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Colon ischemia: Right-sided colon involvement has a different presentation, etiology and worse outcome. A large retrospective cohort study in histology proven patients

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ABSTRACT

Background: Colon ischemia (CI), is generally considered a non-occlusive mesenteric ischemia disorder that usually runs a benign course, but right-sided involvement (RCI) has been associated with worse outcome. The poor outcome of RCI has been associated with comorbidity, but more recently also with occlusions of the mesenteric arteries. We performed a retrospective analysis of a large cohort of CI-patients to assess differences in presentation, etiology, and comorbidity between right-sided colon ischemia (RCI) and non-right-sided colon ischemia (NRCI), and their relation to outcome.
Methods: We performed a retrospective cohort study in two centers from 2000 to 2011 for CI and analyzed clinical presentation, etiology, treatment and outcome. Diagnosis was based on full colonoscopy and/or surgical findings and confirmed by histopathology.
Results: 239 patients were included (mean age 69, 52% female). RCI was found in 48% and NRCI in 52%. Patients with NRCI presented more often with rectal bleeding (87% vs. 45%; p < 0.001). In RCI more nausea (58% vs. 39%; p = 0.013), weight loss (56% vs. 19%; p < 0.001), paralytic ileus (32% vs. 18%; p = 0.018) and peritoneal signs (27% vs. 7%; p < 0.001) was observed compared to NRCI. The cause of CI was more often idiopathic in NRCI (46% vs. 26%; p = 0.002); an occlusive cause was seen more often in RCI (26.3 vs 2.4%, p < 0.0001).
RCI patients had longer hospital stay (15 vs. 8 days, p < 0.001), need for surgery (61% vs. 34%, p < 0.001), and trend toward higher 30-day in-hospital mortality (20% vs. 12%, p = 0.084).
Conclusions: RCI ischemia has different etiology, presentation, and outcome. The series shows a high proportion of − treatable − vessel occlusion. It reinforces the advice to perform CT angiography in RCI as means to improve its poor outcome.

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Background

Colon ischemia (CI) is considered a form of ischemia without vessel occlusion (non-occlusive ischemia), in contrast to mesenteric ischemia in the stomach and small bowel, with often an occlusive nature [1]. CI is however the most prevalent ischemic disease of the gastrointestinal tract with incidence rates ranging from 4.5 to 44 cases per 100.000 person years [2—5]. As in all mesenteric ischemia, the incidence rises with age, in recent study from Minnesota from 1:100.000 in those <40 years of age to 107:100.000 in octogenarians [5]. The cause is not always known but can vary widely from hypoperfusion (low-flow), to local bowel obstructions, infections [6—8], or mesenteric vascular occlusions [9]. Typical presenting symptoms are an abrupt onset of abdominal cramping pain, and passage of bloody stools [10,11]. Diagnosis is usually made by endoscopy or during laparotomy, the latter in patients with severe

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peritonitis; histopathological confirmation is highly recommended [6]. Urgent CT scanning has been advocated [12] especially in RCI [6,9], but still seems to be performed in a minority of cases. The outcome is generally good, and was associated largely on comorbidity and age [10,13], with large differences between general and tertiary centers [14].

It has been repeatedly shown RCI is an independent risk factor for adverse outcome [10,11,15]. In a meta-analysis of all published series in CI, right sided involvement was the most significant predictor of disease severity and adverse outcome, even when taking age and comorbidity into account [16]. The cause of this association between RCI and poor prognosis is unknown, but it has been noted that the clinical presentation is often unspecific with a lower incidence of rectal bleeding [14]. After a recent study that reported an association between acute mesenteric infarction and RCI [17], more attention to right-sided colon ischemia has been given [6]. It was especially noted that, although data on vascular imaging in these patients was sparse, early CTA should be considered in RCI [9].

The importance of RCI was repeatedly encountered in Medisch Spectrum Twente, a nation-wide referral center for analysis and treatment of gastrointestinal ischemia. In our series of over 600 patients diagnosed with chronic or acute-on-chronic mesenteric ischemia over the last 15 years, CI was part of the clinical presentation in 30 patients (data not yet published). Most of these had RCI, and often were treated for suspected Crohn's disease or non-occlusive ischemia. In most cases, the ischemic cause of the colon disorder was not suspected until peritonitis developed, or the so-called inflammation did not respond to anti-inflammatory drugs. An earlier diagnosis and treatment would have been helpful in these cases. This observation triggered us to perform a study in two large regional centers assessing all patients diagnosed with CI. Our main question was whether RCI differs from NRCI in clinical presentation, etiology, especially vascular anatomic information when available, and treatment outcome.

Methods

Study design & selection of patients

We included patients diagnosed with CI between January 2000 and December 2011 at Medical Spectrum Twente, Enschede, and at Isala Clinics, Zwolle, The Netherlands. To identify patients, we performed a search in the pathology, endoscopy, and vascular surgery database. The pathology database (PALGA) is a pathology registry that contains data of all histological, cytological and autopsy examinations in the Netherlands. The endoscopy data are stored in Endosoft, an endoscopy software data program. Search terms were 'ischemia' or 'ischemic' in all colonoscopy reports. We also searched the database of the department of vascular surgery. The search terms were: 'mesenterial', 'splanchnic', and 'ischemic' and 'colitis' or 'colon'. The medical records of all these patients were retrieved to decide whether the diagnosis was indeed CI. Criteria for diagnosis of CI for this study were: 1) a colonoscopy or surgical evaluation of the entire colon with description of ischemic findings confirmed by 2) a pathology report from biopsy or large bowel resection proven or compatible with CI. The main exclusion criteria were the presence of an alternative diagnosis, no large bowel involvement, incomplete colonoscopy, and absence of pathological confirmation of ischemia.

Data collection

We collected demographic findings, the onset of symptoms, whether it occurred in- or out-of hospital, the in-hospital diagnostic delay (time from admission or onset of symptoms – time of diagnostic procedure), clinical history and current medication. The symptoms and findings of physical examination at presentation, and during admission were also recorded as well as endoscopy, radiology, surgery and pathology reports.

A thorough search of all charts was performed to identify specific precipitating causes. They were classified according to the categories: low-flow, occlusive disease (arterial or venous), postoperative, infectious (positive stool culture), secondary to other colonic pathology and idiopathic. In some patients, more than one trigger factor could be identified, for example in patients that had a hypovolemic period after surgery.

For the subgroup analysis of mesenteric artery stenosis, all radiologic reports were reviewed and re-evaluated by an experienced radiologist when the initial report included no statement about the mesenteric vascularization.

Colon segment involvement

The involved colon segments were derived from colonoscopy and surgery reports. Patients were categorized as RCI and NRCI according to the classification proposed by Brandt et al. [10]. RCI is diagnosed if the most proximal ischemic lesion is located proximal to the hepatic flexure. When the most proximal lesion is seen distal from the hepatic flexure, patients are classified as NRCI. The rationale behind this distinction is that branches of the superior mesenteric artery uniformly perfuse the RCI-region and ischemia may then be accompanied by extensive small bowel ischemia.

Pathology

Using the histopathology reports, biopsy findings were graded as evident ischemia or suspect for ischemia based on the conclusion of the pathologist, which was based on the well-described features [18]. Recently, this has been summarized in large nation-wide Spanish study. Apart from mucosal infarction, early signs of CI are loss of mucus-containing glands, loss of superficial cells, ghost cells (presence of cellular outline without content), hemorrhage and edema, or fibrin thrombi in the capillaries and venules. The early inflammatory changes consists of neutrophils, and is usually moderate, and there is absence of chronic inflammation (no glandular distortion, branching or regeneration). Later abnormalities may show superficial ulceration, more diverse inflammatory infiltration (but no chronicity) and crypt abscesses. Pseudomembranes can be seen, as well as haemosiderin-laden macrophages [11].

Treatment and outcome

Types of treatment were: 1) medical treatment 2) revascularization of main mesenteric arteries and 3) acute laparotomy (with or without bowel resection). Medical therapy mainly consisted of intravenous resuscitation and analgesics and/or antibiotics. Revascularization consisted of percutaneous or open revascularization. Acute laparotomy was defined as laparotomy to assess bowel vitality, and may include bowel resection. All operative procedures and 30-day mortality were recorded. An unfavorable outcome was defined as the 1) need for acute laparotomy for suspected gangrene, 2) death, or a combination of both. Performance of open surgery to perform revascularization alone was not recorded as unfavorable outcome. Finally, the hospital stay was recorded as the difference between time of admission or symptom presentation (in case of in-hospital onset) and the time of hospital discharge or death.