

Conclusions

The use of contrast agents enhances the revelatory power of ultrasound for the intestinal tract as well. The additional data obtained through routine use of CEUS for intestinal visualization can improve the quality of clinical treatment. High frequency probes with optimized contrast ultrasound sensitivity should be used for such procedures.

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Clinical examples of the use of contrast-enhanced ultrasound (CEUS) as a routine gastroenterological diagnostic tool

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Introduction

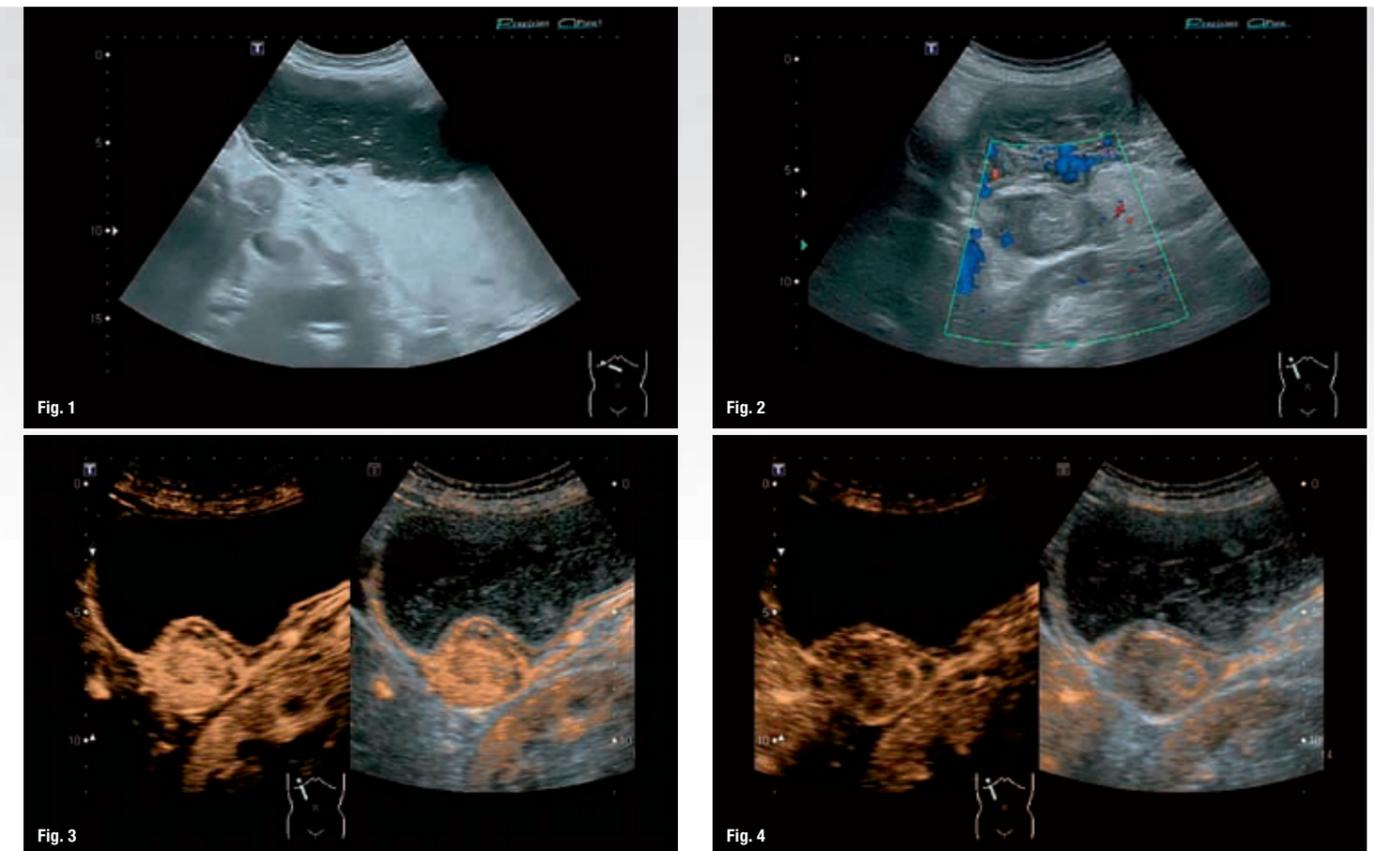
Contrast-enhanced ultrasound (CEUS) has become a routine diagnostic tool and has demonstrated its usefulness for the diagnosis of a host of gastroenterological and hepatological disorders.

For example, numerous studies have shown that

the diagnostic accuracy of CEUS in detecting hepatic lesions is on a par with that of CT and MRI.

However, the use of CEUS for intestinal diagnoses has been less thoroughly evaluated despite the fact that ultrasound has long been used as a basic diagnostic tool by virtue of the high local resolution

and dynamic visualization it provides. In addition, advances in probe technology are increasingly allowing the clinician to leverage the advantages of high resolution ultrasound when using CEUS and to integrate it into clinical decision making processes. Following are some illustrative case studies.



Case 1: B-scan in a patient who presented with nausea and recurrent vomiting revealed pronounced food retention (Figure 1), apparently provoked by a low-echo pyloric tumor that Doppler sonography did not differentiate further (Figure 2). CEUS revealed a highly vascularized (Figure 3) late-phase inhomogeneously contrasted tumor (Figure 4). Operative cleanup and a histological workup confirmed the ultrasound findings indicating the presence of pyloric adenocarcinoma.

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Fig. 5

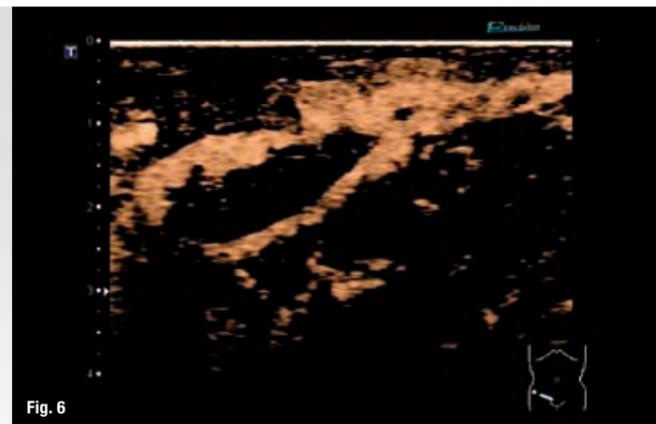


Fig. 6



Fig. 7

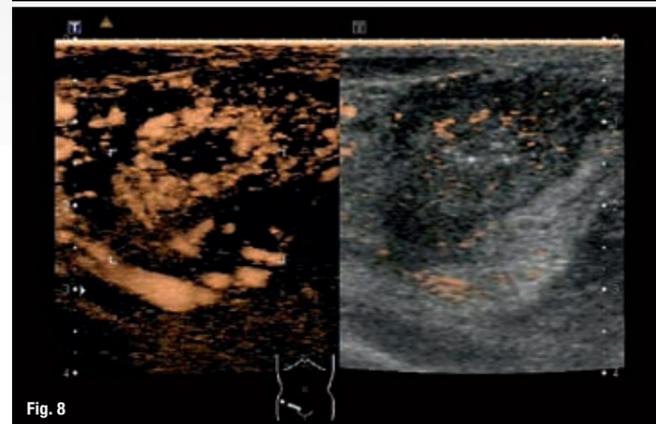


Fig. 8

Case 2: B-scan in a patient with chronic Crohn's disease revealed high-grade wall thickening of the terminal ileum (Figures 5 and 7). CEUS revealed pronounced hypervascularization of the highly inflamed segment (Figure 8). Microflow Imaging (MFI) revealed a hyper-perfused mucosa region more than 120 seconds following contrast agent administration (Figure 8).

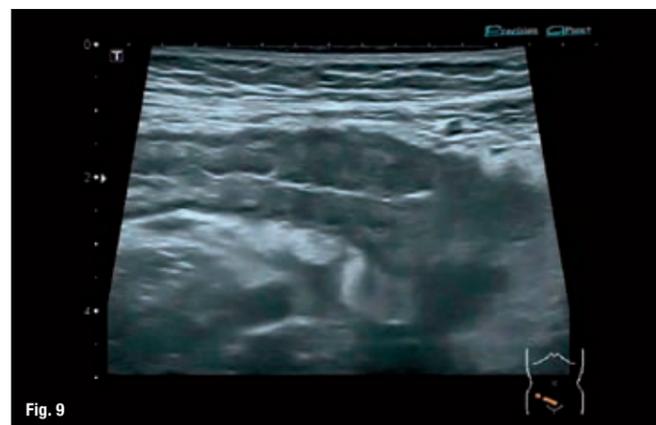


Fig. 9

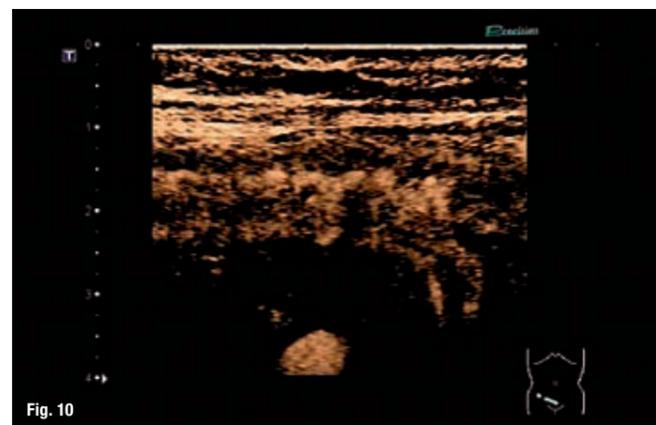


Fig. 10

Case 3a: The symptoms of a patient with Crohn's disease worsened despite steroid therapy. It was not possible to determine whether or not the therapy was having an effect on the terminal ileal thickening (Figure 9) that had been detected prior to treatment. However, CEUS revealed the continued presence of hyper-perfusion of the small intestine as an ultrasound correlate of the persistent inflammation (Figure 10).



Fig. 13

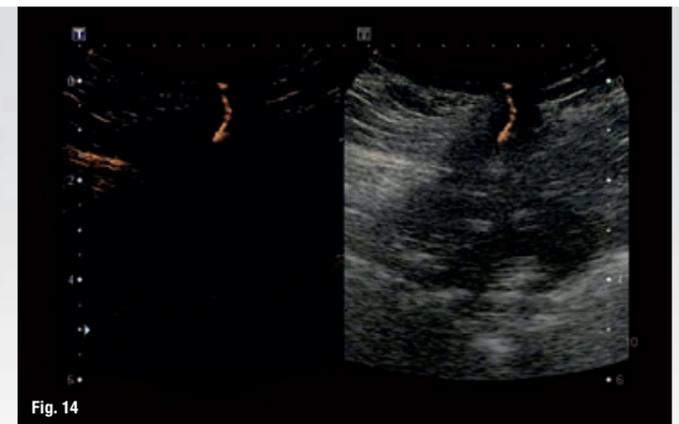


Fig. 14

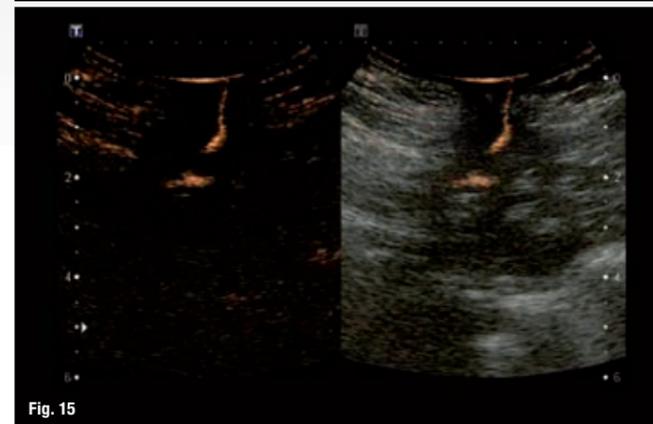


Fig. 15

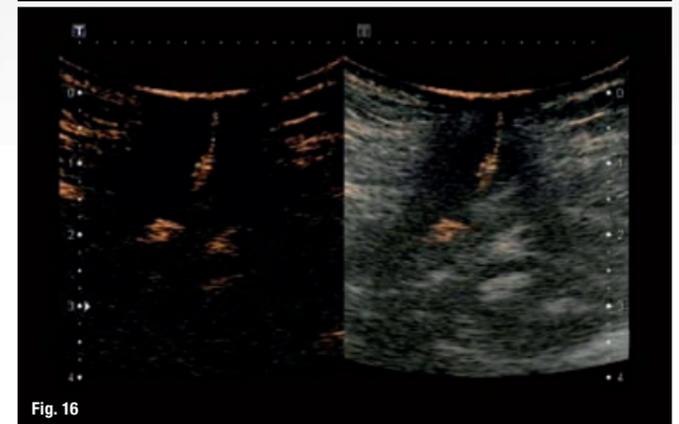


Fig. 16

Case 4: This case illustrates an extravascular application of contrast agent. A young woman with chronic Crohn's disease, who underwent a number of small-intestine resections and who was resistant to azathioprine, TNF alpha blocking, and high dose steroid therapy, presented with a foul smelling discharge from a laparotomy scar that was thought to be provoked by an enterocutaneous fistula. B-scan (Figure 13) revealed the suspected region in the subcutaneous tissue. Following probe exploration of a cutaneous pore, application of contrast agent via the probe confirmed the presence of the suspected fistula (Figure 14) and its contrast-medium extension into the intestine (Figures 15 and 16).

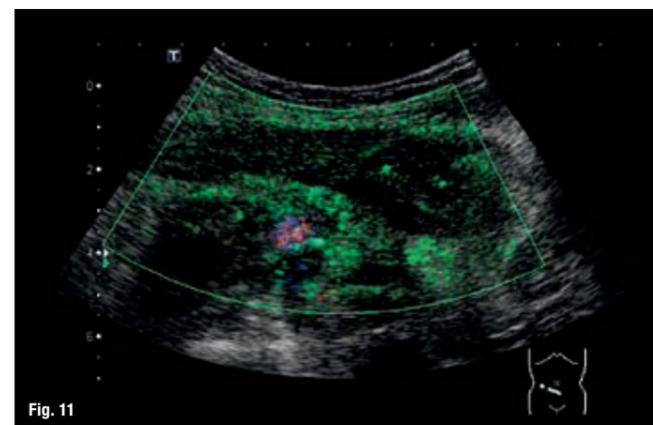


Fig. 11

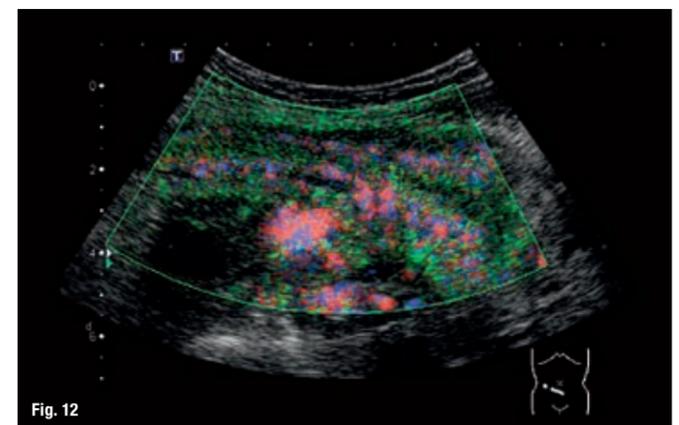


Fig. 12

Case 3b: Vascular Recognition Imaging (VRI) revealed extremely elevated blood flow even more clearly (Figures 11 and 12).