CLINICAL IMAGE

Exacerbation of Crohn disease mimicking menstrual cramping: the diagnostic value of contrast-enhanced ultrasound in assessing acute inflammatory lesions

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Inflammatory bowel disease has become a global problem with the highest prevalence (often exceeding 0.3%) in Europe and North America.[1] Current international guidelines and recommendations (European Crohn's and Colitis Organization, European Society of Gastrointestinal and Abdominal Radiology, American College of Gastroenterology) emphasize the role of diagnostic imaging both in initial and periodic evaluation of patients with Crohn disease (CD). Magnetic resonance enterography (MRE) and computed tomography enterography exhibit similar diagnostic characteristics, with MRE being preferred due to absence of radiation. We aimed to prove an equally high diagnostic value of contrast-enhanced ultrasound (CEUS) in imaging of patients with CD.[2-4]

A 43-year-old woman presented to the emergency room due to an exacerbation of persistent bile-stained vomiting (8 episodes on the day of admission) and acute abdominal pain within the right lumbar and iliac regions. No symptom alleviation was observed after the intravenous administration of antispasmodic agents (drotaverine hydrochloride) and nonsteroidal anti-inflammatory drugs (metamizole). She was in the first phase (period) of the menstrual cycle. The patient was diagnosed with CD 12 years before, had a history of multiple perianal fistulae removal, and appendectomy at the age of 15. She had recently finished biologic treatment (infliximab), and at the time of admission was treated with azathioprine and mesalazine.

The physical examination showed blood pressure of 95/78 mm Hg, pain on palpation limited to previously mentioned abdominal regions with moderate bloating, no muscle guarding or peritoneal symptoms. Digital rectal examination was unremarkable except for scarring related to healed perianal fistulae. Abdominal X-ray showed single intestinal air-fluid level in the mid abdomen. Laboratory testing indicated an elevated C-reactive protein level of 61.3 mg/l (reference range, 0–5 mg/l), which was comparable with the levels during the recent biologic treatment, without leukocytosis (white blood cell count 7.65 $\times 10^3/\mu l$; reference range, 4–10 $\times 10^3/\mu l$). The consulting surgeon assessed the clinical findings as related to menstruation.

However, given the previous medical history and poor clinical condition, the patient was transferred to the gastroenterology department where abdominal ultrasound was performed. It indicated mild jejunal distension, bowel wall thickening with preserved mural stratification, and hyperemia within both the terminal ileum and the angulated ileal loop in the lower abdominal region. Increased echogenicity of the surrounding mesenteric fat and peri-intestinal trace of fluid within the hypogastrium were reported as well. There was no apparent lymphadenopathy. It was decided to include CEUS and MRE in the diagnostic imaging protocol. CEUS was performed using the Hitachi Aloka Arietta 850 ultrasound setup with the L441 2–12 MHz linear transducer. It confirmed prior ultrasound findings; additionally it revealed an asterisk shaped configuration of both previously reported ileal loop localized within the hypogastrium and the adjacent large intestine, raising the suspicion of fistula with surrounding inflammation (FIGURE 1A and 1B). Following the initial anatomic assessment, the patient received contrast medium injection (SonoVue, Bracco,

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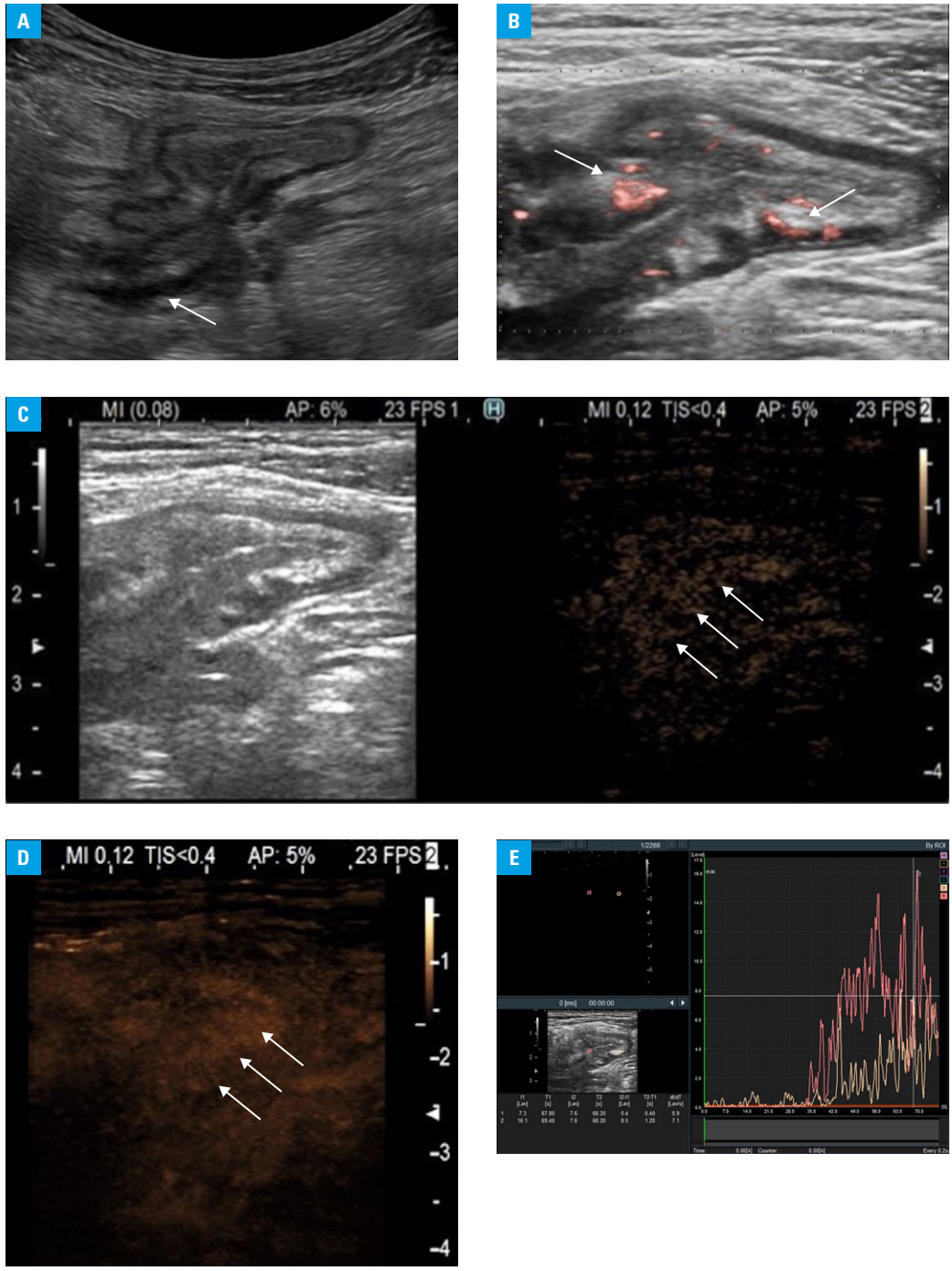

FIGURE 1 **A** – ileal and sigmoid loop tethering with preserved mural stratification and apparent wall thickening (especially within the mucosa and submucosa); a small amount of free fluid visible as well (arrow). **B** – low velocity blood flow signals (arrows) depicted using the novel detective flow imaging option indicating bowel wall hyperemia. Marked enhancement of the ileal wall with an accumulation of SonoVue/microbubbles within the mucosal and submucosal layers (arrows) is visible in both real-time dynamic contrast harmonic imaging (**C**) and accumulation motion-compensated microbubble trace imaging modes (**D**). This was numerically confirmed as seen in time-intensity curves generated for 2 distinct regions of interest (ROI); ROI 1 represents a poorly enhancing muscular layer (peak enhancement level, 7.3) and ROI 2 represents the affected mucosal/submucosal region (peak enhancement level, 16.1) (**E**). All findings were further verified with a reference modality, that is, magnetic resonance enterography

Milan); the examination demonstrated marked enhancement of the abnormal, tethered ileal loop's wall, particularly within the mucosal and submucosal layers, suggestive of active inflammation (FIGURE 1C–1E). All outcomes were further confirmed with a reference modality, that is, MRE (FIGURE 1F–1H).

The patient received optimal medical treatment, including intravenous corticosteroids, mesalazine, azathioprine, and metronidazole, due to her CD activity index score of 459.82 indicating an acute exacerbation of CD. Based on imaging findings, she was qualified for an elective surgery of a complex ileosigmoid fistula.

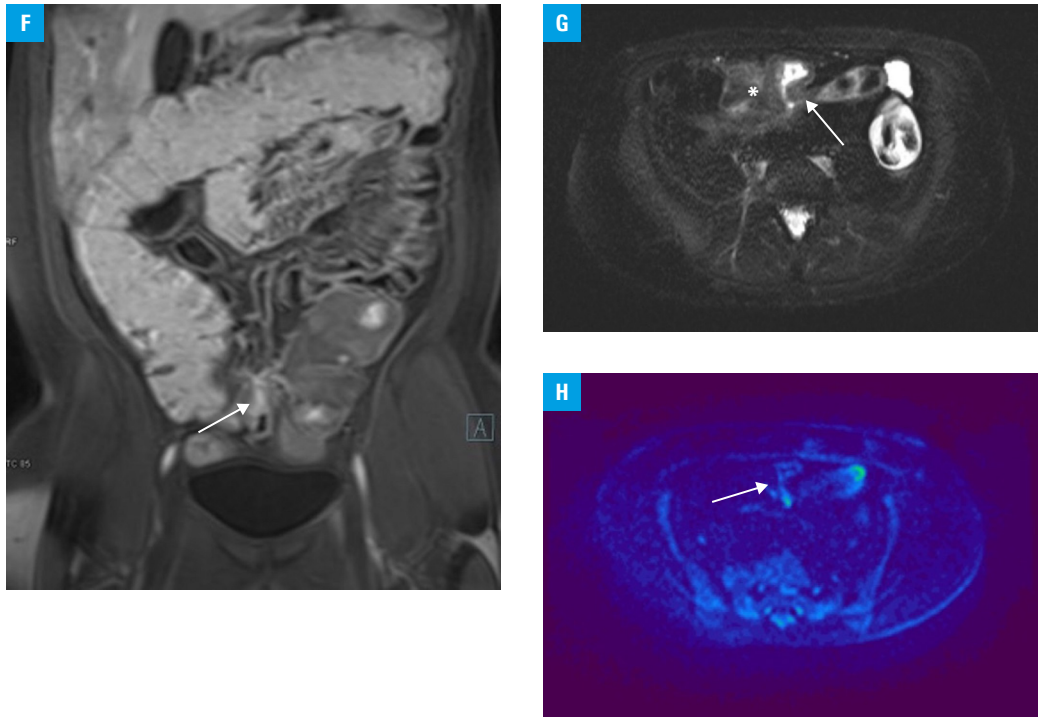

FIGURE 1 **F** – dynamic coronal T1-weighted VIBE sequence with fat-saturation depicting ileal and sigmoid loop tethering with early contrast enhancement of the mucosal/submucosal layer of the affected ileum (arrow), indicative of acute inflammation; **G** – axial STIR images indicating ileosigmoid fistula of small size (arrow); prominent edema of the ileal wall and surrounding fatty tissue can be seen as well (asterisk). **H** – axial diffusion-weighted imaging (DWI) sequence (ASSIST perfusion color settings) highlighting the most severe edematous lesions limited mostly to the mucosal/submucosal layers (arrow)

The presented case proves that CEUS might be an effective and reliable diagnostic modality to evaluate the activity and severity of CD.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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