

# Malignant Peritoneal Mesothelioma Presenting as Mucinous Ascites

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## ABSTRACT

We present a rare case of a 46-year-old man presenting with mucinous ascites secondary to malignant peritoneal mesothelioma (MPM) that was diagnosed via colonoscopy with biopsies. Both our findings and the clinical presentation were unique. While it is widely known that asbestos exposure is commonly associated with pleural mesothelioma, 6-10% of malignant mesotheliomas arise from the peritoneum. To date, only 4 cases of MPM with the primary tumor site in the colon have been described in the literature.

## INTRODUCTION

Malignant peritoneal mesothelioma (MPM) is a rare, underrecognized neoplasm arising from the mesothelial surface of the peritoneal cavity. Although the mechanism by which MPM develops is not completely understood, like pleural mesothelioma, the more common malignant mesothelioma variant, MPM has been linked to asbestos exposure.<sup>1</sup> Without treatment, MPM has a poor prognosis with a median survival rate of 8.4 months.<sup>2</sup>

## CASE REPORT

A 46-year-old man with no significant past medical history presented for evaluation of worsening ascites. He was a Mexican immigrant who came to the United States in 2000 with no known exposure to contacts with tuberculosis. He reported first having ascites 2 years prior to admission. He had undergone therapeutic paracentesis 3 times at an outside hospital, most recently 1 month prior to presentation at our institution. Evaluation at an outside facility did not determine a cause of ascites and was negative for hepatic and cardiac etiologies. He denied abdominal pain or fevers. History was positive for early satiety, nausea, and muscle wasting. He reported significant alcohol use and was a daily smoker.

Review of outside hospital records was significant for a laparoscopic appendectomy for a perforated appendix and ascites 6 months prior. The surgical report described an acutely inflamed appendix, 4 L of turbid ascites, and what appeared to be frank peritonitis, which obscured the abdominal viscera. The pathology report described the external surface of the appendix as roughened and granular in appearance, with a diagnosis of acute appendicitis with perforation. No appendiceal neoplasm was observed.

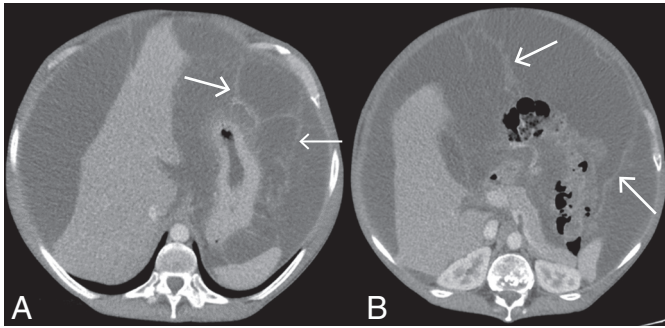
Physical exam revealed cachexia with significant muscle wasting, abdominal distention, and positive fluid wave. Laboratory values demonstrated normal liver chemistries, alkaline phosphatase 164 IU/L, and platelet count 727,000/ $\mu$ L. Tumor markers including  $\alpha$ -fetoprotein, CA125, CA19-9, and carcinoembryonic antigen were within normal limits.

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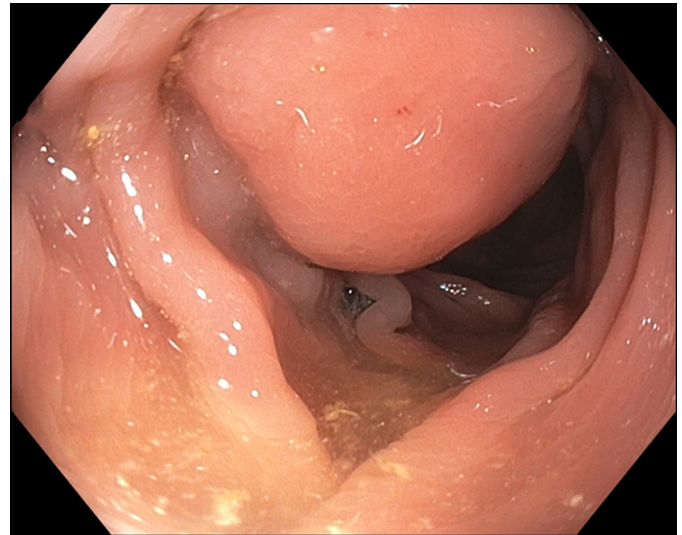


**Figure 1.** Computed tomography showing large-volume, loculated abdominal ascites (arrows).

Computed tomography (CT) of the abdomen and pelvis revealed loculated abdominal ascites with nodular thickening of some of the septations (Figure 1). There was no evidence of cirrhosis or splenomegaly. An eccentric soft-tissue density along the surface of the distal transverse colon measuring  $2.6 \times 2.0$  cm was noted. Paracentesis removed 7.5 L of mucinous, jelly-like fluid notable for white blood cells  $680/\mu\text{L}$ , polymorphonuclear leukocytes  $204/\mu\text{L}$ , red blood cells  $925/\mu\text{L}$ , lymphocytes 30%, and monocytes of 40%



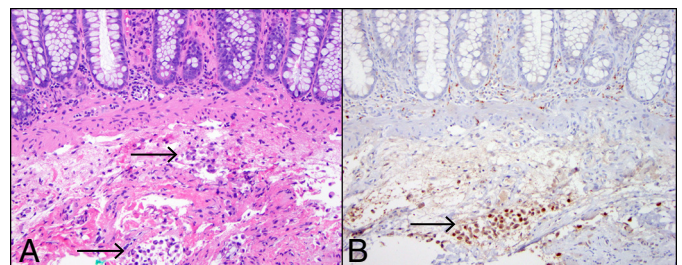
**Figure 2.** The first of five 1.5-L bottles that were filled during paracentesis containing thick, jelly-like ascites.



**Figure 3.** Colonoscopy showing a  $2.6 \times 2.0$ -cm mass in the transverse colon.

(Figure 2). Cytology was negative for malignant cells but did show abundant mucus. Biochemical analysis of the fluid could not be performed due to its mucinous nature. Cultures and gram stain of the fluid, including examination for acid-fast bacilli, were negative.

Colonoscopy was required due to transverse colon thickening on CT of the abdomen and pelvis, and this revealed a 20-mm submucosal nodule in the transverse colon (Figure 3). Several bite-on-bite biopsies were taken with cold forceps. Histologic examination revealed an infiltrative population of discohesive plasmacytoid cells involving the muscularis mucosa and the submucosa. Immunohistochemical studies demonstrated expression of AE1/AE3, CK7, calretinin, WT1, and D2-40. There was no significant reactivity for CK20, BerEp4, MOC31, PAX8, chromogranin, or CDX2 (Figure 4). Given the clinical, radiographic, and histologic findings of infiltrative mesothelial cells, a diagnosis of malignant peritoneal mesothelioma, epithelioid-type, was made. Surgical debulking as well as hyperthermic intraperitoneal chemotherapy were



**Figure 4.** (A) Infiltrating population of monotonous epithelioid cells within the muscularis mucosa and submucosa (arrows). (B) Immunohistochemical study for calretinin highlights the tumor cells (arrow).

recommended by colorectal surgery and medical oncology. However, because this treatment is not available at our center, the patient was discharged with plans to follow up at another center. No further follow-up is available.

## DISCUSSION

MPM is a rare, aggressive neoplasm derived from cells lining serosal membranes and is associated with a poor prognosis. A review of the literature revealed only 4 cases of MPM diagnosed in the colon, which illustrates that MPM is a rare and understudied disease process. While there have been documented cases of MPM presenting as a colonic mass, none had associated mucinous-like ascites. This presenting feature makes our case particularly unique.

While both peritoneal and pleural mesothelioma are strongly associated with asbestos exposure, the differences in molecular signatures and epidemiology suggest a different pathogenesis for MPM.<sup>3</sup> Furthermore, MPM tends to present in younger patients with a mean age of diagnosis of 63 years, compared with pleural mesothelioma at 71 years.<sup>4</sup> In addition, the correlation between asbestos exposure and peritoneal mesothelioma is not as well defined; i.e., while 80% of patients with pleural mesothelioma have a history of asbestos exposure, the same is true for only 50% of patients with peritoneal mesothelioma.<sup>5</sup>

The most common symptoms of MPM are non-specific, including abdominal distention and pain, and these symptoms often do not occur until late in the course of disease.<sup>2,6</sup> Abdominal CT is the most valuable first-line imaging modality because it often shows thickening of the mesentery and multinodular lesions.<sup>7</sup> Elevated hyaluronic acid, CA125, and thrombocytosis have been described in the literature in some accounts, but these associations are unreliable.<sup>2,7-9</sup> A definitive diagnosis is made with histopathology. Tissue samples are most often obtained surgically through laparoscopic surgery, but can also be obtained by ultrasound- or CT-guided biopsy.<sup>2</sup> There are approximately 300–400 new cases of MPM per year in the United States.<sup>6</sup> While the incidence of mesothelioma in the United States has seen a slight decrease since the 1990s, worldwide incidence is increasing due to delayed implementation of work regulations, occupational exposure, and the 20–40-year latency period between asbestos exposure and the development of malignancy.<sup>2,4,10</sup>

Once MPM was diagnosed, the patient's work and occupational exposures were reviewed in more detail. He had an

extensive history of working various jobs in the housing construction and demolition industry, including drywall removal, carpentry, electrical work, and painting. He reported that he never wore a respirator or mask while working.

While MPM is a rare neoplasm, when the evaluation of ascites does not reveal a definitive diagnosis, MPM should be considered. In the setting of perceived malignant ascites, careful consideration should be given to possible diagnostic clues such as peritoneal or colonic thickening, and colonoscopy may serve as a useful diagnostic tool.

## DISCLOSURES

Author contributions: Z. Field wrote the manuscript and is the article guarantor. A. Zori, V. Khullar, M. Mota, M. Feely, and RJ Firpi wrote and edited the manuscript. M. Feely provided the histological images.

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Informed consent was obtained for this case report.

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