

THE VALUE OF A LOW HOUNSFIELD VALUE (LHV) CONTRAST DURING CT ENTEROCLYSIS IN THE STAGING OF CROHN DISEASE

Introduction

CT Enteroclysis is a hybrid technique that combines the advantages of both conventional abdominal CT and barium enteroclysis, while overcoming the deficiencies of each. The introduction of multidetector CT has made this a simple, clinical diagnostic tool. Dr. Maglinte and colleagues perform an average of four to six procedures per day to answer questions relevant to clinical management which are not fully answered by other imaging methods.

CT enteroclysis is of diagnostic value in the staging of Crohn disease, particularly the differentiation of fibrostenosis from inflammatory stenosis, including the depiction of extraluminal complications. It has also become the imaging modality of choice for the localization and characterization (staging) of small bowel tumors pre- and post-capsule endoscopy and lesion localization pre-double balloon endoscopy.

Other indications for CT enteroclysis with neutral enteral and IV contrasts include:

- Unexplained GI bleeding or anemia when early Crohn disease or non-steroidal anti-inflammatory drug enteropathy is not a clinical indication (air double-contrast enteroclysis preferred, if possible).
- Staging of known Crohn disease.
- Unexplained abdominal pain with no evidence of significant small bowel distension on plain-film radiographs.

CT enteroclysis using positive enteral contrast is used when vomiting is a significant clinical presentation because of the value of fluoroscopically-controlled infusion using a 12% iodinated contrast mixture in this subset of patients.

Patient History

A 39-year-old female was transferred to the Indiana University Hospital's OBGYN with complaints of significant amniotic fluid leakage and vaginal bleeding. The patient (16 weeks into her pregnancy) was referred to radiology because of the exacerbation of her Crohn disease which was diagnosed in 1995. The patient had no prior surgery. Subsequent to this clinical happening, the patient lost the fetus following a required blood transfusion.

Diagnostic Goal

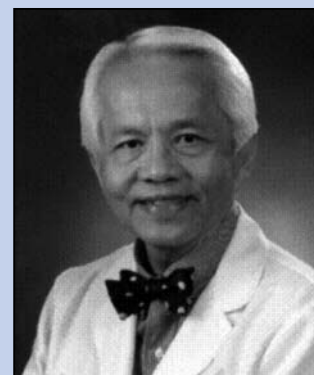
A CT enteroclysis exam was scheduled three days post-miscarriage to ascertain the reason for the patient's abdominal pain, vaginal bleeding, and excessive leaking of amniotic fluid.

Exam Procedure

CT Enteroclysis with IV contrast and VoLumen® (barium sulfate suspension) 0.1% w/v prep: The patient was asked to follow a low-residue diet, drink ample clear fluids, and take a laxative the day before the examination. The patient was also asked to fast for 8-12 hours before the exam.

Fluoroscopic Phase:

- Balloon positioning in the distal duodenum to the left of the spine.
- 0.3 mg glucagon administered intravenously.
- Infusion of 1.5 L of VoLumen via a 9 French small balloon catheter at an initial rate of 100 mL/min. Rate was adjusted up to 120 mL/min or down to 80 mL/min depending on patient's condition after initial 500 mL of contrast was infused.
- Patient was then transferred to the CT table.



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CT Phase:

- Patient was given an additional 0.3 mg of glucagon intravenously.
- An additional 1.5 L of VoLumen at 100 mL/min was infused.
- IV contrast was administered at a rate of 4 mL/sec with a total volume of 150 mL.

CT images were obtained on a 64-channel MDCT in the 64 x 0.625 mm mode and reformatted on a workstation after a 50-sec scan delay with reformation at 2.0-mm width, 1.0-mm reconstruction intervals. Routine soft tissue viewing was used (WW = 360H, WL = 40H).

Findings

CT enteroclysis showed the patient had a perforated distal small bowel, consistent with Crohn disease, as well as a large loculated abscess surrounding an enlarged uterus (filled with endometrial blood). The exam also showed an adhered distal small bowel to the right of the adnexa with loculated fluid in the abdomen and extending into the lesser sac and perihepatic space. A large abscess surrounding the uterus with gas and a higher-density fluid seen posteriorly in the bowel was noted (Figure 1). Active inflammatory disease involving the small bowel with gas and a slighter higher-density fluid (believed to be VoLumen based upon its documented HU value during image analysis) was seen flowing into the gutter along with residual gas (Figure 2). Fluid collections were noted in the lower abdominal region, and active inflammation was noted in multiple segments of the colon (not shown).

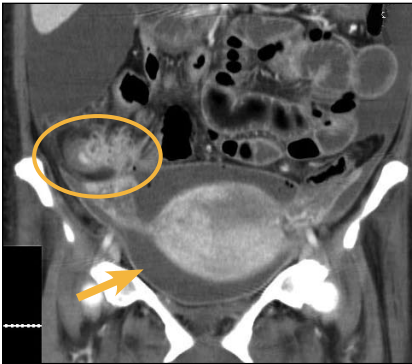


Figure 1. Coronal image showing a large abscess surrounding the uterus (arrow) with gas and a mix of extraluminal fluid and VoLumen. Matted loops of SB are adhered to the right adnexa with a small gas collection suggesting ileoileal fistula (circle).

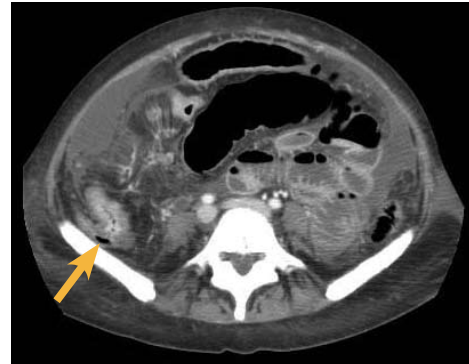


Figure 2. Axial image showing higher-density fluid mixed with gas indicating perforated bowel as source of fluid (VoLumen) (arrow). The higher-density fluid is believed to be VoLumen based upon its documented HU value during image analysis.

Conclusion

Following the procedure, all abscesses were drained. It was noted that the patient tolerated the procedure very well and was released for subsequent follow-up. As a result of the exam, the patient was scheduled for a partial colectomy involving the removal of the distal ileum and an ileocolostomy.

In Dr. Maglinte's opinion, the added density of VoLumen, as compared to water, allows one to diagnose with certainty that enteral fluid from the small bowel lumen was leaking into the gutter. He believes this may not have been possible to tell if only water had been used. There is value in using VoLumen for staging Crohn disease with CT enteroclysis. Although water is also frequently used for CT enteroclysis, the added density of VoLumen may have an advantage in the patient suspected of fistulizing or perforative phenotype of SB Crohn disease.

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01/08 1304493