CTC Workflow: Reviewing & Reporting Exams

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Aims

• Explain the workflow for CTC interpretation and reporting
  • Environment for Interpretation
  • Quality assurance
• Common interpretation strategies
• Generating a CTC report
Workflow of CTC Interpretation

- Confirm segmentation and map out colon
  - 3D transparency view or coronals
- Quality assurance
  - Distention, stool, fluid, tagging
- Search for polyps using both 3D and 2D
- Characterize and measure polyp candidates
- Secondary CAD-assisted evaluation
- Search for extracolonic findings
- Report (follow C-RADS guidelines)
Technologist QA

High Volume CTC Paradigm: Start Read @ CTC Workstation

Low Volume CTC Paradigm: Start Read @ PACS
Technologist QA

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QA Segmentation & Colon Layout
(Supine-Prone Registration)
Supine-Prone Registration
Technologist QA

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QA Segmentation & Colon Layout

QA Distention, Stool, Fluid & Tagging
3D View: Rapid QA of

- Location of segments
  - tortuosity
  - mobility when comparing supine to prone
- Identify ileocecal valve
- Quality of distention
2D QA CHECKLIST

• Retained stool
  • size and tagging
• Retained fluid
  • quantity
  • location
  • tagging
  • change supine – prone
• Artifacts (e.g., metal, breathing)

QA by technologist includes review of axial images for **distention**: most critical for diagnostic quality
You MUST identify the IC valve, but this is NOT always intuitive . . .

- Identify by:
  - Location
  - Fat
  - Shape
    - Papillary (dome-shaped)
    - Labial
    - Mixed
Poor Preparation
Excessive untagged feces
Quality Assurance: The Bottom Line

• Are any segments obscured on both views?
• Could a 10 mm polyp be hidden?
SAM Question:

Intentionally Hidden for Handout

Response 1.
Response 2.
Response 3.
Response 4.
Technologist QA

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QA Segmentation & Colon Layout

 QA Distention, Stool, Fluid & Tagging

3D Primary Read: Polyp search, measure, find flat lesions
Methods of Interpretation

• 3D with 2D problem solving
• 2D with 3D problem solving
• Soft tissue windows for flat lesions
• Bone windows for dense oral contrast tagged fluid and stool
• Virtual Pathology (open views)
• Computer-aided diagnosis (CAD)
Methods of Interpretation

- 3D with 2D problem solving
- 2D with 3D problem solving
- Soft tissue windows for flat lesions
- Bone windows for dense oral contrast tagged fluid and stool
- Virtual Pathology (open views)
- Computer-aided diagnosis (CAD)
Basic Feature of Polyps

6 mm Polyp on a Fold
Coated with tagging agent
Non-tagged Stool
Mobile, With Internal Gas
Well – Tagged Stool
Lipoma on the ICV
Dedicated Read for Flat Lesions

Wide Soft Tissue Window in 2D

Endoscopic view

Courtesy of J.L. Fidler, MD
Approach to Polyp Candidate Analysis

- Polyp vs. fold > use > 3D or MPRs
- Polyp vs. stool > use > texture (W/L or color map)
  - If solid . . .
    - Compare supine / prone for mobility
      - If mobile, check for long stalk, colonic rotation / flip
Primary 3D Read Strategies

• Forward and backward
• Supine and prone
• Special software features (e.g., color map for polyp characterization, show blind areas)
• Problem solve in 2D as needed as you read
• Bookmark & defer difficult problem solving (e.g., difficult supine/prone comparison)
Primary 2D Read
Learn to “Track the Colon”

• Highly magnified axial
• Go slowly! Look at all surfaces
• Evaluate very short segments as you move along an imaginary centerline
• Use a lung window (1500/-600) setting or “colon” (2000/0)
• Non-magnified or magnified MPR
• Simultaneous or deferred endoluminal comparison
3D Over-measurement Pitfall
“falling off the cliff”

- Use largest dimension on either 2D or 3D to triage management
- Per “C-RADS” 6 mm threshold for reporting polyps
Flat Lesions: Use Wide Soft Tissue Window

Supine

Prone
Technologist QA

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QA Segmentation & Colon Layout

QA Distention, Stool, Fluid & Tagging

3D Primary Read: Polyp search, measure, find flat lesions

Secondary CAD Read
Computer Aided Detection: Integrated Visualization Display
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QA Segmentation & Colon Layout

QA Distention, Stool, Fluid & Tagging

3D Primary Read: Polyp search, measure, find flat lesions

Secondary CAD Read

Generate Report
Structured CTC Reporting

- History
- Prep
- Informed of exam limitations
- Technique
- Colon findings
- Extracolonic findings
- C-RADS scores / Recommendations
- Footnote qualifier / reference C-RADS
C-RADS Classification

• C0   Inadequate study (can not evaluate 10 mm lesions)
• C1   Normal, routine follow up (Q 5 yrs CTC)
• C2   Indeterminate; 1-3 yr f/u
  • Polyp 6-9 mm, ≤ 3 in number
  • Findings indeterminate; cannot exclude polyps ≥ 6 mm
• C3   10 mm or ≥3 6-9mm polyps → Colonoscopy
• C4   Mass, likely malignant; surgical consult

Sample Histories

History: 55 year old male. CTC for colorectal cancer screening.


Sample #1: The colon was well distended and cleansed. A small amount of residual fluid in the right colon and rectosigmoid was well-tagged with oral contrast.

Sample #2: The colon was well distended and cleansed except for particulate stool in right colon limiting sensitivity for small polyps. A moderate amount of residual fluid in the right colon and rectosigmoid was weakly tagged with oral contrast.
Technologist QA

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QA Distention, Stool, Fluid & Tagging

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Secondary CAD Read

Generate Report
THANK YOU!

Acknowledgments

- Contributors to “The Atlas of Virtual Colonoscopy” Eds1 & 2

http://www.radiology.uchicago.edu/page/virtual-colonoscopy-overview

http://vctraining.uchicago.edu
• Both 2D and 3D skills are needed – use it in every case

• Use a systematic approach that involves QA of images, recognition of anatomic landmarks and supine-prone comparison

• Recognize pitfalls and use CAD secondary read

• Report using C-RADS guidelines and recommendations