From Problem Lists to Illness Scripts

Learning and Teaching Expert Clinical Problem Solving

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Learning Objectives

• Compare and contrast problem solving strategies used by novices and experts.
• Define and understand the tools of processing and illness scripts as they apply to clinical problem solving
• Use these concepts to help learn and teach clinical diagnosis and medical decision making
Case-Based, Small Group Discussions

Case Presentation

Analyze

Differential Diagnosis
Lessons from the Experts:

Learn in the style that you will use the knowledge

*Cognitive Psychology*

*Georges Bordage, MD PhD*
Learner Maturation

Data Gathered

Diagnostic Accuracy

Novice

Expert
Building Blocks of Problem Solving

- Hypothesis Testing
- Forward Thinking
- Pattern Recognition
Learner Maturation

Data Gathered

Diagnostic Accuracy

Novice

Expert
Problem Solving Maturation

- Hypothesis Testing
- Pattern Recognition
- Forward Thinking

Novice to Expert
**Case:**
35 year old AA female with one day hx of sharp, left-sided chest pain, occurring at rest and worse with inspiration and coughing. + SOB (-) fevers Meds: OCPs Normal exam except tachycardic.

**Diff Dx:**
- CAD
- Pneumonia
- Pericarditis
- PE
- Musculoskeletal
- Pleuritis
- GERD
Case: 35 year old AA female with one day hx of sharp, left-sided chest pain, occurring at rest and worse with inspiration and coughing. No fevers, no SOB. Meds: OCPs Normal exam except tachycardic.

Diff Dx: CAD Pneumonia Pericarditis PE Musculoskeletal Pleuritis GERD
Case:
35 year old AA female with one day hx of sharp, left-sided chest pain, occurring at rest and worse with inspiration and coughing. No fevers, no SOB. Meds: OCPs
Normal exam except tachycardic.

Diff Dx:
- CAD
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Hypothesis Testing
What is Emphasized by this Process?

• **Cast the net widely**
  – Pauci-clue differential Diagnosis

• **The law of clinical plausibility**
  – “Could Be…” problem solving, undercuts value of the clinical evaluation
Morning Report

Case:
35 year old AA female
with one day hx of
sharp, left-sided chest
pain, occurring at rest
and worse with
inspiration and
coughing. No fevers, no
SOB. Meds: OCPs
Normal exam except
tachycardic.
Defining the Syndrome

Case:
35 year old AA female with one day hx of sharp, left-sided chest pain, occurring at rest and worse with inspiration and coughing. No fevers, no SOB. Meds: OCPs, Normal exam except tachycardic.
Chest pain
Chest pain

Acute
Chronic
PROCESSING: the key to forward thinking

• Use of Semantic Qualifiers to Refine Symptoms
  – ‘Medical-ese’ facilitates recall
  – Binary and oppositional (either…..or)
  – Facilitates algorithmic thinking
Examples: Descriptive Processing

Temporal
- Acute vs Chronic
- Progressive vs Stable

Qualitative
- Colicky vs Visceral
- Abdominal Pain

Epidemiology
- Immunocompromised
Summative Processing

- Combining the processed descriptive terms to generate the syndrome
- Decreases the number of isolated symptoms that we must keep track of
- Prevents inappropriate focus on one aspect of the syndrome complex
Summative Processing Examples

• Classic Syndromes:
  – CHF, Shock, Meningitis

• Thematic Summaries
  – Pulmonary Dyspnea with a nonfocal exam
  – Destructive Thrombocytopenia
Exercise: Processing

• Key Concepts: Page 3
• Exercise: Page 4

• Using the information provided, practice processing the items listed on the table.
• Discuss whether the processing is descriptive or summative (or both!)
- Thinning hair; male pattern baldness
- Acne
- Hirsutism
- Buffalo hump
- Increased blood pressure
- Easy bruising
- Vertebral compression fractures
- Truncal obesity
- Poor wound healing
- Purple striae
- Muscular weakness and wasting
Pattern Recognition

• The near instantaneous recognition that all (or almost all) components of a known disease are present
  – Rapid fire processing
  – Further questioning searches for the missing elements of the disease

• Accurate and Efficient
Illness Scripts: Key to Pattern Recognition

- Disease Specific Packets of Information
  - Generated by reading and by experience
- Storage Strategy of Experts
- Structure: fairly regimented
  - Epidemiology, temporal pattern, syndrome statement
- Content: those elements which distinguish among like diseases
Case:
35 year old AA female with one day hx of sharp, left-sided chest pain, occurring at rest and worse with inspiration and coughing. (-) fevers, (+) SOB. Meds: OCPs Normal exam except tachycardic.
Group Exercise: Illness Scripts

• Key Concepts, page 6
• Exercise: pp 7-11

• Each Group should work on defining illness scripts for each set of diseases
• Use processed terms and summative statements (brief is better)
• Identify distinguishing features
Small Group Teaching Goals

Case Presentation
Chief complaint
HPI
PE
Labs

Pattern Recognition > Forward Thinking > Hypothesis Testing

Promote Advanced Problem-Solving Strategies

Diagnosis
Demystify the Magic
TEACH/LEARN

• PROCESSING
• ILLNESS SCRIPTS
• PRIORITIZING
CC: Headache and Confusion

- 32 yo African American woman with AIDS, CD4 = 22 presents with 4 weeks of worsening headache and fever. The headache is over her entire head, throbbing and unremitting and is associated with photophobia and a stiff neck. Over the past two weeks she has become progressively confused, and over the past two days she has stopped eating. She also complains of blurry vision and general aches and pains.
CC: Headache and Confusion

- PMHX: AIDS on no meds (ran out), PCP Pneumonia x 2
- SHX: prior IDU, 2 kids, both healthy, no cigs, no ETOH, no drugs for one year
- MEDS: none  ALL: NKDA
Physical Exam

- VS: 103.5°; 139/72; 100; 22;
- Lethargic obese patient, O x 1
- Dry MM, orthostatic pulse change
- Rigid Neck, + Kernigs

- Papilledema, photophobic, PERRLA
- Neuro: no focal motor deficits, unable to test sensory or cerebellar fxn
- All else normal
Simple Problem List

Processed Problem list

Prioritized Diff Dx

Epi

Time Course

Syndrome Statement

Tier I

Ib

Tier II

Tier III
### Step I: Simple Problem List

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache for 4 weeks</td>
<td>T = 103.5</td>
</tr>
<tr>
<td>Fever</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Stiff neck</td>
<td>Intermittent lethargy</td>
</tr>
<tr>
<td>Confusion</td>
<td>Disorientation</td>
</tr>
<tr>
<td>Trouble Walking</td>
<td>Dry mucous membranes</td>
</tr>
<tr>
<td>Blurry Vision</td>
<td>Stiff neck and Kernig’s</td>
</tr>
<tr>
<td>Poor PO intake</td>
<td>Papilledema</td>
</tr>
<tr>
<td>Incontinence</td>
<td>AIDS</td>
</tr>
</tbody>
</table>
Step II: Process the List

- Processing into ‘medical’ized terms facilitates recall
- Develop a precise and descriptive statement that describes this PATIENT’S illness script
  - narrows the diagnostic playing field
- Fewer items on the list allows for better attention
Processed Problem List

• Epidemiology
• Temporal Course of the Problem
• Syndrome description
Epidemiology

• Choose those aspects of the patient’s demographics, exposure or PMHx that set the stage for the illness
• Process the risk factors to emphasize their importance
<table>
<thead>
<tr>
<th>If the CC</th>
<th>And the PMHX</th>
<th>Epidemiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest Pain</td>
<td>Htn, DM, Stroke, PVD, Hypothyroidism</td>
<td>Vasculopathy</td>
</tr>
<tr>
<td>Cough</td>
<td>AIDS, CD4 = 12, Ghanaian Native,</td>
<td>Profound CMI Deficit in recent immigrant</td>
</tr>
<tr>
<td>Rash</td>
<td>Intracranial Hemorrhage, DM, COPD</td>
<td>Recent initiation of anti seizure medication</td>
</tr>
<tr>
<td>Fever</td>
<td>ESRD, Htn, s/p appendectomy</td>
<td>Immunocompromised host with indwelling vascular device</td>
</tr>
</tbody>
</table>
Temporal Processing

• Acute, Subacute, Chronic
  – Definition is linked to the chief complaint
• Patterns:
  – intermittent, waxing and waning, biphasic illness, episodic
• Stability:
  – progressive, indolent, constant
Creating a Syndrome Statement

• Descriptively process all items on the list
• Eliminate nonspecific/redundant symptoms
  – malaise, fatigue, transient diarrhea
  – tachypnea and Shortness of Breath
• Identify the most important symptom and combine it with those s/s that explain the most important symptom
• Check for completeness
Headache
Fever
Stiff Neck
Photophobia
Kernig’s

Waxing and Waning
Mental Status,
Disorientation

Headache
Papilledema
Lethargy

Poor PO Intake
Dry Mucous Memb

Meningitis

Delirium

Increased Intracranial
Pressure

Volume Depletion
Epi:
35 yo woman with T cell immunodef

Time course:
Chronic Syndrome:
Meningitis Delirium
ICH Secondary Vol Depletion

Original Problem List
Headache Fever Stiff neck Confusion Trouble Walking Blurry Vision Poor PO intake Incontinence

Tier 1
T = 103.5 Tachycardia Intermittent leth Disorientation Dry MM Stiff neck and Papilledema AIDS

Tier 2

Tier 3

Prioritized Diff Dx
Tier 1
1b

Tier 2

Tier 3
Step III: Prioritized DDX

• The processed problem list describes the patient’s **ILLNESS SCRIPT**
• Goal: Search for a disease which has an **ILLNESS SCRIPT** that matches the patient’s
• Tools: Pattern Recognition > Forward Thinking > Hypothetico-deductive
Prioritization of Differential

- Learner **Must** describe classic pattern of any diagnosis offered
- The extent of match between patient’s presentation and classic determines priority
Rationale

• Emphasizes that diagnostic power of the carefully done and analyzed clinical exam
• Stresses compare and contrast thinking
• Prioritizes management
• Closes the loop
  – illustrates the value of pertinent positive and negatives from the HPI.
Prioritizing Differential Diagnosis

• **Tier I Diagnosis:**
  – Disease illness script matches the patient’s illness script almost perfectly

• **Tier II Diagnosis:**
  – Patient is missing key features of the disease
  – Disease does not explain prominent features of patient’s presentation

• **Tier III Diagnosis:**
  – single or pauci clue match

IB: A critical addition
Demystifying Pre-test Probability

• Tier I Diagnosis: 75% pretest probability
  – Disease illness script matches the patient’s illness script almost perfectly

• Tier II Diagnosis: 30-50% pretest probability
  – Patient is missing key features of the disease
  – Disease does not explain prominent features of patient’s presentation

• Tier III Diagnosis: < 30% pretest probability
  – Single or pauci clue match
# Prioritized Diff Dx

## Epi:
35 yo woman with T cell immunodeficiency

### Time course:
Chronic

### Syndrome:
- Meningitis
- Delirium
- ICH
- Secondary Vol Depletion

## I. Cryptococcal Meningitis
- Tuberculous Meningitis
- Histoplasma Meningitis

## 1b. Bact. Meningitis

## II. Toxoplasmosis
- CNS Lymphoma

## III. CNS SLE
- Pseudotumor Cerebri
Group Exercise: Case Dissection

• Key Concepts: page 12
• Exercise: pp 13-15
• Create a processed problem list for the case described on page 13.
• Identify illness scripts and then prioritize the ddx for this case using the diagnoses listed on page 15.
Step IV. Teaching and Learning Issues
Wrong Answers?--Coach

• Encourage Autocorrection
• What does that disease typically look like?
  – Use structured processed problem list format
• How does that compare with this patient?
• Stress Key and Rejecting Features
  – What would have to be present to make this a Tier I diagnosis?
No Patterns?
Recommend Alternate Strategies

• Goal: Generate diagnostic ideas and then
• Evaluate: using illness scripts
• Forward Thinking
  – Categories of thrombocytopenia
• Pathophysiology/Anatomy
  – How is edema formed?
• Category Chase
Evaluative Benefits

Process allows window into the black box of thinking
Wrong Answer?

• Step I: inattentiveness
• Step II: processing problem; syndrome recognition
• Step III:
  – Factual knowledge (incorrect illness scripts)
  – Lack of understanding of Key features (correct illness scripts, can’t match)
Compare and Contrast
Illness Scripts

- Syndrome
Compare and Contrast
Illness Scripts

- Syndrome
- Distinguishing Features
Compare and Contrast
Illness Scripts

- Syndrome
- Distinguishing Features
- Key Features