Objectives

- Identify atypical signs and symptoms of common metabolic conditions and infections which may be misdiagnosed in the elderly patient.
- Understand the impact of misdiagnosed or undertreated conditions in elderly patients.
- Develop strategies to avoid or reduce the impact of these metabolic conditions and infections in the elderly.
Why Look for Zebras?

- In elderly patients, certain metabolic problems and underlying infections may be indicated by symptoms often associated with more common conditions, leading to misdiagnoses and errors in treatment.
- Failure to make early, accurate diagnosis and deliver proper treatment of metabolic conditions and infections in the elderly may result in increased hospital admissions and greater morbidity and mortality.

Identifying the Zebras

These signs and symptoms may reflect atypical presentation in the elderly patient:

- Confusion
- Anorexia
- Afebrile
- No complaint of pain
- Functional decline/reduced mobility
- Weakness/Fatigue
- Increased falls
- Urinary incontinence
Identifying the Zebras

The following medical conditions may present with atypical signs and symptoms in the elderly patient:

- Community-Acquired Pneumonia
- Congestive Heart Failure
- Electrolyte imbalance
  - Dehydration
  - Hyponatremia
- Abdominal Pain

Identifying the Zebras

Perform the following steps to determine if signs and symptoms in the elderly patient may be atypical presentation for "zebras”:

- A thorough problem-focused history
- A focused physical exam
- A complete diagnostic work-up

Community-Acquired Pneumonia (CAP)
CAP: Statistics

- CAP is the eighth-leading cause of death in the US.
- Approximately 85% of all pneumonia deaths occur in patients 65 and older, and CAP is the seventh-leading cause of death in this age group.
- In the U.S., more than $16.2 billion was spent on pneumonia cases in 2013.

CAP: Risk Factors

- Asthma
- Alcoholism
- Immunosuppression
- Institutionalization
- Age > 70
- Crowded living conditions
- Close contact with children

CAP: Typical vs Atypical

**Typical Presentation**
- Sudden onset
- Productive cough with purulent sputum
- Fever: 102-102.9°F
- Chills
- Shortness of breath
- No GI symptoms

**Atypical Presentation**
- Insidious onset
- Minimal cough, no sputum
- Afebrile
- Fatigue, confusion, weakness, falls
- Cardiac symptoms, shortness of breath
- GI symptoms
**CAP: Physical Exam**

- Inspection: flushed, cyanotic, use of accessory muscles
- Palpation: tactile fremitus
- Percussion: dullness or flat percussion indicating consolidation or pleural effusion
- Auscultation: rales, rhonchi, bronchial breath sounds

**Anatomy of the Respiratory System**

![Diagram of the respiratory system]

**CAP: Differential Diagnosis**

- Acute Bronchitis
- Radiation or Hypersensitivity Pneumonitis
- Congestive Heart Failure (CHF)
- Pulmonary Embolus
- Acute exacerbation of Pulmonary Fibrosis or Bronchiectasis

Sources:
- Bickley & Szilagyi (2013)
- Mandell (2015)
- Wunderink & Waterer (2014)
Organisms Causing CAP

- Typical:
  - *Streptococcus pneumoniae* (pneumococcus)
  - *Haemophilus influenzae*
- Atypical:
  - *Mycoplasma pneumoniae*
  - *Chlamydia pneumoniae*
  - *Legionella*

CAP: Outpatient Diagnostic Tests

- Chest radiography
- Blood cultures
- CBC/diff
- Basic Metabolic Panel
- Influenza testing
- PCR testing for uncommon causes of pneumonia
- Legionella urinary antigen and Pneumococcal antigen testing recommended for severe CAP

Scoring Systems for CAP Severity

Two systems are used for scoring CAP severity:

- Pneumonia Severity Index (PSI), initially developed to identify CAP patients who could be treated in the community, uses 20 variables to score patients on a five-point severity scale, to help determine whether patient should be treated as an outpatient vs inpatient.
- CURB-65, developed by the British Thoracic Society, assesses five variables to score patients on a three-point severity scale to determine whether patient should be hospitalized.
CAP: Recommended Treatment
(By Infectious Disease Society of America (IDSA) and the American Thoracic Society)

- Outpatients without coexisting illness or recent use of antibiotics: Macrolide or Doxycycline.
- Outpatients with coexisting illnesses or recent use of antibiotics: Fluoroquinolone alone or a beta-lactam plus a macrolide.

Recommended Pneumococcal Vaccinations

- Pneumococcal vaccine-naïve persons aged ≥ 65 years:
  \[ \text{PCV13 at age } \geq 65 \text{ years} \] \[ \text{PPSV23 at age } \geq 65 \text{ years} \]

- If previously received PPSV23 at age ≥ 65 years:
  \[ \text{PPSV23 received at age } \geq 65 \text{ years} \] \[ \text{PCV13 at age } \geq 65 \text{ years} \]

- If previously received PPSV23 before age 65 and are now aged ≥ 65 years:
  \[ \text{PPSV23 at } < 65 \text{ years} \] \[ \text{PCV13 at } \geq 65 \text{ years} \] \[ \text{PPSV23 at age } \geq 65 \text{ years} \]

Pneumococcal Vaccinations

- If previously received PPSV23 at age ≥ 65 years:
  \[ \text{PPSV23 at age } \geq 65 \text{ years} \] \[ \text{PCV13 at age } \geq 65 \text{ years} \] \[ \text{PPSV23 at age } \geq 65 \text{ years} \]

- If previously received PPSV23 before age 65 and are now aged ≥ 65 years:
  \[ \text{PPSV23 at } < 65 \text{ years} \] \[ \text{PCV13 at } \geq 65 \text{ years} \] \[ \text{PPSV23 at age } \geq 65 \text{ years} \]
Case Study - MF

- In March 2016, over approximately a 3-week period, MF complained of increased fatigue and weakness, dizziness when standing and tunnel vision.
- Experienced labored breathing; felt like she could not catch her breath.
- Experienced increased confusion, unable to remember when she last ate or drank or had a bowel movement, no appetite or thirst.
- Withdrew from normal social contacts and activities, did not want to go to urgent care, said she just wanted to stay in bed.

Case Study - MF

- A close friend took MF to hospital ER in early April.
- The friend, a retired nurse, feared MF was in CHF based on fatigue, weakness, labored breathing, tunnel vision and lack of apparent fever or cough.
- MF was initially found to be dehydrated with elevated WBC.
- Chest x-ray and blood test indicated pneumonia.
- MF’s breathing became more labored, productive cough developed and she was put on oxygen, antibiotics and steroids.

Congestive Heart Failure (CHF)
CHF: Statistics

- CHF incidence is 10 in 1,000 after the age of 65.
- CHF is the leading cause of hospitalization for individuals over age 65.
- At 80 years of age, remaining lifetime risk for developing new HF remains at 20% for both men and women.
- Among Medicare beneficiaries, the overall one-year HF mortality rate declined slightly from 1998 to 2008, but remained high, at 29.6%.

CHF: Costs

- In 2012, there were 1.7 million physician office visits with a primary diagnosis of CHF.
- In that year, the total cost for CHF was estimated to be $30.7 billion, of which 68% represented direct medical costs.
- Projections show that by 2030, the total cost of CHF will increase almost 127% to $69.7 billion from 2012.

CHF: Risk Factors

- Coronary Heart Disease
- Obesity
- Cigarette smoking
- Diabetes Mellitus
- Hypertension
- Dietary sodium intake
CHF: Typical Presentation
- Fatigue
- Shortness of breath
- Dyspnea on exertion (DOE)
- Orthopnea
- Paroxysmal Nocturnal Dyspnea (PND)
- Weight gain and lower extremity edema
- Decreased exercise tolerance
- Tunnel vision (occasionally)

AZAD & LEMAY (2014)
HECKMAN, BOSCART, & MCKELVIE (2014)

CHF: Atypical Presentation
- Loss of appetite
- Falls
- Functional decline
- DOE may be absent
- Confusion and weakness
- Non-productive cough
- Sacral edema
- Cool extremities
- New or worsening cognitive impairment
- Delirium

AZAD & LEMAY (2014)
HECKMAN, BOSCART, & MCKELVIE (2014)

CHF: Physical Exam
- Inspection: measure jugular venous pressure (JVP) and check for peripheral edema
- Palpation: point of maximal impulse (PMI), bruits and thrills
- Auscultation: heart rate, normal heart sounds, abnormal heart sounds (s3 and/or s4), and murmurs

BICKLEY & SZILAGYI (2013)
CHF: Diagnostic Tests

- Chest radiography
- Electrocardiogram
- CBC/diff
- Complete Metabolic Panel
- Biomarkers: Brain Natriuretic Peptide (BNP) and its precursor, N-terminal pro-BNP
- Echocardiogram
CHF: Treatment

- Diuretics: furosemide, torsemide, metoalazone
- ACE inhibitors: lisinopril, enalopril, accupril
- Angiotensin receptor blocker (ARB): losartan, valsartan, olmesartan
- Aldosterone antagonists: spironolactone
- Beta Blockers: carvedilol, metoprolol
- Digoxin

CHF: Non-pharma Approach

- Multidisciplinary approach: CHF clinics
- Fluid restriction: 1.5 to 2 liters per day
- Sodium restriction: 2-3 gms/dy
- Smoking cessation
- Exercise: cardiac rehabilitation
- Patient education: diet, daily weights
- Staff education: monitoring CHF patients

Electrolyte Imbalance

The two main conditions affecting electrolyte imbalance are:
- Dehydration: excessive loss of water from the body
- Hyponatremia: low level of sodium in the blood
Dehydration

Dehydration: Statistics

- Dehydration affects 20 to 30% of older adults.
- The World Health Organization recommends 2 to 3 liters of daily water intake; individuals > 70 often drink less than 1.5 liters per day.
- Dehydration increases mortality, morbidity and disability in this population.

Dehydration: Risk Factors

- Inadequate fluid intake
- Medication
- Decreased thirst response in older adults
- Fear of incontinence
- Fever
- Dysphagia
Dehydration: Typical vs Atypical

Typical Presentation
- Headaches
- Dizziness upon standing
- Weight loss
- Diarrhea
- Dry mouth

Atypical Presentation
- Delirium
- Agitated behavior
- Lethargy
- Delusions/hallucinations in persons with dementia
- Rapid weight loss over 1 to 2 weeks
- Dark-colored urine

Dehydration: Physical Exam

- Inspection: Pallor, Sunken periorbital areas, Chapped lips, Dry mucous membranes
- Auscultation: Tachycardia, Orthostatic hypotension
- Palpation: Upper body weakness, Delayed capillary refill

Dehydration: Diagnostic Tests

- Basic metabolic panel
- Check urine for specific gravity and color
- Serum or plasma osmolality: serum osmolality >295 mOsm/kg can indicate dehydration and hyperosmolality
Dehydration: Treatment

- IV or oral hydration, dependent on diagnostic test results
- Education of patient, caregivers and staff on early signs of dehydration *(i.e. dizziness, headache, fatigue, lethargy, & weakness)*

Case Study: MF

- MF presented with weakness, lethargy and confusion.
- On admission to ER, CHF ruled out but MF was found to be dehydrated.
- MF received intravenous hydration, prior to further work-up leading to the diagnosis of pneumonia.
Hyponatremia

• Most common electrolyte abnormality found in inpatient and outpatient settings
• Occurs in 10% to 14.5% of community-dwelling older people
• Severe acute hyponatremia can cause irreversible neurological damage or death

Hyponatremia: Types

• Euvolemic hyponatremia: total body water increases, but the body’s sodium content stays the same
• Hypervolemic hyponatremia: both sodium and water content in the body increase, but the water gain is greater
• Hypovolemic hyponatremia: water and sodium are both lost from the body, but the sodium loss is greater
## Conditions Causing Hyponatremia

### Euvolemic Hyponatremia
- Syndrome of inappropriate antidiuretic hormone:
  - Intracranial pathologic conditions
  - Tumors
  - Lung disease
  - Surgical procedures
  - Acquired immune deficiency syndrome (AIDS)
  - Pain

### Hypervolemic Hyponatremia
- CHF
- Cirrhosis
- Renal Disease
- Exercise-induced hypotremia

### Hypovolemic Hyponatremia
- Diabetes Mellitus

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## Drug-Induced Hyponatremia

- Diuretics
- Selective serotonin reuptake inhibitors (SSRIs)
- Amitriptyline
- Antipsychotic drugs
- Angiotensin II receptor blockers (ARBs)
- Rivastigmine
- Antiepileptic drugs
- Opiates
- Ciprofloxacin
- Proton Pump Inhibitors
- Angiotensin-converting enzyme inhibitors (ACE-inhibitors)

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## Hyponatremia: Assessment

- Determine whether hyponatremia is acute vs chronic
- Typical symptoms include headache, nausea, vomiting and lethargy
- Advanced symptoms of hyponatremia include seizures, coma, non-cardiogenic pulmonary edema
Hyponatremia: Atypical Presentation

Atypical symptoms of hyponatremia include:

- CNS symptoms: blurred vision, dilated pupils, inability to concentrate, confusion
- Mood changes: irritability, altered mood and depression
- Bone changes: decreased bone mineralization and increased osteoclastic activity, resulting in falls and fractures


Hyponatremia: Diagnostic Tests

- Serum sodium (135 to 145 mEq/L)
- Urine sodium (20 mEq/L in a random urine sample)
- Urine osmolality (50 to 1200 mosm/kg)
- Sodium osmolality (275 to 295 mosm/kg)
- Thyroid stimulating hormone (0.4 - 4.0 milli-international units per liter (mIU/L))
- Cortisol level (6 and 23 micrograms per deciliter (mcg/dL))

Hyponatremia: Treatment

- Euvolemic Hyponatremia:
  Fluid restriction < 800 cc/day; Vasopressin 2 antagonists (vaptans)
- Hypervolemic Hyponatremia:
  Fluid restriction < 800 cc/day; Vasopressin 2 antagonists (vaptans)
- Hypovolemic Hyponatremia:
  Isotonic saline; Discontinue medication when possible

Vaptans for Hyponatremia

- Vasopressin 2 antagonists (vaptans) – new class of medication for euvoletic and hypervolemic hyponatremia
- Acts on the vasopressin receptors resulting in an increased urinary free water diuresis without increasing loss of electrolytes
- Vaptans include: conivaptan, tolvaptan, satavaptan and lixivaptan
- Common side effect is thirst

Abdominal Pain

- Abdominal pain is the most common emergency room (ER) complaint in the general population, and is the fourth most common complaint among elderly patients.
Abdominal Pain in the Elderly: Statistics

- Nearly 50% of elderly patients with abdominal pain will require admission, and 33% will require surgical intervention.
- Abdominal pain in an elderly patient may result in longer ER admissions, worse outcomes, higher rates of admissions and surgical interventions than in a younger patient.

Difficulties Diagnosing Abdominal Pain in the Elderly

- Frequently very difficult to evaluate in an older population due to physiological, pharmacological and psychosocial issues.
- Impairments in hearing, vision and cognition may make it difficult to communicate with a provider.
- Elderly patients may present with symptoms more vague and broader than in a younger patient.
- Under-reporting of symptoms – patient dismisses it as just related to aging.
Abdominal Pain: Physical Exam

- Inspection: distension, color, symmetry, movement and scars
- Auscultate: in all 4 quadrants for bowel sounds and bruits in aortic, iliac and renal arteries
- Percussion: lightly in all 4 quadrants to assess distribution of tympany and dullness, and to assess for shifting dullness and liver span
- Palpation: in all four quadrants and in suprapubic and epigastric areas. Palpate for rebound tenderness. Palpate liver’s edge and Murphy’s sign

Causes of Abdominal Pain in the Elderly

- Biliary Tract Disease
- Peptic Ulcer Disease
- Diverticular Disease
- Constipation
- Gastroesophageal Reflux Disease
- Appendicitis
- Pancreatitis
- Large and Small Bowel Obstruction

Bickley & Szilagyi (2013)

 causes of Abdominal Pain in the Elderly

Bickley & Szilagyi (2013)

Causes of Abdominal Pain in the Elderly

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Bickley & Szilagyi (2013)
**Biliary Tract Disease**

- Leading cause of acute abdominal surgery in the elderly
- Incidence increases after the age of 70
- Typical presentation: *right upper quadrant abdominal pain, nausea, vomiting*
- Atypical presentation in the elderly: *no nausea, vomiting or fever*
- Leukocytosis may be absent
- Diagnosis with liver sonogram or hepatobiliary scan

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**Peptic Ulcer Disease (PUD)**

- Peptic ulcer
- Stomach
- Ulcer
- Duodenum

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*Sources: Morrow, Thompson, & Wilson (1978)*
*Rosenthal & Andersen (1993)*
Peptic Ulcer Disease

- High incidence of PUD in the elderly, primarily due to use of NSAIDS or aspirin.
- The risk of bleeding from PUD is about 14 times higher in the population over the age of 70 than patients under the age of 40.
- Early diagnosis is important because elderly patients are more likely to bleed, re-bleed, require blood transfusions, and require surgery to control bleeding than younger patients.

PUD: Typical vs Atypical

Typical Presentation
- Abdominal pain
- Nausea and vomiting
- Heartburn
- Belching

Atypical Presentation
- Absence of pain
- Presence of melena
- Visceral perforation is often painless, with no rigidity on physical examination
- Signs of long-term blood loss (e.g., chest pain, CHF)

PUD: Treatment

- Proton pump inhibitor: omeprazole, esomeprazole
- H2 Blocker: ranitidine, famotidine
- Gastric mucosa protection: Sucralfate
- Four-week trial
- No improvement – refer to gastroenterology for upper endoscopy
Diverticular Disease

- Diverticular disease is linked to chronic constipation, poor oral hydration, decreased physical activity and increased transit time of stool through colon.
- Usually seen in patients older than 40 years and present in approximately 50% to 80% of older patients.
- Approximately 80% of patients with diverticulosis are asymptomatic.

Acute Diverticulitis

**Typical Presentation**
- Left lower quadrant abdominal pain with or without bloody stools
- Nausea
- Fever

**Atypical presentation**
- No abdominal pain
- Afebrile
- No elevation of white blood count
- Absence of guaiac positive stools
Acute Diverticulitis

- Diagnosis with abdominal CT scan
- Treatment:
  - Ciprofloxacin and metronidazole
  - Trimethoprim/sulfamethoxazole
  - Amoxicillin/clavulanate

Diverticulitis: Follow-up

- Diet:
  - High fiber
  - Avoid foods with seeds, nuts or corn
- Exercise:
  - Lower risk if more physically active
- Referral:
  - Gastroenterology for colonoscopy

Constipation
**Constipation**

- Common problem in the elderly with prevalence ranging from 25% to 50%.
- In the elderly, may be associated with fecal impaction and fecal incontinence.
- In older patients, may be due to medications, co-morbidities, malignancy, physical inactivity and decreased gastric emptying, whereas in a younger patient likely due to poor dietary habits.

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**Constipation: Risk Factors**

- Dehydration
- Multiple medications including: *diuretics, anti-hypertensives, pain medications and iron supplements*
- Multiple co-morbidities: HTN, CHF, Chronic pain, Iron Deficiency Anemia
- Decreased ability to perform Instrumental Activities of Daily Living (IADLs)

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**Constipation**

<table>
<thead>
<tr>
<th>Typical Presentation</th>
<th>Atypical Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased bowel frequency</td>
<td>Frequent straining</td>
</tr>
<tr>
<td>Altered bowel consistency</td>
<td>Rectal or vaginal digitation</td>
</tr>
<tr>
<td>Abdominal cramping</td>
<td>Sensation of rectal blockage</td>
</tr>
<tr>
<td>Dyspepsia</td>
<td>Fecal seepage</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>Confusion</td>
</tr>
</tbody>
</table>
**Constipation: History, Physical & Diagnostic Testing**

- Thorough history, including medication (prescribed, over-the-counter and herbal supplements)
- Abdominal exam
- Perianal and digital rectal exam to assess for lesions, strictures, fissures or stool impaction
- Labs: TSH, basic metabolic panel
- Plain abdominal radiograph to check amount of stool, impaction or obstruction

**Constipation: Pharmacological Treatment**

- Bulk laxatives: *Psyllium*
- Osmotic laxatives: *Sorbitol, Lactulose, Polyethylene glycol*
- Stimulant laxatives: *Bisacodyl, Senna*
- Lubricants: *Mineral oil*
- Chloride channel activator: *Lubiprostone (Amitiza)*
- Guanylate cyclase activators: *Linaclotide (Linzess)*

**Constipation: Non-Pharma Treatment**

- Diet:
  - 25 to 30 grams of fiber per day
  - Prunes, bananas, kiwis
- Biofeedback
Gastroesophageal Reflux Disease (GERD)

- Most common upper gastrointestinal condition in primary care.
- Approximately 50% of adults in the United States experience heartburn once a month.
- GERD is believed to increase with age.

GERD: Typical vs Atypical

Typical Presentation
- Heartburn
- Retrosternal burning
- Postprandial fullness
- Regurgitation of acidic fluids especially when supine

Atypical Presentation
- Dysphagia
- Breathing difficulties
- Dyspepsia
- Hoarseness/Dry Cough
- Nausea and vomiting
- Belching
- Epigastric pain
- Chest pain
GERD: Diagnosis and Treatment

- Usually treat symptoms in younger patients but in elderly consider diagnosing with upper endoscopy before starting medication.
- Medications:
  - Histamine 2 Blocker: ranitidine, famotidine
  - Proton pump inhibitor: omeprazole, esomeprazole
  - Over-the-counter antacids

GERD: Non-Pharma Treatment

- Weight loss
- Elevate head of bed and avoid late evening meals, especially meals with high fat content.
- Avoid food triggers: chocolate, caffeine, spicy foods, citrus foods and carbonated beverages

Key Points

- Elderly patients frequently present with atypical signs and symptoms.
- Adequate diagnostic work up is especially important in older patients.
- Early diagnosis can prevent disease progression, hospitalization and mortality, especially for older patients.
- For this reason, it is especially important to perform a thorough problem-focused history, focused physical exam and appropriate diagnostic work-up.
Questions?

References

References


References


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References


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References

References

- Southern Care University (2013). Atypical presentation of disease in the elderly.
References


References