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Inguinal abscess as presentation of a right colon cancer. A systematic review

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ABSTRACT
Perforation in colorectal cancer is an uncommon condition, and neoplastic invasion of the abdominal wall with local infection is even rarer. Our objective is to present the case of an 84-year-old male with right colon cancer that manifested as an inguinal abscess, and also to perform a systematic review of the literature in PubMed, EMBASE, and Web of Science. A total of 59 cases in retrospective studies were found. Median age was 64 years, thirty cases were men and twenty-nine were women (51% and 49%, respectively). The most common location was the right colon with 27 cases (46%), followed by the left colon with 18 cases (31%), 12 cases in the transverse colon (20%), and 2 cases with colonic synchronous neoplasm (3%). Surgery was performed in two or more occasions for 33 cases (60%), and on one occasion for 21 cases (38%); medical treatment alone was administered in one case (2%). The most common histological type was adenocarcinoma (64%), followed by its mucinous variant (22%). There was recurrence in 33% of cases. Mortality at follow-up was 47%. As a limitation of our
study, follow-up was heterogeneous, making it impossible to interpret long-term results regarding the influence of treatment on patient survival, also difficulted by the urgent nature of the condition and its exceptional incidence. Further studies are needed with prospective data collection on the management of colorectal cancer in the emergency setting, standardizing follow-up in order to facilitate an adequate analysis of the prognosis of the disease.

Keywords: Colonic neoplasms. Abscess. Abdominal wall.

INTRODUCTION
Colorectal cancer (CRC) is one of the most frequent neoplasms worldwide (1). Perforation is uncommon, presenting different scenarios at the time of diagnosis: a) tumor perforation to the abdominal cavity causing peritonitis; b) formation of an intra-abdominal parietal abscess; or c) formation of fistulous tracts, most often a colovesical, colo-enteric or colo-vaginal communication (2-6). The left colon is the most frequent site of perforation of colorectal cancer followed by the right colon. From a pathophysiological standpoint two perforation mechanisms exist – primary tumor perforation and perforation secondary to retrograde hypertension (5-7). Neoplastic invasion of the abdominal wall accompanied by local infection is a very rare condition (4-8). As of the date of this study there are no systematic reviews published about this condition. Our objective is to present a case of CRC manifesting as an inguinal abscess, and to perform a systematic review of the literature, to determine the reported frequency and treatment of this condition.

METHODS
We performed a search in PubMed, EMBASE and Web of Science, updated on June 24, 2019, with the following search strategy: ((Colonic Neoplasm) or (Colon Cancer)) and ((Cutaneous Abscess) or (Abdominal Wall Abscess) or Colocutaneous Fistula)). The systematic review was carried out according to the PRISMA standards (9).
Inclusion criteria would be met by studies of any level of evidence containing cases of any age, with abscess/infection of the abdominal wall secondary to a primary colon neoplasm. The entire abdominal circumference including the lumbosacral region was considered the abdominal wall.

Each abstract was reviewed and, if not available, the entire article was assessed. The total number of articles included were organized according to type and level of evidence. The variables collected are listed in table 1. The surgical treatment performed was defined as “one-time” with en bloc excision of the neoplasm plus drainage of the parietal abscess at the time of diagnosis, or as “two-time” with drainage/resolution of the infection (antibiotic therapy, percutaneous drainage) plus delayed tumor resection once the infection was solved. Intraoperative identification of peritoneal carcinomatosis, distant metastases, infiltration to neighboring organs, etc., was reported as “other findings”.

The descriptive analysis of the collected variables was reported in terms of frequency, and measures of central tendency (median) and dispersion (interquartile range, IQR), as appropriate, using the SPSS v.20 software. Once the variables were collected, the risk of bias, whether individual or among the studies included, was virtually null since the analysis performed on all studies was a descriptive one. The patient gave his consent for the publication of this case and its related image.

**RESULTS**

**Case report**

An 84-year-old male visited the emergency department because of progressive volume increase in the right inguinal region for the past 4 months. Concomitant redness, purulent discharge, and fever (39 °C) had developed a week before the assessment. Physical examination revealed a 20 x 20-cm mass in the right lower abdominal quadrant and inguinal region with local flushing and heat, accompanied by purulent drainage in the groin (Fig. 1). Laboratory testing found leukocytes, 12,600/µL; neutrophils, 84%; and CRP, 133.5 mg/dL. A CT scan of the abdomen and pelvis showed an image suggestive of right colon neoplasm with a contained perforation and an abscessed collection measuring 5 x 5 x 3 cm towards the right psoas muscle,
accompanied by a cutaneous-muscular abscess measuring 7 x 5 x 3 cm in the right inguinal region (Fig. 2). Because of these findings, an urgent laparotomy was performed during which a right colon neoplasm was confirmed, with a perforation contained by the abdominal wall plus a parietal abscess. A right hemicolecctomy was performed including manual ileo-colic anastomosis, inguinal abscess drainage, and Friedrich's procedure of the affected parietal region, whereby a Penrose-like drainage was exteriorized and removed on the 9th postoperative day. The pathology analysis revealed a pT4b, pNO adenocarcinoma. The patient had a good clinical evolution and was discharged after 12 days of hospitalization. Oncologic treatment was rejected due to advanced age. At 5 months, the patient was readmitted in our center because of a retroperitoneal abscess with signs of local recurrence, associating a nosocomial pneumonia during his stay. A percutaneous drainage and empirical antibiotic therapy were performed. After 24 days he was discharged and followed up by the Palliative Care Unit, and ultimately died at month 11 after surgery.

Systematic review
We found a total of 531 articles with a final inclusion of 44 studies, as summarized in figure 3. Fifty-nine cases were reported in the literature. All the studies were retrospective. The common objective of all studies was the descriptive presentation of a series of cases (8%, five studies represented in table 1) (8,10-13) or only one case (rest of studies). Median age was 64 years (IQR, 53-72). Thirty cases were male and twenty-nine women (51% and 49%, respectively). The median duration of symptoms was 4 weeks (IQR, 0.9-8). For diagnosis, the most common study was a CT scan, with 42 cases (82%), followed by colonoscopy with 16 cases (31%), abdominal ultrasound with 13 cases (28%), and barium enema with 12 cases (26%). In eight patients complementary studies were not specified. The most frequent location was the right colon with 27 cases (46%), followed by the left colon with 18 cases (31%), the transverse colon with 12 cases (20%), and two cases (3%) of synchronous neoplasm (one in the right colon and left colon, one in the transverse colon and right colon). Surgery was performed in two or more times for 33 cases (60%), in one time for 21 cases (38%), and medical treatment was used for one case (2%). The type of treatment
performed was not specified in four patients. Other findings were observed in 22 cases (37%, synchronous neoplasms in other organs, dissemination by contiguity, liver metastases, etc.). The most frequent histological type was adenocarcinoma (ADC) in 38 cases (64%), followed by its mucinous variant in 13 cases (22%) and by a histological type other than ADC in 3 cases (5%). In 5 cases histological type was not reported. There was persistent disease in 12 cases (33%), and in 19 cases the follow-up was not described. Mortality was 47%, with a median follow-up of 2 months (IQR 0.2-11).

**DISCUSSION**

In spite of the screening methods in use, the clinical manifestations of CRC may be variable (14,15), requiring urgent surgery 33% of cases, and with colonic perforation as the second most common cause, with an incidence around 2.6%-12% (2-6,15-18). Mortality secondary to peritonitis may rise to 30-50% (14,15). The condition may present as free perforation to the abdominal cavity or as perforation contained by adjacent structures, with the consequent formation of an abscess (15,18,19). The left colon is the most common site of perforation in CRC, followed by the right colon (5). In our review we observed that the most common location of CRC associated with parietal abscess is the right colon.

Intra-abdominal abscesses secondary to a perforated neoplasm may occur in 0.5-0.7% of cases as described in published series (4,17,20), and they may exceptionally present as an abdominal wall infection secondary to colon cancer. White et al. retrospectively reviewed about 16,000 patients treated for colon cancer at the Massachusetts General Hospital between 1938 and 1970, finding only nine cases with abdominal wall infection/abscess, not specifying whether it was the initial presentation leading to a diagnosis of CRC (8). Tsai et al. reported only two cases of initial CRC presentation as a parietal abscess, with an incidence of 2.26% (4).

The existence of contained perforation in a CRC with invasion of the abdominal wall may be related to histological type. Merrill et al. reported an incidence of 36.7% for the mucinous ADC type of colon cancer with an abscess on the anterior abdominal wall (21). Some authors relate this condition to the slow growing, direct extension and dissemination of this histological type (22). Our results (20% of mucinous ADC type)
were similar to those published in the literature.

As an infrequent condition, there is no consensus about its management (18,23). In our research, we found variability in the selection of a surgical management modality, with predominance of surgery in two or more procedures.

As a limitation of this review, the descriptive analysis of the literature did not provide treatment patterns. Follow-up in each study was heterogeneous, making it difficult to interpret long-term results regarding the influence of treatment on survival, to which the urgent and rare nature of the condition add. On the other hand, since the time range of the studies included is wide (1956-2018), patient prognosis may also be influenced by other factors, like advances in diagnostic methods (from barium enema to CT scan) and improvements in medical treatment (antimicrobial therapy, chemotherapeutics). However, data are not enough for this type of analysis. Additionally, in a percentage of the cases long-term follow-up (greater than 30%), disease recurrence, and cause of death (more than 35%) were not recorded.

To conclude, the presentation of a parietal abscess as initial manifestation of CRC is a rare condition that must be considered when evaluating a patient in the ER. Prospective studies on the management of CRC in the emergency setting, with follow-up and surgical management standardization, are needed to facilitate an adequate analysis of the prognosis of patients with this disease.

ACKNOWLEDGEMENTS

We are grateful to all the healthcare staff who help manage this condition in the emergency department, as well as during surgery and patient hospitalization.
REFERENCES

1. GLOBOCAN. Estimate number of cancer cases, all ages. WHO (AFRO), WHO (PAHO), WHO (EMRO), WHO; 2012.
10.1186/s13104-017-2440-0


Table 1. Series of cases published in the literature: parietal abscess as initial manifestation in the diagnosis of colon cancer

<table>
<thead>
<tr>
<th>Case</th>
<th>Ref.</th>
<th>Year</th>
<th>Age</th>
<th>Gender</th>
<th>Time (Weeks)</th>
<th>Location (Colon)</th>
<th>Image technique</th>
<th>Other findings</th>
<th>Tx</th>
<th>Recurrence</th>
<th>HT</th>
<th>FU (Months)</th>
<th>M</th>
<th>COD</th>
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<td>Jackson PP et al. (10)</td>
<td>1956</td>
<td>78</td>
<td>M</td>
<td>1.0</td>
<td>Right</td>
<td>BE</td>
<td>No</td>
<td>Two-time</td>
<td>Yes</td>
<td>MC</td>
<td>6</td>
<td>Yes</td>
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<td></td>
<td>78</td>
<td>F</td>
<td>ND</td>
<td>Synchronous left and right</td>
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<td>Two-time</td>
<td>Yes</td>
<td>Others</td>
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<td>M</td>
<td>6.0</td>
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<td>BE</td>
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<td>Yes</td>
<td>ADC</td>
<td>18</td>
<td>Yes</td>
<td>PC</td>
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<td>M</td>
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<td>ADC</td>
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<td>Age</td>
<td>Gender</td>
<td>Technique</td>
<td>Orientation</td>
<td>Experience</td>
<td>Two-time</td>
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<td>45</td>
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<td>Left</td>
<td>TC US BE</td>
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<td>HT: 8.0</td>
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<td>BE: TC US</td>
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<td>ABT: One-time</td>
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<td>Time: 33</td>
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<td>BE: TC US BE</td>
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Ref: reference; Time: duration of symptoms in weeks; BE: barium enema; CT: computed tomography; US: abdominal ultrasound; COL: colonoscopy; Tx: type of treatment; ABT: antibiotic therapy; ND: no data; HT: histological type; ADC: adenocarcinoma; MC: mucinous; FU: follow-up in months; M: mortality; COD: cause of death; MT: metastasis; PC: peritoneal carcinoma; IPP: immediate postoperative period; MI: myocardial infarction.
Fig. 1. Right inguinal-parietal abscess.
Fig. 2. CT scan image of the abdomen and pelvis, with contrast enhancement. Right colon cancer with right-side skin abscess in the inguinal region, 7 x 3 x 5 cm in size (A: axial; B: coronal). Abscessed collection towards the right psoas muscle, 5 x 5 x 3 cm in size (C: axial; D: coronal).
PubMed: 101 results
EMBASE: 65 results
WOS: 365 results
TOTAL: 531 results

Excluded:
- 98 duplicated studies

Abstracts:
- 49 studies

Excluded:
- No subject to study: 370 studies
- Different location than colon: 10 studies
- Animal experimentation: 4 studies

Complete articles included:
- 44 studies

Excluded:
- CCR infiltration without local infection: 1 study (55)
- Impossibility of obtaining the complete article: 3 studies (56-58)
- Colon neoplasm with a gynecological origin: 1 study (59)

Fig. 3. Flowchart describing the different phases of the systematic review (CRC: colorectal cancer; WOS: Web of Science).