

Switching neutral oral contrast from VoLumen® to Breeza® to improve patient tolerance and acceptability of Magnetic Resonance Enterography (MRE) and Computed Tomography Enterography (CTE)

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Introduction

- Neutral oral contrast in MRE and CTE is necessary for adequate bowel distension and assessment of diagnostic mucosal and mural imaging features
- VoLumen® (a berry-flavored, 0.1% low-density barium sulfate suspension by Bracco Diagnostics, Milan, Italy) and Breeza® (a flavoring agent containing sorbitol and mannitol for oral CT contrast by Beekley Medical, Bristol) are the two neutral contrast agents available at our institution. Breeza® is used in children because of a better taste profile. This project was designed to assess if adult patients exhibited similar preferences for Breeza® vs VoLumen®. Separately, image quality with Breeza® use was compared to image quality with VoLumen® use in patients who had previous scans with VoLumen®



Methods

PDSA methodology was used for this quality improvement (QI) project

Purpose: To assess taste preference, tolerability, image quality of Breeza® vs VoLumen® in adult patients undergoing CTE and MRE.

Do: Patient registered → Arrives at MR/CT waiting room → MRI screening if applicable → Labs checked → Peripheral IV placed.

- Patients given samples of VoLumen® and Breeza® and allowed to choose the one that tasted better and which they were more likely to tolerate.
- Patients who chose Breeza® in the previous step and others who were being given VoLumen® received it in the Zone II/waiting room → Questionnaire to assess taste preferences and tolerability of administered oral contrast → MRE/CTE performed → patient returns to home, clinic, inpatient, or ER room.
- Patients who received VoLumen® historically and Breeza® during the previous step had images analyzed to assess adequacy of bowel distension, quality of images, and presence of artifacts.

Study: Analyze questionnaire used to assess taste tolerance for contrast agent. One author measured mean small bowel diameter in five quadrants (right and left upper and lower quadrants and pelvis) in all patients. Two other authors independently assessed adequate distention of bowel lumen based on percentage of bowel loops distended (bowel distension score: 5→>90%, 4→76-90%, 3→51-75%, 2→26-50%, 1→0-25%), adequacy of image quality for diagnosis, and presence of motion artifacts. Interreader agreement was assessed for bowel distension score.

Act: Change oral contrast used for MRE to the one with better acceptability among patients if image quality is adequate



Questionnaire

Questionnaire for taste preference of oral contrast that has been given to you before your procedure.

Name of contrast given to you – _____

Please answer the following questions on a scale of 0 to 10, 0 being least and 10 being the most, or use the emojis which best suits your response to the contrast given to you.

1. How would you rate the taste of the contrast given to you?

0	🤢	1	🤨	2	😬	3	😫	4	😬	5	😬	6	😬	7	😬	8	😬	9	😬	10	😋
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2. How would you rate the texture of the contrast given to you?

0	🤢	1	🤨	2	😬	3	😫	4	😬	5	😬	6	😬	7	😬	8	😬	9	😬	10	😋
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3. How do you rate your perceived state of health after consuming the contrast given to you?

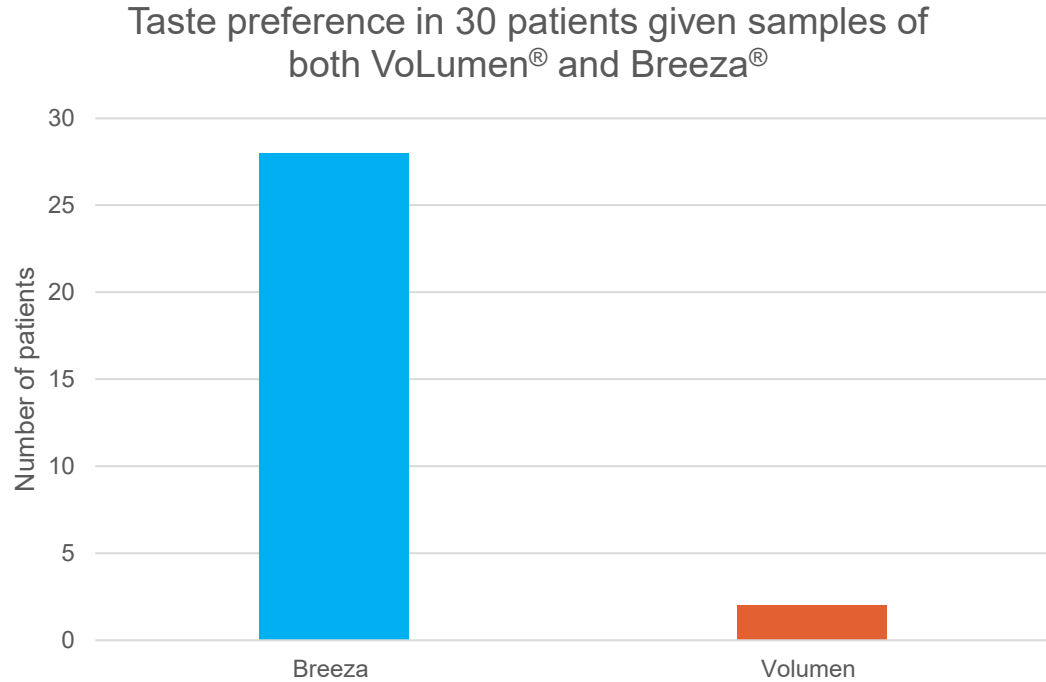
0	🤢	1	🤨	2	😬	3	😫	4	😬	5	😬	6	😬	7	😬	8	😬	9	😬	10	😋
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4. Would you be willing to consume this contrast again?

0	🤢	1	🤨	2	😬	3	😫	4	😬	5	😬	6	😬	7	😬	8	😬	9	😬	10	😋
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5. Please mention if there is anything in particular that you dislike about the contrast?

Results



93.3% of patients preferred Breeza[®] over Volumen[®]

Results

Complaints with VoLumen®

- Tastes like chalk
- Thickness is hard to consume
- Has very peculiar taste – mix of blueberries and chalk
- Has a bad after taste that lasts for a long time
- Feels like it coats the mouth and make me lose my appetite

***We did not receive any compliments for Volumen®**

Complaints with Breeza®

- Large amount to drink in short time span
- Has a strange smell

Compliments with Breeza®

- Tastes almost like diet Coke®/diet Pepsi®
- Watery texture
- Easy to consume
- Does not have an after taste
- Taste like sugar free limeade



Results – Questionnaire responses

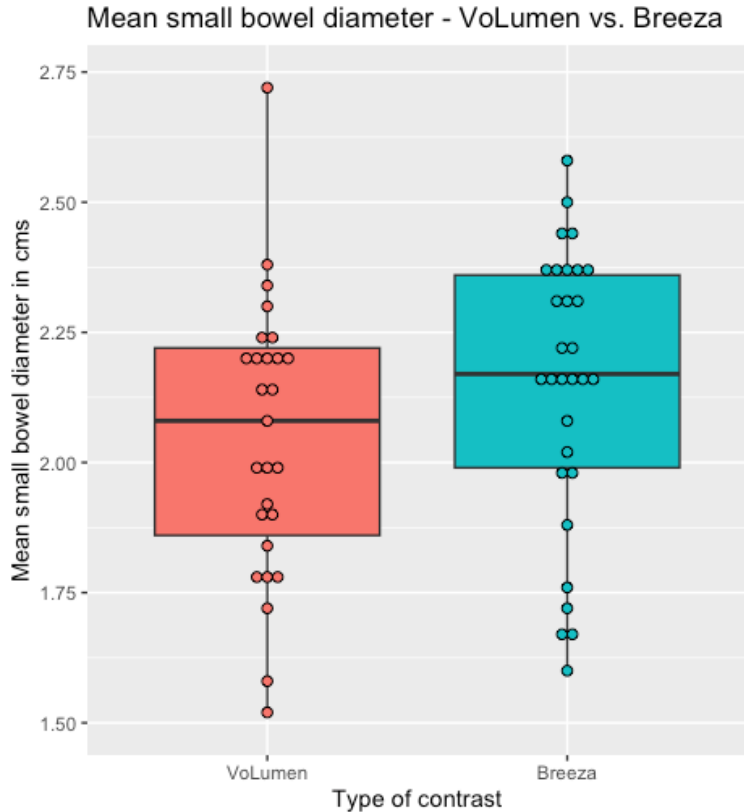
Mean of responses for each question on a 0-10 scale where 0 is least preferred (worst) and 10 is most preferred (best). A two-tailed t-test for two samples with unequal variance was used to compare the means.

	Volumen	Breeza	p-value
Taste	4.1	7.1	<0.05
Texture	4.4	7.9	<0.05
Tolerability	4.9	7.2	<0.05
Future preference	4.4	7.6	<0.05

Breeza was significantly better in terms of taste, texture, tolerability, and future preference (willingness to consume again in future if needed)



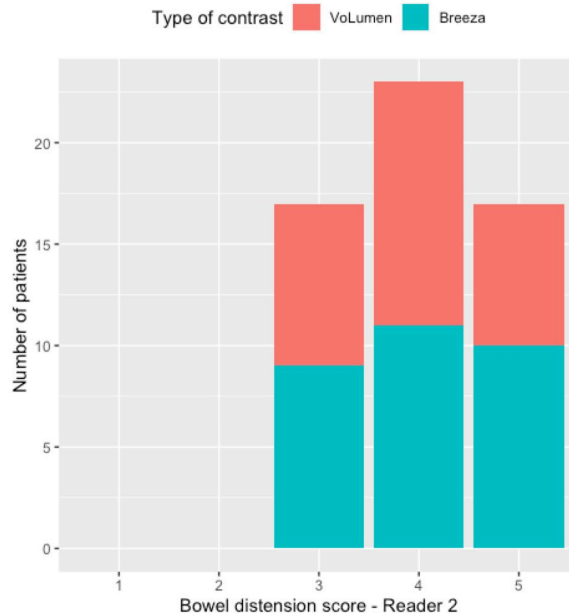
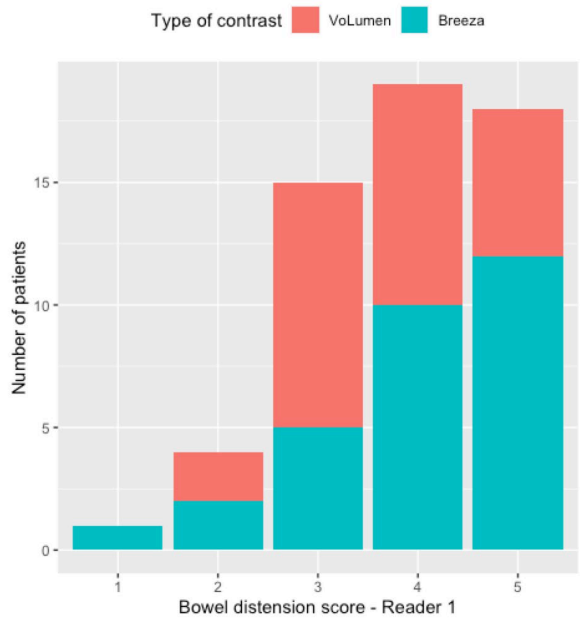
Results – Small bowel diameter assessment



A two-tailed Wilcoxon signed-rank test for paired samples was used and the p-value was 0.07.

No significant difference seen in mean small bowel diameter in patients receiving VoLumen[®] historically and Breeza[®] currently

Results – Bowel distension score



Paired-sample sign test was used to compare bowel distension scores for VoLumen® and Breeza® for each reader. The p-value was >0.05 for both readers.

No significant differences were seen in bowel distension scores between VoLumen® and Breeza® for each reader

5: $>90\%$ of loops distended, 4: 76-90% of loops distended, 3: 51-75% of loops distended, 2: 26-50% of loops distended, 1: 0-25% of loops distended

Results

- Interreader reliability was calculated by Cohen's weighted kappa and was weak for Breeza[®] and moderate for VoLumen[®]
- There were no image quality issues or motion artifacts in either the Breeza[®] or VoLumen[®] group

Conclusion

Breeza was preferred by 93.3% of our patients

No significant differences were seen in mean small bowel diameter, bowel distension score, image quality, and artifacts between Breeza[®] and VoLumen[®]

Based on these results, we have implemented a switch from VoLumen[®] to Breeza[®] as a neutral oral contrast agent in adult patients undergoing MRE and CTE