Computed Tomography Interpretation in Colonic Cancer: Let there be more Exhaustive

**Corresponding Author:**
Dr. Antonio Manenti,
Associate Professor, Department Surgery - Italy

**Submitting Author:**
Dr. Antonio Manenti,
Associate Professor, Department Surgery - Italy

---

**Article ID:** WMC003181  
**Article Type:** Original Articles  
**Submitted on:** 22-Mar-2012, 09:21:43 AM GMT  
**Published on:** 22-Mar-2012, 04:07:36 PM GMT  
**Article URL:** [http://www.webmedcentral.com/article_view/3181](http://www.webmedcentral.com/article_view/3181)  
**Subject Categories:** RADIOLOGY  
**Keywords:** Colonic cancer, Computed Tomography, Colonic vascular pathology

**How to cite the article:** Manenti A, Manco G, Donatiello S, Vezzelli E. Computed Tomography Interpretation in Colonic Cancer: Let there be more Exhaustive. WebmedCentral RADIOLOGY 2012;3(3):WMC003181

**Copyright:** This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
Computed Tomography Interpretation in Colonic Cancer: Let there be more Exhaustive

Author(s): Manenti A, Manco G, Donatiello S, Vezzelli E

Abstract

Computed Tomography (CT) of colonic cancer (CC), when correctly performed, permits a precise pre-operative staging, demonstrating lymph nodal, peritoneal or retroperitoneal possible involvement, and also secondary or concomitant vascular pathology. Today these findings are essential for an adequate therapeutic choice.

Introduction

CT in CC staging has been employed especially to discover distant metastasis to abdominal and thoracic organs or lymph nodes, or other unusual secondary localizations (lumbar muscles, diaphragm, etc.) (1-4). Today improved diagnostic imaging, particularly high resolution, contrast-enhanced scans, multiplanar reconstruction, has led to an increased sensitivity of this technique.

On other hand, surgery, every day more, requires precise staging of CC, evaluating possible co-pathology of the arterial, venous and lymphatic system, and also of the mesentery, peritoneum, and retroperitoneum.

This is essential for planning an adequate surgical strategy, comprehensive of radical lymphadenectomy and enlarged dissection. At the same time, post-operative complications, related to uncertain perfusion of the colonic segments to be anastomosed, must be avoided (5-11).

Considering these problems (12,13,14,15), we have performed a retrospective review of our experience, comparing CT and histo-pathological results, in order to provide more accurate guidelines of interpretation, overcoming interobserver variability.

Methods

We have re-examined 50 cases of CC, observed between in the years 2010 and 2011; 27 men and 23 women, aged between 41 and 79 years. All the patients had a previous diagnosis of CC based on colonoscopy with biopsy. CC was detectable at CT as a mass or a parietal infiltration.

The CT was performed with a multiple slices technique, intravenous contrast enhancement, and a collimation thickness of 2,5 mm. All the patients have been submitted to colon resection, and the histo-pathology was performed according to TNM and grading classification (16).

Particular attention was focused to the following points:
- Definition of the vascular supplying trunks of the colon segments, where the CC were discovered, in order to define the corresponding lymph nodes chains.
- Study of the principal abdominal vessels, detecting their possible anatomical variants and pathology (thrombosis, compression, obstruction, dissection, aneurysm, etc).
- Grade of contrast enhancement of the CC, recognizing a condition of hyper- or hypo-enhancement.
- Peri-tumoral infiltration, distinguishing involvement of the peritoneum from that of the retroperitoneum. The peritoneal plane was identified on the base of the corresponding vascular network.
- Irregular expansion of peritumoral veins and their enhancement.

Contrast enhancement and thickness of the walls of the colon, proximally and distally to the tumour, in order to discover a possible inflammatory or vascular pathology.

Results

Our experience permits to underline the following points.

The lymph nodes chains topography, just above and below the neoplastic involved colonic segment, could be easily detected following the corresponding arterial supplying branches. In case of sigmoid tumours the inferior mesenteric and the superior haemorroidal arteries were considered points of reference.

Tumour contrast enhancement is directly correlated with its histological degree. A hyper-enhancement, found in 28 cases, corresponded to an undifferentiated histological grading (Grade 3 or 4) (Illustration 1).

In cases of vegetating intraluminal masses,
endoscopically referred as a “polyp”, but with an uncertain histology, their hyper-enhancement was found closely related to a malignant development (Illustration 2).

Another important radiological characteristic of the CC regards its vascular supply, expressed chiefly by peri-tumoral prominent veins with persistent enhancement. This was observed in 17 (47.22%) of the 36 cases with vegetating neoplastic masses; in 9 (53.53%) histology confirmed angio-invasion of the tumour (Illustration 3).

In 18 cases (36%) of tumours extending outside of the colonic wall, we distinguished between peritoneal (8 cases = 44.44%), or retroperitoneal (10 cases= 55.55%) secondary involvement, consequently with a different TNM staging (T4 and T3). This was possible recognizing the peritoneal plane, on the base of its vascular network (Illustration 4 and 5).

Discussion

The aforementioned diagnostic guidelines can be justified considering:

- Topography of the vascular arterial branches is equivalent to the pathways of lymphatic drainage; in case of CC equidistant between two of them, a double lymphatic drainage is possible.

- In case of CC, a secondary arterial or venous thrombosis can be induced chiefly by compression from metastatic lymph nodes, or mesenteric and retroperitoneal secondary localizations. A paraneoplastic syndrome, and a pre-existing arterial obstructive pathology can be important co-factors (Illustration 6).

- Co-existence, especially in the splenic flexure or in the proximal left colon, of hypoperfused segments, unsafe for anastomosis, must be excluded, before a planned surgery.

Before arterial central ligation, necessary for an extended lymph node dissection, the surgeon must be aware of possible concomitant vascular pathologies or variants, threatening blood supply to the colonic segments, which will be anastomosed.

Conclusion(s)

Our policy of CT extended lecture of CT findings confirms the value of this imaging technique in CC pre-operative staging.

All details about possible vascular abnormalities, topography of the main lymphatic chains, presence of ischemic or sub-ischemic colonic segments, peritoneal or retroperitoneal secondary involvement, demanding more extended dissections, are useful for the surgeon (17,18,19). It is clear that in some of these cases (peritoneal or retroperitoneal diffusion, vascular abnormalities, lymph node enlargement) a possible indications to a laparoscopic procedure decays (20). On the contrary, in case of CC with a demonstrated advanced stage, a neo-adjuvant therapy can be considered.

Finally, radiologists, to avoid any under-classification of CC, must accept this invitation to a “vascular reading” of CT in their common practice.

Reference(s)

Illustrations

Illustration 1

Vegetating neoplastic mass of the caecum, hypervascularized by a cluster of enlarged vessels, clearly visible in the corresponding mesentery (arrow).

Illustration 2

Polypoid mass inside the caecum, with arterial hypervascularization (arrow), corresponding to its malignant evolution.
Illustration 3

Infiltrating hyper-dense tumour of the descending colon, hyper-vascularized through multiple dilatated vascular pedicles (arrow).

Illustration 4

Vegetating neoplastic mass of the caecum, infiltrating its lateral wall, and extending outside, towards the parietal peritoneum (arrow).
Illustration 5

Advanced neoplastic mass of the caecum, infiltrating the parietal peritoneum and the retroperitoneum, with hyper-dense strands (arrows).

Illustration 6

Case of advanced tumour of the ascending colon, with massive lymph nodes involvement. Acute thrombosis of the middle superior mesenteric artery, with pre-existing signs of atherosclerosis (arrow) (Reconstructed sagittal [A] and coronal [B] section).
Disclaimer

This article has been downloaded from WebmedCentral. With our unique author driven post publication peer review, contents posted on this web portal do not undergo any prepublication peer or editorial review. It is completely the responsibility of the authors to ensure not only scientific and ethical standards of the manuscript but also its grammatical accuracy. Authors must ensure that they obtain all the necessary permissions before submitting any information that requires obtaining a consent or approval from a third party. Authors should also ensure not to submit any information which they do not have the copyright of or of which they have transferred the copyrights to a third party.

Contents on WebmedCentral are purely for biomedical researchers and scientists. They are not meant to cater to the needs of an individual patient. The web portal or any content(s) therein is neither designed to support, nor replace, the relationship that exists between a patient/site visitor and his/her physician. Your use of the WebmedCentral site and its contents is entirely at your own risk. We do not take any responsibility for any harm that you may suffer or inflict on a third person by following the contents of this website.