Clinical Decision Making in Emergency Medicine

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Chapter 10 – Section II – Cardinal Presentations
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In the ED:

? How do you think?
? What do you think about?
? How do you spend your time?
? How do you make a decision?
? How do you live with that decision?
? What is the patients perception?
? How does the wrong decision get made?
Today's Index
Clinical Decision Making

• Diagnostic and Management approach

• Errors in Medical Inquiry and Clinical Decision Making
Clinical Reasoning

• **Medial inquiry (data gathering)**
  – Cognitive and psychomotor skills or techniques used to gather data
    • H&P
    • testing

• **Clinical decision making**
  – Cognitive process required to utilize medical data obtained to evaluate, diagnose, or manage medical problems
Diagnostic and Management
decision-making processes

1. Pattern Recognition
2. “rule-using” algorithm
3. Hypothetico-deductive
4. Naturalistic or event driven
Diagnostic and Management decision-making processes

1. Pattern Recognition

- Requires memorization of a critical number of facts or concepts
- Build a representation that links the patient’s case to an existing knowledge structure
- Corresponds to the lowest level of the clinical decision-making hierarchy
- Most practitioners require hundreds or thousands of patient encounters to develop this expertise
Diagnostic and Management decision-making processes

2. “Rule-using” algorithms

- Higher on the clinical decision-making hierarchy
- “if X then Y’
- Recognize the pattern and apply the rule
- ACLS, ATLS, pathways
3. Hypothetico-deductive

- Highest in the clinical decision-making hierarchy
- Problem solving to use previous knowledge to create new solutions
- Requires conscious, analytic processing of stored knowledge to originate a novel solution

- **Hypothesis generation** - perceived cues trigger potential diagnosis
- **Hypothesis evaluation** - cues and data interpreted to confirm or reject provisional hypothesis
- **Hypothesis refinement** - additional diagnosis generated
- **Hypothesis verification** - choose and verify most likely diagnosis
Diagnostic and Management decision-making processes

4. Naturalistic or Event driven

- Treat patients’ signs or symptoms before a definitive diagnosis
- More likely to be used in Emergency Medicine than any other specialty
- Decision making is evaluation of possible courses of action or therapeutic trial, not decision making of diagnostic possibilities
- Rule out the worst case scenario
- Focus on stabilizing actions, not diagnosis
- Response to intervention assists in evaluation and diagnosis decisions
Which Decision Making Process is best?

• Depends on the clinicians level of experience
• **Inexperienced** have undeveloped associations
  – Unfocused in ordering
  – Cannot eliminate diagnostic possibilities
• **Experienced** clinicians use details
  – history, physical, tests, therapeutic trials
  – Assess the possibility of significant or life-threatening disease
  – “hypothetico-deductive” becomes “pattern recognition” with increased encounters
  – Diagnose and manage with less mental effort
Decision-making Algorithm

1. Rule out life or limb threats first
2. Determine whether more than one active pathologic process is present.
3. Try a diagnostic-therapeutic trial.
4. Determine the bottom line. Address unanswered questions that affect patient safety.
5. Close the disposition and follow-up loop.
6. Understand fully why the patient is in the emergency department, and then meet the patient’s expectation.
7. Use emergency department resources fully but understand that emergency department personnel and facilities cannot be all things to all people.

Errors in Inquiry and Clinical Decision-making

~44,000 die in US hospitals each year due to medical errors

1. Affective events
2. Psychomotor events
3. Cognitive events
   1) Medical Inquiry
   2) Diagnostic Decision making
      a. Pattern Recognition
      b. Using rules
      c. Hypothetico-deductive
         I. Hypothesis generation
         II. Hypothesis evaluation
         III. Hypothesis refinement
         IV. Hypothesis verification
   3) Management Decision Making
Errors in Inquiry and Clinical Decision-making

1. Affective events
   - **Attitudinal bias**: anger, overconfidence, prejudice, fear, stereotyping, cultural
   - **Attribution bias**: pt responsible for their own disease or situation

2. Psychomotor events
   - Improper technique
   - Distraction omission
   - “force of habit”
Errors in Inquiry and Clinical Decision-making

3. Cognitive events
   - Medical Inquiry - faulty clinical data gathering
   - Unfocused testing error - Ordering tests without completing an adequate history or PE
   - “trial and error” diagnostic testing – diagnostic tests ordered sequentially
   - Confirmation bias – diagnosing what is preconceived and interpreting data in that light
Errors in Inquiry and Clinical Decision-making

3. Cognitive events

• Diagnostic Decision making
  – Pattern Recognition – unorganized knowledge base
  – Error of missed cues – expand knowledge base

• Defects in Using Rules
  – Not the correct rule
  – Applying the rule incorrectly
  – Causes premature closure of decisions
  – If the rule doesn’t fit it probably isn’t the right rule
Errors in Inquiry and Clinical Decision-making

3. Cognitive events
   - **Hypothetico-deductive**
     - *mistakes*: clinician’s analytic processing activities are disturbed, interrupted, or missing key data
     - Caused by stress, fatigue, task overload, environmental distractions, lack of clinical knowledge
     - **Perfectly executing a faulty plan**
     - **Poorly executing the right plan**

I. Hypothesis generation
II. Hypothesis evaluation
III. Hypothesis refinement
IV. Hypothesis verification
Errors in Inquiry and Clinical Decision-making

3. Cognitive events
   • Management Decision Making
     – Making the right management decision is often more important than the right diagnostic decision
     – Being rigid or unwilling to act without complete data leads to errors of omission
Heuristic (/hɪˈrɪstɪk/)

• An adjective for experience-based techniques that help in problem solving, learning and discovery.

• A heuristic method is particularly used to rapidly come to a solution that is hoped to be close to the best possible answer, or 'optimal solution'.

• Heuristics are "rules of thumb", educated guesses, intuitive judgments or simply common sense.
Heuristics for Optimal Decision Making in Emergency Medicine

• Sit at patient's bedside to collect a thorough history.
• Perform an uninterrupted physical examination.
• Generate life-threatening and most likely diagnostic hypotheses.
• Use information databases and expert systems to broaden diagnostic hypotheses.
• Collect data to confirm or exclude life threats first, then most likely diagnoses.
• Avoid diagnostic testing whenever possible by using readily available decision making algorithms (e.g., Ottawa ankle rules).
• Order only those tests that will affect disposition or that will confirm or exclude diagnostic hypotheses.
• Include decision rules on diagnostic testing order forms.
• Use guidelines and protocols for specific therapeutic decisions to conserve mental energies while on duty.
• Allow 2 to 3 minutes of uninterrupted time to mentally process each patient.
• Mentally process one patient at a time to disposition.
• Avoid decision making when overly stressed or angry. Take 1 to 2 minutes out, regroup, then make the decision.
• Carry a maximum of 4 or 5 “undecided” category patients. Stop—make some dispositions.
• Use evidence-based medicine techniques to substantiate decisions with evidence, understand the limitations of the evidence, and to answer specific questions, such as usefulness of diagnostic testing, management plans, and disease prognosis.
BOX 10-3  Heuristics for Minimizing Errors in Clinical Decision Making

• Avoid the biggest obstacle to the correct diagnosis—a previous diagnosis.
• Avoid inheriting someone else's thinking whether it is related to diagnostic or personal bias.
• Check for critical past medical history and risk factors for serious disease or poor outcome.
• Pay attention to vital signs and nurses' and Emergency Medical Service (EMS) notes.
• Avoid premature closure if the diagnosis is not certain—enlist the patient as a partner in that uncertainty, arrange for appropriate follow-up, and give specific precautions in written form.
• Beware of high-risk times—patient sign out (see and touch all), high-volume or high-acuity times, and times of personal fatigue.
• Beware of high-risk patients—hostile, violent, or abusive patients, patients with alcohol or drug abuse, psychiatric patients, and patients who elicit a negative visceral response.
BOX 10-3 (cont) Heuristics for Minimizing Errors in Clinical Decision Making

• **Beware of the return visit**—this is an opportunity to correct what was missed during the previous visit.

• **Beware of high-risk diagnoses** —myocardial infarction (MI), pulmonary embolus (PE), subarachnoid hemorrhage (SAH), tendon and nerve injuries, retained foreign bodies, intracranial hemorrhage (ICH) in intoxicated patients, vascular catastrophes in elderly patients, appendicitis, meningitis, ectopic pregnancy, and testicular torsion. Rule out the worst-case scenario or high-risk diagnoses first.

• **Beware of the non-fit** —when the presumptive diagnosis does not match the symptoms, signs, or diagnostic tests—recognize the non-fit and reevaluate and refine diagnostic hypotheses.