

Virtual Colonoscopy / CTC

Clinical Trials & Publications

The New England Journal of Medicine

"Accuracy of CT Colonography for Detection of Large Adenomas and Cancers",

C. Daniel Johnson, M.D., M.M.M., Mei-Hsiu Chen, Ph.D., Alicia Y. Toledano, Sc.D., Jay P. Heiken, M.D., Abraham Dachman, M.D., Mark D. Kuo, M.D., Christine O. Menias, M.D., Betina Siewert, M.D., Jugesh I. Cheema, M.D., Richard G. Obregon, M.D., Jeff L. Fidler, M.D., Peter Zimmerman, M.D., Karen M. Horton, M.D., Kevin Coakley, M.D., Revathy B. Iyer, M.D., Amy K. Hara, M.D., Robert A. Halvorsen, Jr., M.D., Giovanna Casola, M.D., Judy Yee, M.D., Benjamin A. Herman, S.M., Lawrence J. Burgart, M.D., and Paul J. Limburg, M.D., M.P.H., September 18, 2008, (Vol. 359, No. 12)

In this study of asymptomatic adults, CT colonographic screening identified 90% of subjects with adenomas or cancers measuring 10 mm or more in diameter. These findings augment published data on the role of CT colonography in screening patients with an average risk of colorectal cancer (ACRIN 6664)

"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., October 4, 2007, (Vol. 357, No. 14)

Primary CTC and OC screening strategies resulted in similar detection rates for advanced neoplasia, although the numbers of polypectomies and complications were considerably smaller in the CTC group. These findings support the use of CTC as a primary screening test before therapeutic OC

"Computed Tomographic Virtual Colonoscopy to Screen for Colorectal Neoplasia in Asymptomatic Adults",

Perry J. Pickhardt, M.D., J. Richard Choi, Sc.D., M.D., Inku Hwang, M.D., James A. Butler, M.D., Michael L. Puckett, M.D., Hans A. Hildebrandt, M.D., Roy K. Wong, M.D., Pamela A. Nugent, M.D., Pauline A. Mysliwiec, M.D., M.P.H., and William R. Schindler, D.O., December 2003 issue (Vol. 349, No. 23)

Viatronix was an exclusive participant in the largest-ever clinical trial utilizing 3D virtual colonoscopy as the primary read. This trial compared virtual and optical colonoscopy. Results showed a higher sensitivity for virtual colonoscopy than for optical colonoscopy (the "gold" standard) for adenomas 8mm and larger.

American Gastroenterological Association

"AGA Supports New Guidelines Favoring Tests That Prevent Colorectal Cancer "

March 5, 2008

The AGA Institute supports CTC as a promising screening test for colorectal cancer, which we believe will be in widespread clinical use in the near future.

Alimentary Pharmacology & Therapeutics

"Virtual vs. optical colonoscopy in symptomatic gastroenterology out-patients: the case for virtual imaging followed by targeted diagnostic or therapeutic colonoscopy"

M.Bose, J.Bell, L.Jackson, P.Casey, J.Saunders, O.Epstein Volume 26 Issue 5 Page 727-736, September 2007

In symptomatic patients, three-dimensional virtual colonoscopy is equivalent to optical colonoscopy for diagnosing colon cancer and clinically significant polyps. A case can be made for three-dimensional virtual colonoscopy as a primary modality followed if necessary by same day-targeted optical colonoscopy.

American Cancer Society

"Prevention the Focus of New Colon Cancer Screening Guidelines", Article date: 2008/03/05

CT colonography (virtual colonoscopy) is recommended every 5 years

"Screening and Surveillance for the Early Detection of Colorectal Cancer and Adenomatous Polyps, 2008: A Joint Guideline from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology"

Bernard Levin, MD, David A. Lieberman, MD, Beth McFarland, MD, Robert A. Smith, PhD, Durado Brooks, MD, MPH, Kimberly S. Andrews, Chiranjeev Dash, MD, MPH, Francis M. Giardiello, MD, Seth Glick, MD, Theodore R. Levin, MD, Perry Pickhardt, MD, Douglas K. Rex, MD, Alan Thorson, MD, Sidney J. Winawer, MD and for the American Cancer Society Colorectal Cancer Advisory Group, the US Multi-Society Task Force, and the American College of Radiology

Based on the accumulation of evidence since that time, the expert panel concludes that there are sufficient data to include CTC as an acceptable option for CRC screening.

American Journal of Gastroenterology

Association Between Colonoscopy Rates and Colorectal Cancer Mortality Linda

Rabeneck,MD,MPH 1,2,3,4, Lawrence F. Paszat,MD,MS 2,3,4, Refik Saskin, MSc 4 and Therese A. Stukel, PhD 2,4

OBJECTIVES: Although colonoscopy use has increased in the United States and Canada since the early 1990s, it is unclear whether this has been associated with benefit at the population level. Our objective was to evaluate the association between regional colonoscopy rates and death from colorectal cancer (CRC).

American Journal of Roentgenology

"Extracolonic Findings on CT Colonography Increases Yield of Colorectal Cancer Screening"

Ganesh R. Veerappan, Mazer R. Ally, Jong-ho R. Choi, Jennifer S. Pak, Corinne Maydonovitch, Roy K.H. Wong , Am. J. Roentgenol., Sept 2010; 195: 677-686

"Automated Measurement of Colorectal Polyp Height at CT Colonography: Hyperplastic Polyps Are Flatter Than Adenomatous Polyps",

Ronald M. Summers, Jiamin Liu, Jianhua Yao, Linda Brown, J. Richard Choi, and Perry J. Pickhardt, Am. J. Roentgenol., Nov 2009; 193: 1305 - 1310

"CT Colonography Predictably Overestimates Colonic Length and Distance to Polyps Compared With Optical Colonoscopy",

James E. Duncan, Michael P. McNally, W. Brian Sweeney, Andrew B. Gentry, Duncan S. Barlow, Donald W. Jensen, and Brooks D. Cash, Am. J. Roentgenol., Nov 2009; 193: 1291 - 1295

"CT Colonography: Coming of Age", C. Daniel Johnson, Am. J. Roentgenol., Nov 2009; 193: 1239 - 1242

"Normalized Distance Along the Colon Centerline: A Method for Correlating Polyp Location on CT Colonography and Optical Colonoscopy",

Ronald M. Summers, Jeffrey A. Swift, Andrew J. Dwyer, J. Richard Choi, and Perry J. Pickhardt, Am. J. Roentgenol., Nov 2009; 193: 1296 - 1304

"Comparison of Optical Colonoscopy and CT Colonography for Polyp Detection", Dachman, A.H., Am. J. Roentgenol., 2009; 193:1289-1290

"Comparison of Polyp Size and Volume at CT Colonography: Implications for Follow-Up CT Colonography",

Emily Bethea, Ogonna K. Nwawka, and Abraham H. Dachman, Am. J. Roentgenol., Dec 2009; 193: 1561 – 1567

"Clinical Management of Small (6- to 9-mm) Polyps Detected at Screening CT Colonography: A Cost-Effectiveness Analysis",

Perry J. Pickhardt, Cesare Hassan, Andrea Laghi, Angelo Zullo, David H. Kim, Franco lafrate, and Sergio Morini, Am. J. Roentgenol., Nov 2008; 191: 1509 - 1516.

"Performance of a previously Validated CT Colonography Computer-Aided Detection System in a New Patient Population",

Ronald M. Summers, Laurie R. Handwerker, Perry J. Pickhardt, Robert L. Van Uitert, Keshav K. Deshpande, Srinath Yeshwant, Jianhua Yao, and Marek Franaszek Am. J. Roentgenol., Ju 2008; 191: 168-174

"Replacing Barium Enema with CT Colonography in Patients Older Than 70 Years: The Importance of Detecting Extracolonic Abnormalities",

Damian J. M. Tolan, Euan M. Armstrong, and Anthony H. Chapman, Am. J. Roentgenol., Nov 2007; 189: 1104 - 1111

" Primary 2D Versus Primary 3D Polyp Detection at Screening CT Colonography",

Perry J. Pickhardt, Andrew D. Lee, Andrew J. Taylor, Steven J. Michel, Thomas C. Winter, Anthony Shadid, Ryan J. Meiners, Peter J. Chase, J. Louis Hinshaw, John G. Williams, Tyler M. Prout, S. Hamid Husain, David H. Kim, 189, December 2007

"Translucency Rendering in 3D Endoluminal CT Colonography: A Useful Tool for Increasing Polyp Specificity and Decreasing Interpretation Time",

P. J. Pickhardt August 2004 AJR:183(2),429 - 436

"Three-Dimensional Endoluminal CT Colonography (Virtual Colonoscopy): Comparison on Three Commercially Available Systems",

P. J. Pickhardt December 4, 2003 AJR: 181, 1599-1606

Among Viatronix, GE and Vital Images products, V3D-Colon was heavily favored by participating physicians, ranking consistently higher in all categories (92%), including polyp conspicuity, 3D effect, likeness to OC and navigational features.

"Electronic Cleansing and Stool Tagging in CT Colonography: Advantages and Pitfalls with Primary Three Dimensional Evaluation",

Perry J. Pickhardt, September 2003:181, 799-805

"Performance of a Previously Validated CT Colonography Computer-Aided Detection System in a New Patient Population",

Ronald M. Summers, Laurie R. Handwerker, Perry J. Pickhardt, Robert L. Van Uitert, Keshav K. Deshpande, Srinath Yeshwant, Jianhua Yao, and Marek Franaszek Am. J. Roentgenol., Jul 2008; 191: 168 - 174.

Annals of Internal Medicine

Is Computed Tomographic Colonography Being Held to a Higher Standard?,

Samita Garg, MD, and Dennis J. Ahnen, MD

Recent guidelines for colorectal cancer screening have reached different conclusions on whether computed tomographic colonography (CTC) is an acceptable screening option, and the Centers for Medicare & Medicaid Services recently decided not to cover CTC screening. The rationale against recommending or covering CTC screening includes concerns about radiation exposure, false negative rates for small polyps, the discovery of extracolonic findings, variability in performance, a lack of targeted studies, a higher adenoma rate in the Medicare-eligible age group, and an absence of evidence that covering CTC would increase overall screening rates. Similar concerns can be raised for other recommended and covered colon cancer screening tests, but it seems that CTC is being held to a new and higher standard.

"Location of Adenomas Missed by Optical Colonoscopy",

Perry J. Pickhardt, MD; Pamela A. Nugent, MD; Pauline A. Mysliweic, MD, MPH; J. Richard Choi, ScD, MD; and William R. Schnindler, DO, September 7, 2004 | Volume 141 Issue 5| Pages 352-359

Archives of Internal Medicine

Computed Tomographic Colonography to Screen for Colorectal Cancer, Extracolonic Cancer, and Aortic Aneurysm Model Simulation With Cost-effectiveness Analysis

Cesare Hassan, MD; Perry Pickhardt, MD; Andrea Laghi, MD; Daniel Kim, MD; Angelo Zullo, MD; Franco Iafrate, MD; Lorenzo Di Giulio, MD; Sergio Morini, MD
Arch Intern Med. 2008;168(7):696-705

When detection of extracolonic findings such as AAA and extracolonic cancer are considered in addition to colorectal neoplasia in our model simulation, CT colonography is a dominant screening strategy (i.e., more clinically effective and more cost-effective) over both colonoscopy and colonoscopy with 1-time ultrasonography.

Gastrointestinal Endoscopy

"CT Colonography: Perforation Rates and Potential Radiation Risks"

Berrington de Gonzalez A, DPhila, *, Kwang Pyo Kim, PhD, Judy Yee, MD
Gastrointest Endosc Clin N Am. 2010 Apr;20(2):279-291 April 2010

Although several organizations have raised concerns about the safety of CTC, the current evidence suggests that the risks are likely to be small. The data on colonic perforation suggest that the rate is low (0.005%-0.03%), especially compared with colonoscopy (0.06%-0.19%). Also, because no sedation is required the cardiopulmonary risks are avoided. Current CTC technique uses low-dose parameters. The 2009 American College of Radiology practice guidelines specifically recommend the use of low-dose technique for screening CTC. Studies have been performed showing that with the use of multidetector CT scanners the ability to detect polyps of size 6 mm and larger is maintained with low-dose techniques. New dose-modulation techniques that are now available may be used to help reduce radiation dose further.

Journal of Computer Assisted Tomography

"Polyp Detection at 3-Dimensional Endoluminal Computed Tomography Colonography: Sensitivity of One-Way Fly-Through at 120 Degrees Field-of-View Angle"

by Pickhardt, Perry J. MD; Schumacher, Clark MD; Kim, David H. MD, Journal of Computer Assisted Tomography: July/August 2009 - Volume 33 - Issue 4 - pp 631-635 doi: 0.1097/RCT.0b013e31819778ea

The Journal of Urology

"Prevalence of Urolithiasis in Asymptomatic Adults: Objective Determination Using Low Dose Noncontrast Computerized Tomography",

Cody J. Boyce, Perry J. Pickhardt, Edward M. Lawrence, David H. Kim, and Richard J. Bruce

A clinical study of more than 5,000 asymptomatic individuals is shedding new light on the prevalence and sequelae of stone disease in adults screened with virtual colonoscopy. Researchers found evidence of calculi in nearly 9% of the study population, results that tweak assumptions about groups thought to be at higher risk of stone disease.

Urolithiasis is an expensive and time-consuming condition for healthcare providers to treat, accounting for more than 2 million office visits and nearly 200,000 hospital admissions each year, with estimated costs of more than \$2 billion annually in the U.S., noted study authors Dr. Cody Boyce, Dr. Perry Pickhardt, Dr. Edward Lawrence, Dr. David Kim, and Dr. Richard Bruce from the University of Wisconsin School of Medicine and Public Health in Madison. Studies also suggest that the incidence of symptomatic stone disease is increasing, they wrote.

Radiology

Colorectal and Extracolonic Cancers Detected at Screening CT Colonography in 10 286 Asymptomatic Adults,

Authors: 1. Perry J. Pickhardt, MD, 2. David H. Kim, MD, 3. Ryan J. Meiners, MD, 4. Kimberly S. Wyatt, MD, 5. Meghan E. Hanson, MD, 6. Duncan S. Barlow, MD, 7. Priscilla A. Cullen, RN, 8. Rahim A. Remtulla, MD and 9. Brooks D. Cash, MD

The overall detection rate of unsuspected cancer is approximately one per 200 asymptomatic adults undergoing routine screening CT colonography, including about one invasive CRC per 500 cases and one extracolonic cancer per 300 cases. Detection and treatment at an early presymptomatic stage may have contributed to the favorable outcome.

CT Colonography: Performance and Program Outcome Measures in an Older Screening Population,

David H. Kim, MD, Perry J. Pickhardt, MD, Meghan E. Hanson, MD and J. Louis Hinshaw, MD

Purpose: To evaluate computed tomographic (CT) colonography performance and program outcome measures in an older cohort (65–79 years) of an established large-scale colorectal cancer screening program.

"Unsuspected Extracolonic Findings at Screening CT Colonography: Clinical and Economic Impact",

Perry J. Pickhardt, MD, Meghan E. Hanson, MD, David J. Vanness, PhD, Justin Y. Lo, MS, David H. Kim, MD, Andrew J. Taylor, MD, Thomas C. Winter, MD, and J. Louis Hinshaw, MD, Radiology 2008;249:151-159

Detection of relevant unsuspected extracolonic disease at CT colonographic screening is not rare, accounting for a relatively large percentage of cases in which additional workup was recommended. Judicious handling of potential extracolonic findings is warranted to balance the cost of additional workup against the potential for early detection of important disease, because many findings will prove to be of no clinical consequence.

"Screening for Colorectal Neoplasia with CT Colonography: Initial Experience from the 1st Year of Coverage by Third-Party Payers",

Perry J. Pickhardt, MD, Andrew J. Taylor, MD, David H. Kim, MD, Mark Reichelderfer, MD, Deepak V. Gopal, MD, and Patrick R. Pfau, MD, 2006. 0:2412052007

As a primary colorectal screening tool, CT colonography covered by third-party payers has an acceptably low endoscopic referral rate and a high concordance of positive findings at optical colonoscopy.

"Linear Polyp Measurement at CT Colonography: In Vitro and in Vivo Comparison of Two-Dimensional and Three-dimensional Displays",

Perry J. Pickhardt, MD, Andrew D. Lee, MD, Elizabeth G. McFarland, MD, Andrew J. Taylor, MD, 2005; 236:872-878

Linear polyp measurement on 3D endoluminal views was significantly more accurate than measurement on 2D transverse, coronal, or sagittal views, both in vitro and in vivo, for the CT colonography system evaluated. Use of the optimized 2D view substantially reduced 2D measurement error and may be valuable when used in conjunction with 3D measurement.

"Building a CT Colonography Program: Necessary Ingredients for Reimbursement and Clinical Success",

Perry J. Pickhardt, MD, Andrew J. Taylor, MD, Gary L. Johnson, MD, Lawrence A. Fleming, MD, Debra A. Jones, MD, Patrick R. Pfau, MD, Mark Reichelderfer, MD, 2005; 235:17-20

The challenges facing widespread implementation of CT colonography programs for primary screening are substantial but certainly not insurmountable.

"Incidence of Colonic Perforation at CT Colonography: Review of Existing Data and Implications for Screening of Asymptomatic Adults",

Perry J. Pickhardt, MD, 2006; 239: 313-316

The actual risk of colonic perforation at CT colonography is exceedingly low and may likely approach zero in asymptomatic patients who are undergoing screening when specific techniques are employed.