

An Approach to Teaching Clinical Reasoning

Nora Yusuf Osman, MD



ROAD MAP

- **Setting the stage**
 - **How doctors think**
- **Metacognition**
- **Cognitive Errors**
- **Approaches with students**

Patient Story, 29-year-old woman

I woke up this morning feeling awful. I think I have a fever. My stomach really hurts, especially just below my belly button. I haven't eaten since last night. I think my period is due, but it's pretty irregular, so I'm not sure. I usually get bad cramps with my period, but this feels much worse than usual. I tried taking paracetamol but it hasn't helped at all. My husband brought me in today.

How we teach students to think

- Pattern recognition
- Getting the right answer
- Short cuts
- Biases
- Lists, algorithms, memorization

HOW DOCTORS THINK

**PATTERN
RECOGNITION**



**ALGORITHMIC
REASONING**

**HYPOTHESIS
GENERATION**

**EXHAUSTIVE
METHODS**

Exhaustive method

- Comprehensive data gathering
- Complete physical exam
- Extensive investigation through lab testing, studies
- Favored by less experienced students and clinicians
- Favored in the in-patient medical school setting (in U.S.)

Exhaustive method

- Comprehensive data gathering
- Complete physical exam
- Extensive investigation through lab testing, studies
- Favored by less experienced students and clinicians
- Favored in the in-patient medical school setting (in U.S.)
- **RISK: Time-consuming, expensive, risky to patient**

Algorithmic Reasoning

- Consistent logical method that does not vary from patient to patient
- Typically best used in situations with few diagnostic possibilities or limited data needed
- Example: post-menopausal vaginal bleeding

Algorithmic Reasoning

- Consistent logical method that does not vary from patient to patient
- Typically best used in situations with few diagnostic possibilities or limited data needed
- Example: post-menopausal vaginal bleeding
- **RISK: inflexibility may lead to missed diagnoses**

Hypothesis Generation

- Iterative process beginning with early hypothesis
- Information gathering to test the hypothesis
- Revision of the hypothesis based on new information

Hypothesis Generation

- Iterative process beginning with early hypothesis
- Information gathering to test the hypothesis
- Revision of the hypothesis based on new information
- **RISK: premature closure, hasty decision making**

Pattern Recognition

- Rapid diagnosis based on patterns and clinical experience
- Favored by very experienced clinicians
- "I've seen this before..."
- Examples: lateral epicondylitis, zoster

Pattern Recognition

- Rapid diagnosis based on patterns and clinical experience
- Favored by very experienced clinicians
- "I've seen this before..."
- Examples: lateral epicondylitis, zoster
- **RISK: premature closure, missed diagnoses**



METACOGNITION

Thinking about thinking; completing a learning task through planning, monitoring, evaluating and comprehending.

“The awareness and knowledge of one’s mental processes such that one can monitor, regulate and direct them to a desired goal.”

Harris and Hodges, 1995

CASE 29-year-old woman

"I woke up this morning feeling awful. I think I have a fever. My stomach really hurts, especially just below my belly button. I haven't eaten since last night. I think my period is due, but it's pretty irregular, so I'm not sure. I usually get bad cramps with my period, but this feels much worse than usual. I tried taking paracetamol but it hasn't helped at all. My husband brought me in today."

She has no past medical history and is on no medications.

She and her husband have been trying to conceive for three months. They ate raw oysters at a party last night. She does not smoke, drink alcohol or use any recreational drugs.

CASE 29-year-old woman

Physical Exam:

T 38.6C HR 120, BP 108/60 RR 20

Ill-appearing, lying still in bed

Chest clear to auscultation

Cor: normal

Abdominal exam: rebound tenderness and tenderness to palpation in right lower quadrant

Pelvic exam: pain on the right, no cervical motion tenderness



Group Work

- In groups of 3-4 discuss the case
- How are you thinking about the case?
- How might you guide a student to think about the case
- What FRAMEWORKS could we use with the students?

CLINICAL REASONING

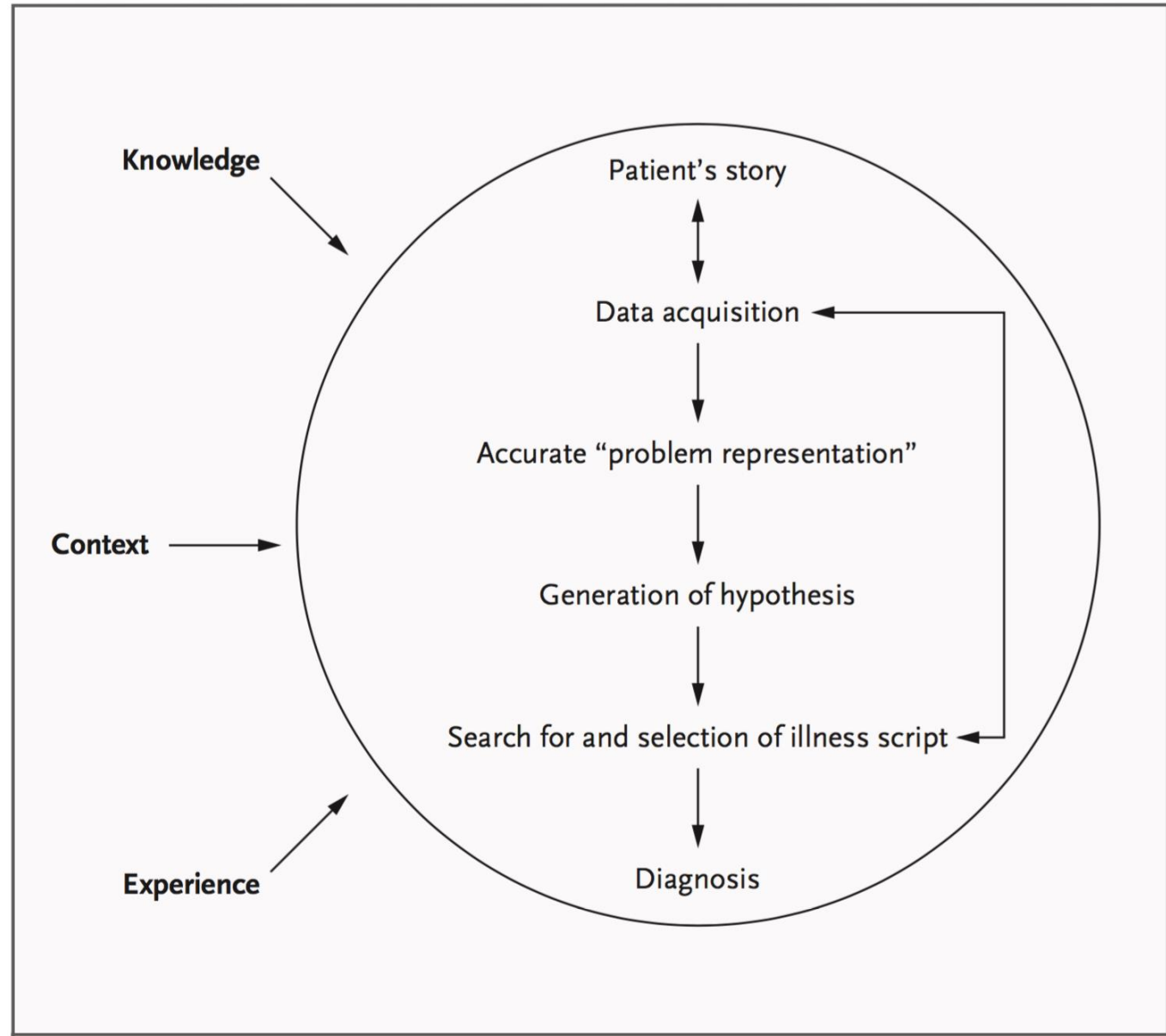
Unconscious iterative process –
Thinking begins immediately

Thinking about differential diagnosis
in context of patient

Questions guided by context

Problem – hypothesis – illness
script

This then leads to further data
acquisition



**CLINICAL
CONTEXT,
CHIEF
COMPLAINT**

**GATHER
DATA**

**ILLNESS
SCRIPT**

**REFINE
SUMMARY**

**REFINE
HYPOTHESIS**

DIAGNOSTIC ERRORS

- **Anchoring**
 - **Availability bias**
 - **Attribution**
 - **Heuristics – rule of thumb**
- **It's an ectopic, that was the first thing I thought of.**
 - **The last patient I saw had an ectopic.**
 - **It's very common for women at her age to have ectopic pregnancy**
 - **She's too old for an appendicitis**

ENGAGING OUR LEARNERS

WHAT CAN WE DO

ENGAGING OUR LEARNERS

WHAT CAN WE DO

- Activate prior knowledge
- Ask how questions rather than what questions
- Practice "problem statements"
- Model thinking out loud
- Promote self- reflection
- encourage students to articulate thought processes
- teach students to name and recognize cognitive biases and other errors in thinking

ENGAGING OUR LEARNERS

Questions that encourage thinking

- How do you approach...
- Can you think of an example of...
- How would this be different if...
- How might we clarify this further?

Questions that do not encourage thinking

- List the common causes of abdominal pain in women.
- What is the differential diagnosis?
- What do you want to know?
- What tests do you want to order?

Student presentation

This is a 29-year-old sexually active woman with a history of dysmenorrhea who comes in today with bad abdominal pain after eating oysters last night. She has not had her period this month. Her exam is notable for a fever and severe abdominal pain in the right lower quadrant. It is possible that she has an infection although it is more likely that she has an ectopic pregnancy because she and her husband are trying to conceive. My last patient had an ectopic and it was exactly the same presentation.



Group Work

- Work in pairs
- Identify errors in the student's reasoning
- Practice questions to help the student develop clinical reasoning



- Sick not sick
- Common not common
- Anatomical approach
- VINDICATES or Pathophysiology – vascular, infectious, neoplastic...
- Others?

FRAMEWORKS for students



SUMMARY

- **Setting the stage**
 - **How doctors think**
- **Metacognition**
- **Cognitive Errors**
- **Approaches with students**
 - **Frameworks**
 - **Probing questions**



Cảm ơn nhiều