Ultrasound Characterization of 'To-and-Fro' Waves with Point-of-Care Ultrasound (POCUS) in the Emergency Department Setting

Caracterização Ultrassonográfica das Ondas 'To-and-Fro' com Recurso a Ecografia Point-of-care (POCUS) no Contexto do Serviço de Urgência

Keywords: Emergency Service, Hospital; Intestinal Obstruction/diagnostic imaging; Intestine, Small/diagnostic imaging; Point-of-Care Systems; Ultrasonography
Palavras-chave: Intestino Delgado/diagnóstico por imagem; Oclusão do Intestinal/diagnóstico por imagem; Serviço de Urgência Hospitalar; Sistemas Point-of-Care; Ultrassonografia

Small bowel obstruction (SBO) is a frequent cause of acute abdominal pain in the emergency department (ED). It remains a diagnostic challenge due to its variable clinical presentation and often non-specific findings. Although computed tomography (CT) is considered the reference standard, point-of-care ultrasound (POCUS) has emerged as a valuable, rapid, and reproducible bedside tool in the early assessment of suspected SBO.[1]

We report the case of a 25-year-old man presenting with a 12-hour history of diffuse abdominal pain and vomiting. His medical history was notable for a previous Hartmann's procedure following trauma, with subsequent colostomy reversal, and multiple prior ED admissions for SBO. On examination, the abdomen was distended and diffusely tender, without signs of peritonitis. Vital signs showed mild tachycardia, while laboratory tests revealed leukocytosis (12.3 × 10^3/μL) with normal lactate levels.

A bedside abdominal POCUS examination was performed using a Mindray TE7 ultrasound machine (Video 1). Initial assessment was carried out with a low-frequency curvilinear probe (C5-2s, up to 5.7 MHz) to identify dilated bowel loops in the transverse plane, followed by longitudinal evaluation with a high-frequency linear probe (L12-3RCs, up to 12.8 MHz). The ultrasound demonstrated multiple fluid-filled small bowel loops exceeding 3 cm in diameter, some approaching 5 cm (Fig. 1). Dynamic assessment revealed increased peristalsis with bidirectional movement of intraluminal contents, consistent with the characteristic to-and-fro sign, a recognized feature of early mechanical SBO.[2,3]

The patient was managed conservatively, with no need for further imaging tests. Intravenous fluids and nasogastric decompression promoted the resolution of symptoms, and the patient was discharged with good oral tolerance and improved ultrasound findings within less than 48 hours in the emergency department.

Typical ultrasound findings in SBO include bowel dilation greater than 2.5 cm, abnormal peristalsis, bowel wall thickening, and the presence of free intraperitoneal fluid. Early obstruction is often characterized by hyperperistalsis and to-and-fro motion, whereas advanced stages may present with reduced or absent peristalsis, suggesting possible ischemia.[4]

Point-of-care ultrasound offers several advantages in the ED, including rapid availability, repeatability, and absence of ionising radiation. However, it remains operator-dependent and less reliable than CT in identifying the underlying cause of obstruction or detecting complications such as closed-loop obstruction, ischemia, or perforation. Therefore, it should be regarded as a complementary tool rather than a replacement for CT.[5]

This case highlights the practical role of POCUS in supporting early diagnosis and guiding initial management in selected patients with suspected SBO in the ED.

ACKNOWLEDGMENTS

The authors have declared that no AI tools were used during the preparation of this work.

AUTHORS CONTRIBUTIONS

LF: Conception of the work, study design, acquisition and interpretation of clinical and ultrasound data, drafting of the manuscript, and final approval of the version to be published.

JPP: Conception of the work, study design, critical revision of the manuscript for important intellectual content, acquisition and interpretation of clinical and ultrasound data, supervision of the ultrasound methodology, and final approval of the version to be published.

AG: Acquisition and interpretation of imaging findings, literature review, manuscript revision, and final approval of the version to be published.

DM: Clinical data collection, interpretation of patient evolution, manuscript revision, and final approval of the version to be published.

RBM: Conceptual supervision of the work, critical revision of the manuscript for important intellectual content, and final approval of the version to be published.

All authors agree to be accountable for all aspects of the work and ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in October 2024.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

PATIENT CONSENT

Obtained.

CONFLICTS OF INTEREST

JPP received fees from POCUSX to coordinate the EFAST training, undergoing paid training himself, and from Kosmos open-ended loan of Kosmo Torso Probe" and acted as Treasurer for the Associação Cirúrgica de Braga.

All other authors have no conflicts of interest to declare.

FUNDING SOURCES

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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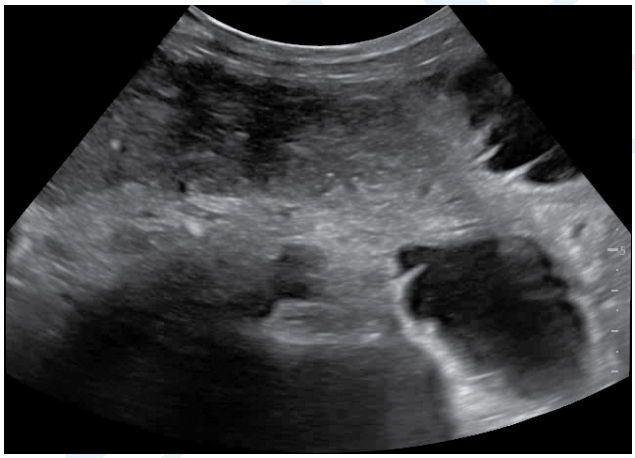

Video 1 – Modified peristalsis identification POCUS longitudinal bowel loop visualization referred to as the 'to-and-fro' movement sign (https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/24445/15963)

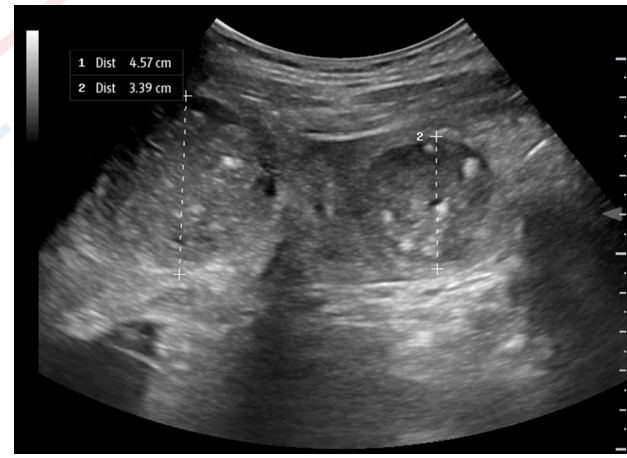

Figure 1 – Ultrasound image at the point of care displaying enlarged bowel loops in a transverse view

Luís FARIA [1], José Pedro PINTO [2,3,4], André GOULART [5], Daniela MACHADO [1], Renato BESSA DE MELO [1]

1. Unidade Local de Saúde da Cova da Beira. Covilhã. Portugal.
2. Unidade Local de Saúde de Braga. Braga. Portugal.
3. Hospital Lusíadas Braga. Braga. Portugal.
4. PocusX. Braga. Portugal.
5. Hospital da Trofa. Trofa Saúde. Porto. Portugal.

✉ **Autor correspondente:** Luís Faria. luisfaria2@hotmail.com

Revisto por/*Reviewed by*: Gustavo Nobre de Jesus , Catarina Pestana Santos
Recebido/*Received*: 25/01/2026 - **Aceite/*Accepted*:** 28/04/2026 - **Publicado *Online*/*Published Online*:** 17/06/2026

https://doi.org/10.20344/amp.24445