Avoidable Imaging Wave II

M&M and Overtesting:
How to Discuss Diagnostic Error Without Causing Unnecessary Imaging
Presenter

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M&M and Overtesting: How to Discuss Diagnostic Error Without Causing Unnecessary Imaging

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• CRICO/Risk Management Foundation: Associate Medical Director for Emergency Medicine

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• CRICO/Risk Management Foundation
Objectives

• Review role of diagnostic error in EM & contributing factors to diagnostic error

• Review role of morbidity and mortality (M&M) conference in overtesting

• Discuss strategies to review cases of diagnostic error while encouraging appropriate testing
Case

- You come back from a weekend away to find an email from your medical director title “peer review – confidential”
- Enclosed is an email chain... that starts with the admitting hospitalist -> PCP -> chief of medicine -> ED director -> to you ... asking you to reply to the PCP on your failure to diagnose a PE
- On your way to the ED, you run into a colleague who says – I saw a patient you discharged last week with COPD and she came back...and had a PE
Case

• 48 year old woman with COPD and rheumatoid arthritis who presented to the ED with dry cough and shortness of breath for several days. Despite using her inhalers she was worsening. She also reported some chest pain that day.

• In the ED she was breathing rapidly (RR 22), with wheezing, but was stable. Her chest X-ray showed a viral pattern. Her HR was 90

• You treated her with nebulizers, steroids and oral antibiotics; she had improvement, and could walk without difficulty after several hours. Her resting RR was 14 and HR 90 after treatment

• You considered other causes of the chest pain:
  – you got an ECG and sent a troponin which were negative.
  – You considered PE, but as she did not have risk factors for DVT, and you thought her chest pain was from coughing you did not test for PE

• You discharged her to follow up with her PCP
Case

- Four days later the patient had gone to her PCP. Her respiratory status was slowly improving. She had continued to have cough, and chest pain. The PCP ordered a d-dimer and repeat CXR. The d-dimer resulted as 900 (<500 normal)
- She was sent to the ED for a CT scan
- Your colleague ordered a CT scan of her chest with contrast that showed several subsegmental PEs
- She was admitted for PE, started on a LMWH, transitioned to DOAC.
What gets reviewed shapes our culture

• At your institution do you review:
  – Adverse outcomes regardless of cause
  – Missed diagnoses
  – Complaints from outside providers
  – Near misses
  – Unnecessary / Avoidable tests
Diagnostic Error
Error Analysis: 15 year at one ED

- Cook County ED
- Retrospective review of 636 cases
- Two physicians independently reviewed:
  - 4 categories phase of work (diagnosis, treatment, disposition, and public health)
  - contributing factors that likely affected outcome (patient factors, triage, clinical tasks, teamwork, and system).

• 122 closed malpractice claims from 4 liability insurers in which patients had alleged a missed or delayed diagnosis in the ED.
• 48% of these missed diagnoses were associated with serious harm
• 39% resulted in death.
The leading breakdowns in the diagnostic process were:

• *Failure to order an appropriate diagnostic test (58% of errors)*,
• Failure to perform an adequate medical history or physical examination (42%),
• Incorrect interpretation of a diagnostic test (37%),
• Failure to order an appropriate consultation (33%).
The leading contributing factors to the missed diagnoses were:
- cognitive factors (96%),
- patient-related factors (34%),
- lack of appropriate supervision (30%),
- inadequate handoffs (24%),
- excessive workload (23%).
How Do We Balance

Diagnostic Error

Overtesting

[Diagram showing a balance scale with Diagnostic Error and Overtesting on either side]
Morbidity and Mortality (M&M) Conference
Background

• Ernest Amory Codman
  • “End Result Card”
  • "End Result Hospital" in Boston, Massachusetts, 1911–1917
• M&M Conferences today
  • Forum to discuss adverse outcomes
    • Identify and avoid repeatable individual errors
  • Foster a climate of openness around errors
• Patient Safety forum for the E.D.
  • Identify systems problems
M&M in Practice: Culture of Blame & Shame

Historical - punitive
• Cases chosen based on bad outcome
• Question: how could this outcome have been avoided
• Focus on individual
• Lesson: do more in this patient, ergo do more in similar patients

Modern: non-punitive
• Chosen based on error potential: bad outcome or “near-miss”
• Question: how did this event happen, what can we change to decrease likelihood in future
• Focus on role of individual & system
• Lesson: practice changes; modify system
M&M in Practice: Culture of Blame & Shame

• Fear of missing a diagnosis leads to overtesting
• What do we fear
  – Patient harm
  – Medicolegal risk
  – Humiliation, ostracization by peers
  – Shame, personal inadequacy
Emergency Medicine Morbidity and Mortality Conference and Culture of Safety: The Resident Perspective

Kathleen Wittels, MD, Emily Aaronson, MD, Richard Dwyer, MD, Eric Nadel, MD, Fiona Gallahue, MD, Christopher Fee, MD, Robert Tubbs, MD, Jeremiah Schuur, MD, MHS, for the EM M&M Culture of Safety Research Team

ABSTRACT

Objective: Morbidity and mortality conference (M&M) is common in emergency medicine (EM) and an Accreditation Council for Graduate Medical Education (ACGME) requirement. We aimed to characterize the prevalence of elements of EM M&M conferences that foster a strong culture of safety.

Methods: Emergency medicine residents at 33 programs across the United States were surveyed using questions adapted from a previously tested survey of EM program directors and the Agency for Healthcare Research and Quality (AHRQ) Culture of Safety Survey.

Results: The survey response rate was 80.3% (1,002/1,248). A total of 60.3% (601/997) of residents had not submitted a case of theirs to M&M in the past year. A total of 7.6% (73/954) reported that issues raised at M&M always led to change while 88.3% (842/954) reported that they sometimes did and 4.1% (39/954) reported that they never did. A total of 56.2% (536/954) responded that changes made due to M&M were reported back to the residents. Of residents who had cases presented at M&M, 24.2% (130/538) responded that there was regular debriefing, 65.2% (351/538) responded that there was not, and 10.6% (57/538) were unsure. A total of 10.2% (101/988) of respondents agreed that M&M was punitive, 17.4% were neutral (172/988), and 72.4% (715/988) disagreed. A total of 18.0% (178/987) of residents agreed that they felt pressure to order unnecessary tests because of M&M, 22.3% (220/987) were neutral, and 59.6% (589/987) disagreed. A total of 87.4% (862/986) felt that M&M was a valuable educational didactic session, and 78.3% (766/978) believed that M&M contributes to a culture of safety in their institution.
# Emergency Medicine Morbidity and Mortality Conference and Culture of Safety: The Resident Perspective

Kathleen Witters, MD, Emily Aaronson, MD, Richard Dwyer, MD, Eric Nadel, MD, Fiona Callahue, MD, Christopher Fee, MD, Robert Tubbs, MD, Jeremiah Schuur, MD, MHS, for the EM M&M Culture of Safety Research Team

## Table 3
Residents' Perceptions of M&M

<table>
<thead>
<tr>
<th>Perception</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort submitting cases I was not involved in</td>
<td>21.9 (217)</td>
<td>21.0</td>
<td>27.5</td>
<td>20.8</td>
<td>8.8 (87)</td>
</tr>
<tr>
<td>Comfort submitting cases I was involved in</td>
<td>82.0 (858)</td>
<td>35.2</td>
<td>24.4</td>
<td>7.0</td>
<td>3.1 (31)</td>
</tr>
<tr>
<td>M&amp;M feels punitive</td>
<td>2.6 (26)</td>
<td>7.6</td>
<td>17.4</td>
<td>38.2</td>
<td>43.5 (426)</td>
</tr>
<tr>
<td>Case discussion is focused on cognitive errors</td>
<td>14.7 (146)</td>
<td>44.4</td>
<td>27.1</td>
<td>11.4</td>
<td>2.3 (23)</td>
</tr>
<tr>
<td>Case discussion is focused on systems errors</td>
<td>23.9 (237)</td>
<td>52.4</td>
<td>17.2</td>
<td>5.2</td>
<td>1.2 (12)</td>
</tr>
<tr>
<td>Mistakes have led to positive changes</td>
<td>21.2 (209)</td>
<td>46.4</td>
<td>21.4</td>
<td>3.8</td>
<td>1.0 (10)</td>
</tr>
<tr>
<td>Feel pressure to order unnecessary tests because of M&amp;M</td>
<td>3.3 (33)</td>
<td>14.7</td>
<td>22.3</td>
<td>41.1</td>
<td>18.5 (183)</td>
</tr>
<tr>
<td>M&amp;M is a valuable educational didactic session</td>
<td>35.1 (352)</td>
<td>34.5</td>
<td>9.0</td>
<td>1.5</td>
<td>1.4 (14)</td>
</tr>
<tr>
<td>M&amp;M contributes to culture of safety at my institution</td>
<td>36.7 (359)</td>
<td>41.6</td>
<td>18.5</td>
<td>2.0</td>
<td>1.1 (11)</td>
</tr>
<tr>
<td>Issues raised at M&amp;M lead to change</td>
<td>7.6 (73)</td>
<td>88.3</td>
<td>4.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes are reported back to residents</td>
<td>56.2 (536)</td>
<td>43.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debriefing for residents</td>
<td>17.5 (168)</td>
<td>42.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are reported as % (n).
M&M = morbidity and mortality conference.
Agreement was measured on a five point Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree.
Strategies to Review Diagnostic Error without Sending Message that the answer is always more testing...
Strategies

1. Create a “just culture” that focuses on decisions rather than outcomes, and acknowledges human error
2. Modify the structure of your case conference (M&M) to encourage generalized decision-making, system improvements, and avoid blame
3. Add reviews of overtesting to balance the culture of diagnostic error that more is always better
Just Culture
Poll

• At my institution we have a just culture for managing errors and preventable events?
  
  – TRUE
  
  – FALSE
How do we create a culture of safety?

• New ways of thinking about error and risk
  – fair and just approach
  – Don’t judge quality of decision based on outcome, but by understanding how systems and values impact decisions

• Just Culture training
  – Skills-based
  – Tools to understand how systems and behaviors create or reduce risk, and give framework for thinking about how systems and behavior impact risk

• Manage risk and have fair and consistent response
What is a just culture?

• Traditional health care model:
  – Individuals accountable for all errors to patients under their care, Worse outcome = more attention

• A just culture:
  – Focuses on decisions not outcomes
  – Recognizes that individuals should not be held accountable for system failings
  – Recognizes many errors represent predictable interactions between human operators and the systems in which they work
  – Recognizes that competent professionals make mistakes
  – Acknowledges that even competent professionals will develop unhealthy norms
  – Has zero tolerance for reckless behavior
The Outcome Bias

- We tend to focus on the outcome instead of the choice made by the individual
  - We punish for mistakes where there is harm
- We want to focus on the “why”
- A Learning Organization remains curious about what drives behavior
- We cannot judge the *quality* of a person’s choice by the outcome, good or bad
What we know

• To err is human
  – We are human, and therefore fallible. We will occasionally make mistakes.

• To drift is human
  – “Drifting” is normal human behavior.

• We work within systems that have fallibilities. They were designed with limited resources and by humans.
Values, Expectations, Incentives

• Values compete
  – In ED: Length of stay vs. patient education

• There are nearly always incentives for people’s behavioral choices
  – What are they?
  – Is it important?
### The Behaviors we Expect

<table>
<thead>
<tr>
<th>Human Error</th>
<th>At-Risk Behavior</th>
<th>Reckless Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product of Our Current System Design and Behavioral Choices</strong></td>
<td><strong>A Choice: Risk Believed Insignificant or Justified</strong></td>
<td><strong>Conscious Disregard of Substantial and Unjustifiable Risk</strong></td>
</tr>
</tbody>
</table>

#### Manage through changes in:
- Choices
- Processes
- Procedures
- Training
- Design
- Environment

#### Manage through:
- Removing incentives for at-risk behaviors
- Creating incentives for healthy behaviors
- Increasing situational awareness

#### Manage through:
- Corrective Action Plans
- Progressive Action

**Console**
- Remediate

**Coach**
- Culture Change

**Corrective Action**
Human Error

• Human Error is not a “Cause” – it is a consequence associated with other factors:
  – Did the person make an at-risk choice that increased the risk an error might occur?
  – Did the system contribute to the error?
  – Were there personal performance factors, like fatigue, distraction, or environment that contributed?

• Manage: Console & Remediate Systems
Just Culture, Diagnostic Error & Testing

• What was the root cause of the diagnostic error
  – Failure to gather information
  – Failure to consider
  – Wrong application of knowledge (e.g. decision rule)

• Was the decision to not order the test reasonable based on available information
  – e.g. low risk by ACEP policy

• Make sure the result of review is clear statement about the likely cause and what can be done to avoid in the future
Cognitive Errors and Tips to Avoid
Poll: Which neck would you image
3 patients w/ neck pain (all neurologically intact)

• 70 yo woman tripped and fell at home
  – Delayed onset neck pain
  – No midline tenderness
• 45 yo M crashed car on local street (25 mph)
  – Passenger died in accident
  – Immediate neck pain
  – Ambulatory at scene
• 45yo M bicycle messenger hit front of car over hood
  – Wearing helmet
  – Walking at accident
System 1 and System 2 Thinking

**System 1**
- "Fast"
- Defining Characteristics:
  - Unconscious
  - Effortless
  - Automatic
- WITHOUT Self-Awareness or Control
- "What You See Is All There Is"
- Role:
  - Assess the Situation
  - Deliver Updates

**System 2**
- "Slow"
- Defining Characteristics:
  - Deliberate and Conscious
  - Effortful
  - Controlled Mental Process
- WITH Self-Awareness or Control
- Logical and Skeptical
- Role:
  - Seeks New/Missing Information
  - Makes Decisions
<table>
<thead>
<tr>
<th>Cognitive style</th>
<th>Type 1</th>
<th>Type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computational principle</td>
<td>Heuristic, intuitive</td>
<td>Rule based</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Passive</td>
<td>Active</td>
</tr>
<tr>
<td>Capacity</td>
<td>High</td>
<td>Limited</td>
</tr>
<tr>
<td>Cognitive awareness/control</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Automaticity</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Rate</td>
<td>Fast</td>
<td>Slow</td>
</tr>
<tr>
<td>Reliability</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Errors</td>
<td>Relatively common</td>
<td>Rare</td>
</tr>
<tr>
<td>Effort</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Emotional attachment</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Scientific rigor</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

Broken lines indicate significant interactions between System 1 and System 2.

Source: Adapted from Crosberry (2009) with permission.
Addressing Cognitive Biases:

Forcing functions and other tools
Types of Diagnostic Errors

No-Fault
- Unusual presentation of disease
- Patient refusal to be tested
- Limitations in medical knowledge

System
- Technical failures
- Organizational failures
  - Testing not available
  - Inadequate supervision
  - Poor coordination of care

Cognitive
- Knowledge
- Judgment
- Memory/Vigilance
Reducing Cognitive Errors

• Cognitive awareness

• Cognitive debiasing strategies

• Cognitive training
Cognitive awareness

• Providing descriptions of cognitive biases and examples of their adverse impact on decision-making

• Metacognition: thinking about thinking. Reflection on the decision making process itself.
Cognitive Awareness
Recognizing High Risk Situations

• Patients

• Situations

• Diagnoses
Cognitive Awareness
Recognizing High Risk Situations

• High risk patients
  – “The young, the old, and the crazy”
  – The hostile, abusive, and intoxicated

Unreliable history, atypical presentations, negative visceral response
Recognizing High Risk Situations

• The Return Visit
  – Diagnosis Momentum
  – Visceral Bias
Recognizing High Risk Situations

• High risk times
  – Patient sign-out
    • Loss of information
    • Misinterpretation of new incoming data
  – High acuity or volume
  – End-of-shift (personal fatigue)
Recognizing High Risk Situations

• High Risk Diagnoses
  – CP: MI, PE, TAD
  – Headache: SAH, meningitis, SDH
  – Abd pain: appendicitis, ectopic, torsion
  – Ortho: tendon & nerve injuries, foreign bodies
Cognitive Debiasing Strategies

Heuristics or mental strategies to avoid bias

Forced Thinking

What else could it be?

Is there anything that doesn’t fit?

Is it possible that I have more than one problem?
Cognitive Awareness

- High-risk Times
- High-risk Patients
- High-risk Diagnoses

Cognitive Strategies

- Have I explained all the patient’s findings?
- What else could it be?
- Have I considered worst-first?
- Could there be more than one problem?
- Is there a nonfit?
Cognitive Training

• Simulation – create clinical scenarios that are high risk for cognitive errors

• Observation- training videos that contrast biased vs. unbiased approaches

• Feedback
  – Immediate
  – M&M
Case Reviews & Cognitive Issues

• Identify cognitive biases that lead to diagnostic error
  – E.g. hassle bias – patient in hallway, did not undress
• Review underlying causes for biases, and specific strategies to address
  – Nursing policy to undress all patients
Case Review Tips

• Do not label case an error at outset
• Get provider’s story in addition to medical record
• Understand root causes of decisions
  – Knowledge gap vs. cognitive error?
  – Reckless vs. At-risk
• Close review with clear guidance on criteria for testing that can be applied in future
  – Clinical decision rule, guideline, consultant
• Acknowledge and address fear & shame of providers
Making M&M a Systems Conference

• Case choice
  – Potential errors and system failures NOT bad outcomes that cannot be explained

• Preparation
  – Root cause analysis beforehand
  – Get providers perspective beforehand
Making M&M a Systems Conference

• Presentation
  – Do not reveal outcome until the end
  – Present chronologically, as information was available to team
  – Present data, not interpretations
  – Ask audience to interpret and suggest action at typical decision points
    • Patient arrival, after H&P, after initial tests, etc.
  – Open discussion focusing on why and how to prevent
  – Formal recommendations with specific action plans
    • Provider recommendations – e.g. guideline
    • System recommendations
Overtesting Conference

• Identify cases where tests were done unnecessarily
• Discuss costs and value and connect overuse to patient harm by labeling it a medical error and performing root-cause analyses.
• Goal is to create a safe environment for open discussion, in the hopes of preventing patient harm from overuse from happening again.
• Identifying these cases can be challenging; we weren’t trained to look for them in the past.
  – E.g. tracing a case of clostridium difficile back to treatment for presumed bacterial bronchitis is difficult.
  – Look at high cost and radiation imaging and review; e.g. CTPA in pregnancy

Summary

• Providers never want to miss a diagnosis; fear of inadequacy leads to over testing
  – Formally acknowledge and manage for both provider of case & audience at conference

• Use case reviews to understand how decision-making happened so recommendations can guide future cases
  – Individual cognitive issues
  – Systems issues

• Consider reviewing cases of overtesting
Thank you!

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