

## A Teenage Boy with Abdominal Pain and Vomiting

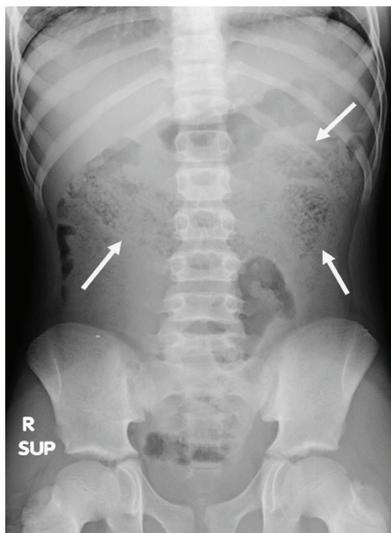
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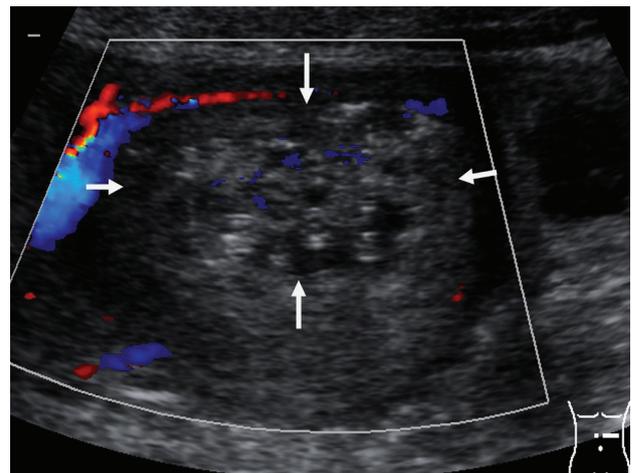
### CLINICAL PRESENTATION

A 14-year-old boy came to the emergency department (ED) with abdominal pain and vomiting for 2 days. He had no remarkable history. Physical examination revealed stable vital signs, generalized mild tenderness

and no palpable mass. The laboratory results reported mild leukocytosis ( $11,700 \times 10^9/L$ ) and normal differential count percentage. The abdominal radiograph in supine position is shown in **Figure 1**. What is the most likely diagnosis?



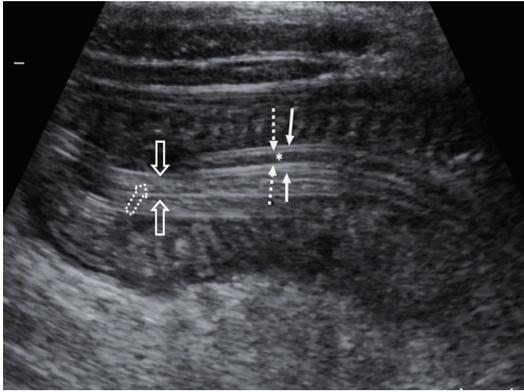
**Figure 1** The plain abdominal radiograph shows the impact of the worms appearing as a soft-tissue-density mass outlined by the gas along the small bowel shadow (arrows)



**Figure 2A** Transverse sonogram of a bowel loop showing multiple small target-like structures packed inside the small bowel (arrows)

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E-mail: supikak@yahoo.com  
doi: 10.31584/psumj.2023265182  
<https://he01.tci-thaijo.org/index.php/PSUMJ/>

PSU Med J 2023;3(3):179-181  
Received 3 August 2023  
Revised 21 August 2023  
Accepted 21 August 2023  
Published online 26 December 2023



The triple-parallel lines are the outer echogenic lines (open arrows), which are the walls of the worm, and the central echogenic line, which is the collapsed intestinal tract (dashed open arrow). The four parallel lines, or inner tube sign, are the two outer echogenic lines (arrows), which are the walls of the worm; and the two inner echogenic lines (dash arrows), which are the walls of the distended worm's alimentary tract and centrally filled with fluid (\*).

**Figure 2B** Longitudinal sonogram shows triple-parallel lines and a four-parallel line, or inner tube sign appearance

## DIAGNOSIS

Intestinal ascariasis. The diagnosis in this case was confirmed by worms passing through the vomitus and typical parasitic characteristics on ultrasound.

## DISCUSSION

Ascariasis is a common worm infestation in developing countries and predominantly infects children and young adults<sup>1-3</sup>. The jejunum and middle ileum are where the adult worms spend the majority of their lives in the intestines<sup>4,5</sup>. Unless the environment becomes intolerable for them, they often live in the intestines without causing major symptoms. Serious symptoms like pancreatitis, cholecystitis, liver abscess, intestinal obstruction, volvulus, and even perforation manifest during their migration<sup>6</sup>. Gut obstruction from conglomerate and lodged big worms is the most common complication; it may also be accompanied by volvulus or intussusception<sup>1,3</sup>. The presenting symptoms include abdominal pain, vomiting, abdominal distension, constipation, fever, and worms passing in the stools,

as well as vomitus<sup>3,7</sup>. The clinical signs observed are abdominal tenderness, palpable worm masses, and normal, hyperactive, or absent bowel sounds.

Conventional abdominal radiograph has a role for patients with abdominal symptoms. It can detect the worms with or without evidence of gut obstruction. The worms appear as curvilinear soft-tissue-density cords or there are signs of a bolus of worms, including whirlpool, cigarette ash, and tangled thick cord<sup>1,7,8</sup>. On a plain radiograph, the mottled appearance caused by the accumulation of worms and gas in the small intestine might occasionally be mistaken for colonic feces (Figure 1). The colonic gas shadow's distribution must be determined<sup>8</sup>.

Ultrasound can identify the parasite in the intestinal lumen. On a transverse scan, the individual worm displays a "target" or "bull's eye" or "doughnut-like" sign with an outer echogenic, circular body and a central, sonolucent dot-like digestive tract<sup>2,4,5</sup> (Figure 2A). In a longitudinal scan, the linear high-frequency transducer provides the details of the worm's wall and alimentary tract. Since the wall of the worm is made of protein, it appears echogenic, and the alimentary lumen appears hypoechoic, because it contains fluid<sup>2</sup>. The appearance of three- or triple-parallel lines indicates a collapsed intestinal tract, whereas a four-parallel line or inner tube sign indicates a fluid-filled lumen<sup>1,2,9</sup> (Figure 2B). The diagnosis is made simpler when a live worm exhibits slow pendular, non-directional, curling, or zigzag motions<sup>2,5</sup>.

Although CT is not the modality for the diagnosis of ascariasis, it can detect the worm, either gas- or fluid-filled, within the bowel lumen or associated bowel ischemia<sup>1</sup>. Rare reports on the MRI characteristics of intestinal ascariasis reveal elongated hyperintense tubular structures occupying the small bowel on the T2-weighted image<sup>4</sup>.

Albendazole is usually a successful medical treatment when given orally in single doses of 400 mg. However, surgical resection with primary anastomosis is required in cases of intestinal obstruction, gangrene, perforation, or intussusception with compromised bowel<sup>1,3</sup>.

## ABSTRACT

This diagnostic image presented a plain abdominal radiograph and ultrasonographic findings from a case of intestinal ascariasis, which is a relatively common cause of abdominal symptoms in developing countries. The plain x-ray highlighted soft tissue mass within the small bowel which could be accompanied by features of intestinal obstruction. The ultrasound study depicted triple-parallel lines or four-parallel lines which are characteristics of the roundworm.

**Keywords:** intestinal obstruction; roundworm; ultrasonography

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