

Top 10 Adult Emergencies

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Emergency Visits*~

- Visits per 100 persons
 - ✓ 1994 - 36 per 100
 - ✓ 2004 - 38.2 per 100
 - ✓ 2006 - 40.5 per 100

*National Hospital Ambulatory Medical Care Survey:
2004 Emergency Department Survey.

~Ambulatory Medical Care Utilization Estimates for 2006

Emergency Visits *

- 2004 - 20% of U.S. adult population made one or more ED visits
- 7.5% made 2 or more visits
- 1994 - 2004 ED visits increased from 93.4 million to 110.2 million (18%)

Emergency Department Visits~

- During 2004, there were about 209 visits to U.S. ED's every minute.
- During this presentation there will be 12,600 ED visits!

Most Common Presentations

- Most frequent principle reasons for visit
 - ✓ Abdominal pain
 - ✓ Chest pain
 - ✓ Fever
 - ✓ Musculoskeletal symptoms
 - ✓ Digestive symptoms
 - ✓ Respiratory symptoms

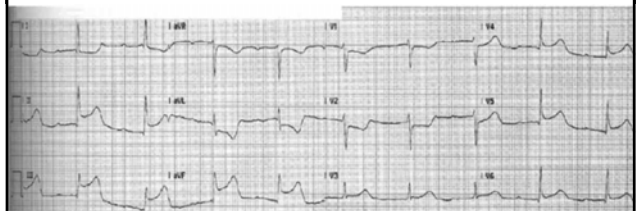
Chest Pain

- Cardiac
 - ✓ ACS, MI, Pericarditis, Aortic Dissection
- Pulmonary
 - ✓ Pulmonary Embolism, Pneumonia, Pneumothorax
- Musculoskeletal
- Gastrointestinal
 - ✓ Reflux, Esophageal rupture

Acuity

- 12.9% Emergent
- 37.8% Urgent
- 21.8% Semiurgent
- 12.5% Nonurgent
- Age >65 higher proportion of Emergent
- 13% Admitted

STEMI



STEMI

- STEMI patients presenting to hospital with PCI capability should be treated within 90 minutes of first medical contact
 - ✓ Note: first medical contact = EMS to balloon

STEMI - PCI

- Transfer arrangements
- Aspirin
- Clopidogrel 600 mg loading dose (<75 yrs of age)*
- Beta blockers
- Unfractionated Heparin- 60u/kg, 4000u max
- No Drips
 - * Cuisset, Frere, et al, J.Am. Coll. Cardiol. 2006,48;1339-1345.

STEMI

- STEMI patients presenting to a hospital without PCI capability, and who cannot be transferred to a PCI center and undergo PCI within 90 min of first contact, should be treated with fibrinolytic therapy within 30 minutes of hospital presentation.
 - ✓ ACC/AHA 2007 STEMI Guidelines

STEMI Guidelines

- *Focused Update of the ACC/AHA Guidelines for Management of Patients With ST-Elevation Myocardial Infarction (Journal of the American College of Cardiology)*
 - ✓ <http://content.onlinejacc.org/cgi/content/full/j.jacc.2007.10.001>
- The full-text guidelines are also available on the Web sites:
 - ✓ ACC - www.acc.org and, AHA - www.americanheart.org

Aortic Dissection

- Ripping or tearing pain
- Abrupt onset
- Pain location may vary
- Neurologic symptoms/findings in up to 20% of patients
- Hypertension
- Pressure differential $\geq 20\text{mmHg}$

Aortic Dissection

- Type A = ascending (DeBakey I & II)
 - ✓ Surgical treatment
- Type B = no ascending involvement (III)
- Mortality can approach 50% at 48 hours in those untreated

Aortic Dissection

- Male:female 3:1
- Peak age 50-65 yrs
- Risk factors
 - ✓ Connective tissue disease
 - ✓ Hypertension
 - ✓ Pregnancy
 - ✓ Syphilis
 - ✓ Cocaine

Aortic Dissection

- ECG may show ST elevation or depression
- D-dimer (?)
- Chest radiograph
- CT angiography, Echocardiography, MRI

Aortic Dissection



Aortic Dissection



Aortic Dissection



Aortic Dissection

- Aggressive control of heart rate and BP
 - ✓ 100-120 mmHG
 - ✓ 60-80 beats per minute
 - ✓ Monitor end organ perfusion
- Urgent surgical evaluation for Type A
- Pain control

Aortic Dissection

- Pharmacologic agents
 - ✓ Beta blockers
 - Esmolol
 - Labetalol
 - Metoprolol
 - ✓ Nitroprusside

Pulmonary Embolism

- Kline JA, et al. Clinical Criteria to Prevent Unnecessary diagnostic testing in emergency department patients with suspected pulmonary embolism. J. Thromb Hemost 2004;2: 1247-55
- Prospective multicenter evaluation of the pulmonary embolism rule out criteria. J Thromb Hemost 2008; 772-80

Dr. Michael DeBakey 1908-2008



Pulmonary Embolism

- PERC Criteria
 - ✓ Age < 50
 - ✓ Pulse < 100
 - ✓ SaO2 >94%
 - ✓ No unilateral leg swelling
 - ✓ No recent surgery
 - ✓ No prior PE or DVT
 - ✓ No oral hormone use

Pulmonary Embolism

- PERC criteria
 - ✓ When physicians had a low clinical gestalt, the sensitivity of 97.45
 - ✓ Defined those patients in whom NO additional testing was needed.

Abdominal Aortic Aneurysm

- 13th leading cause of death in U.S.
- Males 7x more often than females
- 75% are > 60 years old

Abdominal Pain

- Aortic Abdominal Aneurysm
- Ectopic Pregnancy
- Ovarian Torsion

AAA

- Asymptomatic until expand or rupture
- Expanding AAA may cause sudden, severe back, abdominal, groin, or flank pain
- Rupture AAA present with shock
- 65-70% die prior to hospital

AAA

- Initial vital signs may be normal if rupture is contained
- Pulsatile mass is seen in less than 1/2
- Pain with hypotension, shock, and mass in only 30-50 of cases
- Initial misdiagnosis of 20-40%
- High index of suspicion

AAA

- Bedside ultrasound good for screening and can detect free fluid

CT scan is study of choice

AAA

- Treat hypotension
 - ✓ Target blood pressure
- Reverse any coagulopathy
Immediate surgical consultation

Ectopic Pregnancy

- Assume all females with abdominal pain are pregnant
- 19.7 per 1000 pregnancies
- Most occur in women 25-34
- Higher incidence in those on fertility drugs

Ectopic Pregnancy

- Pain- abdominal, pelvic, shoulder
- Syncope or near syncope
- 30% have no vaginal bleeding

Ectopic Pregnancy

- Quantitative HCG
 - ✓ Discriminatory level
 - ✓ Approximately 1000 mIU/ml
- Beware heterotopic pregnancy
 - ✓ 1 in 3,000 pregnancies

Ectopic Pregnancy

- Quantitative hcg
- CBC
- Ultrasound
 - ✓ May demonstrate IUP
 - ✓ May demonstrate extra uterine mass
 - ✓ May demonstrate free fluid

Ovarian Torsion

- Sudden or gradual onset of lower abdominal pain
 - ✓ Radiation to back is common
 - ✓ Pain may be bilateral
 - ✓ Nausea and vomiting in 70%
- Ovary is abnormal in over 50% of cases

Ovarian Torsion

- Pregnancy test
- Ultrasound with color Doppler

Stroke

- Consider stroke in any patient with neurologic deficit or altered level of consciousness.
- When was the patient last seen normal?
- Beware of mimics - seizure, metabolic, toxic, infectious, trauma

Ischemic Stroke

- Leading cause of disability in the U.S.
- Third leading cause of death
- One third of stroke patients < 65 yo
- “Time is Brain”
- Roughly 4% of patients with stroke receive rt-PA

Stroke

- Physical exam
 - ✓ Signs of trauma
 - ✓ Signs of infection
 - ✓ NIH Stroke Scale
 - 0-42 points
 - ≥10 correlates with visible lesions on angiography

Stroke

- Non-contrast CT is imaging modality of choice
- MR may be considered but should not delay treatment
- CBC, chemistries, coagulation, tox

Stroke

- Key Thrombolytic criteria
 - ✓ Measurable deficit
 - ✓ Not spontaneously clearing
 - ✓ Not minor and isolated

Stroke

- Key Thrombolytic criteria
 - ✓ With in 3 hours of symptom onset
 - ✓ European Cooperative Acute Stroke Study III, 2008 - may extend window up to 4.5 hours

Stroke

- Key Thrombolytic Criteria
 - ✓ If on anticoagulant - INR < 1.7
 - ✓ Blood pressure < 185 mmHg Systolic
 - ✓ Blood pressure < 110 mmHg Diastolic
 - ✓ Seizure is not absolute contraindication

Stroke

- **Blood pressure control**
 - ✓ If not eligible for thrombolytics
 - ✓ Systolic ≤ 220 , diastolic ≤ 120 observe
 - ✓ Systolic >220 , diastolic 122-140
 - Labetalol or nicardipine
 - ✓ Diastolic >140
 - Nitroprusside

Infectious

- **Epidural abscess**
- **MRSA**
- **Sepsis**

Stroke

- **No role for heparin or other anticoagulants in acute phase of care**

Epidural Abscess

- **Musculoskeletal complaints very common**
- **Red flags**
 - ✓ Fever
 - ✓ Neurologic deficit
 - ✓ Risk factors

Spinal Epidural Abscess

- Although rare, incidence has doubled in the past 2 decades.
- Classic triad is
 - ✓ Back pain - 75%
 - ✓ Fever - 50%
 - ✓ Neurologic deficit -33%
 - ✓ All three present in a minority of patients

Spinal Epidural Abscess

- Co-morbidities - predisposing factors
 - ✓ Diabetes, alcoholism, HIV
 - ✓ Spinal abnormality - instrumentation, djd, trauma, injections
 - ✓ Source of infection -skin, urine, catheter
 - ✓ IV drug use, tattooing

Spinal Epidural Abscess

- Symptoms often progress
 - ✓ Back pain
 - ✓ Nerve root pain
 - ✓ Motor weakness, sensory deficit, bladder/bowel dysfunction
 - ✓ Paralysis

Spinal Epidural Abscess

- Diagnosis
 - ✓ Clinical findings
 - ✓ Leukocytosis 2/3rds patients
 - ✓ Elevated ESR, CRP (non-specific)
- Imaging
 - ✓ MRI with contrast

Spinal Epidural Abscess

- Treatment
 - Antibiotics - cover MRSA (vancomycin) and gram negative bacilli
 - Surgery - decompressive laminectomy
 - Neurologic symptoms present for less than 24-36 hours
 - Facilitate treatment by draining abscess

MRSA



Skin Infections

- “Abscessologist”
- MRSA - hospital acquired vs. community acquired

MRSA

- Community acquired
 - ✓ Patients have NOT been in hospitals
 - ✓ Genetically UNRELATED to H-MRSA
 - ✓ Genomic sequencing - USA300-0114
 - ✓ Arginine Catabolic Mobile Element (ACME)
 - ✓ Prevalent in *S. epidermidis*
 - ✓ More effective cutaneous colonization

C-MRSA

- Risk factors?
 - ✓ “Over crowding” (prisoners)
 - ✓ Close contact - athletes
 - ✓ IV drug users (?)

C-MRSA

- Moran, et al NEJM, August 2006
- Study - August 2004
- 11 University Affiliated EDs
- 59% skin and soft tissue infections = CMRSA
- 97% USA300-0114

Close Contact!



C-MRSA

- OSU - 75% + cultures of skin and soft tissue from ED are MRSA

C-MRSA

- Treatment
 - ✓ Trimethoprim-sulfamethoxazole 100%
 - ✓ Rifampin 100%
 - ✓ Clindamycin 95%
 - ✓ Tetracyclin 92%
- Combination of trimethoprim-sulfa and rifampin eradicates MRSA colonization
- In cases of cellulitis, consider adding strep coverage

Sepsis

- Surviving Sepsis Campaign
 - ✓ Mortality 30-60%
 - ✓ 750,000 cases per year
- Problems
 - ✓ Inconsistency in diagnosis
 - ✓ Inconsistency in fluid resuscitation
 - ✓ Late or inadequate antibiotics
 - ✓ Inconsistent ventilator strategies

C-MRSA

- Moran study -only 59% received "correct" antibiotics
- Follow up - NO DIFFERENCE - 96% improved
- ** I & D
- Regardless of antibiotic you use, you will likely have treatment success. However, with inadequate I & D, you will have treatment failure.

Sepsis

- Early recognition - SIRS
 - ✓ Temp <98.8 F or > 100.4
 - ✓ HR > 90 bpm
 - ✓ RR > 20 or paco2 <32 or ventilated
 - ✓ WBC > 12,000 or < 4,000

Sepsis

- Early Recognition - Septic Shock
 - ✓ Serum Lactate > 4 mmol/L or
 - ✓ Systolic BP \leq 90 after 1-2 liters fluid or
 - ✓ Need for vasopressors

More Interesting Top 10 Lists?

- David Letterman
 - ✓ http://lateshow.cbs.com/latenight/lateshow/top_ten/archive/
- Top Ten Useless Limbs (and other vestigial organs)
 - ✓ http://www.livescience.com/animals/top10_vestigial_organs.html
- Top Ten Worst Business Deals
 - ✓ http://www.time.com/time/specials/2007/top10/article/0,30583,1686204_1686305_1692095,00.html
- Top Ten Simpson's Science Moments
 - ✓ http://www.nature.com/nature/journal/v448/n7152/box/448404a_BX1.html
- Top Ten Urinals
 - ✓ <http://www.urinal.net/topfive.html>

Sepsis - Septic Shock

- Antibiotics within 3 hours
- Fluid resuscitation and vasopressors
- Goal directed
 - ✓ CVP 8-12 mmHg
 - ✓ MAP \geq 65 mmHg
 - ✓ Urine output \geq 0.5 ml/kg/hr
 - ✓ Central Venous O₂ Sat \geq 70%