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Perforated Sigmoid Colon Adenocarcinoma with Concomitant Intestinal Ascariasis: Coincidence or Association? A Case Report.

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ABSTRACT

Background:
Colorectal carcinoma and intestinal ascariasis are both encountered in tropical and low-resource settings. However, their simultaneous occurrence in a single surgical case is rarely reported. Ascaris lumbricoides is not classified as a proven carcinogenic helminth and its relationship with colorectal carcinoma remains uncertain.

Case Presentation:
An elderly woman presented with features of acute abdominal pain and generalized peritonitis. Contrast-enhanced computed tomography showed free intraperitoneal air and fluid, mural thickening of the sigmoid and descending colon and a loculated peri-sigmoid collection. These imaging features were suggestive of hollow viscus perforation. An emergency laparotomy was done which showed faeculent peritoneal contamination and a perforated sigmoid mass adherent to the urinary bladder. Sigmoidectomy with end colostomy was performed. During bowel examination, three adult Ascaris lumbricoides worms were retrieved from the small intestine. Histopathology confirmed well-differentiated adenocarcinoma of the colon invading up to the serosa, staged as pT4aN0, AJCC 8th edition. The appendix showed acute appendicitis and was free of tumour. The patient received albendazole along with standard postoperative care.

Conclusion:
This case represents rare coexistence of perforated sigmoid colon adenocarcinoma and intestinal ascariasis. The perforation was most likely attributable to transmural tumour invasion, while ascariasis was most likely incidental. The case highlights the need for careful intraoperative assessment and mandatory histopathological examination, as parasitic infestation should not obscure an underlying malignancy.

Keywords: Ascaris Lumbricoides, Case Report, Colorectal Carcinoma, Intestinal Ascariasis, Perforation Peritonitis, Sigmoid Colon Adenocarcinoma

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INTRODUCTION

Ascariasis is one of the most common helminthic infections affecting humans and it continues to be a major public health problem in tropical and developing countries. The disease is caused by Ascaris lumbricoides which is a large intestinal nematode that commonly inhabits the lumen of the small intestine. Transmission is known to occur through ingestion of embryonated eggs from contaminated soil, food or water. Ascaris infestation is strongly associated with poor sanitation, overcrowding, unsafe water supply and inadequate hygiene practices. In endemic regions ascariasis is frequently encountered in children but adults may also be affected, particularly in communities where exposure is continuous.[1]

Most individuals with ascariasis are asymptomatic or have only nonspecific gastrointestinal complaints such as vague abdominal pain, nausea, altered bowel habits, or abdominal distension. However, clinically significant complications may occur when the worm burden is heavy or when the worms migrate into abnormal anatomical sites. Intestinal complications include obstruction, volvulus, intussusception, appendicitis, and rarely perforation. Extraintestinal migration may lead to biliary ascariasis, cholangitis, cholecystitis, pancreatitis, hepatic abscess, or respiratory manifestations during the larval migratory phase. In surgical practice, ascariasis is therefore an important consideration in patients from endemic areas presenting with acute abdomen.[2]

Colorectal carcinoma is a common gastrointestinal malignancy and is increasingly being diagnosed in developing countries. Adenocarcinoma is the predominant histological type, and the sigmoid

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colon is one of the common sites of involvement. The usual clinical manifestations include abdominal pain, altered bowel habits, constipation, bleeding per rectum, anaemia, weight loss, and features of large bowel obstruction. In some patients, however, colorectal carcinoma may first present as an emergency with intestinal obstruction, abscess formation, or perforation peritonitis. Perforation in colon cancer may occur directly through the tumour because of necrosis and transmural invasion, or proximally due to increased intraluminal pressure secondary to distal obstruction. Such presentations are associated with higher morbidity and usually require emergency operative management.[3]

The relationship between parasitic infection and malignancy has long been a subject of medical interest. Certain parasites have an established role in carcinogenesis. Schistosoma haematobium is associated with urinary bladder carcinoma, while Clonorchis sinensis and Opisthorchis viverrini are associated with cholangiocarcinoma. The mechanisms proposed in parasite-associated carcinogenesis include chronic inflammation, repeated epithelial injury, oxidative stress, immune modulation, fibrosis, and long-term tissue remodeling. However, Ascaris lumbricoides is not recognized as a proven carcinogenic helminth. Unlike tissue-invasive parasites or trematodes associated with long-standing mucosal or biliary epithelial injury, Ascaris lumbricoides is primarily a luminal nematode. Hence, a direct causal link between ascariasis and colorectal carcinoma has not been demonstrated.[4]

The simultaneous presence of ascariasis and colonic adenocarcinoma is therefore unusual and clinically interesting. In endemic regions, both conditions may occur independently in the same patient, making coincidence a more likely explanation than causation. Nevertheless, such cases are important because the intraoperative discovery of worms may distract from the possibility of an underlying malignancy. Conversely, malignancy may coexist with parasitic infestation, and both conditions may contribute to the complexity of presentation and management. The interpretation must therefore be cautious and evidence-based.[5]

We report a case of an elderly woman who presented with perforation peritonitis and was found to have a perforated sigmoid colon adenocarcinoma along with intestinal ascariasis. The case is presented to highlight this rare coexistence, to discuss whether the association is likely coincidental or biologically meaningful, and to emphasize that parasitic infestation should not prevent thorough evaluation for underlying malignant pathology.

CASE REPORT

An elderly woman presented to the emergency department with acute abdominal pain and clinical features that suggested generalized peritonitis. The symptoms were severe enough to warrant urgent surgical evaluation. On clinical assessment, a diagnosis of hollow viscus perforation was suspected. In view of the abdominal findings and suspected colonic pathology, the working diagnosis was perforation peritonitis, likely secondary to sigmoid colonic perforation, with a suspected sigmoid mass.

Initial abdominal ultrasonography showed multiple abnormalities. In the right iliac fossa an elongated, non-compressible tubular structure measuring approximately 3.2 × 1.3 cm was noted. There was significant probe tenderness present. These features suggested subacute appendicitis. Dilated bowel loops with to-and-fro peristalsis were seen, suggestive of subacute intestinal obstruction. The gallbladder showed multiple mobile calculi consistent with cholelithiasis. Additional unrelated findings included grade 1 renal parenchymal disease with a cortical cyst in the left kidney. In view of these multiple findings further cross sectional imaging was advised.

Contrast-enhanced computed tomography of the abdomen and pelvis was done. It showed mild-to-moderate free fluid in the peritoneal cavity along with multiple free intraperitoneal air foci. These findings were consistent with hollow viscus perforation. A loculated collection containing air foci measuring approximately 4.4 × 4 cm was identified superior to the sigmoid colon. Mural thickening and surrounding fat stranding were seen involving the sigmoid and descending colon. The imaging findings raised strong suspicion of a perforated sigmoid colonic lesion. Additional CT findings included cholelithiasis with biliary dilatation, with the common bile duct measuring approximately 12 mm, and a small hepatic cyst (Figure 1).

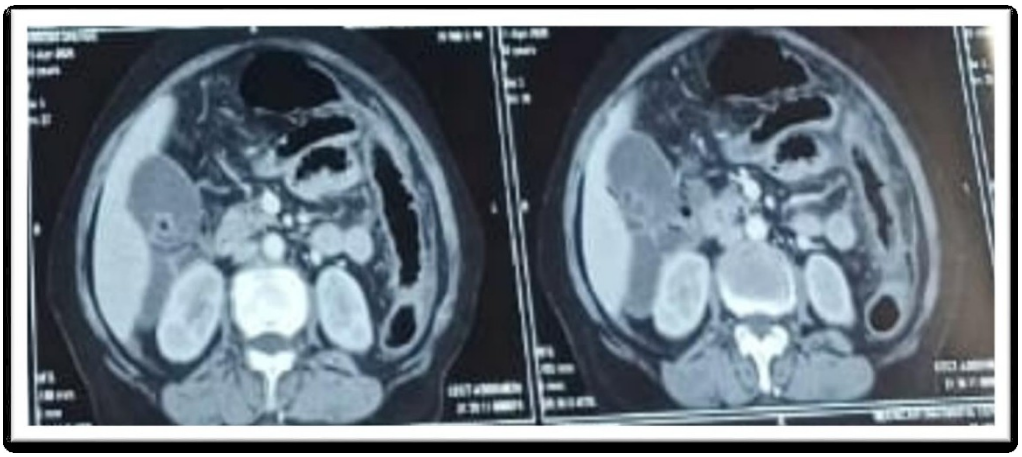


Figure 1. Contrast-enhanced computed tomography (CECT) of the abdomen demonstrating free intraperitoneal air and fluid with mural thickening of the sigmoid colon and adjacent inflammatory changes, suggestive of perforated sigmoid colonic pathology.

In view of generalized peritonitis and radiological evidence of perforation, emergency exploratory laparotomy was performed. On entering the peritoneal cavity, faeculent contamination was found in both the right and left paracolic gutters. Careful exploration revealed a hard sigmoid colonic mass adherent to the urinary bladder. A perforation measuring approximately 3 × 2 cm was identified at the site of the hard sigmoid mass. The intraoperative findings were suggestive of a malignant sigmoid colonic lesion complicated by perforation.

Sigmoidectomy was carried out with stapled division, and an end colostomy was fashioned in the left lumbar region. During systematic examination and palpation of the bowel, a tubular intraluminal structure was felt approximately 75 cm distal to the duodenojejunal flexure. On gentle manipulation, three adult Ascaris lumbricoides worms were milked out and retrieved from the bowel. Appendicectomy was also performed in view of the preoperative sonographic suspicion of appendicitis and intraoperative decision-making. Thorough peritoneal lavage was performed and an intra-abdominal drain was placed.

The resected sigmoid colon specimen measured 18 cm in length. On gross examination, it contained a solid grey-white to yellowish firm-to-hard tumour measuring 18 × 3 × 2 cm, extending up to the serosa. Two additional intraluminal nodular growths were also identified. The specimen was submitted for further histopathological examination (Figure 2).



Figure 2. Gross specimen of the resected sigmoid colon showing a perforated firm grey-white tumour mass consistent with adenocarcinoma, extending up to the serosal surface.

Microscopy of the resected specimens revealed malignant epithelial tumour cells which were found to be arranged in a villoglandular pattern. The tumour cells showed pleomorphic hyperchromatic nuclei, glandular stratification, loss of polarity, brisk mitotic activity, and a desmoplastic stromal response. The tumour infiltrated through the muscularis propria and extended up to the serosa. Lymphovascular invasion and perineural invasion were not identified. Both surgical resection margins were free of tumour. The appendix showed features of acute appendicitis and was free of tumour involvement. One mesenteric lymph node was identified and was negative for metastasis, corresponding to 0/1 nodal involvement. There was no perinodal extension. Based on these histopathological findings diagnosis of well-differentiated adenocarcinoma of the colon was made. The tumour was staged as pT4aN0 according to the AJCC 8th edition.

Postoperatively, the patient was managed with bowel rest, intravenous fluids, broad-spectrum antibiotics, analgesics for pain and stoma care. Antihelminthic therapy with albendazole 400 mg was administered for ascariasis. After stabilization, the patient was planned for multidisciplinary oncological evaluation and further oncological management.

DISCUSSION

The present case describes the coexistence of perforated sigmoid colon adenocarcinoma and intestinal ascariasis in an elderly woman. This association is rare and should be interpreted with caution. The most important question is whether *Ascaris lumbricoides* played any role in the development or perforation of the colonic malignancy, or whether it was an incidental finding in a patient from an endemic region. Based on the clinical, operative, and histopathological findings, the perforation in this case was most likely due to the malignant lesion rather than ascariasis. Both colorectal carcinoma and ascariasis can independently cause acute abdominal emergencies.[6] Colorectal carcinoma can lead to obstruction, perforation, abscess formation, and generalized peritonitis. Perforation may occur directly through the tumour when there is transmural invasion and necrosis, or proximally due to increased pressure in an obstructed colon. Ascariasis may also produce acute surgical complications, particularly when the worm burden is heavy.[7] These include intestinal obstruction, volvulus, intussusception, appendicitis, and rarely perforation. However, in the present case, the perforation was found directly at the hard sigmoid mass and histopathology confirmed tumour invasion up to the serosa. Only three adult worms were retrieved from the bowel, and there was no evidence that the worms were the direct cause of perforation. Therefore, the most reasonable interpretation is that the ascariasis was concomitant and probably incidental.

The available literature on ascariasis associated with malignancy is limited. Jhatial et al reported a 33-year-old male diagnosed with sigmoid colon adenocarcinoma who showed complete pathological response after only one cycle of capecitabine.[8] In the resected specimen, an eosinophilic abscess with giant cell reaction and ova of *Ascaris lumbricoides* was identified. Their report is one of the closest published comparisons to the present case because it involved sigmoid colon adenocarcinoma and evidence of ascariasis. However, the context was different: their case focused on unexpected pathological response after neoadjuvant therapy, whereas the present case involved emergency perforation peritonitis due to a perforated sigmoid malignancy.

Lyons and Schneider reported gallbladder carcinoma in association with *Ascaris lumbricoides* infection in a 73-year-old woman.[9] In that case, a live *Ascaris* worm was identified in the common bile duct during surgery for suspected gallbladder neoplasm, and histopathology confirmed gallbladder carcinoma. The authors discussed the possibility that chronic inflammation caused by active ascariasis might

have contributed to carcinogenesis, but they also clearly recognized that *Ascaris lumbricoides* had not been previously established as a cause of gallbladder carcinoma. This case is useful in the present discussion because it shows that *Ascaris* may coexist with gastrointestinal or hepatobiliary malignancy, but it does not establish a causal relationship.

Yoo et al. reported a case of synchronous sigmoid colon cancer and colonic anisakiasis detected on CT colonography. Their patient had sigmoid colon cancer along with anisakiasis in the ascending colon. This case is not directly related to ascariasis however; it is relevant as an example of a parasitic colonic lesion coexisting with colorectal malignancy. It also highlights how parasitic disease may be detected during imaging or pathological evaluation of colorectal cancer and may complicate interpretation.[10]

Mineta et al. reported chronic anisakiasis of the ascending colon associated with advanced colonic carcinoma in a 69-year-old man.[11] Furnée et al described *Enterobius vermicularis* infection of the liver in a patient with colorectal carcinoma in whom liver metastasis was suspected.[12] Catalano et al. reported colorectal cancer associated with *Strongyloides stercoralis* colitis.[13] These reports, although involving different parasites, collectively show that parasitic infections may coexist with colorectal malignancies, mimic malignant disease, or create diagnostic confusion. However, each parasite differs in its tissue tropism, pathogenic mechanism, inflammatory potential, and evidence for carcinogenicity. Therefore, conclusions drawn from infestations such as anisakiasis, enterobiasis, or strongyloidiasis cannot be applied to ascariasis.

Several mechanisms have been proposed by researchers for parasite-associated carcinogenesis. Chronic inflammation may lead to repeated epithelial injury, oxidative DNA damage as well as compensatory epithelial proliferation. However, it must be remembered that *Ascaris lumbricoides* is primarily a luminal nematode and is not currently classified as a carcinogenic organism. Thus, any claim of direct causation between ascariasis and colorectal carcinoma would be unsupported by current evidence.[14]

The clinical lesson from this case is important. In regions where helminthic infestation is common, the discovery of worms during surgery should not lead to diagnostic anchoring. A visible parasitic infestation may appear to explain obstruction, inflammation, or even perforation, but it does not exclude a coexisting malignancy. Careful examination of the bowel, appropriate surgical management, and histopathological examination of all resected specimens are essential. At the same time, confirmed ascariasis should be treated adequately with antihelminthic therapy to prevent future complications.[15]

The present case should therefore be considered a rare coexistence of perforated sigmoid colon adenocarcinoma and intestinal ascariasis. The perforation was best explained by the malignant tumour at the site of perforation with serosal involvement, while the ascariasis was most likely an incidental finding. Nevertheless, reporting such cases contributes to the limited literature on parasite–malignancy coexistence and emphasizes the need for cautious interpretation rather than unsupported causal assumptions.

CONCLUSION

We report a rare case of perforated sigmoid colon adenocarcinoma with concomitant intestinal ascariasis in an elderly woman. The perforation was most likely attributable to the malignant sigmoid lesion with serosal invasion, while the presence of Ascaris lumbricoides appears most likely incidental. Although parasite-associated carcinogenesis is recognized for certain helminths, a causal relationship between Ascaris lumbricoides and colorectal carcinoma has not been established. This case highlights the importance of avoiding diagnostic anchoring in endemic regions and reinforces the need for thorough intraoperative evaluation and histopathological examination of all resected specimens.

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