



Episode 11 - Diagnostic Decision-making & Medical Error

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Medical error is the 6th leading cause of death in North America, and despite huge advances in imaging technology and lab testing as well as an explosion of EM literature, the misdiagnosis rate detected through autopsy studies has not changed significantly over the past century.

Studies on diagnostic error in emergency medicine have shown error rates between 1 and 12%, and it's been suggested that cognitive error, or some flaw in the decision making process (as apposed to a lack of knowledge), is present in about 95% of these cases.

3 groups of errors of diagnosis:

1. **No-Fault Errors** are ones that are no the fault of the ED doc but are a result of the less-than-perfect information from the patient which is either misleading or absent (eg: malingering)
2. **Systemic Errors** which involve the workplace environment, overcrowding, delays in test results etc.
3. **Cognitive errors** which range from basic knowledge deficiencies to the way we tend to respond to patients in predictable ways

3 ways to improve our cognitive decision-making skills:

1. Understanding *how we make quick diagnostic decisions* and the dangers of some of these methods of decision-making,
2. Understanding and recognizing our *biases in decision making*, and
3. Recognizing *high risk situations*

Type 1 & Type 2 Decision-making approaches:

Type 1: The Intuitive/Reflexive Approach involves automatic decision making based on pattern recognition. It's fast, requires little effort and usually brings you the correct diagnosis, but it's very prone to error.

Type 2: The Analytical/Problem-Solving Approach on the other hand, is more critical and logical. This is when you step back and think more carefully about the patient's presentation. It involves estimating pretest probabilities, continuous self-questioning, and considering alternative diagnoses. While it takes more effort, more time and is more resource intensive, it's reliability is much better than the intuitive approach, and is more likely to give you the correct diagnosis.

Reasoning will invariably try to default to the automatic/reflexive approach, the most economical and fastest mode. The key is to step back and think analytically when you realize that there are subtle inconsistencies that arise. It's important to recognize when you need to change from an automatic / reflexive approach to analytical decision making.

Heuristics: Cognitive 'short-cuts'

How ED docs generally think when presented with a case: “Is the situation typical?” - if the answer is “Yes” it is because we have matched the patient to a preformed illness script based on patients we have seen before, and we can proceed to treatment and confirmation of the diagnosis

If there is diagnostic uncertainty we use one of 3 heuristics:

1. *Rule out worst-case scenario*
2. *Sick or not sick dichotomy* - fails when faced with Life threatening conditions that can present as benign conditions: P.E., acetaminophen overdose
3. *Shotgunning*

Affective Bias:

It is important to recognize your own affective state, vulnerability to self deception and personality which can contribute to making reflexive decisions which carry higher risk for error.

Confirmation Bias:

Humans naturally tend to privilege information that confirms what they already believe to be true and often ignore information that challenges what they believe. This is called *confirmation bias*. This can lead to *premature closure*, where we shut out any other possibilities.

Countering Confirmation Bias and Premature Closure:

1. *Make predictions* about what sort of lab test results, x-ray findings etc. should be present or absent if your working diagnosis is correct
2. *'Running the board'* or review the patients at regular intervals, actively searching for disconfirming information
3. *Encourage input* from nurses, respiratory therapists, other ED docs and residents (different perspectives help develop more sophisticated interpretations)
4. *Keep labels broad*, especially early in the work-up
5. Have another doc, or if you are a resident have your staff be the *devil's advocate*

Anchoring Bias:

Anchoring bias causes physicians to stay with their initial impression of a case and fail to adjust to new information that would make the initial impression less likely. This often leads to prematurely ending their search or *premature closure*.

Ways to Improve the Ability to Consider Alternate Diagnoses:

1. Write the ddx in chart upon initial evaluation and re-visit the ddx when initial tests are back and when deciding disposition.

2. *Cognitive forcing strategies* for unusual diagnoses eg: any pt who presents with chest pain, force yourself to consider aortic dissection.
3. *Cognitive Checkpoint*: we must always confirm that the continued development of the case is consistent with our working diagnosis by checking our decision in light of the subsequent case development, and avoiding the common biases.

High Risk Situations:

Night shifts (especially around 5:00am), handover (especially from night shift), the overconfident learner and physician, the very young and the very elderly patients, high patient volumes with many interruptions, the 'difficult patient'

Strategies for dealing with High Risk Situations:

Formalizing Handover: '**S BAR**' **Mnemonic** for Handover - **S**ituation, **B**ackground, **A**ssessment, **R**ecommendation

Consider having the attending doc and the handover doc seeing patient together, and if you are taking over the case ask what the plan is if the test is negative; you should have a low threshold for 'starting from scratch' with a case that is handed over to you

Written discharge instructions in addition to verbal instructions are more effective than verbal instructions alone; ask the patient and their family "do you have any questions?" or "does that make sense to you?"

Communication Strategies:

Written Orders are less prone to error than verbal orders, so minimize verbal orders

Closed Loop Communication: when you must give a verbal order, have the nurse repeat the order back to you and tell you that the task was completed

Team Huddle before the patient arrives to predict diagnoses and *Assign Roles*

Paramedics should report to every person on the ED team at the same time in a quiet environment

Shift Work & Sleep Deprivation:

Before a shift make sure you are well-rested, hydrated and fed (but avoid large carbohydrate-rich meals just prior to starting your shift)

Fatigue and high risk decision making occurs more frequently during the latter half of a given ED shift

Shift work causes *Sleep Debt* over time which is associated with increased risk of cancer, PUD, mood disturbances, infertility and obesity; the impact of shift work increases with age

Sleep Deprivation impairs short term recall, performance on intensive tasks, increases distractibility as well as error of omission and commission and most importantly, increases tolerance of risk

How to minimize the negative effects of Shift Work and Sleep Deprivation:

1. *Sleep Hygiene* - pre-sleep routine, no caffeine or alcohol before sleep and after night shift there should be an area in the home that is quiet dark and free from interruptions for the shift worker to sleep
2. *Napping* - mid-afternoon 45min-2hrs allowing 1hr to 'wake-up' and try to nap during the anchor

period of your night shift

3. *Light therapy* - sleeping in pitch dark and waking in bright light help to signal our brain
4. *Casino shifts* - preserves the *anchor period* (2am-6am when it is the most important for your circadian rhythm to get some sleep in order to adjust properly) and is associated with more total sleep, reduced sleep debt, shorter recovery time, reduced cognitive impairment, improved work performance, improved career longevity; the first casino shift (eg: 10pm-4am) tends to be preferred by males, younger docs and those who tend to be 'night owls' vs the 2nd casino shift (eg: 4am-10am) tend to be preferred by women, older docs and those who tend to be 'morning people'

Improving feedback to physicians to facilitate learning:

1. M&M rounds - using the 'cognitive autopsy' rather than 'laying blame'
2. Read consult notes and discharge summaries on your patients to calibrate learning
3. Use Emergency Department Information Systems (EDIS) to give feedback to docs about 'bouncebacks' and mortality
4. Protocol to automatically forward discharge diagnoses (or a copy of ED chart) to the pre-transfer doc of all handovers
5. Scheduled ED follow-ups: improves patient satisfaction, augments the doctor-patient relationship, decreases liability and ensures a higher standard of care
6. Simulation tools with analysis of cognitive decision-making; videotaping realistic scenarios with the ED team allows for review and analysis in a safe setting; there is evidence that this intervention can improve team functioning—an important contribution to diagnostic error.

The current trend in how to disclose error to patients and their families:

1. inform the patient and the family of the mishap at the earliest convenient time in the presence of a 3rd party such as a department chief
2. express your concern, lay out the next steps in the course of care and answer any questions
3. notify your hospital risk management staff and (in Canada) the CMPA
4. consider writing a 'late note' in the chart the next day and write a personal note to yourself outlining all the details for your personal file

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