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Is the Virtual Colonoscopy a Replacement for Optical Colonoscopy?

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Objective: *To examine the viability of colon cancer screening with computed tomography colonography, also known as virtual colonoscopy.*

Data Sources: *Clinical guidelines, published medical research.*

Conclusion: *Virtual colonoscopy, under the right circumstances, is an accurate viable screening tool for patients who may not otherwise desire to or are not able to participate in traditional colonoscopy.*

Implications for Nursing Practice: *Nurses should be aware that routine colon cancer screening is recommended starting at age 50. In addition to the traditional colonoscopy, there are other options if a patient is unwilling or unable to undergo optical colon screening. Nurses should discuss the positive and negative aspects of different types of colon screening and teach proper bowel preparation for colon screening.*

Key Words: *virtual colonoscopy, colon cancer, screening, polyp.*

Having survived all of the birthday parties decorated in black, you come to the understanding that you are indeed 50 years old. You find yourself sitting in your doctor's office for your annual physical. Your vital signs are taken. Your primary care provider performs the obligatory assessments, including a listen to your heart and lungs, checking of the reflexes, and palpating the belly. You pass your exam with flying colors. However, before escaping unscathed, your primary care provider says "Happy 50th Birthday, by the way, it's time you get your colonoscopy."

Most anyone who has had a colonoscopy will tell you the actual procedure is easy. It is the prep that is difficult. However, despite the promise that the patient will neither feel nor remember much if any of the procedure, many are averse to the invasiveness of the standard optical colonoscopy. Still, others in need of colonography are too frail to endure the sedation required to perform the procedure. While we may still be decades away from a science fiction-inspired hand-held, noninvasive colon diagnostic device that provides instant results as seen on the silver screen, the technology exists today to perform

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a "virtual colonoscopy." As its name implies, the clinician visualizes the inside of the colon as with traditional colonoscopy, but without the insertion of a scope. This technology is referred to as CT colonography, or CTC. Whether or not a CTC is an acceptable surrogate for a traditional colonoscopy remains an ongoing debate.

Why Screen, Who to Screen, How to Screen?

The question of why to screen someone is actually perhaps the easiest question to answer. Excluding skin cancers, colon cancer is the 3rd most commonly diagnosed cancer in men and women, with an estimated 135,000 cases of colon and rectal cancer diagnosed in the United States in 2017.[1] More than 50,000 deaths from colon cancer were estimated for 2017.[1] Regarding colon screening, this is both a preventative and an early detection of cancers. Removal of polyps can actually prevent a colon cancer before it happens. A biopsy can identify an already formed colon cancer. There is evidence that both incidence and mortality have decreased over the past several decades because of colon screening.[2]

Examination of three major cancer organizations reveals identical guidelines for men and women. The American Cancer Society, the American Gastroenterological Association, and the National Comprehensive Cancer Network (NCCN) recommend average-risk men and women have colon screening at age 50 (see Table 1).[3-5] Average risk is defined as no history of adenomatous polyp, sessile serrated polyp, or colorectal cancer, no history of inflammatory bowel disease, and a negative family history of colorectal cancer.[5]

In addition to the methods that will be primarily discussed here, traditional colonoscopy and CTC, flexible sigmoidoscopy and double-contrast barium enema are two additional pre-cancerous polyp detection methods. There are limitations in these two methods.[4] The flexible sigmoidoscopy is limited in that it only visualizes, at most, the rectum, sigmoid colon, and descending colon. Additionally, the lack of sedation can be considered as positive or negative. Some individuals cannot have sedation, so it is a positive because they are able to have colon screening without sedation. That patient may otherwise have not been screened. However, being completely awake results in some discomfort with the procedure, which can be a negative. The discomfort may even prevent patients from ever repeating the procedure in the future.[4] Likewise, there are limitations of the double-contrast barium enema. The prep is extensive, requiring a colonoscopy-style bowel preparation beforehand. The procedure itself can be uncomfortable, with barium contrast applied via enema followed by air as a contrast. If negative, flexible sigmoidoscopy, double-contrast barium enema, and CTC (virtual colonoscopy) should be repeated in 5 years.

There are also a variety of stool-based tests that detect the presence of cancer. These different methods cannot detect pre-cancerous lesions. These tests can be used in isolation or in conjunction with a visual method. They are non-invasive, but require re-testing within 1 to 3 years depending on the type of testing and whether or not it was combined with a visual screen. These stool tests include high-sensitivity guiac (blood)-based, immunohistochemical-based, and DNA-based testing. DNA testing is the most sensitive, requiring only every 3-year testing. The others require yearly testing unless combined with flexible sigmoidoscopy. If combined, testing can go to every 3 years according to the NCCN.[5]

There may be reasons why screening with a method other than a colonoscopy would be chosen. Regardless, any result other than completely negative may require referral for full colonoscopy. Table 2 summarizes colorectal screening tests and recommended frequency.[3]

TABLE 1.
What is average risk, and when does screening occur for these patients?[3-5]

- Average risk:
  - No history of adenoma or sessile serrated polyp or colorectal cancer
  - No history of inflammatory bowel disease (no ulcerative colitis, Crohn's disease, etc.)
  - No family history of colorectal cancer
- Begin screening at age 50

The Gold Standard

A traditional optical colonoscopy involves the use of a colonoscope. A provider uses a thin, flexible, hollow lighted tube that has a tiny camera on the end. The colonoscope is gently eased inside the colon and sends pictures to a TV screen.[6] Small amounts of air are pumped into the colon to keep