

CASE REPORT

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Tubercular abdominal cocoon: a rare cause of subacute small bowel obstruction

Sachin Girdhar^{1*} , Alisha Naik¹ and Maneesh Uniyal¹

Abstract

Background Encapsulating peritoneal sclerosis (EPS) or abdominal cocoon is a very rare cause of subacute intestinal obstruction. We hereby report an elderly male presenting with recent-onset subacute intestinal obstruction with characteristic imaging findings of this entity in a background of abdominal tuberculosis on computed tomography (CT) scan that enabled timely diagnosis and appropriate clinical management. The report aims to highlight the typical radiological findings of this rare entity that may otherwise go undetected on imaging investigations, thereby causing a delay in diagnosis with adverse clinical outcomes.

Case presentation A 57-year-old male patient presented to the hospital with complaints of diffuse *abdominal pain* with obstipation and recurrent episodes of vomiting since last three days. Clinical evaluation also revealed an ill-defined lump in right lower abdomen. An urgent contrast-enhanced CT scan after oral contrast administration was performed that revealed dilated, clumped up small bowel loops in a 'whorl-like' pattern in right iliac fossa region. These obstructed loops were encased by a thick peritoneal membrane giving a 'cocoon-like' appearance. Also appreciated were scattered punctate calcific foci in jejunal walls and adjacent peritoneum along with mild ascites. On the basis of typical imaging findings, provisional diagnosis of tubercular cocoon abdomen was given that was later confirmed by laboratory investigations and diagnostic laparoscopy.

Conclusion Encapsulating peritoneal sclerosis or cocoon abdomen is an extremely rare cause of subacute intestinal obstruction. Further, cocoon abdomen in a background of abdominal tuberculosis is even rarer. However, this case report highlights the characteristic imaging findings for broader audience that enabled prompt diagnosis and appropriate clinical management in this case, achieving optimal clinical outcome.

Keywords Cocoon, Encapsulating peritoneal sclerosis, Intestinal obstruction, Tuberculosis, Case report

Background

Encapsulating peritoneal sclerosis (EPS) or abdominal cocoon is a rare, benign, chronic inflammatory disorder of the peritoneum initially reported by Foo et al. [1]. Encapsulation of bowel loops within a thickened fibrocollagenous peritoneal membrane and recurrent episodes of bowel obstruction are two characteristic features of EPS. The most commonly described risk factors include

previous history of peritonitis or abdominal surgical procedures, continuous ambulatory peritoneal dialysis (CAPD) and peritoneal infections especially tuberculosis [2–4]. In a large number of cases, no attributable cause can be implicated; these cases are labelled as primary or idiopathic EPS.

Case presentation

A 57-year-old male presented to the surgery outpatient department with complaints of diffuse *abdominal pain* with obstipation and recurrent episodes of vomiting since last three days. He also complained of ill-defined lump in right lower abdomen for past 3–4 months. Clinical examination revealed soft, non-tender abdomen with a poorly

*Correspondence:

Sachin Girdhar
smilinglucky@gmail.com

¹ Department of Radiology, Command Hospital (WC), Panchkula, India

marginated, mobile lump in right iliac fossa. Ultrasound abdomen was inconclusive because of extensive bowel gas. Non contrast and contrast enhanced computed tomography (CT) examination after oral contrast administration showed bowel dilatation with clumped up small bowel loops in a 'whorl-like' pattern in right iliac region (Fig. 1a–d). These clumped up bowel loops were seen encased within a thick, non-enhancing peripheral peritoneal membrane (arrows in Fig. 1b, c) with interlacing mesenteric bands giving a cocoon-like appearance. No significant transit of oral contrast was noted at the level

of clumped up small bowel loops, suggestive of luminal obstruction. Multiple scattered, punctate calcific foci were noted in the adjacent peritoneum and also within jejunal wall (arrows in Fig. 1a, d). Multiple regional calcified mesenteric lymph nodes and mild ascites were also appreciated.

In view of typical imaging findings of 'whorl-like' appearance of dilated small bowel loops, diagnostic consideration of cocoon abdomen was entertained.

Laboratory studies revealed the following: interferon-gamma release assay (IGRA)—positive; ascitic fluid

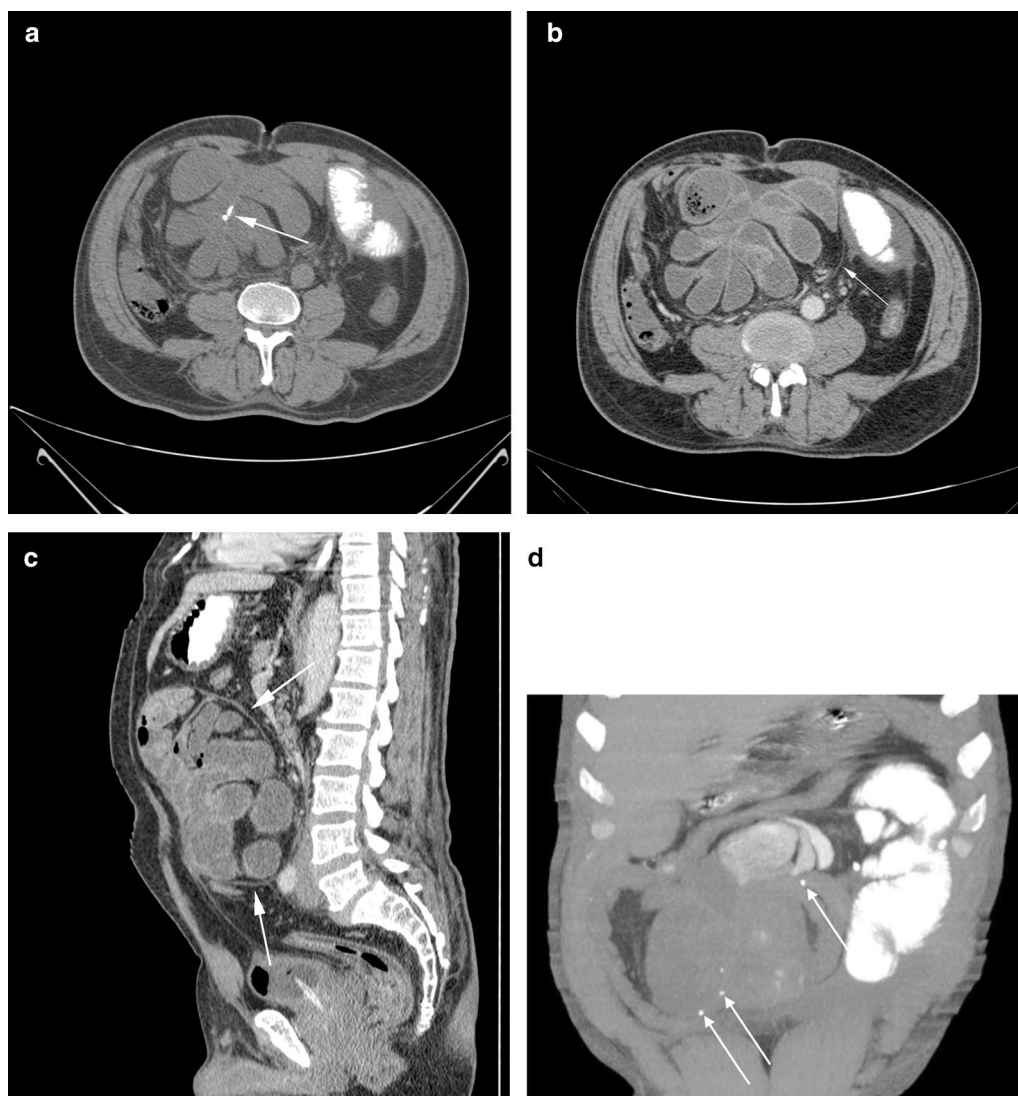


Fig. 1 **a** Non-contrast axial CT abdomen images on the day of presentation reveal 'whorl-like' appearance of dilated small bowel loops in right iliac fossa region with central chunky calcification (annotated by white arrow). No transit of oral contrast noted through clumped-up small bowel loops. **b** Axial contrast-enhanced CT abdomen image showing thick, peripheral membranous structure around the 'whorl-like' formation of dilated bowel loops (annotated by white arrow). **c** Sagittal contrast enhanced CT abdomen image shows thick peripheral membrane at posterosuperior and inferior aspect of cocoon abdomen (annotated by white arrows). **d** Thick MIP coronal reformation of CT abdomen showing multifocal punctate peritoneal calcification (annotated by white arrows)

analysis—low albumin level and raised adenosine deaminase (ADA) levels.

On the basis of typical imaging and laboratory findings, tubercular cocoon abdomen was strongly considered in the current case. The patient underwent diagnostic laparoscopy with parietal wall biopsy that confirmed tubercles on small bowel wall as well as parietal peritoneum.

The patient was subsequently initiated on antitubercular therapy (ATT) and supportive management with marked symptomatic improvement. Follow-up imaging after institution of conservative therapy (Fig. 2a, b) revealed near-complete resolution of bowel loop dilatation with normal transit of oral contrast (arrow in Fig. 2a) and progression of ascites (arrow in Fig. 2b).

Discussion

We describe an extremely rare cause of subacute intestinal obstruction with characteristic imaging findings in a background of tuberculosis abdomen that is not very uncommon in tropical countries even today. *Encapsulating peritoneal sclerosis (EPS) or abdominal cocoon* is a rare, benign, chronic inflammatory disorder of the peritoneum initially reported by Foo et al. [1]. Encapsulation of bowel loops within a thickened fibro-collagenous peritoneal membrane and recurrent episodes of bowel obstruction are two characteristic features of EPS. The most commonly described risk factors include previous history of peritonitis or abdominal surgical procedures, continuous ambulatory peritoneal dialysis (CAPD) and peritoneal infections especially tuberculosis [2–4]. In a large number of cases, no attributable cause can be implicated; these cases are labelled as primary or idiopathic EPS.

Tuberculosis presenting with pain abdomen is one of the most common causes of subacute intestinal obstruction in tropical countries. One of the rare and serious complications of abdominal tuberculosis is encapsulating peritoneal sclerosis [4]. However, pathophysiology of peritoneal sclerosis in tuberculosis is poorly understood and may reflect a sequela to chronic inflammatory process. Patients may be asymptomatic or may present with features of bowel obstruction. The condition is difficult to diagnose preoperatively in most cases. However, a high index of clinical suspicion along with characteristic imaging findings enables prompt diagnosis and timely management.

Erect and supine radiographs may be normal. However, in cases of bowel obstruction with a background of abdominal tuberculosis, abnormal clumping and dilatation with air fluid levels may be identified.

US may show clumping of bowel loops with or without echogenic mural thickening. Frequently, a thick peritoneal membrane encasing the bowel loops and mesentery can be identified. Ascites is commonly observed; sometimes with echogenic strands within. A characteristic cauliflower-like arrangement of bowel loops can also be appreciated in few cases.

CT is the mainstay for diagnosis of EPS. Non-enhanced CT exhibits multifocal peritoneal calcification. Thickened fibro-collagenous peritoneal membrane encasing the clumped up bowel loops and mesentery is pathognomonic of cocoon abdomen. Dilated bowel loops \pm adhesions can also be seen [5–7]. Non/delayed passage of oral contrast confirms bowel obstruction. EPS due to abdominal tuberculosis may show

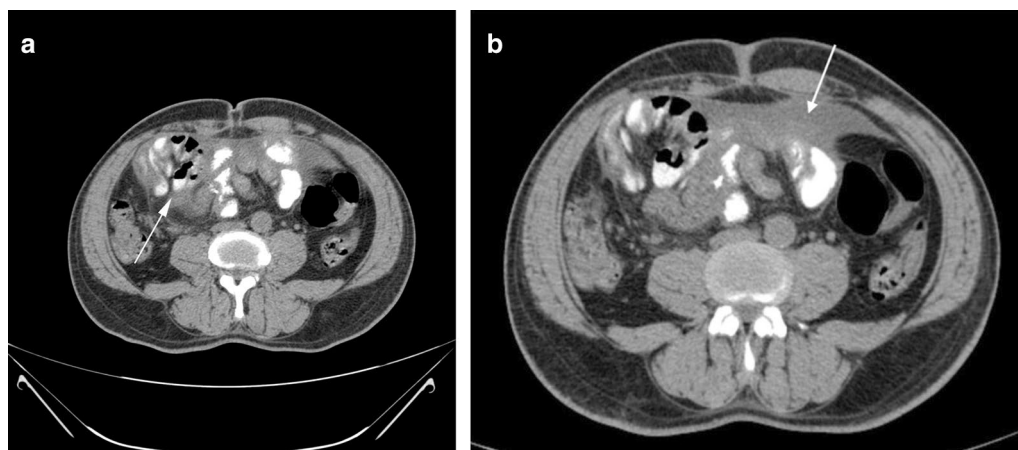


Fig. 2 **a** Follow-up non-contrast CT axial section on day 4 of presentation after oral contrast administration shows near complete resolution of small bowel loop dilatation in right iliac fossa (annotated by white arrow) following conservative management with ATT and supportive therapy. Smooth transit of oral contrast is noted through non-dilated clumped-up bowel loops. **b** Follow-up non-contrast CT axial section also exhibited moderate ascites (annotated by white arrow)

hepatosplenomegaly, peritoneal thickening, omental caking, necrotic lymph nodes and ascites.

In recent times, conservative management is the mainstay with treatment of the underlying cause. Complete reversal of membrane formation may occur with conservative treatment [8]. Patients with overt signs of obstruction need to be managed surgically (e.g. bowel resection or adhesiolysis) that otherwise carries high morbidity and mortality.

This case highlights the typical imaging findings of encapsulating peritoneal sclerosis (EPS) that is a rare entity, especially so, on a background of abdominal tuberculosis. The limitations include lack of radiographic imaging that could have added valuable complementary information in this case. Further, the patient did not undergo exploratory laparotomy that is diagnostic for this rare entity as it clearly delineates peritoneal membranes, albeit at the cost of high morbidity and mortality associated with surgical intervention in this condition.

Conclusions

In conclusion, we presented an uncommon cause of sub-acute intestinal obstruction in an elderly male. Distinctive imaging results led to the suspicion of encapsulating peritoneal sclerosis (EPS), which was subsequently confirmed through laboratory investigations and diagnostic laparoscopy, facilitating a prompt diagnosis. The significance of recognizing these characteristic imaging findings cannot be overstated in this instance, as it played a crucial role in guiding the appropriate clinical interventions and optimizing the patient's outcome.

Abbreviations

EPS	Encapsulating peritoneal sclerosis
CAPD	Continuous ambulatory peritoneal dialysis
CT	Computed tomography
IGRA	Interferon-gamma release assay
ADA	Adenosine deaminase
ATT	Antitubercular therapy

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Author contributions

SG performed conception, design, and writing of case report. AN provided data collection. MU revised proofreading and data interpretation.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical approval

NA.

Consent for publication

Informed consent obtained.

Competing interests

All the authors declare that they have no conflict of interest.

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