Radiologist’s Perspective
Medical Image Perception & Cognition

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How I read imaging studies

• Quiet, dark room
  • How behind am I?
  • What kind of day is this going to be?
How Long Is the List?
What kind of study?

• What are the referring physicians interested in:
  • Diagnostic investigation (e.g. Why is this patient febrile? Tumor?)
  • Infectious/Cancer disease: better or worse?
  • Trauma/Surgery: What's broken or out of place or not draining?
  • Cancer:
    • Diagnosis?
    • Staging?
    • Response to therapy?
Prior report

- What were the major findings last time?
- What were incidental findings that I don’t want to miss!
- What is the tempo of this disease:
  - Has it been stable?
  - Has it been getting better?
  - Has it been getting worse?
  - At what rate is this happening?
Prior Medical History

• Our PACS system has access to recent medical e-notes in chart.
• What is going on with this patient?
• What is the treatment team primarily interested in?
• Is this a routine check or a purpose-driven study?
Cognition Drives Perception
or
The educated eye sees more
Staying organized

• Layout:
  • New over old
  • Match types of images with each other so they are close
  • Standard format aids in reducing confusion, less taxing

• Set up Report
  • Standardized format acts as checklist
  • Getting into a rhythm with a routine decreases chance of missing something
Identify normal structures

• Chest:
  • Heart, vessels, mediastinum, lungs, chest wall
  • Look for deviations from normal
  • Record and measure
  • Compare
  • Report
  • Be methodical
The Standardized Report
Problems

• Interruptions/Distractions
  • Before the interruption: “I should mention X”
  • After the interruption: “Where was I?”
  • X gets missed
Problems

• Fatigue and Errors of Attention
  • Physical and mental
  • Scrolling too fast
  • Not comparing properly (slice alignment)
  • Not focused
  • Distracted
  • Failure to record what is perceived!
Problems

• Interpretive
  • Benign to malignant: mimics tumor but on close inspection is not
  • Malignant to benign: Failure to notice subtle changes or new lesions
  • Don’t know what it is…describe
  • Failure to link findings (Adrenal nodule with a Lung mass)
Artificial Intelligence
Cognition, Perception and Artificial Intelligence

• Cognition:
  • AI can help in sorting out relevant medical information
  • AI can help understand links
  • AI can sort out what the clinician is looking for from the study

• Perception
  • AI can identify abnormalities
  • AI can identify previous abnormalities and detect changes on current exam
  • AI can double check reports (is everything mentioned?)

• Better, faster reports
Acknowledgements

• Todd Horowitz
• Melissa Trevino
• Baris Turkbey
• Stephanie Harmon
• Tom Sanford
• Sherif Mehralivand
• Stephanie Walker
• Jonathan Sackett

• Former Radiology Mentors
  • Art Rosenfield (Yale)
  • Ken Taylor (Yale)
  • Anne Curtis (Yale)
  • Herb Kressel (Penn)
  • Bev Coleman (Penn)
  • Hal Kundel (Penn)
  • Bob Zeman (Georgetown)
  • Andy Dwyer (NIH)
  • John Doppman (NIH)
  • Liz Jones (NIH)