400 U/kg of body weight as a loading dose over a 10-min period, followed by 4400 U/kg over a period of 12–24 hr; accelerated regimen, 3 million U over a 2-hr period‡	
Alteplase†	100 mg over a 2-hr period¶; accelerated regimen, 0.6 mg/kg over a 15-min period	
Reteplase*‖	Two bolus injections of 10 U 30 min apart	
Tenecteplase**	30- to 50-mg bolus over a 5–10-sec period, adjusted for body weight (<60 kg, 30 mg; ≥60 to <70 kg, 35 mg; ≥70 to <80 kg, 40 mg; ≥80 to <90 kg, 45 mg; ≥90 kg, 50 mg)	

Surgical and Interventional Tx

- Emergency surgical embolectomy
- Inferior vena cava filters

Treatment

- Treatment Strategies Based on Severity

Table 3. Stratification of Risk of Death Associated with Pulmonary Embolism and Severity-Adjusted Treatment.*

Early Risk of Death	Risk Factor			Recommended Treatment
	Shock or Hypotension (on Clinical Examination)	Right Ventricular Dysfunction (on Echocardiography or Multidetector CT)	Myocardial Injury (on Cardiac Troponin Testing)	
High	Present	Present†	NA‡	Unfractionated heparin plus thrombolysis or embolectomy
Non-high				
Intermediate§	Absent	Present	Present	Low-molecular-weight heparin or fondaparinux; as a rule, no early thrombolysis; monitor clinical status and right ventricular function
	Absent	Present	Absent	
	Absent	Absent	Present	
Low	Absent	Absent	Absent	Low-molecular-weight heparin or fondaparinux; consider outpatient treatment

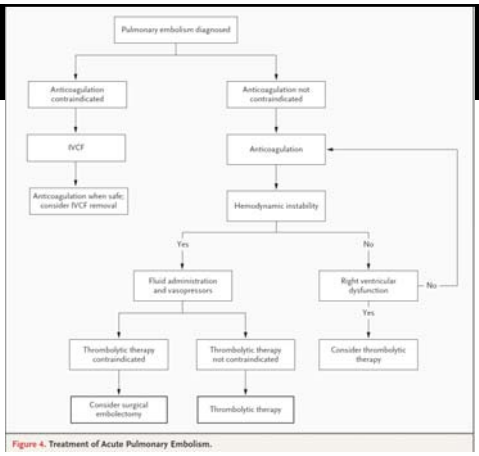

Figure 4. Treatment of Acute Pulmonary Embolism.

Thank You for Your Attention!!