

## USEFULNESS OF CT COLONOGRAPHY IN PATIENTS WITH OCCLUSIVE COLORECTAL CANCER BEFORE METALLIC STENT PLACEMENT: A SINGLE CENTER EXPERIENCE

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### Abstract

Up to 15% of patients with colorectal cancer (CRC) present with large bowel obstruction. Currently, computed tomography colonography (CTC) is regarded as a promising technique for complete evaluation of the proximal colon and simultaneous assessment of extraluminal status.

Aim of this retrospective, observational study is to evaluate the feasibility of using CTC for preoperative examination of the proximal colon before metallic stent placement in patients with colon obstruction caused by CRC.

Sixteen patients who demonstrated colonic obstruction caused by CRC, underwent CTC immediately after incomplete colonoscopy. Per-patient sensitivity of CTC for lesions 5 mm or larger in diameter in the colon proximal to the stent was 100% (95% CI: 0.4385-1). Per-patient specificity for lesions 5 mm and larger in the proximal colon was 92.3% (95% CI: 0.6669-0.9863). CTC did not generate any false diagnosis of synchronous cancer. False positive findings at CTC did not result in a change in surgical plan for any patients. Although the small number of

patient of our study, our data show that CTC is a safe and useful method for preoperative examination of the proximal colon before metallic stent placement in patients with acute colon obstruction caused by CRC.

### 1. Introduction

Colorectal cancer (CRC) is a significant health problem; it is the most common malignancy of the gastrointestinal tract (1). The incidence of CRC increased around the world during the last two decades even though there were many strategies in preventing it. Colonoscopy is the gold-standard investigation of the colon, offering a sensitive luminal examination that allows biopsy samples to be taken for definitive diagnosis.

However, older patients and those with comorbidities are more likely to have an incomplete or difficult colonoscopy (2,3) and are at greater risk of adverse events than younger patients with no comorbidities (4,5). Therefore, in some circumstances, it might be preferable to use an alternative first-line investigation for patients

with symptoms suggestive of colorectal cancer (6).

CT colonography (CTC) is a minimally invasive sedation-free imaging modality that has been shown to be comparable to optical colonoscopy in the detection of clinically significant colon polyps and CRC (7-10) and has been endorsed by some national guidelines as an acceptable option for CRC screening (11,12). In addition to the excellent performance measures, the risks and complications related to this examination are very low (13,14).

In addition, Up to 15% of patients with colorectal cancer (CRC) present with large bowel obstruction. Several studies have shown that computed tomographic (CT) colonography is an effective method for evaluating the proximal colon in patients in whom stenosing colorectal cancer prevents colonoscopic examination past the lesion (14–18).

Aim of this retrospective, observational study is to evaluate the feasibility of using CTC for preoperative examination of the proximal colon before metallic stent placement in patients with colon obstruction caused by CRC.

## 2. Methods

### 2.1 Patients

Between January 2010 and December 2013, sixteen consecutive patients were referred to the endoscopy unit at Fondazione Istituto San Raffaele – Giuseppe Giglio of Cefalù, Palermo, Italy, because of the occurrence of colon obstruction due to stenosing CRC. These patients (13 of whom were male (68,4%) with a median age of 71, range 61-82), who demonstrated colon obstruction caused by histologically proved CRC, underwent CTC immediately after the incomplete diagnostic colonoscopy. Cancer obstructions were located in the rectum (12,5%), in the sigma (37,5%), in the descending colon (31,3%), in the transverse colon (12,5%), and in the ascending colon (6,2%).

### 2.2 Colonic Stent Placement

Stent placement had been performed by experienced gastroenterologists using colonoscopic and fluoroscopic guidance. WallFlex enteral colonic stent (Boston Scientific, Galway, Ireland), 25 mm in diameter and 60–120 mm in length were employed. Complete coverage of

the cancer mass by the stent and proper stent expansion were confirmed at the end of each procedure.

### 2.3 Technique of CT-colonography

Patients were instructed to maintain a liquid diet before CT colonography. Fecal/fluid tagging was achieved with a single aliquot of 100 mL of meglumine diatrizoate (Gastrografin; Bayer Schering Pharma, Berlin, Germany) administered 3 hours after bowel cleansing. Patients underwent CT scanning through the abdomen and pelvis prior to colonic insufflation to detect any clinically silent colonic perforation, with a low-dose technique. The images were viewed by an experienced abdominal radiologist.

Colonic distention with CO<sub>2</sub> was achieved in all the sixteen patients by employing the same distention method used for CT colonography according to the international standard (21,22)

Both supine and prone scans were obtained by using a 16-detector CT scanner, according to the international protocols (22).

### 2.4 Image interpretation

Images were interpreted prospectively for clinical practice by an experienced radiologist (DS). At the beginning of the study period, the radiologist had the experience of interpreting at least 100 CT colonography studies. Examination quality was evaluated regarding the quality of bowel preparation, faecal and fluid tagging, and colonic distention and regarding the presence of CT artifacts. The interpretation was performed by using a primary three-dimensional (3D) review employing conventional endoluminal fly-through or panoramic endoluminal fly-through (21), and two-dimensional (2D) problem solving, on one of two commercial CT colonography systems (Lucion or Xelis; INFINITT).

Maximal lesion diameter was measured on a 3D conventional endoluminal view as this is known to be more accurate than measurement on orthogonal 2D planes (22,23) Next, lesions 6 mm or greater in diameter were reported (24). The segmental location according to six segment scheme and the morphologic type of each lesion (sessile, pedunculated, flat, and mass) were recorded (24). Stent dislodgment/migration and the presence of extraluminal air or spillage of

meglumine diatrizoate into the peritoneal space were also evaluated.

**2.5 Statistical analysis**

Per-patient sensitivity, and per-patient specificity of CT colonography used for the detection of colonic lesions 6 mm or larger in the colonic segment proximal to the stent, were obtained. False-positive and false-negative findings at CT colonography and the reasons or such findings were analyzed. The rates of CT colonography-related stent dislodgment/migration and colonic perforation were determined. The 95% confidence intervals (CIs) were calculated for proportional data.

**3. Results**

The features of the population are described in table 1. Per-patient sensitivity of CTC for lesions 5 mm or larger in diameter in the colon proximal to the stent was 100% (16 of 16 patients, 95% CI: 0.4385-1). Per-patient specificity for lesions 5 mm and larger in the proximal colon was 92.3% (15 of 16 patients, 95% CI:0.6669-0.9863). CT colonography did not generate any false diagnosis of synchronous cancer. False positive findings at CTC did not result in a change in surgical plan for any patients. No CTC-associated stent dislodgment/migration or colonic perforation occurred in any patient.

**4. Discussion**

To date, few studies had been performed about the feasibility of using CTC before metallic stent placement in patients with colon obstruction

caused by CRC. In the study performed by Cha and coworkers, the authors evaluated the performance of CTC for the preoperative examination of the proximal colon after metallic stent placement in patients with acute colon obstruction caused by CRC (18). Per-lesion and per-patient sensitivities of CTC for lesions 6 mm or larger in diameter in the colon proximal to the stent were 85.7% and 90%, respectively, and CTC depicted all synchronous cancers and advanced adenomas (18).

In the present study, we aimed to examine the feasibility of using CTC for preoperative examination of the proximal colon before metallic stent placement, for the following reasons:

- (a) barium enema examination is not recommended for patients who are waiting for surgery before or after temporary decompression of malignant colon obstruction because of the risk of barium desiccation in the proximal colon;
- (b) meglumine diatrizoate enema examination is inadequate to detect synchronous colonic polyps or small masses, evaluating the feasibility of CT colonography as a method to examine the proximal colon before or after metallic stent placement is a clinically relevant issue, also in quantifying better the extension of the neoplastic lesions;
- (c) the occurrence of extracolonic findings at CTC could change the surgical management of the patients.

In the present study we aimed to plan, before the stent placement, the management of patients with acute colonic neoplastic obstruction, through the

**Table 1**

Features of the patients enrolled in the study

Number of Patients	16
Age (median, range)	71 (61,82)
Male/Female ratio	13:3
Location of colorectal cancer (%)	Rectum (12,5%) Sigma (37,5%) Descending colon (31,3%) Transverse colon (12,5%) Ascending colon (6,2%)
Outcome (%)	Palliation (81,3%) Bridge to surgery (18,7%)

several advantages provided by CTC. In fact, CTC better defines, through the tridimensional view, the extension of the neoplastic stenosis. Second, CTC allows, in the patients which could undergo to a curative surgical intervention, to better manage the therapeutic plan, mainly in the case of synchronous lesions. In the present study, three synchronous tumours were detected, even if only in one case such finding changed the clinical plan of the patient; in fact in the other two cases the patients had a metastatic disease which did not affect the therapeutic plan.

Finally, the accurate detection of extracolonic findings could also dramatically change the clinical management of such patients; however, in the present study none of the enrolled patients presented extracolonic findings which changed the final therapeutic plan.

With regards to the findings of the present study, an optimal feasibility of CTC in this clinical setting seems to be warranted (per-patient sensibility of 100%, per-patient specificity of 92,3%).

Although the small number of patient of our study, our data show that CTC is a safe and useful method for preoperative examination of the proximal colon before metallic stent placement in patients with colon obstruction caused by CRC. Further studies with a larger number of patients and assessing the role of CTC in assessing the extracolonic findings are needed to assess the feasibility of CTC in this setting of patients.

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