

IRRITABLE BOWEL SYNDROME AN EXCLUSION DIAGNOSIS – WHERE IS THE PLACE OF CT COLONOGRAPHY?

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Abstract: *Computed tomographic colonography (CTC) is an alternative to optical colonoscopy, in dedicated circumstances, for the examination of the colon. We made a literature review and a retrospective analysis regarding CTC in a single imaging center between august 2009 and July 2012.*

Key words: *CT colonography, Colorectal cancer (CRC) screening, polyp, advanced adenoma, functional gastrointestinal disorders.*

1. Introduction

1.1. Review on CT colonography

Computed tomographic colonography (CTC) or virtual colonoscopy is a non invasive method that uses computed tomographic data combined with specialized imaging software to examine the colon, intended for the detection of polyps or cancer. Practically, the visualization in 3D mode is mimicking the navigation inside the colon during optical colonoscopy (OC).

The technique was developed in 1994 as an alternative investigation to optical colonoscopy [36].

1.2. Definition

CTC consists in an abdominal CT examination after colonic preparation and

gas distension (air or CO₂). These two conditions are the main terms in the Pickhardt definition of CTC: "When a properly prepared and distended colon is imaged with CT, clinically relevant polyps can be readily detected with dedicated CT software"[24].

1.3. Colon preparation

Regarding this topic there is no general consensus. Usually the colon preparation is based on the administration of a cathartic agent (phosphosoda, magnesium citrate or polyethylene glycol).

AGA guidelines recommended all three agents for the colonic preparation, the results in detection of polyps being similar. Phosphosoda is preferred because of its higher compliance and less residual stools [8].

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The residual content of the colon may lead to false positive results or hide the lesions. To avoid this situation the fecal tagging is used. The technique, adapted from MRI colonography [37], consists in the administration of an oral contrast agent, barium or iodine, during colonic preparation. There are different possibilities to achieve the fecal tagging using different combinations between cathartic agents and contrast agents [25,10]. New preparation regimens are using only the oral contrast (Gastrografin) concomitant with low fiber diet several days prior CTC in order to improve tolerance [16,14] or avoid electrolyte disturbances in frail and elderly patients [17].

1.4. Colon distension

Colonic inflation is performed prior to CT acquisition using air or CO₂ gas. Adequate colonic distension is critical to analyze the colonic wall. To improve the uniform distension and complete examination of the colonic wall, both supine and prone positions are used during the acquisition [34]. For elderly patients or patients with disabilities supine and left decubitus is a valuable alternative [6].

1.5. Technical details

The detection of colorectal polyps on CTC is in part dependent on CT acquisition parameters. The performance in detecting polyps 6-9 mm is acceptable using 2.5 or 3 mm slice thickness [25,34].

A permanent concern is to use low dose radiation [34, 20].

The analysis of CTC images can be performed in 2D or 3D visualization modes. 2D offers standard axial images. 3D is simulating optical colonoscopy. In different studies sensitivity in detection of

polyps was similar for 2D and 3D visualization [26, 35, 33]. The CTC final report is based on the analysis of both for an accurate diagnosis.

1.6. Clinically significant polyps

The primary target of CTC is detecting polyps with characteristics of advanced adenoma.

The advanced adenoma has a high risk for colorectal cancer [27]. It is defined as an adenoma ≥ 1 cm with significant villous feature, high grade dysplasia or early invasive cancer [38]. There are studies that support the clear correlation between size of the lesion and risk of degeneration. In Pickhardt studies 90-95% of lesions were qualified as advanced adenomas using only the size criteria (≥ 1 cm) and only 4% of lesions measuring 6-9 mm were advanced adenomas (histology confirmation) [11]. The sensitivity of CTC is similar to optical colonoscopy (close to 100%) in detection of large lesions. More than that, the sensitivity for lesions 6-9 mm is higher for CTC versus OC [25, 10]. Concerning lesions ≤ 5 mm there are different opinions. The large majority of gastroenterologists and radiologists say that we could ignore these lesions [34] and include these subjects in screening in the normal risk population.

1.7. Intracolonic findings

A report is concluding the CTC examination. This report refers first of all to the intracolonic findings. CTC reading should include the size, morphologic features, and location of polyps and masses and lesion attenuation [31]. The „Working group on virtual colonoscopy” made a classification of CTC findings (C-RADS) and management recommendations [40]:

Table 1

Classification of CTC findings (C-RADS) and management recommendations

| | |
|----|--|
| C0 | Inadequate study/Awaiting prior CTC comparisons: Inadequate preparation: cannot exclude lesions ≥ 1 cm due to the presence of residual matter. Inadequate insufflation: one or more segments collapsed on both series of images Awaiting prior studies for comparison |
| C1 | <i>Normal colon or benign lesions</i> Recommended: continue routine screening (every 5–10 years): No visible abnormalities of the colon No polyps ≥ 6 mm Lipoma or inverted diverticulum Non-neoplastic lesions (e.g. diverticula) |
| C2 | <i>Intermediate-sized polyps or indeterminate findings</i> Recommended: surveillance (can be postpone to 3 years but subject to individual circumstances) or colonoscopy: Medium-sized polyps 6–9mm, < 3 in number. Indeterminate findings cannot exclude polyps ≥ 6 mm in technically adequate studies |
| C3 | <i>Polyp, possibly advanced adenoma</i> Recommended: colonoscopy: Polyps ≥ 10 mm ≥ 3 polyps, each 6–9mm in size |
| C4 | <i>Colonic mass, likely malignant</i> Recommended: surgical consultation: Lesion compromises colonic lumen or shows extracolonic invasion |

1.8. Extracolonic findings

Extracolonic findings on CTC are common, about 40% of patients having 1 or more abnormalities. In a review involving 3488 patients, extracolonic cancer was detected in 2,7% and 0,9% had an aortic aneurism [39]. The incidence of extracolonic findings is much higher than the incidence of colorectal lesions, 5mm size [18,30]. The majority of these findings don't require medical work up (eg. hiatal hernia, renal or gallblader stones)[31].

1.9. Indications

1. Failed colonoscopy – neoplastic stenosis due to diverticulosis, adhesions, loops or redundant colon [4, 1, 19], inadequate colon preparation, patient discomfort or uncooperativeness [28].
2. CRC screening in patients with contraindications for colonoscopy or refusal of other screening options.
3. Evaluation of colon proximal to an obstructing lesion (CRC) because

probability of synchronous lesions is high [5, 32].

4. CRC screening of asymptomatic normal risk adults [13].
5. Postsurgical follow-up of colorectal cancer with the advantage to detect in the same session extracolonic abnormalities [21, 12] **-not recommended** by the American Cancer Society and US Multisociety Task Force [29].
6. CTC in symptomatic patients, especially elderly patients [9, 7] - **not** in AGA guidelines.

1.10. Contraindications

The contraindications refer to patients for whom perforation is a concern (eg. immediatelly after failed OC with polyps removal or large biopsy taken). Other contraindications, better said nonindications, refers to patients with symptoms of organic disease, familial colon cancer, IBD in whom colonic sampling is recommended [31].

2. Retrospective analysis on CT colonography

CT colonography was introduced few years ago in our country as an alternative to optical colonoscopy.

In the present there is an international agreement regarding the role of CTC in colorectal cancer screening (failed colonoscopy, contraindications or refusal of OC, evaluation of colon proximal to an obstruction, CRC screening of asymptomatic normal risk adults). There are different opinions concerning the postsurgical follow up of colorectal cancer [21, 12] and the screening of symptomatic elderly patients (33,34). More than that, in the large field of gastrointestinal functional disorders (FGID) especially irritable bowel syndrome (IBS) is a „paucity of evidenced guiding radiologic imaging”[22].

3. Material and method

We made a retrospective analysis on CTC performed to 106 patients between September 2009 – July 2012 in an imaging outpatient centre in Brasov, Romania.

The group was heterogeneous concerning the age (24 to 89 years, average age 60.9, 81 > 50 years).

There were 77 women (70.2%) and 29 men (29.8%).

They performed CTC because of refusal (78 patients) or failed prior colonoscopy.

All patients were symptomatic, 17 of them with alarm symptoms like weight loss, fever, rectal bleeding.

The clinical pretest diagnosis was IBS 43 patients, colorectal cancer in observation 26 patients, constipation 20 patients, chronic abdominal pain 13 patients, functional diarrhea 3 patients, functional bloating 1 patient.

Bowel preparation consisted in liquid diet and polyethylene glycol and oral gastrografin the day prior investigation.

Reading and reporting results were made by the radiology specialist.

4. Results

4.1. Intracolonic findings

According with C-RADS classification (20) we obtained the following results:

- C0: none
- C1:
 - o 98-38 normal colon
 - o 31 dolico colon
 - o 24 diverticula
- C2: 3 patients with intermediate size polyps (6-9mm.) – referred to colonoscopy
- C3: 3 patients with polyps possibly adenoma – referred to colonoscopy
- C4: 7 patients with colonic mass likely malignant - referred to surgery

4.2. Extracolonic findings

We found extracolonic abnormalities in 38 patients (35.8%) according with literature data (21) some of them with more one abnormality:

- 13 renal stones
- 7 renal cysts
- 6 aortic atheromatosis,
1 uncomplicated aortic aneurism
- 2 liver steatosis
- 2 colecistectomy
- 1 hysterectomy
- 1 adenopati
- 1 pancreatic mass
- 3 prostate hypertrophy
- 1 hiatal hernia
- 3 liver cysts
- 1 liver hemangyoma

5. Discussions

We consider that CT colonography was beneficial in this group of patients because:

- all patients were symptomatic
- most of the patients, $\approx 76\%$, were >50 years aged and they have to be subjects for colorectal cancer screening (even in the absence of symptoms)
- the clinical appearance of functional gastrointestinal disorders orientate the choice of colon investigation to CT colonography.

It is well known that patients with IBS difficult tolerate the colonoscopy, the time to attempt the caecum is longer, the sedation has to be deeper and frequently the right colon is missed because stopping the examination (38). In these conditions we can use CT colonography.

The fear of the patients, especially those with FGID with particular behavior and psychology, is the main reason of refusal of colonoscopy.

The extracolonic findings could be of great value in diagnosis in different clinical situations.

6. Conclusions

CT colonography is reasonable alternative to colonoscopy in colorectal cancer screening respecting the actual guidelines.

Concerning the symptomatic patients, especially those with bowel FGID, we prefer non invasive investigation as first step. In these patients we have to use the advantages offered by CT colonography (less pain, no sedation, less time, good evaluation of the entire colon).

Speaking about the disadvantages of CT colonography (no biopsy, no polypectomy, missing very small or flat lesions) that remain to be solved by colonoscopy long time from now on. In this situation it will be very important to have rapid access to both methods and switch between them in the same session if needed.

A delicate problem in our country is the reimbursement of the procedure which is an important factor concerning the number of CTC performed until now (106 CTC versus >1000 OC in our center).

The title of an article who says "Diagnostic colonoscopy: the end is coming." [2] is suggesting a parallel with ERCP where CT or MRI have to be performed before invasive approach.

This article is not a advocacy of CTC against colonoscopy but is pleading for better guidelines in the field of bowel functional gastrointestinal disorders, especially irritable bowel syndrome.

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