CT Colonography: Clinical Application and Reimbursement

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Boston University Chobanian & Avedisian School of Medicine
&
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Reimbursement Expert

Part I: CT Colonography Clinical Applications
Presented By

Kevin J. Chang, MD, FACR, FSAR, currently serves as the Section Chief of Abdominal Imaging and Director of MRI at Boston Medical Center and Associate Professor of Radiology at Boston University Chobanian & Avedisian School of Medicine as well as Adjunct Associate Professor of Diagnostic Imaging at Brown University Alpert Medical School. Dr. Chang has worked across multiple practices, health systems, and hospitals over the past 20 years in a wide variety of academic, private practice, and hybrid clinical settings caring for a wide variety of patient populations before dedicating his current practice to the care of the underserved. He strives to make advanced medical imaging accessible to any patient that is in need regardless of ability to pay. His research and advocacy efforts have concentrated on colorectal cancer prevention and detection and he has published and lectured widely on the underutilized screening option of CT Colonography (aka Virtual Colonoscopy).

Disclosures

- Received honoraria from:
  - Bracco Diagnostics
  - Philips Healthcare
  - Applied Radiology
Learning Objectives

1. Review the epidemiology and pathophysiology of colorectal cancer and justifications for colorectal screening
2. Identify the targets of colorectal screening and provide the rationale for selective polypectomy
3. Compare and contrast CT Colonography with other screening options

Colorectal Cancer

• 2nd leading cause of cancer death in US
  – 1 in 11 deaths, 53k deaths/yr
  – 150k new cases/yr

• 5% lifetime risk

SEER & ACS 2021 projections
Colorectal Cancer Screening in US

- Decreasing overall incidence & mortality due to increased screening
- A preventable disease for which only 50-60% of eligible adults are screened (even lower in minorities)
- Dramatically increasing incidence in those under 50 y
- Will become #1 cancer killer in 20-49 yo by 2030!

Polyp Progression to Cancer

- **85% Adenoma-Carcinoma Sequence**
  - APC, Cox-2, K-ras, p53, 18q
  - Window for Prevention: ~10-15 Years
  - Window for Cure

- **15% Serrated Adenoma Sequence**
  - BRAF, CIMP, MSI
Improving Incidence & Mortality

- Early detection and removal of polyps reduces the incidence and mortality of colorectal cancer


Colorectal Cancer

Over 95% of colorectal cancer deaths are preventable

Earlier diagnosis = better prognosis
- Localized: 90% 5-yr survival
- Regional: 72%
- Distant: 14%
Target Population

• Average Risk: Start @ 45-50 y.o.
• Increased Risk: Start @ 40 y.o. (or 10 y before youngest index case)
  – 1st degree family hx (1 < 60 y.o. or 2 any age)
  – Personal hx

• High Risk: Should get Optical Colonoscopy, age varies
  • IBD, Hereditary Syndromes

American Cancer Society
2018 Recommended Screening Options

Average risk individuals should be screened from age 45 to 75-85.

Prevention Tests: detect polyps & cancer

- colonoscopy every 10 years (OC)
- CT colonography every 5 years (CTC)
- flexible sigmoidoscopy every 5 years
- double-contrast barium enema every 5 years

Detection Tests: detect cancer

- fecal occult blood test (gFOBT) every year
- fecal immunochemical test (FIT) every year
- stool DNA test (sDNA), every 3 years
US Preventive Services Task Force 2021 Recommendation

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 to 49 years</td>
<td>The USPSTF recommends screening for colorectal cancer in adults ages 45 to 49 years.</td>
<td>B</td>
</tr>
<tr>
<td>50 to 75 years</td>
<td>The USPSTF recommends screening for colorectal cancer in all adults ages 50 to 75 years.</td>
<td>A</td>
</tr>
<tr>
<td>76 to 85 years</td>
<td>The USPSTF recommends that clinicians selectively offer screening for colorectal cancer in adults ages 76 to 85 years. Evidence indicates that the net benefit of screening all persons in this age group is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the patient’s overall health and prior screening history.</td>
<td>C</td>
</tr>
</tbody>
</table>

USPSTF 2021 Screening Strategies

<table>
<thead>
<tr>
<th>Screening Method</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct Visualization Tests</strong></td>
<td></td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>Every 10 y</td>
</tr>
<tr>
<td>CT Colonography</td>
<td>Every 5 y</td>
</tr>
<tr>
<td>Flexible sigmoidoscopy</td>
<td>Every 5 y</td>
</tr>
<tr>
<td>Flexible sigmoidoscopy + FIT</td>
<td>Flexible sigmoidoscopy every 10 y + FIT every year</td>
</tr>
<tr>
<td><strong>Stool-Based Tests</strong></td>
<td></td>
</tr>
<tr>
<td>High sensitivity gFOBT</td>
<td>Every year</td>
</tr>
<tr>
<td>FIT</td>
<td>Every year</td>
</tr>
<tr>
<td>Stool DNA-FIT</td>
<td>Every 1 or 3 y</td>
</tr>
</tbody>
</table>
Medicare/Medicaid Covered Indications

- **Incomplete colonoscopy:**
  - can be performed on the same day for any reason except *inadequate prep*

- **Contraindication to colonoscopy**
  - Anticoagulation
  - Difficulty with prior colonoscopy
  - Difficulty with or high risk for sedation

Differences From Colonoscopy

- 20X Lower risk of perforation*
- No sedation = Immediate return to activity
- Less manpower (no anesthetists, RNs)
- Faster exam (10-15 min table time)

- Still requires colonoscopy for biopsy
- Does not avoid prep

*Pickhardt PJ. Radiology 2006;239:313-316.
### Screening Performance Sensitivities

<table>
<thead>
<tr>
<th></th>
<th>CTC</th>
<th>C-scope</th>
<th>FIT</th>
<th>Stool DNA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Polyp Detection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ 10 mm</td>
<td>90%</td>
<td>88.2%</td>
<td>23.8%</td>
<td>42.4%</td>
</tr>
<tr>
<td>@ 6 mm</td>
<td>78%</td>
<td>90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cancer Detection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>96.1%</td>
<td>94.7%</td>
<td>73.8%</td>
<td>92.3%</td>
</tr>
</tbody>
</table>

Pickhardt PJ et al. NEJM 2003;349:2191-2200
Johnson CD et al. NEJM 2008;359:1207-1217
Imperiale TF et al. NEJM 2014;370:1287-1297
Pickhardt PJ et al. Radiology 2011;259:393-405
**Validation Trials**

**ACRIN 6664: The National CT Colonography Trial (NCI/NIH)**
- n=2531 over 15 institutions; average risk
- Sensitivity 90% @ 10 mm

**Munich Colorectal Cancer screening trial**
- n=307 average risk; sensitivity 92% @ 10 mm

**IMPACT trial (Italy)**
- n=1103 increased risk; sensitivity 91% @ 10 mm

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**Size Matters**

<table>
<thead>
<tr>
<th>Size</th>
<th>Risk of CA now</th>
<th>Risk of adenoma now</th>
<th>If adenoma, risk of CA in 10 yrs</th>
<th>Risk of CA in 10 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 mm</td>
<td>&lt;0.01%</td>
<td>&lt;30%</td>
<td>&lt;5%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>10-15 mm</td>
<td>1-2%</td>
<td>80%</td>
<td>15%</td>
<td>7-10%</td>
</tr>
</tbody>
</table>

Lieberman DA et al, JAMA. 2008;300(12):1417-1422.: Out of 3744 1-5 mm polyps, only 1 had advanced adenoma, none with cancer.

Only 3% of adenomas develop into cancer.

The Case for Selective Polypectomy

<table>
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<tr>
<th>Size</th>
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<th>Risk of adenoma now</th>
<th>If adenoma, risk of CA in 10 yrs</th>
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<tr>
<td>&lt; 5 mm</td>
<td>&lt;0.01%</td>
<td>&lt;30%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>6-9 mm</td>
<td>&lt;1%</td>
<td>50%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>10-15 mm</td>
<td>1-2%</td>
<td>80%</td>
<td>15%</td>
<td>7-10%</td>
</tr>
</tbody>
</table>

C-RADS

C1: Normal or Benign
C2: Polyps 6-9 mm, < 3
C3: Polyps 6-9 mm, ≥ 3
C4: Colonic Mass, likely malignant

5-10 yr follow-up CTC vs. OC
3 yr follow-up CTC vs. OC
OC
Surgical consultation


Experience: 3 Year Follow-Up CTC

  - 22% ↑
  - 50% stable
  - 28% ↓ (10% complete resolution)
  - 35% ↑
  - 38% stable
  - 27% ↓ (14% complete resolution)
The Case for Selective Polypectomy

• Optical Colonoscopy (OC) Complication Rate
  – Perforation 0.1%-0.2%
  – Death 0.06%
  – Bleeding 0.5%
  – Oversedation 0.5%
  – Hospitalization rate within 7 days 1.6%
    within 30 days 2.4-3.8%*

• CTC Complication Rate
  – Essentially 0%, risk comes from those referred to colonoscopy


Colorectal Cancer Screening Paradigm

Universal polypectomy at OC
Selective polypectomy for CTC

Affects potential for complications and amount of resources utilized
CT Colonography versus Colonoscopy for the Detection of Advanced Neoplasia

Background
Advanced neoplasia represents the primary target for colorectal-cancer screening and prevention. We compared the diagnostic yield from parallel computed tomographic colonography (CTC) and optical colonoscopy (OC) screening programs.

Methods
We compared primary CTC screening in 1,166 consecutive adults (mean ± SD) age 57.4 ± 12.1 years with primary OC screening in 3,163 consecutive adults (mean ± SD) age 58.1 ± 12.7 years. The main outcome measures included the detection of advanced neoplasm (advanced adenoma and carcinoma) and the total number of harvested polyps. Referral for polyectomy during OC was offered for all CTC-detected polyps of at least 6 mm in size. Patients with one or two small polyps (6 to 9 mm) also were offered the option of CTC surveillance. Existing primary OC, unless all detected polyps were removed, regardless of size, according to established practice guidelines.

Results
Existing CTC and OC screening. 123 and 121 advanced neoplasms were found, including 26 and 4 invasive cancers, respectively. The referral rate for OC in the primary CTC group was 10.7% (N = 3120) compared with 2.3% (N = 3163) for CTC.

Table 2: Diagnostic Yield of Primary CTC and Primary OC Screening.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Primary CTC (N = 3120)</th>
<th>Primary OC (N = 3163)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of OC — no. of patients (%)</td>
<td>246 (7.9)</td>
<td>3163 (100)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total no. of polyps removed</td>
<td>561</td>
<td>2434</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No. of advanced adenomas ≥10 mm</td>
<td>103</td>
<td>103</td>
<td>0.92</td>
</tr>
<tr>
<td>6–9 mm</td>
<td>5</td>
<td>11</td>
<td>0.14</td>
</tr>
<tr>
<td>≤5 mm</td>
<td>1†</td>
<td>3</td>
<td>0.32</td>
</tr>
<tr>
<td>Invasive carcinoma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of carcinomas</td>
<td>14</td>
<td>4</td>
<td>0.02</td>
</tr>
<tr>
<td>No. of patients (%)</td>
<td>12 (0.4)</td>
<td>4 (0.1)</td>
<td>0.04</td>
</tr>
<tr>
<td>Total advanced neoplasia†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of neoplasms</td>
<td>123</td>
<td>121</td>
<td>0.81</td>
</tr>
<tr>
<td>No. of patients (%)</td>
<td>100 (3.2)</td>
<td>107 (3.4)</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Perforations
10-15% of polyps were removed during OC. This may represent a higher perforation rate associated with CTC.

Extracolonic Findings

C-RADS

E1: Normal or Anatomic Variant
(eg. retroaortic renal vein)

E2: Clinically Unimportant Finding
No work-up indicated
(eg. simple cysts, gallstones)

E3: Likely Unimportant Finding, Incompletely Characterized
Subject to local/patient preference
(eg. min complex cyst)

E4: Potentially Important Finding
Communicate to referrer per accepted practice guidelines
(eg. Solid renal mass, LAD, AAA, lung nodule >1 cm)

CT Colonography

- Fast breath hold low radiation dose helical CT
- in Supine and Prone positions
- of a prepped and inflated colon


One Day Bowel Prep ("Dry" prep)

1. Clear liquid diet x 24 hrs

2. 20 oz Mg-citrate + four 5 mg bisacodyl tablets night prior to exam

Fecal/Fluid Tagging

• 60 mL of Iodinated Contrast

• 250 mL of 2% Barium

Same Day Incomplete Colonoscopy

• 2-hour iodine tagging with 30 mL diatrizoate meglumine and diatrizoate sodium
  – Iodinated contrast reached the distal colon in 72-74% of patients*

• Or re-prep and schedule for another day (superior tagging & less fluid?)

Fecal/Fluid Tagging

1. Improve visualization of submerged polyps
2. Adhere to and improve detection of flat lesions

Images courtesy of David H. Kim, MD, FACR

Polyp Coating: Barium

Images courtesy of David H. Kim, MD, FACR
Automated Colon Insufflation

Rectal catheter
• 20 Fr. flexible silicone balloon tip

Carbon Dioxide
• Constant flow of CO2 starts slowly but ramps up to 2-3 L/min to maintain a pressure of 25 mm Hg
  – Quickly resorbed for comfort

CT Colonography (CTC)
aka Virtual Colonoscopy

• Image Acquisition
  – Fast breath hold low radiation dose helical CT
  – in 2 positions (e.g. Supine and Prone or Decubitus)

  – No IV Contrast
  • IV contrast may be used to stage a known obstructing mass
Radiation Dose

• **Low-dose** exam using Automatic Tube Current Modulation with high noise index and iterative reconstruction

• **Total Dose averages** 2-5 mSv
  – 1/3 of a routine abdomen/pelvis CT
  – Less than Double Contrast Barium Enema


Radiation Risk

Rates of cancer induction fall after age 35

• Colon screening starts at 45
• Medicare population is > 65

Below 50-100 mSv, risk of health effects are either too small to be observed or are nonexistent

CTC in the Pandemic Era

- Fewer Personnel, Less PPE
- Decreased Aerosolization
- No Sedation = less recovery time, no driver
- Lower risk of complication and hospitalization
- Better performance than mt-sDNA

Disproportionate Impact on Minorities and Underserved

- African-Americans/Blacks have higher CRC death rate than any racial/ethnic group*
- While racial gap in cancer mortality is narrowing, socioeconomic inequalities are widening
  - Largest gaps in the most preventable cancers
- Lower screening rates
- Potential cultural barriers to optical colonoscopy

Summary

- Colorectal Cancer has the model pathobiology for cancer screening
- CTC is an ideal screening option amongst many
- CTC will increase screening rates and save additional lives
- CTC with selective polypectomy limits complications and optimizes resource utilization
- CTC is an excellent option in the pandemic era & can help to reduce health disparities
Part II: CT Colonography Reimbursement

Donna Richmond, BA, CPC, RCC, CIRCC, has more than 25 years experience in billing, coding and compliance. She is an accomplished teacher and author, and of course, some of you are familiar with her, as she manages the Bracco Reimbursement Hotline. She holds credentials from the Radiology Coding Certification Board, AAPC and as a Certified Interventional Radiology Cardiovascular Coder. She has also served as president of the local AAPC chapter. And many of you know her from the Bracco Reimbursement Hotline.

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**Diagnostic**
- 74261 Computed tomographic (CT) colonography, diagnostic, including image postprocessing; without contrast material
- 74262 Computed tomographic (CT) colonography, diagnostic, including image postprocessing; with contrast material(s) including non-contrast images, if performed

**Screening**
- 74263 Computed tomographic (CT) colonography, screening, including image postprocessing

All 3 codes include image post-processing. Do not code 76376 or 76377
The interpretation should include both intra- and extra-luminal evaluation
Do no report conventional CT abdomen codes in addition to the CTC codes
HCPCS Codes

- Tagging agents such as Tagitol™V (barium sulfate) Oral Suspension do not have a HCPCS code and will not be separately paid
  - Included in the procedure if provided by the facility
  - Hospitals may report under revenue codes such as 0255, 0270, or 0621
  - Prescription is required if the patient will obtain from a pharmacy
- If IV contrast is used for diagnostic exams, the appropriate HCPCS code for the contrast material should be reported
  - Q9966 – ISOVUE®-200, ISOVUE®-250
  - Q9967 - ISOVUE®-300, ISOVUE®-370

Other Supplies

- PROTOCO₂L Touch® - Colon Insufflator for CT Colonography
- Disposables
- No specific HCPCS codes
- May be reported under revenue codes such as 0270 or 0621
- No separate payment
Coverage

• Medicare continues non-coverage of the screening CTC
• Diagnostic CTC may be covered in limited situations
  – Failed diagnostic optical colonoscopy (obstructing neoplasm, intrinsic scarring, aberrant anatomy, obstruction from prior surgery, radiation or diverticular disease; extrinsic compression)
  – Board certified gastroenterologist determines that an optical colonoscopy cannot be safely performed
  – Evaluation of submucosal abnormality found on colonoscopy or other imaging

Coverage

• Most non-Medicare payers do cover both screening and diagnostic CTC exams
• Check with the payer before performing the exam
• Many states mandate coverage based on guidelines from the American Cancer Society, the United States Preventive Services Taskforce, or American College of Radiology
**Medicare Payment**

- OPPS National Payment Amount
  - 74261 - $106.88
  - 74262 - $180.34
- MPFS National Payment Amount
  - 74261 - $442.23
  - 74261 TC - $327.35
  - 74261 26 - $114.88
  - 74262 - $498.14
  - 74262 TC - $378.52
  - 74262 26 - $119.62

**Diagnosis Codes**

- Possible ICD-10-CM diagnosis codes for diagnostic exam
  - Z53.8 Procedure and treatment not carried out for other reasons
  - Z08, Z09 Follow-up after completed treatment (malignant neoplasm or other than malignant neoplasm
  - C18 –C21 Malignant neoplasm of colon, rectosigmoid junction, rectum, anus
  - D12 Benign neoplasm
  - K50 – K63 Diseases of intestines
  - K91.3 Post procedural intestinal obstruction
  - K92.2 Gastrointestinal hemorrhage, unspecified
  - R93.3 Abnormal findings on diagnostic imaging of other parts of digestive tract
Diagnosis Codes

- Possible diagnosis codes for screening CTC
  - Z12.11 Encounter for screening for malignant neoplasm of colon
  - Z12.10 Encounter for screening for malignant neoplasm of intestinal tract, unspecified
  - Z12.12 Encounter for screening for malignant neoplasm of rectum

Diagnosis Codes

- Z80.0 Family history of malignant neoplasm of digestive organs
- Z83.71 Family history of colonic polyps
- Z15 Genetic susceptibility
- Z79.01 Long term (current) use of anticoagulants
Resources

- ACR
  - https://www.acr.org/Clinical-Resources/Colon-Cancer-Screening-Resources
  Register your center
  Guidelines
  Patient brochures
  Education

Resources

- Myctcolonography.com
- Nccrt.org – National Colorectal Cancer Roundtable
Bracco Diagnostics Reimbursement Hotline

- 1-800-349-1388
- Monday-Friday
- 8:00 a.m. to 5:00 p.m. (Central)
- askbracco@reimbursement.bracco.com

Questions?
TAGITOL™ V (barium sulfate) oral suspension

Indications and Usage:
TAGITOL™ V (barium sulfate) oral suspension is indicated for use in adult patients for use in computed tomography (CT) colonography as a fecal tagging agent.

IMPORTANT SAFETY INFORMATION:
For Oral Administration. This product is contraindicated in patients with known or suspected perforation of the gastrointestinal (GI) tract, known obstruction of the GI tract, or hypersensitivity to barium sulfate products. Rarely, severe allergic reactions of anaphylactoid nature have been reported following administration of barium sulfate contrast agents.

Please see full Prescribing Information for TAGITOL V (barium sulfate) oral suspension here

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch or call 1-800-FDA-1088.


TAGITOL is a trademark of E-Z-EM, Inc.

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Monroe Township, NJ 08831 USA
Phone: 609-514-2200
Toll Free: 1-877-272-2269 (U.S. only)
Fax: 609-514-2448

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