

Point-of-care ultrasound for the diagnosis of an atypical small bowel obstruction in a cannabis user: a case report

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Abstract

This case report describes an atypical small bowel obstruction in a 71- years old cannabis user and how point-of-care of ultrasound (PoCUS) helped to its management by further orientating the physician toward the bowel obstruction etiology, namely intussusception. Intussusception is the invagination of an intestinal segment into the adjacent segment. The acute clinical presentation of intussusception often has non-specific symptoms, and the diagnosis can be challenging. While the most common etiology is neoplasm, intussusception also occurs in bowel motility disorder such as after cannabis use. Although this case report illustrates intussusception PoCUS findings, these should nevertheless be integrated into the clinical picture and CT-scan should remain the gold standard complementary examination in case of a suspected bowel obstruction.

Keywords

Bowel obstruction, Point-of-care ultrasound, Adult intussusception, Case report

Key points

- PoCUS has a good sensitivity and specificity for bowel obstruction.
- PoCUS should be complemented by a CT scan in case of bowel obstruction to define the underlying cause of obstruction.
- Although intussusception can be diagnosed using PoCUS, a CT scan should be performed to define the appropriate treatment.

Introduction

The following case report describes an atypical clinical presentation of a small bowel obstruction (BO) secondary to intussusception attributed to cannabis use in an adult patient and illustrates how point-of-care ultrasound (PoCUS) findings helped in the management. Intussusception is commonly seen in pediatric populations but rarely in adults. It represents less than 5% of all adult cases of bowel obstruction (BO). Although etiologies of adult

intussusception (AI) are mainly tumors, it remains idiopathic in 8-10% of patients.¹

Case Presentation

A 71-year-old man presented to the emergency department (ED) with vomiting and diarrhea for the past 7 days accompanied by increasing periumbilical abdominal pain of recent onset with no fever.

The patient reported a history of active cannabis use and previous ethanol abuse.

His hemodynamic parameters were stable at 80/min pulse rate and 138/46 mmHg blood pressure.

Clinical examination revealed a diffusely sensitive abdomen associated with signs of dehydration. In

the ED, the patient suffered from acute diarrhea without bleeding. The first suspected diagnosis was gastroenteritis. The blood test revealed a discreet neutrophilic hyperleukocytosis (11380/9740 per microL, respectively) and an acute rise in creatinine level (2.55 mg/dl – glomerular filtration rate 24 ml/min according to CKD-EPI), the ion count was normal. A venous gasometry was performed showing a lactate level of 3.2 mmol/l, without acidosis. After one liter of saline the lactate level returned to normal (1.7 mmol/l). At shift change, bedside PoCUS was performed, identifying images compatible with BO (Figure 1a) and two images suggesting AI: a target sign image (Figure 1b) and intussusception observed longitudinally (Figure 1c).

Although not initially planned in patient's management and in light of the PoCUS images showing a small BO, an abdominal computed tomography (CT) scan was performed, confirming an ileocecal intussusception associated with an occlusive pattern upstream of the intussusception as well as signs of intestinal ischemia.

The patient underwent a right colectomy. The histology of the specimen showed inflammatory bowel consequent to ischemia with no malignancy.

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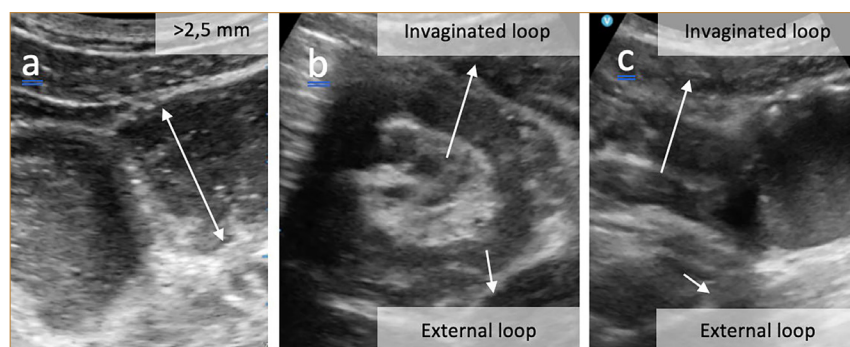


Figure 1. Point-of-care ultrasound showing (a) dilated small bowel, (b) target sign image in which the transverse view of the intussusception shows the receiving digestive loop externally and the invaginated digestive loop in the center, and (c) longitudinal view of the intussusception.

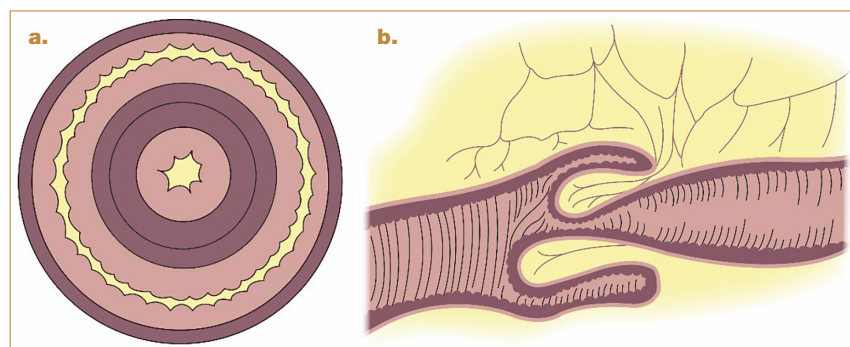


Figure 2. Anatomical drawing corresponding to an intussusception in transvers section (a) and longitudinal section (b)

Discussion

Intussusception is defined as the invagination of an intestinal segment into the adjacent segment (Figure 2).^{1,3} This condition occurs more frequently in the pediatric population (95%) and rarely in adults. Accounting for less than 5% of all adult BO, AI can be identified by its location, point load, and affected population.^{1,2,3}

Clinical presentation of AI

In adults, AI concerns mostly patients around 50 years of age with no sex predominance.¹

The acute clinical presentation of intussusception often has non-specific symptoms and can be associated with BO. In a subacute or chronic situation, the diagnosis can be challenging. Typical symptoms include abdominal pain, bloody stools sometimes associated with a transit disorder, nausea and/or vomiting, and inability to pass gas. Depending on the underlying etiology, general symptoms such as weight loss and fever may also be present.¹

Etiology of AI

The majority of AI cases (80-90%) are diagnosed in the small or large bowel. Other described cases, which occur in the upper digestive tract (i.e., stomach, esophagus), are extremely rare and are therefore not

discussed in this case report.¹ Around 90% of AI are associated with an identifiable cause, whereas 10% of cases are idiopathic.^{1,2,3} The leading identifiable causes are tumors, which account for two-thirds of AI, 60% of which are benign and are located in the small bowel. Malignant cases are mostly metastatic lesions such as melanoma and carcinomatosis.^{1,3} The remaining cases in the small bowel are caused by intestinal tract infection, intestinal hemorrhage, inflammatory bowel disease, Meckel's diverticulum, anorexia, and malabsorption syndrome, all of which increase the flaccidity of the bowel wall and thus facilitate intussusception. Less commonly, AI occurs in the colon (20-25%) and is usually caused by primary colic adenocarcinoma. Ileocolic intussusception in adults is a unique variant in which nearly all cases have a malignant lead point, namely, cecal adenocarcinoma involving the ileocecal valve.¹ Concerning the remaining 10% of idiopathic AI cases, the exact mechanism is still unknown, although it could involve an intestinal motility disorder.^{2,3} This can, for instance, be observed in cannabis users for which it was shown that interaction through inhibition of intrinsic cholinergic mechanisms can inhibit gastrointestinal motility, thus resulting in intussusception.^{2,3}

Patient evaluation

The gold standard to evaluate BO or diagnose AI is an abdominal CT-scan. PoCUS can nevertheless contribute to the diagnostic approach. Although PoCUS sensitivity and specificity remains unknown for AI, Gottlieb et al. showed in a systematic review of 11 studies that POCUS can accurately diagnose BO, with sensitivity of 90.0-92.4% and specificity of 96.0-96.7%.⁵ Five PoCUS signs can lead the physician to a diagnosis of BO: a bowel dilatation of at least 2.5 cm in the small bowel or 4.5 cm in the large bowel; the presence or absence of abdominal A-lines reflecting gastrointestinal intraluminal air; reduced or ineffective bowel peristalsis characterized by the to-and-fro movement of bowel content; and interloop free fluid or thickened bowel wall (at least 3 mm in the small bowel or 2 mm in the thickness of valvulae conniventes in the large bowel).⁵ To determine the level of the obstruction, the physician analyzes its location (peripheral or central), the bowel contents (feces or fluids), and the presence or absence of haustra on the ultrasound image.⁴ PoCUS can moreover determine the transition point, although this finding is limited to an approximative location.⁴ AI can be demonstrated by the target sign (Figure 1b). In the specific case of AI, POCUS has a sensitivity of 60%, except of a palpable mass that elevated the sensitivity to 91%.⁶

PoCUS not only has a high diagnostic accuracy for BO but is also non-irradiant and readily available in the ED. However, its diagnosis depends on the type

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of PoCUS machine available, practitioner training, and patient characteristics. Generally, it remains incomplete to determine the treatment and follow-up care. Thus, any diagnosis of BO made by PoCUS should be confirmed by a CT-scan.

Treatment

In the case of BO, the treatment of AI is surgical and associated to a preoperative colonoscopy depending on the location of the intussusception and the probability of malignancy.¹

Conclusion

This case report shows how PoCUS remains useful for the diagnostic approach of any abdominal symptoms as it can confirm the presence of BO. PoCUS, as an adjunct to clinical examination, can further orientate the physician toward the obstructive mechanism, namely, AI possibly secondary to cannabinoid use

in our case. These findings should nevertheless be integrated into the clinical picture. CT-scan should remain the complementary examination of choice to determine the location of the obstruction and evaluate any further treatment needs.

Declarations

Conflict of interest

Declaration of competing interests:
Nothing to declare.

Consent to participate

Informed consent was obtained from the patient included in the study.

Consent to publish

The patient consented to the submission of the case report to the journal.

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