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## Case Report

# Phlebosclerotic colitis with long-term herbal medicine use ☆,☆☆

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## ABSTRACT

Phlebosclerotic colitis (PC), also known as idiopathic mesenteric phlebosclerosis, is a rare disease resulting in ischemic colon due to venous sclerosis and calcifications that can be identified by characteristic imaging features on computed tomography and colonoscopy. Clinical examination reveals nonspecific symptoms with slow progression in the majority of cases. Patients with PC often require late-stage hospitalization and colectomy. We report a 79-year-old man with long-term clinical symptoms who used herbal medicines. Computed tomography and colonoscopy studies revealed several classical PC characteristics, and the patient subsequently underwent emergency total colectomy.

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## Introduction

Phlebosclerotic colitis (PC) is a rare disease characterized by sclerosis and calcification of the venous system located in the colonic wall and mesentery tissue, which eventually results in

chronic colonic ischemia. The incidence of PC in East Asian countries has previously been documented, indicating that PC was particularly common in China and Taiwan [1,2]. The pathogenesis of PC remains controversial, but prior research has suggested a possible association between PC and the long-term use of herbal medicines. In 2014, Fang Guo et al [1]. postu-

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lated that herbal medicine use might contribute to PC pathogenesis. In 2021, a retrospective review of 240 individuals of primarily East Asian descent reported by Jialing Wang et al [3], concluded that 78.7% of participants diagnosed with PC admitted to the use of herbal medicines. The ileocecum and ascending colon are the primary intestinal segments responsible for dietary absorption, including water, nutrients, and toxicities. Therefore, PC tends to occur in the right colon (ileocecum and ascending colon) and may extend to the descending colon, sigmoid colon, or rectum [4].

Common PC hallmarks can be detected by computed tomography (CT), including calcification of the mesenteric veins and branches (intramural tributaries, marginal veins, and vena recti) [5]. Chronic colitis presents in most situations, associated with diffuse thickening of the colon, fat stranding surrounding the colon, and complications, such as intestinal obstruction or necrosis, that result in a perforated colon [6–8].

In this paper, we describe a clinical case that was not detected during the early disease stage but presented with multiple characteristic features of progressive disease.

## Case report

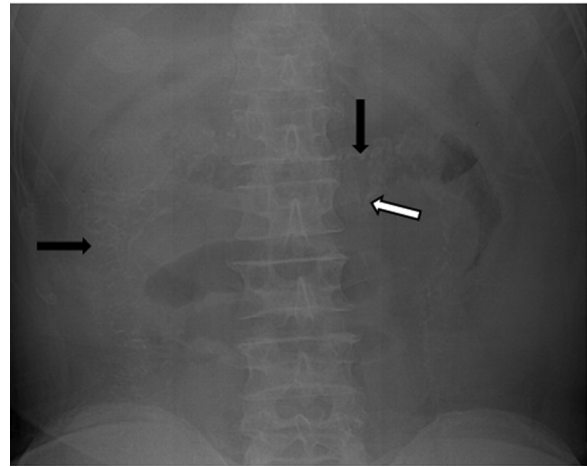
A 79-year-old man was admitted to our hospital with abdominal pain for 2 days accompanied by a lack of flatulence or defecation. His medical history included several prior episodes of abdominal pain and constipation starting from a young age with recurrent incidents of increasing frequency. He was diagnosed with chronic colitis and self-treated at home using herbal medicines for over 40 years. The clinician detected no abnormal vital signs, fatigue, or abdominal pain, and the patient was suspected of abdominal guarding.

Laboratory test results were within normal limits: red blood cells (RBCs), 4.6 T/l; hemoglobin (Hb), 132 g/l; hematocrit (Hct), 38.6%; white blood cells (WBCs), 8.54 G/l; no abnormal values were identified for hepatic or renal functions.

Plain radiography showed multiple serpiginous, thread-like calcifications that ran along the colon frame, with some calcifications that appeared perpendicular to the colon, indicating vascular calcification. No pneumoperitoneum signs or air-fluid levels were documented (Fig. 1).

CT demonstrated diffuse and symmetrical wall thickening of the cecum and the ascending, transverse, and descending colon, potentially associated with the submucosa layer. The thickest region measured approximately 9 mm and presented with distinctive gastrointestinal layers. Bowel wall thickening was also identified at the end segment of the ileum, and mild dilatation of the small bowel was detected in the pelvis. After contrast administration, the mucosa layer showed strong homogeneous enhancement, with calcifications in the colon walls and surrounding fat stranding (Fig. 2A and B). No dilation or abnormal thickening of the sigmoid colon or rectum was documented (Fig. 2C).

Multiple thread-like calcifications were detected that ran along the superior mesenteric vein branch and several inferior mesenteric vein branches that supply blood to these colonic segments (Fig. 2D and E). The main superior mesenteric vein and all great branches appeared normal (Fig. 2E).



**Fig. 1 – Plain radiograph demonstrated multiple serpiginous, thread-like calcifications that ran along the colon frame (black arrows), with some calcifications observed perpendicular to the colon frame (white arrow).**

Colonoscopy obtained images of 40 cm of the colon, as measured from the anus. The colon was narrowing and did not allow the further passage of the detector (with a diameter of 13 mm) beyond 40 cm; the colonic mucosa was edematous, with congestion, and appeared dark purple. No signs of neoplasm were noted (Fig. 3).

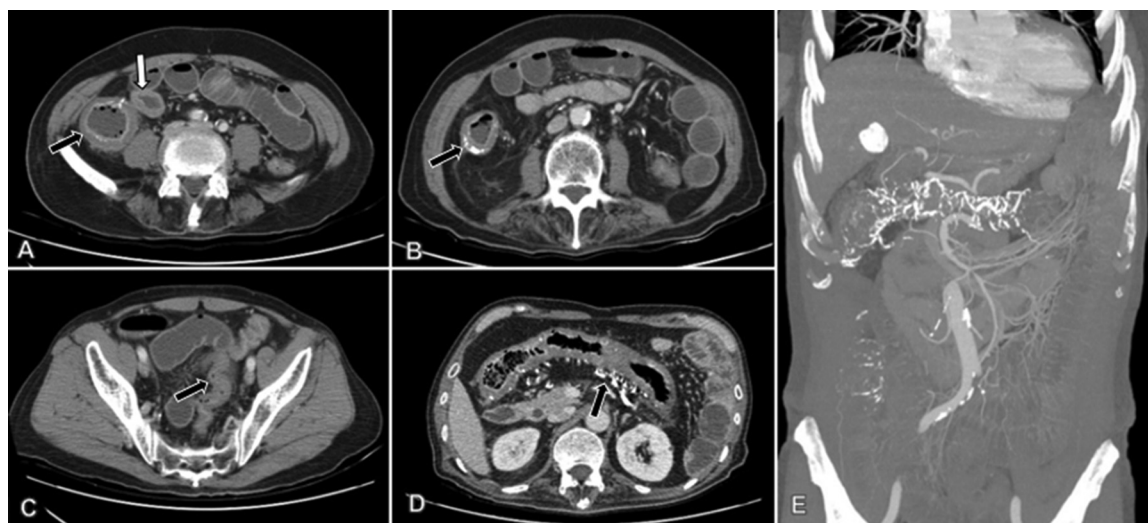
Our patient was managed using conservative treatment for 2 weeks, but symptom relief was not achieved. Anemia colostomy was subsequently performed. The surgeon reported that the entire colon segment from the cecum to the sigmoid colon was dark and necrotic, with hardened mesenteric veins. The mesenteric arteries and the segment from the sigmoid colon to the rectum were normal (Fig. 3E). Postoperatively, the affected colonic segments were resected, including the terminal ileum, cecum, ascending colon, transverse colon, descending colon, and part of the sigmoid colon. An artificial stoma was performed by creating two openings from the ileum and sigmoid colon.

Histopathological results showed chronic colitis (with significant immune and blood cell invasion in the epithelial layer of the colon) throughout the resected regions of the colon, and the surrounding mesentery was sclerotic, with calcium and hyaline deposits in the submucosal layers as well as thickening and calcium deposits in the subendothelial layer of the colon wall (Fig. 4). No evidence of malignancy was detected. Ischemic necrosis due to vascular calcifications was the most likely diagnosis.

PC was finally diagnosed based on the combination of clinical characteristics and the results from CT, colonoscopy, and histopathology.

## Discussion

PC is a rare gastrointestinal disease, and the use of herbal medicines is thought to play an important role in PC patho-



**Fig. 2 – Contrast-enhanced abdominal computed tomography (CT) imaging.** Axial images in the venous phase showed (A) symmetrical wall thickening of the cecum (black arrow) and the end segment of the ileum (white arrow) and the mild dilatation of the small bowel in the pelvis. (B) Symmetrical thickening of the bowel wall was observed, with calcifications in the submucosal layer of the ascending colon wall. The mucosal layer showed strong enhancement in the post-contrast phase (arrow). (C) The sigmoid colon and rectum showed normal appearances. (D) Calcifications appeared along the superior mesenteric vein branches (arrow). (E) Coronally reformatted images in the arterial phase showed normal great branches of the superior mesenteric vein.

genesis [6,9]. Our patient had a long-term disease history and was managed by herbal medicines (the specific medicines used are unknown) but experienced recurrent episodes of discomfort with increasing frequency. Furthermore, the involvement of the descending colon is considered a severe prognostic sign.

The clinical symptoms of PC are generally nonspecific and vary with disease stages, and diagnostic dilemmas are sometimes unavoidable. During the early disease stages, patients may be asymptomatic, and incidental findings are often discovered during routine medical check-ups. Common manifestations include abdominal pain (70%), diarrhea (30%), and several recurrent episodes with increasing severity if not accurately treated [4]. Other co-existing symptoms include bloody stool, weight loss, and vomiting. Patients may suffer from intestinal perforations or obstructions due to necrosis or strictures [1,10,11]. Our patient reported multiple previous episodes of abdominal pain. However, the cause could not be determined because the symptoms were atypical and mild. These symptoms progressed over time, leading to partial bowel obstruction, suggesting the progression of an acute disease.

The imaging features on abdominal CT and colonoscopy are often dominant contributors to the final diagnosis and management of patients with PC [12]. The most common and specific characteristic imaging features are calcifications distributed along the branches of the mesenteric veins and the veins in the colon wall (intramural tributaries, marginal veins, and vena recti) [6].

Abdominal plain radiography revealed linear, thread-like, serpiginous calcifications along the colon wall, following an inverted U-shaped distribution, with some calcifications

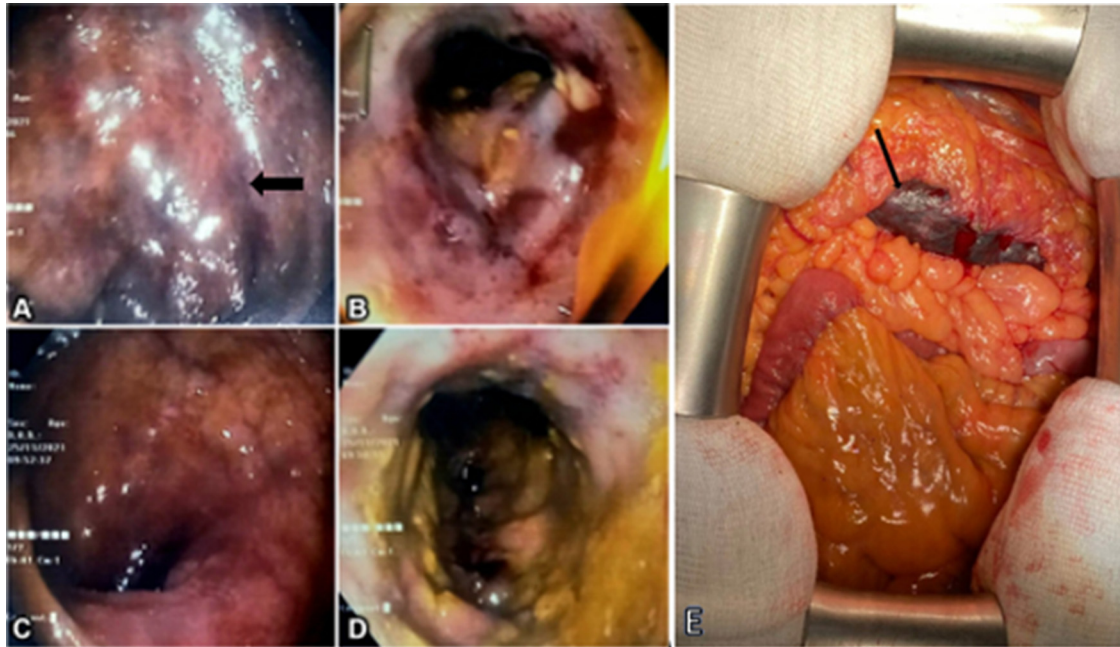
aligned perpendicular to the colonic axis [6,13]. On abdominopelvic CT with contrast injection, serpiginous calcifications were observed in the bowel walls and in the mesenteric veins of the proximal colon wall [PH7], especially in the ileocecum, cecum, ascending, and transverse colon [13].

In some advanced-stage cases, calcification can be observed throughout the entire colon, even in the proximal segment of the superior and inferior mesenteric veins [14]. According to Tsung-Shuo Yen et al., the severity of mesenteric venous calcification is often proportional to the clinical symptoms associated with PC [15].

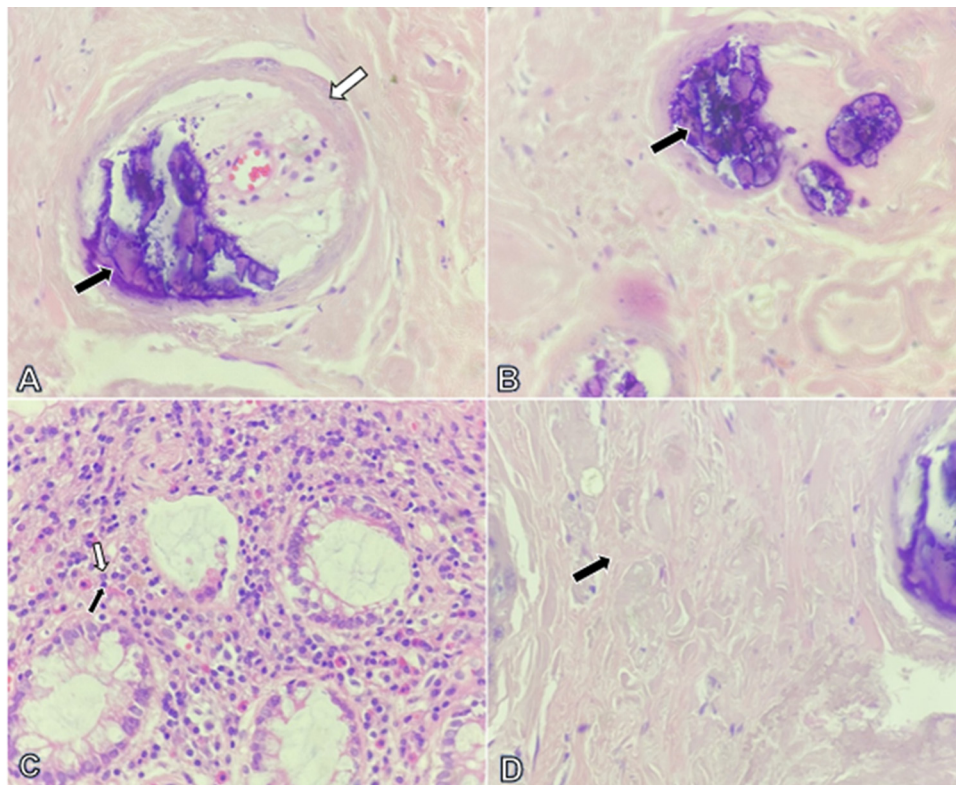
In addition, other signs of chronic colitis can commonly be identified, including diffuse thickening of the colonic wall that appears more prominent on the mesenteric border and pericolic fat stranding. Abdominal CT is a reliable tool for assessing PC diagnosis and follow-up evaluations. When evaluating potential complications, abdominal CT is considered the gold standard, particularly for the detection of hazards, such as bowel obstruction, necrosis, and perforation [6–8].

Barium enema examinations generally show nonspecific images that often share common features with intestinal ischemia of arterial origins (colonic wall thickening, thumb printing, the disappearance of semilunar folds, irregular bowel luminal narrowing, stenosis, and hardness of the cecum through the ascending colon) [13,16].

On digital subtraction angiography, the arterial branches persistently appeared smooth with a normal blood flow, whereas the venous branches were narrow, and the numbers of mesenteric vein branches were reduced in the ascending and transverse colon. The venous phase often shows poor venous perfusion in PC [6]. Our patient presented with calcifications along the colonic wall veins and mesenteric veins, in-



**Fig. 3 – Colonoscopy.** (A) Images were obtained 40 cm from the anus, at which point colonic narrowing and did not allow the further passage of the detector. (B-D) The colonic mucosa was edematous, with congestion, and appeared a dark purple color (arrow). No signs of neoplasm were noted. Postoperative images showed dark and necrotic areas of the transverse colon (arrow).



**Fig. 4 – Hematoxylin and eosin staining of the colon wall:** (A) Thickening (white arrow) and calcium deposits in the subendothelial vasculature in the colon wall (black arrow). (B) Calcium deposits and thickening of the submucosal (black arrow) vasculature in the colon wall. (C) Chronic colitis (invading immune cells [black arrow] and blood cells [white arrow] in the epithelial layer of the colon). (D) Suspicious hyaline deposits in the submucosa (arrow).

dicating the spread of ischemic intestinal lesions to the descending colon. These features likely contributed to the increasing frequency of clinical symptoms; however, no complications were observed, including intestinal obstructions, necrosis, or perforation.

Colonoscopy revealed the dark purple discolorations of the mucosa, suggesting a chronic intestinal ischemic condition due to calcifications and fibrosis of the mesenteric veins [10,17]. Other signs that might be encountered, depending on disease stage, include edematous mucosa, ulcerations, extensive erosion, narrowing and hardening of the colon wall, loss of mucosal folds, or necrosis of the colonic mucosa [10]. In our case, the endoscopic results aligned with reports in the literature, including the narrowing of the intestinal lumen, preventing the further passage of the detector. The entire bowel mucosa was edematous, congested, and dark purple.

Histopathological features highlighted the thickening of the colonic submucosa, with a sclerosis-fibrous predominance. The submucosal vessel wall displayed thickening and calcification, and collagen deposition in the venous wall was observed [2]. Signs of fibrosis included thickening of the venous branches with calcification, submucosal fibrosis, collagen deposition in the mucosa, and foamy macrophages in the bowel wall [2]. Hematoxylin and eosin staining showed hyalinization, calcification, and obstruction of the mesenteric veins. Different degrees of obstruction could be observed, associated with the accumulation of hemosiderin-laden macrophages, erythrocyte extravasation, and macrophages featuring dark brown and black pigmentation.

Patient management depends on disease severity. The vast majority of patients can be successfully managed with conservative and symptomatic treatments [18–20]. The presentation of bowel loop dilatation, the number of involved colonic segments with venous calcification, and the total mesenteric venous calcification score on CT have been shown to be useful for predicting the failure of conservative treatment [12]. Colectomy is indicated for patients with persistent and recurrent symptoms following conservative therapy [18]. Patients with evidence of colonic stricture after the resolution of an acute ischemic episode or with additional complications (such as bowel obstruction, necrosis, or perforation) also require surgical intervention [18]. A reduction in the use of herbal medicines is also recommended due to their relationship with disease pathogenesis and severity.

## Conclusion

Although PC is a rarely encountered disease, distinct features on abdominal CT and endoscopic examinations are commonly observed in the majority of reported cases. Patients with a history of herbal medicine use and nonspecific intestinal symptoms should be considered for potential PC diagnosis. We hold the view that understanding disease characteristics is essential for achieving early diagnoses and increasing the likelihood of beneficial outcomes for patients.

## Author contributions

Nguyen DM, Nguyen DH, and Nguyen MD contributed equally to this article as co-first authors. All authors have read the manuscript and agree to the contents.

## Ethical statement

Appropriate written informed consent was obtained for the publication of this case report and accompanying images.

## Patient consent

Informed consent for patient information to be published in this article was obtained.

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