Dr. Brown's Medical Webinar
Thickening Practices for Infant Populations
Memorie Gosa
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Q: Can you elaborate on hand-mixed thickened formula?

MG: Hand-thickened formula just refers to a formula that has an external thickening agent mixed with it to create the desired thickness level.

Q: Is pediatric considered 1 year and older?

MG: The Federal Food, Drug, and Cosmetic Act (FD&C Act) defines pediatric patients as persons aged 21 or younger at the time of their diagnosis or treatment; In the presentation, when I talked about infants I was referring to people 0-12 mos, and pediatrics was referring to those older than 12 months of age.

Q: Did the study measure percentages per swallow? Or how did they determine the percentages of penetration?

MG: Frequency scale 1 = none, 2 = infrequent or occasional episodes, 3 = intermittent (30–40% of total swallows), 4 = frequent (50% or greater of total swallows). Percentage of swallows figured by counting the number of swallows where laryngeal penetration was observed and dividing the number of swallows with laryngeal penetration by the total number of swallows observed. Miller, A. L., Miller, C. K., Fei, L., Sun, Q., Willging, J. P., de Alarcon, A., & Pentiuk, S. P. (2024). Predictive Value of Laryngeal Penetration to Aspiration in a Cohort of Pediatric Patients. Dysphagia, 39(1), 33-42.

Q: Simply Thick has been reformulated since 2011. What is your opinion on the how this affects the infant GI system at the present time? Do we have additional research information later than 2012 that helps us understand this issue?

MG: I am not aware of any research on the safety of Simply Thick for use in infant populations; General guidelines for use of Simply Thick from Nationwide Children's Hospital includes using Simply Thick for thickening human milk if the child is over 12 months of age (corrected). Simply Thick should not be used for any child under the age of 12 years with a history of necrotizing enterocolitis (NEC) (https://www.nationwidechildrens.org/family-resources-education/health-wellness-and-safety-resources/helping-hands/how-and-why-to-thicken-liquids#:~:text=Simply%20Thick%C2%AE&text=This%20product%20can%20also%20be,of%20necrotizing%20enterocolitis%20(NEC)). There is information on Simply Thick's website regarding its use with infant/pediatric populations that reads as follows: "SimplyThick is advising customers and medical professionals to review FDA's latest advisory that infants of any age may face an increased risk of developing life-threatening conditions if fed SimplyThick®. FDA recommends that "anyone involved in the care of a baby be aware of potential risk before deciding whether to feed SimplyThick® to infants of any age". View the FDA archives for press release.
If you are currently giving SimplyThick® to your infant, please read the latest FDA advisory and consult your

child's health care professional. FDA reports it is aware of infants that ranged from about 24 to 48 weeks post-menstrual age that have become sick. FDA continues to recommend that SimplyThick® brand thickener not be used with or given to babies who were born before 37 weeks." Check the SimplyThick website for additional information (https://www.simplythick.com/Frequently-Asked-Questions) or reach out to them with any additional questions that you might have: info@simplythick.com

Q: I thought that MBM (maternal breast milk) couldn't be thickened with AR/rice/oatmeal, due to the amalayse in MBM breaking down the carbohydrate binding agents in the AR. Also, AR is mixed with water (0 calories) vs MBM (20 cal) and the amount of AR powder needed to thicken MBM would have to be the same (scoop per 53 ml)- however this would make the calorie content very high because you are mixing with a fluid that has caloric content vs water. What do you recommend for thickening MBM in NICU?

MG: In outpatient practice I follow the recommendations from: Wolter, N. E., Hernandez, K., Irace, A. L., Davidson, K., Perez, J. A., Larson, K., & Rahbar, R. (2018). A systematic process for weaning children with aspiration from thickened fluids. JAMA Otolaryngology–Head & Neck Surgery, 144(1), 51-56. This article describes the following: a 10% reduction in thickness every 2 weeks; Parents/caregivers instructed on both overt and subtle signs and symptoms of aspiration. Patients progressed to the next defined incremental thickness level if there were no signs or symptoms of aspiration.
New consistency is maintained for 2 weeks until the next incremental change.
Thickened liquid recipe calculations and a timeline for weaning were individually outlined for each child based on the type of thickening product being used and the severity of dysphagia.
Wean conducted by keeping the amount of thickening agent constant while increasing the amount of fluid or keeping the amount of fluid constant and decreasing the amount of thickening agent.

Q: What are your clinical protocols for weaning from the thickener?

MG: In outpatient practice I follow the recommendations from: Wolter, N. E., Hernandez, K., Irace, A. L., Davidson, K., Perez, J. A., Larson, K., & Rahbar, R. (2018). A systematic process for weaning children with aspiration from thickened fluids. JAMA Otolaryngology–Head & Neck Surgery, 144(1), 51-56. This article describes the following: a 10% reduction in thickness every 2 weeks; Parents/caregivers instructed on both overt and subtle signs and symptoms of aspiration.
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Q: How do you balance offering opportunities for thin oral trials to improve/support swallow function with an infant or child who is also on thickened enteral feeds for GERD?

MG: Discussion with the multidisciplinary team regarding the timing/appropriateness of introducing oral trials of thin (assuming thickened liquids are only being used b/c of reflux and there are no concerns for pediatric dysphagia; If team agrees trials of regular (not thickened) oral feedings are appropriate, then systematically introducing small volumes of regular (not thickened) feeds by mouth through bottle and

monitoring impact on reflux. Adjusting up/down on volumes depending on infant's response and any change to reflux symptoms.

Q: We get a lot of push back when suggesting thickening of infants on NG that the thickened feeds won't go through the NG?

MG: Enfamil AR is a good option for providing a thickened formula through the NG tube; for further evidence regarding the benefits of thickened enteral feeds see: Duncan, D. R., Larson, K., & Rosen, R. L. (2019). Clinical aspects of thickeners for pediatric gastroesophageal reflux and oropharyngeal dysphagia. Current gastroenterology reports, 21, 1-9.

Q: It seems that the IDDSI testing is not specific enough for the small changes in thickness that do show benefit to the infant. Is there any discussion on more specific IDSSI testing for fluids used with infants?

MG: IDDSI Levels include Slightly Thick/IDDSI Level 1, which represents a thickness level between thin and what was previously described as nectar thick. This is an improvement over the previous levels outlined with the National Dysphagia Diet. I am not aware of any plans to expand the IDDSI framework to include more categories of thickened liquids.

Q: You may address this later in the webinar. But, has there been any research you have found on the long-term use of thickened liquids affecting the individual's ability to control the timing of the swallow? For example: A child who demonstrated normal timing of the swallow was placed on thickened liquids for reflux for 3-6 months and was later deemed ok to discontinue thickening. Said child began coughing/choking with thin liquids, which was not a symptom prior to the thickening. Would the long-term use of thickening have caused the timing of the swallow to become delayed?

MG: I am not aware of any research looking at the impact of long-term use of thickened liquids on the resulting swallowing function. It is, at least, a theoretical concern that has to be balanced with the known adverse effects of unmitigated airway compromise during feeding and its impact on the developing infant.

Q: Is Enfamil AR appropriate for our Preterm infants?

MG: Enfamil AR is an option for infants that can tolerate a standard cow's milk formula.

Q: Does it continue thickening after 30 minutes? Would you recommend a 24-hour batch of Enfamil AR, or would the consistency possibly increase to >moderately thick?

MG: I am not aware of any research that documents the effect of time on resulting thickness beyond 30 minutes b/c that is the upper limit of infant feeding times.

Q: Do you have the recipes to increase calories and thicknesses of the formulas

MG: "Powder formulas were mixed with graduated caloric densities ranging from 20–30 kcal/oz. Manufacturer instructions provided recipes for 20 kcal/oz variants. Recipes for higher calorie counts ranging from 22–30 kcal/oz were provided by Boston Children's Hospital Center for Nutrition. Of note, the recommendation of fortification and the determination of fortification recipes should strictly be administered at the discretion of a registered dietician and/or physician. Manufacturers do not recommend fortifying anti-reflux formulas above 24 kcal/oz." See Table 1 in the article. McGrattan, K. E., Spoden, A., Sterkowitz, A., Gosa, M. M., Beckstrand, M., & Hernandez, K. (2022). Validity of anti-reflux formulas as a

slightly thick liquid: effect of time, caloric density, and refrigerated storage on formula thickness. Pediatric Medicine, 5.

Q: What is the best option to use in a preemie- oatmeal cereal? When is it safe and recommended to start gelmix?

MG: Each hospital/setting has different preferences regarding thickening options. Many NICUs routinely use oatmeal cereal. According to the manufacturer's guidelines, GelMix is appropriate for infants that are >42 wks PMA and >6 pounds.

Q: Are there any studies using oatmeal cereal?

MG: Brooks, DiStefano, Clayton, & Gethers (2024) and Gosa & Choquette (2021) both investigate the use of oatmeal cereal as an option for thickening.

Q: Could you discuss thickening options (for barium) during MBSS/VFSS for infants? Specifically ratio of thin:thickened liquids to create a thickened viscosity that would mimic something like an Enfamil AR or mildly thick liquid?

MG: "Varibar Thin Liquid (IDDSI Level 0) is representative of both breastmilk and standard infant formula in terms of thickness.22,35-37 Therefore, it is the preferred first consistency to administer during the MBSS in pediatric patients. Other liquid consistencies (e.g., Varibar Nectar [IDDSI Level 2] and Varibar Thin Honey [IDDSI Level 3]) are administered only if performance indicates potential for improved swallowing safety with their administration. Importantly, many infants show improved safety of oropharyngeal swallowing function under MBSS with increased thickness to IDDSI Level 1 (Slightly Thick). There is currently no Varibar product that meets the clinical characteristics of IDDSI Level 1 (Slightly Thick). IDDSI Level 1 (Slightly Thick) can consistently and accurately be produced by mixing equal parts Varibar Thin Liquid with Varibar Nectar. This ratio has been confirmed to be accurate with the IDDSI Flow Test across multiple trials.38" Steele, C. M., Martin, B., Gosa, M., & Allen, S. (2021). Diagnosis and management of swallowing physiology: Standardized contrast, the MBSImP™, & the IDDSI Framework. Applied Radiology, 50(3), 1-12.

Q: We have found IDDSI flow testing is difficult and inconsistent with cereals, the flakes tend to clog the syringe. Have you all had similar experiences?

MG: Yes! The line spread test is another option for testing the thickness of liquids and it doesn't have the same issues. You can learn more about the Line Spread Test in the following articles: Mann, L. L., & Wong, K. (1996). Development of an objective method for assessing viscosity of formulated foods and beverages for the dysphagic diet. Journal of the American Dietetic Association, 96(6), 585-588.; Gosa, M. M., & Dodrill, P. (2017). Effect of time and temperature on thickened infant formula. Nutrition in Clinical Practice, 32(2), 238-244.; Gosa, M. M., & Choquette, C. K. (2021). Effect of commercially available thickening agents on ready-to-feed infant formulas. Journal of Texture Studies, 52(5-6), 612-622.

Q: Should we be recommending shaking the oatmeal thickener t/o the feed since you found it separates during the feed?

MG: If during feeding you notice the cereal settling to the bottom of the bottle, then yes-- gently agitating it by shaking should help to keep it in suspension with the liquid.

Q: As part of those studies using the infant cereals, were the cereals pulverized or taken direct from package?

MG: In the studies that I authored, no the cereals were not pulverized before mixing with the formula.

Q: Any concern in your practice with the amount of iron in infant oatmeal cereal at moderately thick levels for infants? This has been questioned at our facility.

MG: That is not a question/concern that has been raised at my facility; however, it is something that can be easily monitored with CBC or other blood test. This would be a great QI project within a unit if this is something the team is concerned about.

Q: Are you breaking down the infant cereal in a blender or crushing the cereal before adding to the fluid?; Is there any information from the baby cereal studies re: cereal prep prior to mixing or if it was used straight from the container?? At our hospital we have a consistent practice of grinding/crushing cereal POST measuring to minimize clogs/clumps/blockages, which may impact the thickening over time

MG: No the cereals were not pulverized before mixing with the formula in the articles I authored; while crushing/pulverizing the cereal before mixing may cause less blockage of the nipple, it significantly increases the amount of cereal that is being used and also causes a greater increase in caloric content of the formula and therefore that should be considered when deciding if a facility is going to crush/pulverize cereal used for thickening.

Q: AR may be level 1-ish in the bottle but is reported to thicken further in the stomach when exposed to gastric acid. What is your understanding of how they thicken in the stomach when an infant is on H2 blockers or PPIs?

MG: From the Enfamil AR website: "Enfamil A.R. has a small amount of rice starch that is added to the formula to thicken it. The formula pre-thickened with added rice starch and is designed to become thicker in the stomach, to make it more likely to stay down in the stomach." If infants are on H2 blockers/PPIs those medications will have a direct impact on the stomach pH which should in theory impact further thickening in the stomach. There isn't published information about this phenomenon that I can find, so reaching out to Enfamil with this question is a good idea for getting accurate information. mjmedicalaffairs@reckitt.com is the contact email for healthcare professionals that have technical/medical product related questions.

Q: In the studies discussed, was traditional IDDSI utilized with a syringe or was a viscometer used due to the possibility of oats clogging a syringe?

MG: IDDSI Syringe Test or Line Spread Test was utilized to provide measures of thickness.

Q: I thought you are not supposed to thicken breastmilk with oatmeal?; I've always been taught that the enzymes in breast-milk break down rice and oatmeal cereal over time, making these unreliable thickening agents for human milk. Is this supported in the literature?; I have been told that thickening expressed breast milk with rice cereal creates clumping and is not consistent and should not be done. Do you recommend following this rule of thumb, especially due to AAP discouraging the use of rice cereal?

MG: The variability in the make-up of macro and micronutrients along with different enzymes in human milk make it difficult to have hard and fast rules about what works and what doesn't work to thicken it. The best option is to test it with the thickening options that are available for the infant you are working with to

determine what is the best thickening option. Keep in mind that Human Milk is dynamic and can change feed to feed, so it is a good idea to make sure caregivers know how to recognize the correct thickness for their infant and options for adjusting thickness if they find that it doesn't match the recommended level ; The article by Koo, J. K., Narvasa, A., Bode, L., & Kim, J. H. (2019). Through thick and thin: the in vitro effects of thickeners on infant feed viscosity. Journal of Pediatric Gastroenterology and Nutrition, 69(5), e122-e128. discusses the challenges of thickening human milk- specifically with starch-based thickeners. The authors report that autoclaving human milk inactivates digestive enzymes and, therefore, improves the thickening abilities of starch-based thickeners in human milk. / GelMix, if available, is a consistent way to thicken human milk. It creates a smooth, thickened liquid that generally does not have clumps that block the nipple. That is what I use if available.

Q: When you talk about thickeners and use in infants of 42 wks PMA, is that CGA for preterm infants?

MG: American Academy of Pediatrics: Postmenstrual age (weeks): gestational age plus chronological age. Corrected age (weeks or months): chronological age reduced by the number of weeks born before 40 weeks of gestation; the term should be used only for children up to 3 years of age who were born preterm.

Q: Is Purathick an accepted commercial thickener? Made by the same company who makes Gelmix, I believe. But not recommended for under 1 year of age

MG: Yes, Purathick is also a commercially available thickening option; it isn't recommended for children under 1 year of age so we didn't talk about it today. It is also made by Parapharmatech (same company that makes GelMix) and its active ingredients are Organic Tapioca Maltodextrin & Tara Gum- it can mix liquids at room temperature or heated.

Q: Are you concerned about dehydration the more you thicken? We have been advised not to thicken, for example, AR past 24 calories.

MG: The recommendation of fortification and the determination of fortification recipes should strictly be administered at the discretion of a registered dietician and/or physician. Manufacturers do not recommend fortifying anti-reflux formulas above 24 kcal/oz. The physician and dietician take on the primary roles for determining if/when/how much to fortify formulas and they are monitoring for dehydration and can/will adjust as needed based on infant progression

Q: What department/skill set is responsible for determining the recipe/thickening agent once thickening is recommended post MBS testing in the NICU/PEDI population acute care setting?

MG: The feeding specialist (typically the SLP) is responsible for providing a recommendation for thickening and to what extent to manage verified dysphagia with airway compromise; it is up to the multidisciplinary team with input from the physician/dietitian/SLP to determine the most appropriate thickening option for the infant based on the family/caregiver's preferences/priorities, regional availability of thickening agents, and infant's individual factors.

Q: When using Gelmix have you noticed any differences when needing to fortify expressed breast milk to different levels; Does the calories in mother's milk affect the thickness just like the calories in formula?

MG: Yes! The caloric and nutritional makeup of the base fluid has big impacts on the resulting thickness and we often have to experiment w/ different amounts of thickening agents and volumes of liquid to find the ratios that work best

Q: What age would you recommend using puree food to thicken liquids?; Is there an age when food based thickeners are safe to start?

MG: Pureed foods are appropriate when the infant reaches the recommended age/stage for adding pureed foods into their diet- which is typically between 4-6 months of age (corrected age if the infant was born prematurely)

Q: What recipe from Gelmix were you using to target IDDSI Level 3 as Gelmix does not have a recipe or recommend thickening to that consistency? Are you using Gelmix for an IDDSI Level 3 in your practice?

MG: 2 packets of GelMix (4.8 g) per 4 oz of formula were mixed to create a target Level 3/Moderately Thick Consistency. The thickening agent required heating the formula to between 100 and 120 F (37.78–48.89C) and then adding the thickening agent into the heated liquid while stirring with a wire whisk until granules were dissolved. The thickened mixture was then allowed to rest until the temperature of the thickened liquid was between 96 and 100 F (35.56–37.78C) and then the thickness of the resulting thickened fluid was measured with the Line Spread Test. If a patient I was working with required IDDSI Level 3 consistency, then yes- GelMIx could be used to accomplish that level with this recipe. I primarily work with young infants and therefore haven't had a patient that required that level of thickness in recent memory.

Q: Are there considerations for age / PMA for food-based thickeners?; What age would you consider thickening with food-based products- yogurt, bananas, etc?

MG: Yes- the authors of the studies that used food-based thickeners recommended that they be used for older infants (i.e. those that would be consuming pureed foods in their diet).

Q: Also, we have found that there are limited options for thickening EHM, ie cereal is not effective, what is most often recommended for thickening EHM in very young infants?

MG: In my facility- we don't recommend thickening until infants are at term age; GelMix, if available, is a consistent option for thickening EHM in infants that are >42w PMA and >6 pounds.

Q: Any input on thickening in the NICU population for reflux? Or research on changing feed volume/timing to control reflux? When slowing flow rate does not help.

MG: Clinical Aspects of Thickeners for Pediatric Gastroesophageal Reflux and Oropharyngeal Dysphagia by Duncan, Larson, and Rosen discusses thickening for Reflux. Thickening is the first line option for infants with reflux; if that doesn't work then altering the feeding schedule, inclusive of decreasing bolus size and increasing number of feedings (with the smaller bolus volumes) throughout the day can be trialed clinically. Moving to J-G tube feedings and/or moving to continuous feeds are also more invasive options for reflux management if first line options aren't effective. Duncan, D. R., Larson, K., & Rosen, R. L. (2019). Clinical aspects of thickeners for pediatric gastroesophageal reflux and oropharyngeal dysphagia. Current gastroenterology reports, 21, 1-9.

Q: What thickening agents would you recommend or not recommend to trial with the cleft lip/palate baby and the Specialty Bottle? Balancing the flow rate & thickening agent/formula with the one-way valve is often unsuccessful and challenging.

MG: Gum based thickening agents like Gel Mix/Purathick/Simply Thick/Nestle Thick and Clear are typically the best options for creating a smooth liquid consistency that works well in bottles.

Q: What would you recommend for thickening if the patient is allergic to oats (oatmeal cereal) and tapioca (gel-mix) and has a 4 months adjusted age?

MG: I'd talk with the medical team about the appropriateness of using pureed foods as an option for an infant with allergies that exclude more common thickening agents.

Q: For an infant who is at term age in the NICU setting, say it is determined that they need thickened liquids. If the baby is being offered expressed breast milk exclusively and the parents wish to stay on EBM, what option of thickener would be the best recommendation?

MG: GelMix would be a great option for the theoretical case you described.

Q: One study found that food-based thickeners may be appropriate for older infants. Do you know what was considered older infants and what are the risks of thickening with food based thickeners too soon?

MG: Infants that are between 4-6 months of age are typically appropriate for consuming pureed foods in their diet; if pureed foods are introduced too early, risks might include: digestive issues (constipation, gas, diarrhea, upset stomach) & increased risk for food allergies.

Q: Would you only thicken after instrumental and not based on clinical assessment?

MG: Due to the risks involved in thickening, in clinical practice- I only recommend thickening if it has been shown to improve swallowing function during objective assessment like VFSS or FEES.

Q: A few local hospitals allow thickening with Thick It Concentrated for under 12m with phyisican approval. Do you have information on why this is/isn't recommended in pediatrics?

MG: Thick It does not market for use in pediatric populations and has not been tested and/or shown to be safe for use in pediatric populations and that is why it is not routinely recommended for use in infants/children; however, many products (not just thickening agents) are used off label for pediatric patients. That decision is made by the physician on the multidisciplinary team after determining the risks/benefits of that type of recommendation and, of course with close monitoring for s/s of adverse outcomes.

Q: In regards to Gel-mix, has there been any research on causing an increased risk of NEC? There is some hesitation to use in the NICU, even after the guidelines for age, weight, etc.

MG: No, there is no data and/or published literature suggesting that using Gel-Mix is correlated to an increased risk of NEC. It also uses a different active ingredient for thickening vs Simply Thick (GelMix is carob bean gum based vs Simply Thick which is Xanthan Gum based)

Q: Do you think thickeners are overused? They are controversial and can lead to many other complications. I find many healthcare providers will thicken without trialing other strategies. Additionally, babies that aspirate breastmilk are at lower risk since the body absorbs it.

MG: Thickening is a front-line intervention for infants with GERD; however, it should be the very last option for intervention with infants that have dysphagia. Utilizing thickening judiciously and only after it is confirmed to be an effective strategy with objective testing (VFSS or FEES) is a way to ensure that it doesn't become overused in clinical practice. See Gosa, M. M., Dodrill, P., & Robbins, J. (2020). Frontline interventions: Considerations for modifying fluids and foods for management of feeding and swallowing

disorders across the life span. American Journal of Speech-Language Pathology, 29(2S), 934-944 for more information on when/how to utilize thickened liquids for effective management of dysphagia.

Q: Are there any good/consistent options for thickening with EHM when the infant is not yet 42 weeks corrected?

MG: All the available options were discussed-- the medical team may decide to use products off-label (i.e. before 42 weeks corrected age) and/or wait and give the infant additional time to mature and then determine if thickening is still needed after a small break to allow for additional maturation/lung recovery and maturation.

Q: (Four months is typically too early—their gut and musculature are not ready for solid foods.)

MG: 4-6 months of age (corrected age if the infant is born prematurely) is the recommended age for introducing solid foods (i.e. purees); Parents are recommended to wait until around 6 months of age, but research shows most parents of bottle-fed infants introduce cereals/purees starting at 4 months of age; Infants that are breastfed are typically introduced to foods closer to the 6 month mark https://www.aap.org/en/patient-care/healthy-active-living-for-families/infant-food-and-feeding/?srsltid=AfmBOorD-hIvjFoAms8qpIG9KEbnqxF1tBOB4zY-8XKj5ATlZ7WUp6ZY

Q: For children with severe GERD with emesis who are refusing PO feeds and who are getting tube feeds, are there recommendations for thicker feeds?

MG: Yes- thickening of enteral feeds has been shown to reduce reflux. See Duncan, D. R., Larson, K., & Rosen, R. L. (2019). Clinical aspects of thickeners for pediatric gastroesophageal reflux and oropharyngeal dysphagia. Current gastroenterology reports, 21, 1-9 for more details.

Q: Can you use Enfamil AR to thicken EHM?

MG: I am not familiar with this practice, and I have not read any reports that address the feasibility of this option. It would be something that you could try at your facility-- keep in mind the active thickening ingredient in Enfamil AR is a starch, so it would likely suffer the same results as thickening with a rice/oatmeal cereal and or starch based thickening agent. Additionally, it would add significant calories to the EHM.

Q: What would you use for thickening MBM in the preterm population?

MG: In clinical practice, my facility waits until a preterm infant has reached term age before recommending thickening and then only after we confirm its effectiveness with VFSS/FEES. If your facility follows a different clinical practice guideline, then the feeding team should discuss potential options and come to consensus on what the best option for thickening would be in those infants that have not yet reached term age. Consider allowing the infant additional time to mature/recover as option too.

Q: Does your hospital allow you to use the Varibar thin and nectar for infants under 6 months?

MG: Yes. We've always used Varibar products with infants undergoing VFSS. This is common practice in many children's hospitals. See Steele, C. M., Martin, B., Gosa, M., & Allen, S. (2021). Diagnosis and management of swallowing physiology: Standardized contrast, the MBSImP™, & the IDDSI Framework. Applied Radiology, 50(3), 1-12 for more details.

Q: Do you only test with barium during VFSS, or do you mix the formula/EHM with the barium?

MG: We only use barium- see Steele, C. M., Martin, B., Gosa, M., & Allen, S. (2021). Diagnosis and management of swallowing physiology: Standardized contrast, the MBSImP™, & the IDDSI Framework. Applied Radiology, 50(3), 1-12 for more details and reasons why mixing barium with other food substances can alter the validity of the study.

Q: What is the rationale behind babies needing to be "old enough" for purees but not for rice cereal/oatmeal cereal?

MG: Rice cereal/oatmeal are first foods in most infants' diets and therefore are often recommended as thickening agents for that reason; Rice cereal is easily digestible, has a mild flavor, is low allergy risk, and is typically fortified with iron, a crucial nutrient for infants transitioning to solid foods; making it a good option to introduce them to solid textures without overwhelming their digestive system. Therefore physicians have recommended it as a thickening agent for infants with reflux for many years.

Q: What department/skill set is responsible for determining the recipe/thickening agent once thickening is recommended post MBS testing in the NICU/PEDI population acute care setting?

MG: This is most often done through the service that provided the recommendation for thickening to manage dysphagia-- usually the SLP service.

Q: Do you know anything regarding thickening formula by increasing caloric density over a longer time span than 30 min? Our NICU formula lab will premix thickened formula and leave in the fridge to be warmed for separate different care times. Does this continue to thicken over several hours?

MG: Given the use of refrigeration and then reheating in the scenario described, it would be a good idea to flow test (use either Line Spread or IDDSI Syring test) the formula/EHM before feeding infant at the bedside to confirm that it is at the correct thickness before serving. There is one paper (Koo, J. K., Narvasa, A., Bode, L., & Kim, J. H. (2019). Through thick and thin: the in vitro effects of thickeners on infant feed viscosity. Journal of Pediatric Gastroenterology and Nutrition, 69(5), e122-e128) that looked at the impact of thickening after two hours.