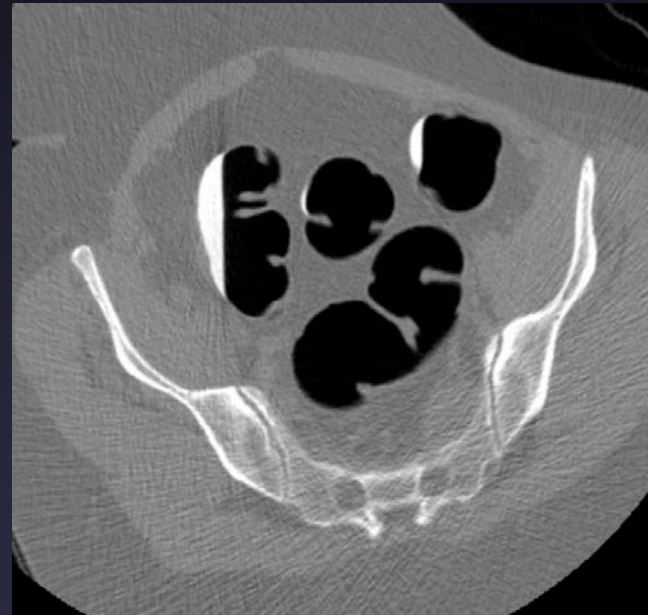


Colonic Gas Volume at CT Colonography According to Patient Position:

Value of Decubitus Series for Optimizing Distention



THE UNIVERSITY
of
WISCONSIN
MADISON

Bakke JR, Pickhardt PJ, Lubner MG, Kim DH
University of Wisconsin School of Medicine & Public Health



What is CT Colonography?

- CT Colonography (CTC or Virtual Colonoscopy) is a radiologic procedure that is complementary to conventional optical colonoscopy
 - Comparable in terms of detecting significant pathology
 - Less invasive with little or no immediate risk
 - No anesthesia or pain control required
 - “Patients” can drive themselves home (or return to work)
 - Can identify important pathology outside the colon
 - Cost approximately $\frac{1}{4}$ that of optical colonoscopy
 - Can improve overall screening rates for CRC



What is CT Colonography?

- Patients undergo a cathartic bowel preparation to clear the colon of residual contents
- Gas-filled colon imaged via computed tomography (CT)
- 3D imaging software allows for virtual “fly-through”
- Interpreting radiologist examines the combined 2D-3D model for polyps, cancer, and other abnormalities





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UW and CTC

- CTC screening program began in 2004
- **FIRST** and (still the) **ONLY** academic medical center offering screening CTC on a large scale with broad health insurance coverage
- Have performed over **10,000** CTC studies
- Have published over **100** peer-reviewed CTC articles

The NEW ENGLAND JOURNAL of MEDICINE

CT Colonography versus Colonoscopy for the Detection of Advanced Neoplasia

David H. Kim, M.D., Perry J. Pickhardt, M.D., Andrew J. Taylor, M.D.,
Winifred K. Leung, M.D., Thomas C. Winter, M.D., J. Louis Hinshaw, M.D.,
Deepak V. Gopal, M.D., Mark Reichelderfer, M.D., Richard H. Hsu, M.D.,
and Patrick R. Pfau, M.D.

2007;357:1403-12



Background

- Standard imaging protocol for CTC consists of scanning in the supine & prone positions
 - Adequate distention is critical for accurate lesion detection
 - Right lateral decubitus series generally added in cases of inadequate distention of the sigmoid colon (~10% of cases)

Performing an additional decubitus series at CT colonography

Christopher M. Buchach, David H. Kim, Perry J. Pickhardt



- Anecdotally, the decubitus often shows improved distention
- Should this view be considered routine for CTC scanning?

Purpose

To apply a novel CTC volumetric analysis tool to compare colonic gas volume between supine, prone, and right lateral decubitus patient positions

Methods

- Volumetric analysis of CTC scans in 151 adults
 - Mean age: 59.0 years; 86 men, 56 women
- Colonic distention achieved with continuous automated low-pressure CO₂ delivery
 - PROTOCO₂L insufflator (Bracco Diagnostics)
- Main inclusion criterion:
 - 1) supine, 2) prone, and 3) decubitus series were obtained
 - Decision to perform 3rd (decubitus) series based on CTC technologist assessment at the time of examination
- Total colonic gas volume for each position derived using a novel automated tool
 - Viatronix V3D Colon (beta version)

Results: Colonic Distention

- Mean colonic gas volume (\pm SD)
 - Supine: 1606 mL (\pm 562 mL)
 - Prone: 1433 mL (\pm 502 mL)
 - Decubitus: 1888 mL (\pm 626 mL)
 - $p < 0.0001$
- Decubitus series most voluminous of three positions in 111/151 cases (73.5%)
 - Higher volume than supine and/or prone in 93.4% (141/151)
 - Least volume in just 10 (6.6%) cases
- Prone was most voluminous in only 1 case (0.7%)
 - Least volume in 72.2% (109/151)

Results: Colonic Distention

Position	Mean Gas Volume (mL)	Standard Deviation (mL)	Highest volume (n=151)
Supine	1606	562	39
Prone	1433	502	1
Decubitus	1888	626	111
p-value	< 0.0001		

Results: Colonic Distention

Supine



1388 mL

Prone



1382 mL

Decubitus



2141 mL

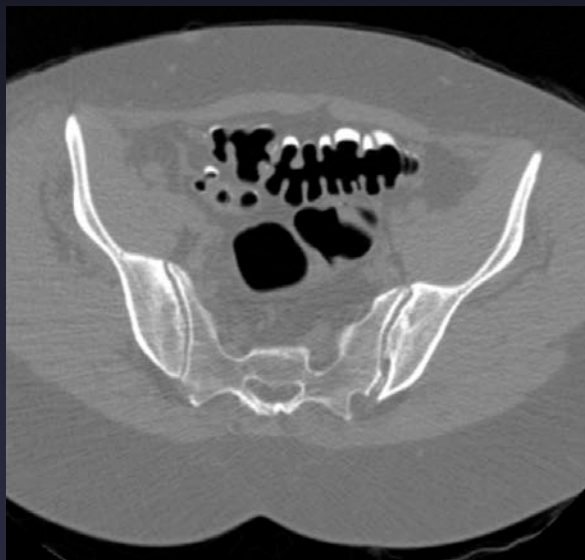
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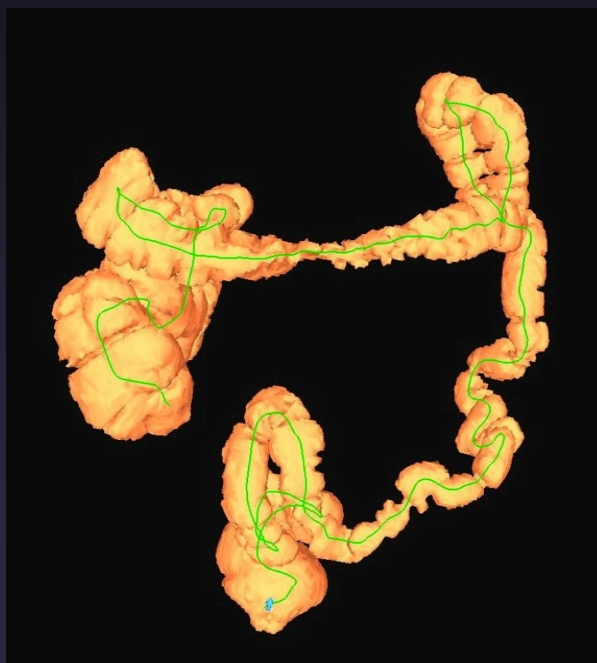
Results: Colonic Distention

Supine



1835 mL

Prone



1639 mL

Decubitus



2452 mL

Results: Colonic Distention

Supine

Prone

Decubitus



1429 mL

973 mL

1963 mL

Conclusions

- Volumetric analysis showed clear separation in overall colonic distention between the three patient positions
 - Decubitus series was the best (by far)
 - Prone series was the worst (by far)
 - Unlikely related to sequential order
- These findings will likely alter our standard CTC protocol, resulting in:
 - Improved colonic distention (& lesion detection)
 - Improved patient comfort (prone most difficult)
 - Reduced radiation dose (fewer series on average)

Thank You



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