

# It's a Matter of Taste

## Palatability and Patient Compliance with Barium Sulfate: North Shore University Hospital Evaluation

**Purpose:** To determine if barium sulfate has an impact on patient compliance and departmental productivity and is a suitable contrast agent for outpatients undergoing CT procedures.

**Materials and Methods:** The CT outpatient population at North Shore University Hospital in Manhasset, NY was evaluated over a two-week period with E-Z-EM's Smoothie Read-Cat<sup>®</sup>2 barium sulfate contrast agent. Patients completed a questionnaire regarding their impressions of the contrast flavors and consistencies, and gastrointestinal comfort. The Radiologist team evaluated transit time and quality of images with the barium sulfate in comparison to their long-standing experience with oral iodinated contrasts.

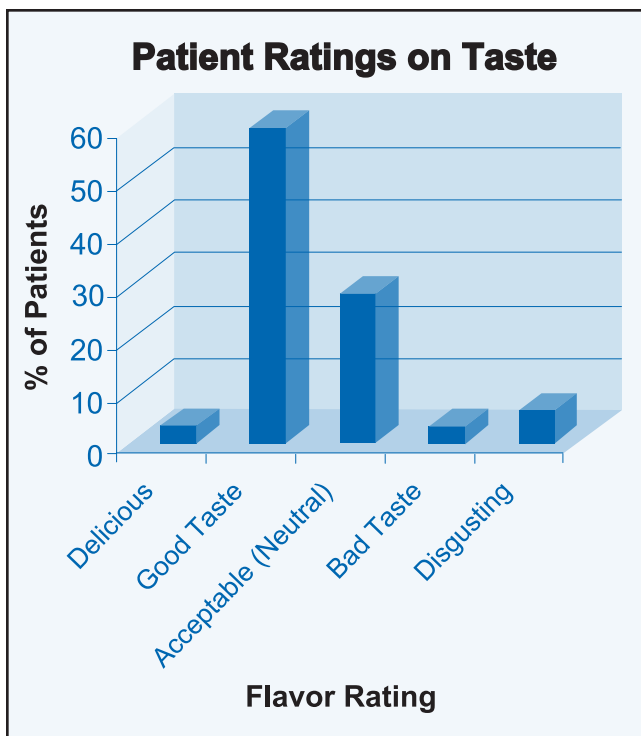


Figure 1. Patient Flavor Ratings for Smoothies

**Results:** The majority of patients rated E-Z-EM Smoothie Read-Cat 2 contrasts "good" in terms of taste (see Figure 1). Radiologists reading the CT scan observed no significant difference in transit time and the contrast enhancement between the iodine and barium. Costs were comparable and not a factor in final decision making.

**Conclusion:** A majority of the patients liked the flavor and consistency of the Smoothie product. North Shore University Hospital switched from iodinated contrast to E-Z-EM Smoothie Read-Cat 2 as the prime choice of oral contrast for all outpatients undergoing a CT procedure.

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## Introduction

During 2003 North Shore University Hospital in Manhasset, NY, a flagship hospital of the North Shore Long Island Jewish Health System, performed an evaluation of a recently introduced reformulation of E-Z-EM's Readi-Cat 2 contrast (called Smoothies). Developed to overcome patient objections to the consistency and taste of earlier formulations, the new contrast is thick and creamy in texture and available in three flavors: Banana Smoothie, Apple Smoothie and Berry Smoothie. This evaluation was conducted with North Shore's CT outpatient population over a two-week period, under the supervision of Victor Scarmato, MD, Physician-in-Charge of Gastrointestinal Radiology.

## Objective

The purpose of the evaluation was to determine whether or not patient preference has an impact on compliance and productivity. The hospital wanted to see if barium sulfate offered a more attractive alternative to iodine. And, if it did, was a switch from iodine to barium sulfate justified? According to Dr. Scarmato, "Iodine had been our contrast of choice since we first began performing CT studies in the early 1980s. We add flavorings to our iodine compounds, and the patients find the taste tolerable. The goal of our evaluation was to document patient acceptability with regard to the Smoothie contrast. Our thinking was that using a contrast that patients find easier to ingest would improve diagnostic quality and patient satisfaction."

## Procedure

Patients recorded their impressions of the contrast's flavor and consistency, and whether or not they experienced any coincident gastrointestinal discomfort on a questionnaire designed specifically for this evaluation. Dr. Scarmato's team evaluated the quality of the resulting images with respect to HU enhancement, consistency of luminal filling, bowel wall delineation and absence of streak artifact.

If not consumed according to instructions, iodine may yield suboptimal bowel opacification and cause delays.

## Results

### Patient Acceptance

A majority of the patients reported that they liked the Smoothie Readi-Cat 2 contrast. "When I looked at our numbers I found that only about 8% indicated that they disliked drinking the Smoothies. More than 60%, however, said that they liked the product or thought it was excellent. In the past, we have observed that with iodine one of the hardest things is getting the patient to drink the contrast without objection. Failing to drink the iodine, or drinking it at a faltering pace, usually results in suboptimal bowel opacification and delays in our schedule."

### Image Quality

"Based on our previous experience with iodine, bowel opacity was comparable with barium," says Dr. Scarmato, "and you can modify either to your liking."

"...bowel opacity was comparable with barium..."

The Smoothies are more dense, but you can have the patient dilute the Smoothies with half a cup of water if desired. With iodine, obviously, the contrast has to be mixed so it can be made as concentrated or as dilute as you like."

### Transit Time

According to Dr. Scarmato, "When comparing the evaluation of barium to our long-standing use of iodine, the transit time to the colon was, essentially, equivalent for both agents. On the other hand, we

can administer the Smoothies as soon as the patient presents in the waiting room, so no time is lost in having the technologist mix and transport the contrast from the CT suite to the reception desk. And if the patient likes the flavor and consistency he/she may drink it more quickly, and, therefore, it may transit the GI tract faster."

### Cost

Cost did not present a significant obstacle to the introduction of Smoothies at North Shore. "We didn't feel it was necessary to do a rigorous cost/benefit analysis," Dr. Scarmato explains, "The product cost of Smoothies may be slightly higher than that of iodine, but when considering the costs associated with flavor additives, mixing, and transporting the contrast from the CT suite to the patient, the perceived cost differential is negligible. It's not so much of an issue when you're talking about less than a dollar or so per scan. If the patient likes the contrast and drinks it, the studies may come out better and help you make a better diagnosis, so a small difference in cost is not much of a factor."

Cost did not present a significant obstacle to the introduction of Smoothies at North Shore.

### Other Considerations

Initially there was a negative reaction on the part of the staff technologists over the additional storage requirements to maintain a supply of the premixed, unit-dose Smoothie containers. Storing the Smoothies in the refrigerator alleviated these concerns. "At our outpatient center we have the option of storing the Smoothies in a refrigerator near the front desk so the reception staff can give the patients their container as they walk in." Dr. Scarmato said. "I also understand

that Smoothies taste better chilled and people may drink it more quickly. Most of the staff seem happy with it now."

### Conclusions

Based on this evaluation, North Shore University Hospital adopted Smoothie Read-Cat 2 as the prime choice of oral CT contrast for all outpatients. Since

"We can administer Smoothies as soon as the patient presents... no time is lost."

North Shore is a tertiary care center, and a large portion of the inpatient population is post-operative, iodine will remain the preferred contrast for inpatients. "Our standard will be iodine for the inpatients, and then on a case-by-case basis we'll move to the Smoothies, and vice versa for the outpatients. Absent a risk of perforation, we plan to approach this as a 'mix-and-match' proposition with selected patients who don't like one contrast or the other. Some of the oncology patients, for example, when being examined radiologically to assess the progress of chemotherapy on their disease, may have trouble drinking the iodine. They would be offered Smoothies so long as they were not being prepared for surgery."

Considering the overall effects of the introduction of Smoothies, Dr. Scarmato says that, "...I think the technologists will find it a nice alternative. They're not going to have to mix the contrast and bring the contrast down to the patients in the waiting room quite so often. They're going to find that the patients are likely to drink it faster and easier and, hopefully, things will run a little smoother for all those involved."

E-Z-EM manufactures and markets a wide range of CT oral contrast products. All products in the range have essentially similar clinical properties, and the decision to choose one over another is based on non-medical criteria such as convenience or taste preference. Not all products manufactured by E-Z-EM are available in all global markets. Brand names used for E-Z-EM CT oral contrast products in various global territories include Smoothie, Read-Cat®, E-Z-Cat®, E-Z-Cat® Dry, and BARICAT®.

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