

# Evaluation of Bowel Distention and Bowel Wall Appearance by Using Neutral Oral Contrast Agent for Multi-Detector Row CT — Megibow, et al., New York University School of Medicine

## ARTICLE HIGHLIGHTS

### Purpose

To prospectively evaluate the performance of an orally administered contrast [VoLumen® (0.1% barium sulfate suspension), distributed by E-Z-EM, Inc., Lake Success, NY] as a bowel-marking agent for multi-detector row computed tomography (CT).

### Method

A total of 60 patients (33 women, 27 men; average age 58.2 years) who were referred for multi-detector row CT of the pancreas were randomized into two groups.

Group 1: Consumed 1200 mL of VoLumen over a 30-min period prior to exam.

Group 2: Consumed 1200 mL of a solution containing 3 parts water and 1 part methylcellulose over a 30-min period prior to exam.

### Results

There was significantly better distention in the stomach ( $P = 0.013$ ), duodenum ( $P = 0.006$ ), jejunum ( $P = 0.029$ ) and ileum ( $P = 0.014$ ) in the VoLumen group (Group 1) compared to the water/methylcellulose group (Group 2).

The VoLumen group (Group 1) also demonstrated significantly better visualization of mural features in the duodenum ( $P = 0.003$ ), jejunum ( $P = 0.024$ ), and ileum ( $P = 0.01$ ) and a trend toward better visualization of mural features in the stomach ( $P = 0.092$ ).

### Conclusion

Oral administration of VoLumen provided excellent distention and excellent visualization of mural features in the gastrointestinal tract.

The more rapid cycle time could improve patient throughput without compromising diagnosis.

The ability of this contrast agent (VoLumen) to produce neutral contrast enhancement provides considerable advantages for emerging volume imaging with multi-detector row CT.

### Exam Details

Fourteen exams were performed with a 4-detector row CT scanner and the remaining 46 were performed with a 16-detector row CT scanner. All exams included IV contrast that was administered by means of an *EmpowerCT*® injector at rates of between 2 and 4 mL/sec.

#### Dual acquisition protocol

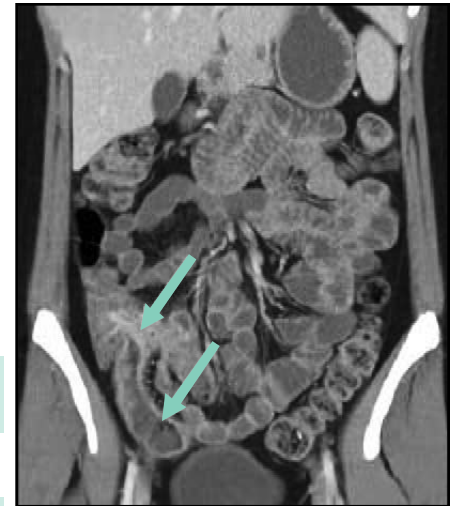
Phase 1 (pancreatic phase): Images were obtained 40 sec after initiation of bolus from the xiphoid to the top of the sacroiliac joints using a 4 x 1-mm detector configuration, creating 3-mm sections.

Phase 2 (portal phase): Images were obtained beginning at 75 sec after initiation of bolus from the xiphoid to symphysis pubis using a 4 x 2.5-mm detector configuration, creating 4-mm sections.

#### 16-detector row scanner

Phase 1: Images were obtained at 50 sec with a 16 x 0.75-mm detector configuration, creating 3-mm sections.

Phase 2: Images were obtained at 90 sec using a 16 x 1.5-mm detector configuration, creating 4-mm sections.



Coronal 3D volume-rendered image reveals marked abnormality of distal ileum. The wall is thick and the folds obliterated. The proximal small bowel is uniformly distended with the help of VoLumen oral prep. The wall is normal and the folds are preserved.

Two attending radiologists (Megibow & Hecht), one with more than 25 years experience and one with 2 years experience in dedicated body imaging, independently reviewed images from each exam as transverse 3- or 4-mm sections on a PACS workstation. Both were blinded to the type of oral contrast used. Images were rated on a continuous five-point scale (0 = worst, 4 = best) for the ability of the readers to visualize selected segments of the GI tract, and for the qualitative assessment of distention in each segment.

### Results of Qualitative Analysis in Small Intestine for Each Group

Group*	Distention				Visualization			
	Stom	Duod	Jejun	Ileum	Stom	Duod	Jejun	Ileum
<b>Group 1 (n = 30)</b>								
Reader 1	3.7	3.4	3.5	3.5	3.9	3.5	3.5	3.5
Reader 2	3.2	2.7	2.7	2.8	3.3	2.7	2.6	2.8
<b>Combined mean+</b>	<b>3.5</b>	<b>3.1</b>	<b>3.1</b>	<b>3.2</b>	<b>3.6</b>	<b>3.1</b>	<b>3.1</b>	<b>3.2</b>
<b>Group 2 (n = 30)</b>								
Reader 1	3.1	2.6	3.0	2.9	3.2	2.6	2.9	2.9
Reader 2	2.7	2.2	2.0	2.1	2.9	2.2	1.9	2.0
<b>Combined mean+</b>	<b>2.9</b>	<b>2.4</b>	<b>2.5</b>	<b>2.5</b>	<b>3.1</b>	<b>2.4</b>	<b>2.4</b>	<b>2.5</b>
<b>P value**</b>	<b>0.013</b>	<b>0.006</b>	<b>0.029</b>	<b>0.014</b>	<b>0.092</b>	<b>0.003</b>	<b>0.024</b>	<b>0.010</b>

\* For Group 1, 1200 mL of VoLumen was administered, and for Group 2, 1200 mL of water with methylcellulose was administered.

+ The combined mean was calculated as the arithmetic mean of both readers' responses.

\*\* P values were calculated using the Mann-Whitney test.

#### Reference:

Megibow AJ, Babb JS, Hecht EM, Cho JJ, et al. Evaluation of bowel distention and bowel wall appearance by using neutral oral contrast agent for multi-detector row CT. *Radiology* 2006; 238(1):87-95.



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